Catalogue
Katalog 2011-2012

ZCC-CT

B C

Milling and Drilling
Fräs- und Bohrwerkzeuge



ZhuZhou Cemented Carbide Cutting Tools Co., Ltd.
ZCC Group, Member of Minmetals Group

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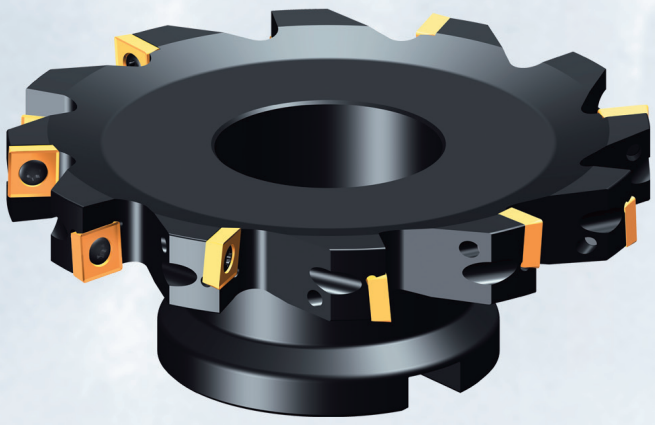
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WSP = Wendeschneidplatte *VHM = Vollhartmetall*


FMP02-050-A22-SE12-06
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1603.5×10 WTI5S

Milling · Fräsen

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FMD02

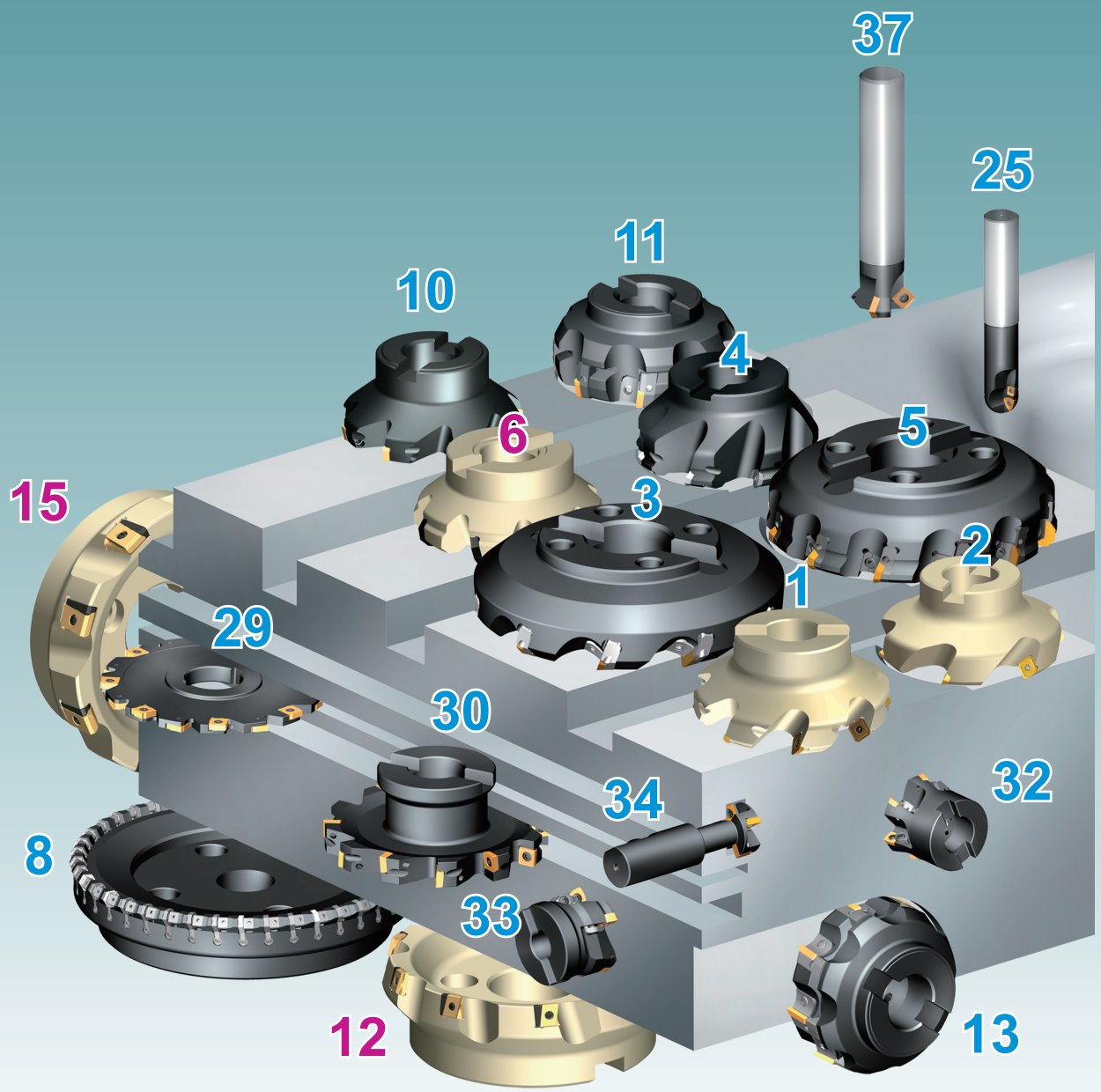


Milling · Fräsen

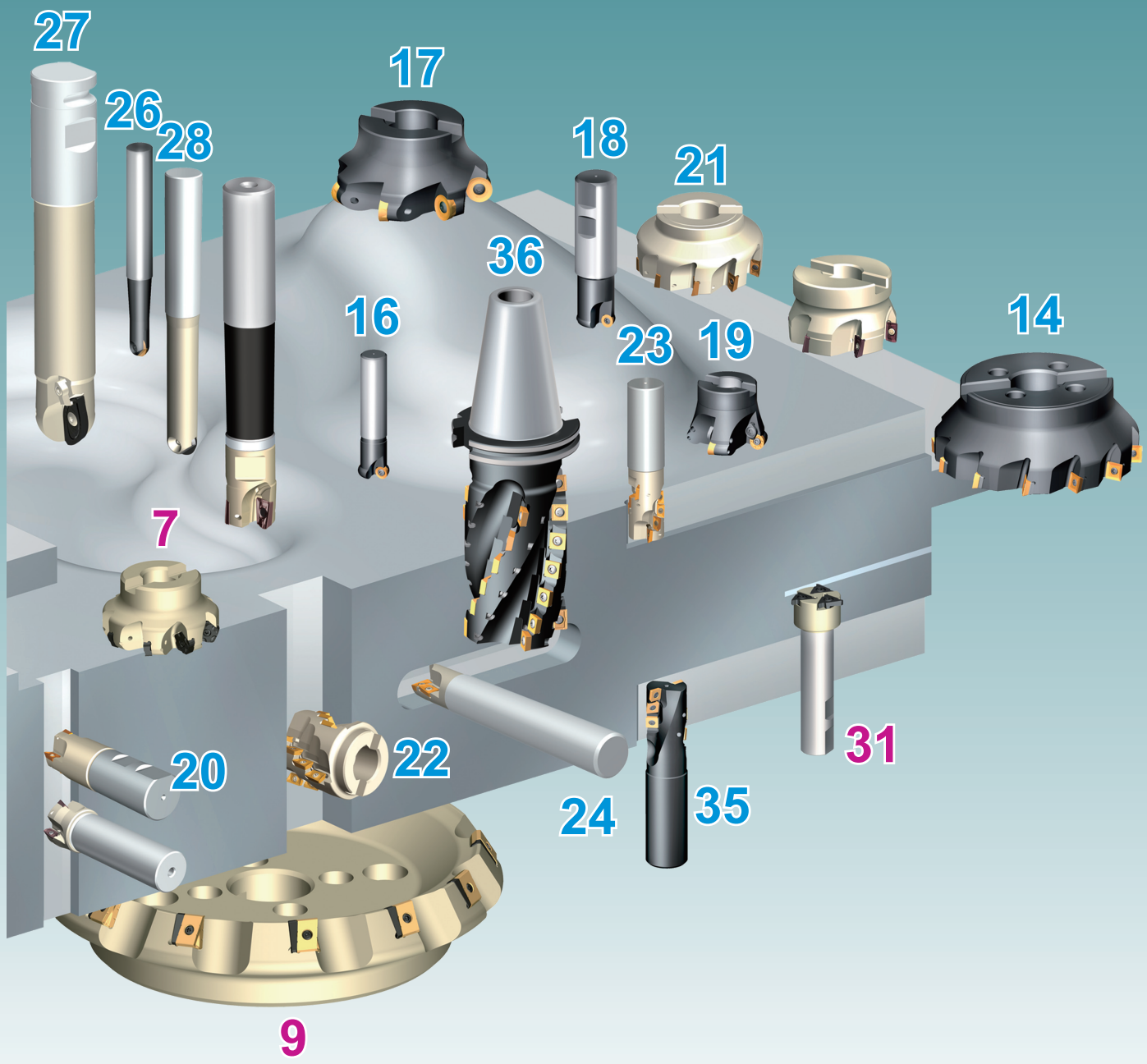
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Indexable inserts milling tool Program
Wendeplatten Fräsprogramm



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6	FMA07	B39	13	FMP01	B58	20	EMP01	B80
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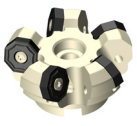


No. Nr.	Tool category Werkzeug Kategorie	Page Seite	No. Nr.	Tool category Werkzeug Kategorie	Page Seite	No. Nr.	Tool category Werkzeug Kategorie	Page Seite
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FMA07



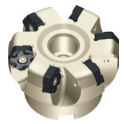
Face milling · Planfräsen

Serie	Approach Angle / max. depth of cut Einstellwinkel/ max. Schnitttiefe	Insert WSP	Application Anwendung	Features Merkmale
FMA01  B24	Kr=45° a_{pmax}=6.0	SEET12T3-DF/DM/DR SEET12T3-CF/CM/CR SEET12T3-EF/EM SEET12T3-LH SEET12T3-W	General face milling of: Steel, alloy steel, stainless steel, cast iron, aluminium alloy, high temperature alloy Allgemeines Planfräsen von: Stahl, leg. Stahl, rostfr. Stahl, Grauguss, Alu.-legierungen, hochtemperaturbeständige Legierungen	• Diameter range Ø50-Ø315 • Large rake angle makes cutting more light and fast • Wide applications by using available inserts with different chipbreaker • Adopting wiper inserts improve surface quality • Durchmesserbereich: 50 – 315 mm weichschneidende Fräser mit großer, positiver Schneidengeometrie. • Großes Anwendungsgebiet durch unterschiedliche Spanbrecherausführung • Wiper-Wendeschneidplatten für beste Oberflächenqualität
FMA02  B25	Kr=45° a_{pmax} =6.0	SEET12T3-DF/DM/DR SEET12T3-CF/CM/CR SEET12T3-EF/EM SEET12T3-LH SEET12T3-W	General face milling of: Steel, alloy steel, stainless steel, cast iron, aluminum alloy, high temperature alloy Allgemeines Planfräsen von: Stahl, leg. Stahl, rostfr. Stahl, Grauguss, Alu.-legierungen, hochtemperaturbeständige Legierungen	• Diameter range Ø50-Ø125 • Large rake angle makes cutting more light and fast • Wide applications by using available inserts with different chipbreaker • Coarse and differential pitch, reduce vibration. • Durchmesserbereich: 50 – 125 mm weichschneidende Fräser mit großer, positiver Schneidengeometrie. • Großes Anwendungsgebiet durch unterschiedliche Spanbrecherausführung • Weite und differential Teilung zur Vermeidung von Vibrationen
FMA03  B29	Kr=45° a_{pmax}=5.5	SEN120*3AF** SE*R1203AF**	General face milling of steel, stainless steel, cast iron Allgemeine Planfräsbear. von Stahl, rostfr. Stahl und Grauguss	• Diameter range Ø80-Ø315 • Large rake angle makes cutting more light and fast • Top clamping reduces vibrations • Durchmesserbereich: 80 – 315 mm weichschneidende Fräser mit großer, positiver Schneidengeometrie. • Großes Anwendungsgebiet durch unterschiedliche Spanbrecherausführung stabile • Topklemmung zur Vermeidung von Vibrationen
	Kr=45° a_{pmax}=7.5	SE*N1504AF** SE*R1504AF**		
FMA04  B32	Kr=45° a_{pmax}=3.5	OFKT05T3-DF/DM OFKT05T3-LH	Face milling of steel, alloy steel, cast iron, aluminum alloy Planfräsen von Stahl, leg. Stahl Grauguss und Alu.-legierungen	• Diameter range Ø50-Ø160 • High economy milling tool with 8 cutting edges • Screw clamping, high precision • Durchmesserbereich: 125 – 315 mm • Hochwirtschaftlicher Fräser mit 8 Schneidkanten • Schraubenklemmung mit hoher Präzision. • Topklemmung zum leichteren Plattenwechsel
 B36	Kr=45° a_{pmax} =5.0	OFKR0704-DF/DM	Face milling of steel, alloy steel and cast iron Planfräsen von Stahl, leg. Stahl und Grauguss	• Diameter range Ø125-Ø315 • High economy milling tool with 8 cutting edges • Top clamping is easy to assemble and disassemble • Durchmesserbereich: 125 – 315 mm • Hochwirtschaftlicher Fräser mit 8 Schneidkanten • Schraubenklemmung mit hoher Präzision. • Topklemmung zum leichteren Plattenwechsel
FMA07  B39	Kr=45° a_{pmax}=4.0	ONHU060408-PF/PM/W	Face milling of steel, alloy steel, cast iron Planfräsen von Stahl und Grauguss	• Diameter range Ø25-Ø50 • High economy milling tool with 16 cutting edges • Durchmesserbereich: 25 – 50 mm • Hochwirtschaftliche Fräser mit 16 Schneidkanten
 B40	Kr=45° a_{pmax}=5.0	ONHU08T508-PF/PM/W		• Diameter range Ø50-Ø315 • High economy milling tool with 16 cutting edges • Durchmesserbereich: 50 – 315 mm • Hochwirtschaftliche Fräser mit 16 Schneidkanten

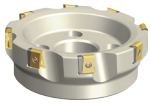
B

Milling Tools · Fräser

Face milling · Planfräser

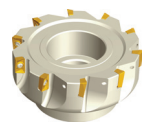
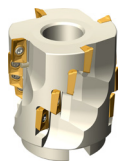
Serie	Approach Angle / max. depth of cut Einstellwinkel/ max. Schnitttiefe	Insert WSP	Application Anwendung	Features
FMD02  B42-B44	Kr=67° a_{pmax}=5.0	PNEG110512R-CR PNEG110512R-CM	Face milling of cast iron Planfräsen von Grauguss	• Diameter range Ø50-Ø315 • High economy milling tool with 10 cutting edges • Durchmesserbereich: 50 – 315 mm • Hochwirtschaftliche Fräser mit 10 Schneidkanten
FMD02  B45	Kr=55° a_{pmax}=6.0	HNEX090512-DF/DM HNEX090512-DR	Face milling of cast iron Planfräsen von Grauguss	• Diameter range Ø80-Ø315 • Top clamping is easy to assemble and disassemble • High economy milling tool with 12 cutting edges • Durchmesserbereich: 80 – 315 mm • Topklemmsystem zum einfachen Wendeschneidplatten-Wechsel • Hoch wirtschaftlich durch doppelseite 12 Schneiden Platte
FMD03  B47	Kr=60° a_{pmax}=12.0	LNKT2007DN-ZR	Heavy-duty face milling of steel, alloy steel and cast iron Schwerzer-spanungsfräsen von Stahl, leg. Stahl und Grauguss	• Diameter rang Ø125-Ø400 • Double positive rake angle reduces the cutting force • Suitable for heavy machining with big cutting depth • Easy to assemble and clamp inserts • Durchmesserbereich: 125 – 400 mm • Doppelt positive Schneidwinkel zur Reduzierung der Schnittkräfte • Anwendung zur Schwerzerspanung bei hohen Schnitttiefen • Einfache und stabile Wendeschneidplatten-Klemmung
	Kr=60° a_{pmax}=17.0	LNKT2510-ZR		
FME02  B50	Kr=75° a_{pmax}=6.0	SPKW1204EDFR SPKW1204EDSR SPKT1204EDR	Face milling of steel, alloy of steel and cast iron Planfräsen von Stahl, leg. Stahl und Grauguss	• Diameter range Ø50-Ø125 • Kr 75°, general face milling • Wide applications by using inserts with different chipbreakers • Durchmesserbereich: 50 – 125 mm • Anstellwinkel 75 Grad, • Allgemeines Planfräsen • Weites Anwendungsgebiet durch Einsatz von Wendeschneidplatten mit unterschiedlichen Spanbrechern
FME03  B52	Kr=75° a_{pmax}=6.0	SP*N1203(1504)ED** SP*R1203(1504)ED**	General face milling of steel, alloy steel and cast iron Allgemeines Planfräsen von Stahl, leg. Stahl und Grauguss	• Diameter range Ø80-Ø315 • Kr 75°, general face milling • Top clamping is easy to assemble and disassemble • Durchmesserbereich: 80 – 315 mm • Einstellwinkel 75 Grad zum allgemeinen Planfräsen • Top Klemmsystem zum einfachen Wendeschneidplattenwechsel.
	Kr=75° a_{pmax}=8.0	SP*N1504ED** SP*R1504ED**		
FME04  B56	Kr=75° a_{pmax}=10.0	LNKT1506EN-ZR	Heavy-duty face milling of steel and alloy steel Schwerzer-spanungsfräsen von Stahl und leg. Stahl	• Diameter rang Ø125-Ø315 • Double positive rake angle reduces the cutting force • Suitable for heavy machining with big cutting depth • Durchmesserbereich: 125 – 315 mm • Doppelt positive Schneidwinkel zur Reduzierung der Schnittkräfte • Anwendung zur Schwerzerspanung bei hohen Schnitttiefen
FMP01  B58	Kr=90° a_{pmax}=18.0	TP*N2204PD* TPKN2204PDF* TPKN2204PDT*	Face milling of steel, alloy steel and cast iron Planfräsen von Stahl, leg. Stahl und Grauguss	• Diameter range Ø80-Ø315 • Kr 90° , square shoulder milling • Top clamping is easy to assemble and disassemble • Durchmesserbereich: 80 – 315 mm • Einstellwinkel 90 Grad Grad zum allgemeinen Planfräser • Top-Klemmsystem zum einfachen Wendeschneidplattenwechsel.

Face milling · Planfräser

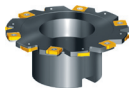
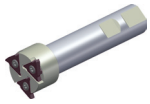
Serie	Approach Angle / max. depth of cut Einstellwinkel/ max. Schnitttiefe	Insert WSP	Application Anwendung	Features Merkmale
FMP02  B60	Kr=90° a_{pmax}=6.7	SEET09T308PER-PF/PM SEET09T308PER-PR	Face milling steel, alloy steel, stainless steel cast iron and Alu. Plan- und Eckfräsen von Stahl, leg. Stahl, rostfr. Stahl Grauguss und Alu.	• Diameter range Ø50-Ø315 • Kr 90°, for square shoulder milling and face milling • Different pitch design: coarse pitch, close pitch and extra close pitch • High precision insert for, high surface quality • Optimized chipbreaker and grade, for finish machining, semi-finish machining and rough machining. • Durchmesserbereich: 50 – 315 mm • Einstellwinkel 90 Grad zum Eck- und Planfräsen • Unterschiedliche Teilung: weit, eng und extra eng • Präzisionsschneidplatten zur Erzielung hoher Oberflächenqualität • Optimale Spanbrecher und Hartmetallsorten zum Schlichten, mittlere Bearbeitung und Schruppen.
	Kr=90° a_{pmax}=10.8	SEET120308PER-PF/PM SEET120308PER-PR		
FMP03  B66	Kr=90° a_{pmax}=8	LNKT1506EN-ZR	Heavy Duty face milling steel, alloy steel, stainless steel and cast iron Schwerzerspa-nung von Stahl, leg. Stahl, rostfr. Stahl und Grauguss	• Diameter range Ø125-Ø315 • Kr 90°, for square shoulder milling and face milling with big cutting depth • positive rake reduces the cutting force • Durchmesserbereich: 125 – 315 mm • Einstellwinkel 90 Grad zum Schulter- und Planfräsen mit großer Schnitttiefe • Positiver Spanwinkel für weniger Schnittkräfte
	Kr=90° a_{pmax}=12	LNKT2007DN-ZR		
	Kr=90° a_{pmax}=15	LNKT2510-ZR		
FMR01  B68	a_{pmax}=5.0	RCKT10T3MO-DM	Cavity profile milling of steel, alloy steel, stainless steel and cast iron Formfräsen von Stahl, leg. Stahl, rostfr. Stahl und Grauguss	• Diameter range Ø25-Ø50 • R-type inserts possess stronger cutting edges • Suitable for machining curved surface of mould • Economical milling cutters with screw clamping • Durchmesserbereich: 25 – 50 mm • Radiusfräser mit stabiler Schneidkante • Einsatz zur Bearbeitung von Formen und • Gesenken • Wirtschaftliche Fräser mit Schraubenklemmung
	a_{pmax}=6.0	RCKT1204MO-DM/DR		
FMR02  B71	a_{pmax}=6.0	RCKT1204MO-DM/DR	Face milling and cavity profile milling of steel, alloy steel, stainless steel and cast iron Plan- und Formfräsen von Stahl, leg. Stahl, rostfreier Stahl und Grauguss	• Diameter range Ø63-Ø200 • R-type inserts possess stronger cutting edges • Suitable for machining curved surface of mould • Economical milling tools with screw clamping • Durchmesserbereich: 63 – 200 mm • Radiusfräser mit stabiler Schneidkante • Einsatz zur Bearbeitung von Formen und Gesenken • Wirtschaftliche Fräser mit Schraubenklemmung
	a_{pmax}=8.0	RCKT1606MO-DM/DR		
	a_{pmax}=10.0	RCKT2006MO-DR		
FMR03  B73	a_{pmax}=4.0	RDKW0702MO RDKW0803MO	Cavity profile milling of steel, alloy steel, stainless steel and cast iron Formfräsen von Stahl, leg. Stahl, rostfreier Stahl und Grauguss	• Diameter range Ø25-Ø50 • R-type inserts possess stronger cutting edges • Suitable for machining curved surface of mould • Economical milling tools with screw clamping • Durchmesserbereich: 25 – 50 mm Radiusfräser mit stabiler Schneidkante • Einsatz zur Bearbeitung von Formen und Gesenken • Wirtschaftliche Fräser mit Schraubenklemmung
	a_{pmax}=5.0	RDKW1003MO RDKW10T3MO		
	a_{pmax}=6.0	RDKW1204MO RDKW12T3MO		
FMR04  B76	a_{pmax}=6.0	RDKW1204MO RDKW12T3MO	Face milling and cavity profile milling of steel, alloy steel, stainless steel and cast iron Plan- und Formfräsen von Stahl, leg. Stahl, rostfreier Stahl und Grauguss	• Diameter range Ø50-Ø160 • R-type inserts possess stronger cutting edge • Suitable for machining curved surface of mould • Durchmesserbereich: 50 – 160 mm • Radiusfräser mit stabiler Schneidkante • Einsatz zur Bearbeitung von Formen und Gesenken • Wirtschaftliche Fräser mit Schraubenklemmung
	a_{pmax}=8.0	RDKW1604MO RDKW1605MO		
	a_{pmax}=10.0	RDKW2006MO		

B

Milling Tools · Fräser

	Serie	Approach Angle / max. depth of cut Einstellwinkel/ max. Schnitttiefe	Insert WSP	Application Anwendung	Features Merkmale
Square shoulder milling · Eckfräsen	**EMP01**  B80	Kr=90° a_{pmax}=10.5	APKT11T3**-PF/PM/ PR APKT11T3**-LH	Multi-function milling of steel, alloy steel, stainless steel, cast iron and Al alloy Universelles Fräsen von Stahl, leg. Stahl, rostfr. Stahl, Grauguss und leg. Alu	• Two mounting modes: Straight shank and Weldon shank, Diameter range Ø12-Ø63 • Kr 90° , for square shoulder milling, slot milling, ramp milling etc. • Wiper inserts also suitable for face milling. • Inserts with 3D helical cutting edge, less cutting force • Zwei Aufnahmeversionen: Zylinderschaft u. Weldon • Durchmesserbereich: 12 – 63 mm • Einstellwinkel 90 Grad, zum Eck, Nuten, Tauchfräsen etc. • Wiper-Schneidplatten zum Planfräsen • Schneidplatte mit 3-D spiral Schneide zur Reduzierung der Zerspanungskräfte
		Kr=90° a_{pmax}=15.5	APKT160408- PF/PM/ PR APKT160408-LH		
	EMP02  B87	Kr=90° a_{pmax}=10.5	APKT11T3**- PF/PM/ PR APKT11T3**-LH	Face milling of steel, alloy steel, stainless steel, cast iron and Al alloy Universelles Fräsen von Stahl, leg. Stahl, rostfr. Stahl, Grauguss und leg. Alu	• Diameter range Ø50-Ø100 • Kr 90° , for square shoulder milling • Wiper inserts also suitable for face milling. • Inserts with 3D helical cutting edge, less cutting force • Durchmesserbereich: 50 – 100 mm • Einstellwinkel 90 Grad zum Eckfräsen • Wiper-Schneidplatten zum Planfräsen Schneidplatte im 3-D Design • Zirkularschneide zur Reduzierung der Zerspanungskräfte
		Kr=90° a_{pmax}=15.5	APKT160408- PF/PM/ PR APKT160408-LH		
	EMP03  B90	Kr=90° a_{pmax}=39.0	APKT11T3**-PF/PM/ PR APKT11T3**-LH	Adopting large cutting depth, for milling of steel, alloy steel, stainless steel, cast iron and Al alloy Fräsen mit großen Schnitttiefen von Stahl, leg. Stahl, rostfr. Stahl, Grauguss und leg. Alu	• Diameter range Ø50-Ø100 • End milling tools with positive helical angle, good chip removal • For side face milling and slot machining • Close pitch, high machining efficiency. • Durchmesserbereich: 50 – 100 mm • Eckfräser mit pos. Zirkularwinkel und guter Spanabfuhr. • Eck- und Nutenfräsen • Enge Teilung zur Erreichung hoher Bearbeitungswirtschaftlichkeit.
	EMP04  B91	Kr=90° a_{pmax}=58.0	APKT11T3**-PF/PM/ PR APKT11T3**-LH	Adopting large cutting depth, for milling steel, alloy steel, stainless steel, cast iron and Al alloy Fräsen mit großen Schnitttiefen von Stahl, leg. Stahl, rostfr. Stahl, Grauguss und leg. Alu	• Diameter range Ø20-Ø40 • End milling tools with positive helical angle, good chip removal • For side face milling and slot machining • Close pitch, high machining efficiency. • Durchmesserbereich: 20 – 40 mm • Schaftfräser mit pos. Zirkularwinkel und guter Spanabfuhr • Eck- und Nutenfräsen • Enge Teilung zur Erreichung hoher Bearbeitungswirtschaftlichkeit.
	EMP05  B95	Kr=90° a_{pmax}=40.0	APMT1135PDR APMT160408PDER	Multi-function drilling and milling steel alloy steel, stainless steel and cast iron Multi-Funktionsbohren und Fräsen von Stahl, leg. Stahl, rostfr. Stahl und Grauguss	• Diameter range Ø25-Ø40 • End edge over center, for drilling directly • Durchmesserbereich: 25 – 40 mm • Zentrum-Schneide (über Mitte) zum Bohren.

	Serie	Approach Angle / max. depth of cut Einstellwinkel/ max. Schnitttiefe	Insert WSP	Application Anwendung	Features Merkmale
Profile milling · Formfräsen	**BMR01**  B97	Cutting depth: see the detailed information about tool specifications Schnitttiefe: siehe detailierte info in der Werkzeug spezifikation.	ZDET**CYR** ZPNT2204CYR** SPMT060304 SDMT**	Profile machining of steel, stainless steel and cast iron Formfräsen von Stahl, rostfreiem Stahl und Grauguss.	• Diameter range Ø20-Ø63 • Very suitable for rough machining large mold • Ball nose cutter with 3-cutting-edges inserts, perfect economical efficiency • Durchmesserbereich: 20 – 63 mm • Besonders geeignet für die Schruppbearbeitung von großen Formen • Radiusfräser mit 3 Schneidkanten pro Schneidplatte. • Hohe Wirtschaftlichkeit
	BMR02  B99		ROHX**	Profile machining of steel, stainless steel and cast iron Formfräsen von Stahl, rostfreiem Stahl und Grauguss.	• Diameter range Ø12-Ø20 • Applied for profile finish machining • Good assembly stability. • Insert with two cutting edges, perfect economical efficiency. • Durchmesserbereich: 12 – 20 mm • Schlichtbearbeitung von Formen • Hohe Fräserstabilität • Schneidplatte mit 2 Schneidkanten • Hohe Wirtschaftlichkeit
	BMR03  B101  B102  B103  B104		XPHT**R**- GM	Profile machining of steel, stainless steel and cast iron Formfräsen von Stahl, rostfreiem Stahl und Grauguss.	• Diameter range Ø16-Ø50 • Very suitable for rough machining moulds • Equipped with 3D chipbreaker inserts, high circular edge precision. • Tool body with high rigidity • Durchmesserbereich: 16 – 50 mm • Besonders geeignet für das Schruppfräsen von Formen. • 3-D Spanbrecher für hohe Rundlaufgenauigkeit • Werkzeugkörper mit hoher Stabilität
	BMR04  B113  B114		ZOHX**	Profile machining of steel, stainless steel and cast iron Formfräsen von Stahl, rostfreiem Stahl und Grauguss.	• Diameter range Ø10-Ø40 • High precision, for finish profile machining. • Two types of chipbreaker, used at different machining condition • High assembling precision, good stability. • Durchmesserbereich: 10 – 40 mm • Hohe Präzision zur Fertigbearbeitung beim Formfräsen. • 2 Spanbrechergeometrien für unterschiedliche Anwendungen • Hohe Fräserstabilität und Präzision.

	Serie	Approach Angle / max. depth of cut Einstellwinkel/ max. Schnitttiefe	Insert WSP	Application Anwendung	Features Merkmale
Slot milling · Nutenfräsen	**SMP01**  B121  B122	Cutting depth: see the detailed information about tool specifications Schnitttiefe: siehe detailierte info in der Werkzeug spezifikation.	XSEQ12□□	Slot milling of steel, stainless steel and cast iron. Nutenfräsen von Stahl und Grauguss	• Diameter range Ø100-Ø250 • Two mounting types • Groove width range : 4, 5, 6, 7, 8mm • Durchmesserbereich Ø100-Ø250 • Zwei Aufnahme Typen • Nutenbreiten Bereich : 4, 5, 6, 7, 8mm
	SMP03  B124  B125		MPHT□□	Slot milling of steel, stainless steel and cast iron. Nutenfräsen von Stahl und Grauguss	• Diameter range Ø80-Ø250 • Two mounting types • Groove width range : 4, 5, 6, 7, 8mm • Durchmesserbereich Ø80-Ø250 • Zwei Aufnahme Typen • Nutenbreiten Bereich : 4, 5, 6, 7, 8mm
	SMP05  B127	Cutting depth: see the detailed information about tool specifications Schnitttiefe: siehe detailierte info in der Werkzeug spezifikation.	QC16L□□ QC22L□□	Slot milling of steel, stainless steel and cast iron. Nutenfräsen von Stahl und Grauguss	• Diameter range Ø25-Ø44 • Durchmesserbereich Ø25-Ø44
Special milling (high feed) Spezialfräsen für hohe Vorschübe	**XMR01**  B130  B130  B132  B133	Cutting depth: see the detailed information about tool specifications Schnitttiefe: siehe detailierte info in der Werkzeug spezifikation.	SDMT□□-DM	Face and profile milling of steel, stainless steel and cast iron in cavity applications Plan- und Formfräsen von Stahl, rostfreiem Stahl und Grauguss	• Diameter range Ø25-Ø100 • Two mounting types: Straight shank and Arbor • The cutting forces are decomposed effectively, realize cutting with high feed rate. • For plunge milling • Double clamping, firm and reliable. • Durchmesserbereich Ø25-Ø100 • als Schaft- und Aufsteckfräser • Die Schnittkräfte werden axial konzentriert. Der Fräser ist für hohe Vorschübe geeignet. • Tauchfräsen möglich. • Doppeltes Klemmsystem für WSP.
			WPGT□□ZSR	Face and profile milling of steel, stainless steel and cast iron in cavity applications Plan- und Formfräsen von Stahl, rostfreiem Stahl und Grauguss	• Diameter range Ø20-Ø100 • Two mounting types: Straight shank and Arbor • The cutting forces are decomposed effectively, realize cutting with high feed rate. • Double clamping, firm and reliable. • Durchmesserbereich Ø25-Ø100 • als Schaft und Aufsteckfräser • Die Schnittkräfte werden axial konzentriert. Der Fräser ist für hohe Vorschübe geeignet. • Doppeltes Klemmsystem für WSP.

	Serie	Approach Angle / max. depth of cut Einstellwinkel/ max. Schnitttiefe	Insert WSP	Application Anwendung	Features Merkmale
T-slot milling T-Nutenfräsen	**TMP01**  B138	Kr=90°	MPHT**	Machining T slot in cast iron T-Nuten von Gusseisen	• Diameter range Ø21-Ø60 • Machining the T-slot with size range 12, 14, 18, 22, 28, 36 mm. • 86° rhombic inserts with positive angle. • Durchmesserbereich Ø21-Ø60 • T-Nutenfräsen im Bereich von 12, 14, 18, 22, 28, 36mm. • 86° rhombische WSP mit positivem Winkel.
Helical end mills · Walzenstirnfräser	**HMP01**  B140	Kr=90° a_{pmax}=55	APKT150412-PM/ KM SPMT120408-PM/ KM	Milling of steel, alloy steel and cast iron with large cutting depth. Fräsen von Stahl, leg. Stahl und Grauguss. Bei großen Schnitttiefen.	• Diameter range Ø40-Ø80 • Coarse and differential pitch, less vibration • Holistic structure with good rigidity, interchangeable heads achieve high economical efficiency. • Durchmesserbereich Ø40-Ø80 • Weite und normale Teilung, weniger Vibrationen • Holistic Struktur mit hoher Stabilität, austauschbare Fräsköpfe für hohe Effizienz und Wirtschaftlichkeit.
	 B141	Kr=90° a_{pmax}=144			
	HMP01 EC  B142	Kr=90° a_{pmax}=144			
Chamfer milling · Fasenfräser	**CMZ01**  B145	Kr=30°	SPMT120408	Chamfer machining of steel, alloy steel, stainless steel and cast iron Fasenfräsen von Stahl, leg. Stahl, rostfreiem Stahl und Gusseisen	• Diameter range Ø12, Ø25, Ø32, Ø36 • With the function of milling small surface • Durchmesserbereich Ø12, Ø25, Ø32, Ø36 • Einsatz bei kleinen Flächen
	CMA01  B146	Kr=45°			
	CMD01  B147	Kr=60°			

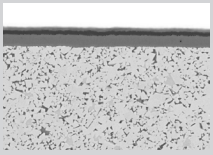
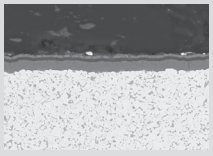
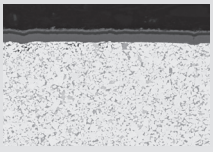
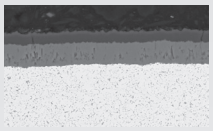
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Milling Tools · Fräser

Comparison table for milling Insert - Grades
Fräswendeplatten Übersichtstabelle - Sorten

Workpiece material	ISO	Coatet carbide · Beschichtetes Hartmetal		Cermet	Uncoatet carbide unbeschichtetes Hartmetal	PCBN & PCD PCBN &PKD
		CVD	PVD			
P Steel · Stahl	P01					
	P10	YBC301, YBM251, YBM253	YBG202, YBG252	YNG151, YNG151C		
	P20	YBC301, YBM251, YBM253	YBG202, YBG252	YNG151, YNG151C		
	P30	YBM351, YBC401	YBG252, YBG302		YC30S	
	P40	YBM351, YBC401	YBG302		YC30S	
M Stainless Steel Rostfreier Stahl	M01					
	M10	YBM251, YBM253	YBG202, YBG205, YBG252	YNG151, YNG151C		
	M20	YBM251, YBM253, YBM351	YBG202, YBG205, YBG252	YNG151, YNG151C		
	M30	YBM351	YBG252, YBG302		YC30S	
	M40	YBM351	YBG302		YC30S	
K Cast iron · Grauguss	K01					
	K10	YBD152, YBD252	YBG102, YBG252	YNG151, YNG151C		
	K20	YBD152, YBD252	YBG102, YBG152, YBG252	YNG151, YNG151C	YD201	
	K30	YBD252	YBG152, YBG252		YD201	
	K40	YBD252	YBG252		YD201	
N Hardened material Gehärtete Werkstoffe	N01					
	N10				YD101	
	N20				YD101, YD201	
	N30				YD201	
S Heat-resistant steel Warmfester Stahl	S01					
	S10		YBG202			
	S20		YBG202			
	S30		YBG202			
H Non-ferrous materials Ne Mettalle	H01					
	H10					
	H20					
	H30					

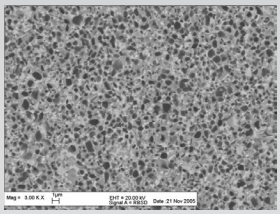
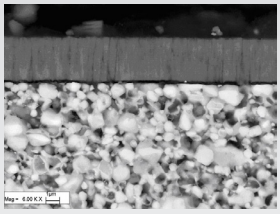
Coated Cemented Carbide CVD
Beschichtetes Hartmetall CVD

Grade · Sorte	Coating · Beschicht.	Micro-Structure	ISO	Application Anwendung
YBC301	Substrate with high strength, in combination with MT-Ti(CN), thin layer Al_2O_3 and TiN Coating. Beschichtetes Hartmetall mit hoher Schneidkanten-sicherheit. In Kombination mit TiCN Al_2O_3, und TiN.		P15~35	Suitable for light and midium milling of low alloy steel and non alloy steel, even under unfavorable condition. Gut geeignet für leichte bis mittlere Fräsbearbeitung von niedriglegierten Stählen unter schwierigen Bedingungen.
YBC401	Substrate with excellent toughness, in combination with Ti(CN), thin layer Al2 O3, TIN. CVD beschichtetes Hartmetall mit einer guter Wärmeleitfähigkeit.		P25~50 M20~40	It is suitable for medium to heavy milling steels and stainless steel. Zum Fräsen von Stahl und rostfreiem Stahl
YBM251	Substrate with good toughness and strength, in combination with Ti(CN), thin layer Al2 O3, TiN. Universal einsetzbare CVD-beschichtete Hartmetallsorte aus TiN +MT-TiCN + dünner Al_2O_3 + TiN mit guter Zähigkeit und Verschleißfestigkeit.		P15~40 M10~30	Good performance in milling of alloy steel and stainless steel. Gute Eigenschaft zum Fräsen von legiertem und rostfreiem Stahl.
YBM351	MT-TiCN+Al2 O3 coated carbide grade with very good strength and impact resistance. Beschichtete Hartmetallsorte MT-TiCN+Al_2O_3 mit ausgezeichneter Widerstandsfähigkeit und Schneidkantensicherheit.		P25~40 M20~40	It is for milling of steel, alloy steel and stainless steel. Zum Fräsen von Stahl, legiertem und rostfreiem Stahl
YBD152	Hard medium fine corn Substrate in combination with TiCN, thick Al2 O3 coating. Hartes mittel-feinkörniges Subtrat mit TiCN, dicker Al_2O_3 Beschichtung.		K05~25	It is suitable for machinig of gray cast iron and nodular cast iron under normal cutting conditions from low to moderate cutting speeds. Bearbeitung von Guss und Kugelgraphitguss mit niedrigen bis mittleren Schnittgeschwindigkeiten.
YBD252	Tough subtrate in combination with TiN, TiCN, thick Al2 O3 coating. For milling of cast iron and alloy steel. Zähes Subtrat mit TiCN, dicke Al_2O_3 Beschichtung.		K15~35	For milling of cast iron and alloy steel. Zum Fräsen von Grauguss und legiertem Stahl.

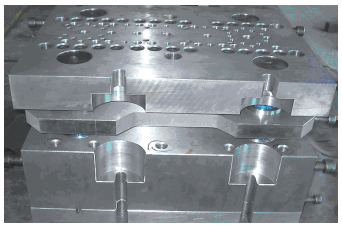
Coated Cemented Carbide PVD
Beschichtetes Hartmetall PVD

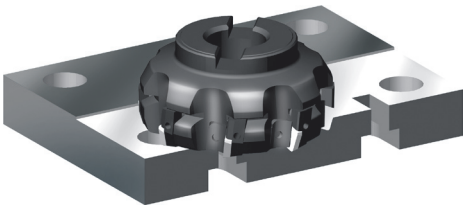
Grade · Sorte	Coating · Beschicht.	ISO	Application Anwendung
YBG102	PVD nano-TiAlN coated fine grain hard carbide grade. Nano-TiAlN PVD-beschichtete, feinkörnige Hartmetallsorte.	K05~K20	For light milling of cast iron, hard steel. Zum Schlichtfräsen von Guss und gehärtetem Stahl.
YBG202	PVD nano-TiAlN coated fine grain hard carbide grade. Good performance in combination of toughness and wear resistance. Nano-TiAlN PVD-beschichtete, feinkörnige Hartmetallsorte. Hervorragende Kombination von Zähigkeit und Verschleißfestigkeit.	P10~30 M10~30 S05~20	Milling of steel, finishing and semi-finishing of stainless steel, and hightemperature alloys . Zum Fräsen von Stahl, rostfreiem Stahl, und warmfesten Superlegierungen bei leichter und mittlerer Bearbeitung.
YBG205	Special PVD nano-TiAlN coated fine grain hard carbide grade. Good performance in combination of toughness and wear resistance. Sonder Nano-TiAlN PVD-beschichtete, feinkörnige Hartmetallsorte. Hervorragende Kombination von Zähigkeit und Verschelißfestigkeit.	M10~30	Milling of steel, finishing and semi-finishing of stainless steel. Zum Fräsen von rostfreiem Stahl bei leichter und mittlere Bearbeitung
YBG302	Substrate with reasonable hardness and strength + Nano-TiAlN PVD coating Substrate mit einer guten Härte und Festigkeit + Nano-TiAlN PVD Beschichtung.	P25~P40 M25~40	For rough and semi-finish milling of steel and stainless steel. Anwendung für mittlere- und Schruppbearbeitung von Stahl, und rostfreiem Stahl .
YBG152	Substrate with medium hardness and strength + Nano-TiAlN PVD coating Substrate mit mittlerer Härte und Festigkeit + Nano-TiAlN PVD Beschichtung	K 20~35	Applicable for rough and semi-finish milling of cast iron. Anwendung für Schrupp- und mittlerer Bearbeitung. von Guss.
YBG252	Ultra fine carbide substrate plus nano-TiALN PVD coating with high strength, thougness and wear resistance. Ultra-feinkorn-Hartmetall plus Nano-TiAN PVD-Beschichtung mit guter Zähigkeit und Verschleißfestigkeit, .	P05~20 M05~20 K05~K20	Special for finishing of alloy steel, stainless steel and cast iron. Speziell zum schlichten von legiertem Stahl, rostfreiem Stahl und Guss.

Cermet

Grade · Sorte	Micro-Structure	ISO	Application Anwendung
YNG151		P05~20 M05~20 K05~20	Applicable for finishing P, M & K ISO Code Anwendung für die Schlichtbearbeitung P,M und K ISO Anwendungsbereich
YNG151C		P01~20 M01~20 K01~20	Applicable for finish milling P, M and K ISO Code Anwendung für die Schlichtbearbeitung P,M und K ISO Anwendungsbereich

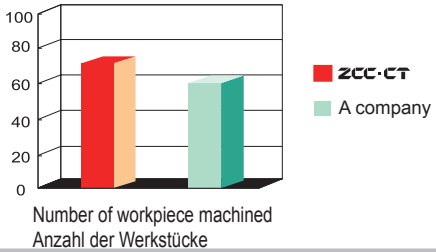
Application Anwendung

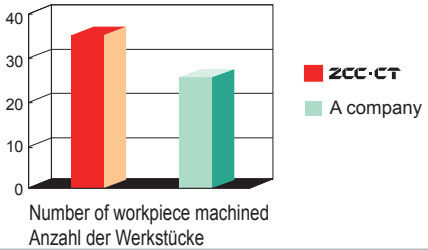




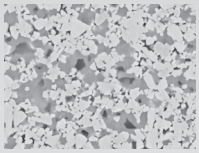
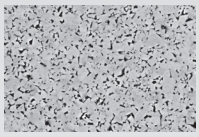
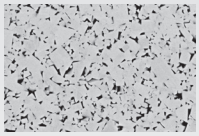
Machine Maschine	Machining center, dry cutting Bearbeitungscenter, Trockenbearbeitung	Machining center, dry cutting Bearbeitungscenter, Trockenbearbeitung
Workp. material & hardness Werkstückstoff & Härte	45 steel HB 170~220 Stahl	NAK80* HRC42~48
Type of machining Bearbeitung	Face milling finishing Schlichtfräsen	Face milling finishing Schlichtfräsen
Milling tool Fräswerkzeug	FMA03-160-B40-SE12-08	FME03-160-B40-SP12-10
Applicable insert Fräsplatte	YNG151/SEEN1203AFTN	YNG151C/SPEN1203EDER
Cutting data Schnittdaten	Vc=400m/min, fz=0.1mm/z, a_p=0.3mm	Vc=420m/min, fz=0.12mm/z, a_p=0.35mm

Application results
Ergebnis

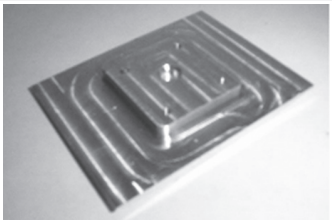
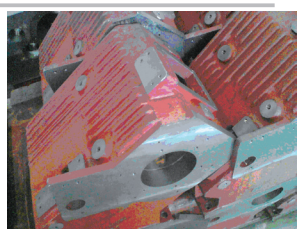




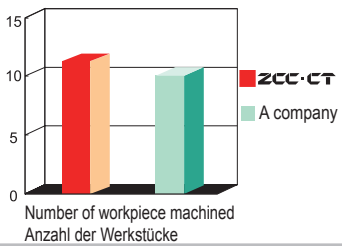
Uncoated Carbide
unbeschichtes Hartmetal

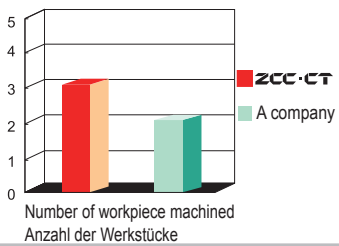
Grade · Sorte	Micro-Structure	ISO	Application Anwendung
YC30S		P25~40 M25~40	Applicable for roughing ISO Code P, M Anwendung für die Schruppbearbeitung ISO Anwendungsbereich P & M.
YD051		K05~20	Applicable for milling/ finishing type ISO Code K Anwendung für die Schlichtbearbeitung ISO Anwendungsbereich K.
YD101		N05~25	Applicable for semi-finish and finish milling type ISO Code N. Anwendung für die Mittlere bis Feinbearbeitung ISO Anwendungsbereich N.
YD201		K15~35 N15~30	Applicable for rough and semi-finish ISO Code K , and for rough milling ISO Code N. Anwendung für die schrupp - mittlerer Bearbeitung ISO Anwend. K und für die Schruppbearbeitung N ISO Anwendung.

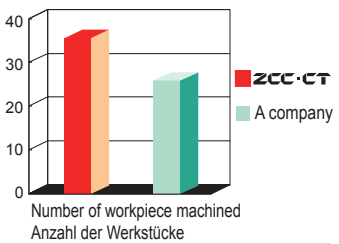
Application Anwendung

Component Werkstück			
Machine Maschine	Verti. machining center, wet machining Vertikales Bearbeitungscenter, Kühlmittel	Face milling machine, wet machining Planfräsmaschine, Kühlmittel	Face milling machine, dry cutting Planfräsmaschine, Trockenbearbeitung
Workp. material & hardn. Werkstückstoff & Härte	Aluminum alloy HB100	40CrMnMo HB240	HT250 HB220
Type of machining Bearbeitung	Face milling Planfräser	Face milling Planfräser	Face milling Planfräser
Milling tool Fräswerkzeug	FMA01-100-B32-SE12-07	FMP01-100-B32-TP22-06	FME03-160-B40-SP15-10
Applicable insert Fräsplatte	YD101/SEET12T3-LH	YC30S/TPKN2204PDR	YD201/SPKN1504EDTR
Cutting data Schnittdaten	Vc=300-350m/min, a_p=1-2mm, fz=0.2mm/z	Vc=170m/min, a_p=5-7mm fz=0.3mm/z	Vc=100-130m/min, a_p=7mm, fz=0.35mm/z

Application results
Ergebnis



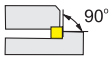
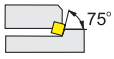
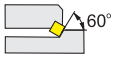
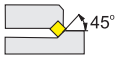
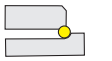




NOTIZEN:

Indexable milling tools code key · Kennzeichnung Fräsen ISO Code

Cutter style / Fräser Typ	
FM	Face milling tools Planfräser
EM	Shoulder face milling tools Eck-und Nutenfräser
HM	Helix end milling tools Walzenstirnfräser
SM	Side and face milling tools Scheibenfräser
BM	Profile milling tools Kopierfräser
CM	Chamfering end milling tools Fasfräser
XM	Special milling tools Sonderfräser
TM	

Lead angle Einstellwinkel der Platten		
P	**90°**	
E	**75°**	
D	**60°**	
A	**45°**	
R		

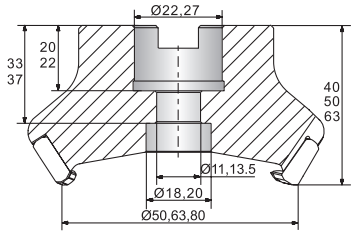
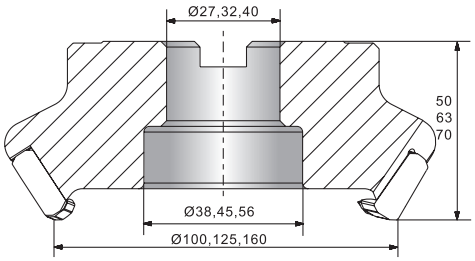
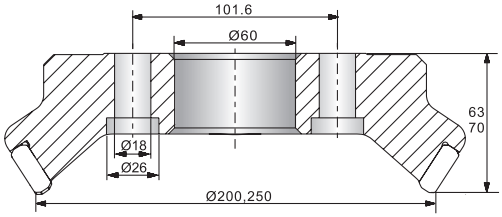
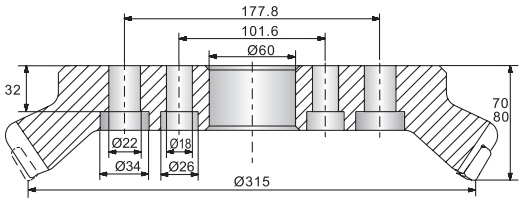
Serial number
Serien Nr.

Tool diameter
Werkzeug Durchmesser
Side and face milling tool :
diameter x cutting edge width

Plan- und Eckfräser:
Durchmesser x WSP-Breite

Coupling size (mm) (as follow figure)
Aufnahmetyp

FM E 03 100 - B 32

Structure shape and size of positioning Ausführung und Größe von Werkzeugaufnahme			
A	 Arbor Ø50-Ø80	**B**	 Arbor Ø100-Ø160
C	 Arbor Ø200-Ø250	**D**	 Arbor Ø315
G	Cylinderical Shank / Zylinderschaft	**MW**	MW
XP	Weldon		

Regarding to the Weldon shank, straight shank and Morse taper shank etc coupling method, please refer to the technical data of tooling systems

Bezüglicher der Befestigung beachten Sie bitte die Angabe der Werkzeugaufnahmehersteller.

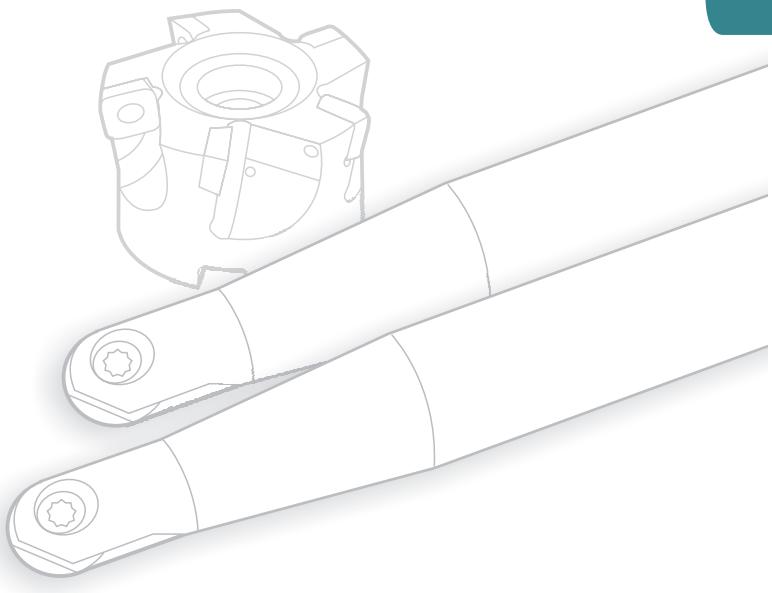
Cutting edge length of insert Schneidenlänge	
80° C	55° D
R	S
60° T	L
H	O

Insert clearance angle Freiwinkel der Platten	
N	0°
B	5°
C	7°
P	11°
D	15°
E	20°
F	25°

Cutting edge length of insert Schneidenlänge						
Diameter Durchmesser	Insert Shape / Plattenform					
	C	D	R	S	T	L
5.556	—	—	—	—	09	—
6.350	06	07	—	—	11	—
9.525	09	11	09	09	16	—
12.700	12	15	12	12	22	—
15.875	16	19	15	15	27	—
19.050	19	—	19	19	33	—
25.400	25	—	25	25	44	25

S - P 12 - 06 L C

- Number of teeth / Anzahl Zähne
- Cutting direction / Schnittrichtung R= right/rechts L=left/ links
- With Internal cooling / Mit Innenkühlung

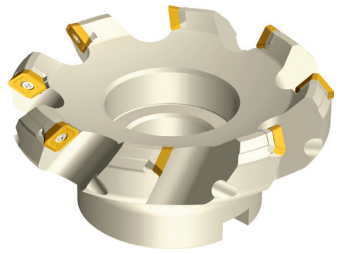


Face Milling Tools · Planfräser

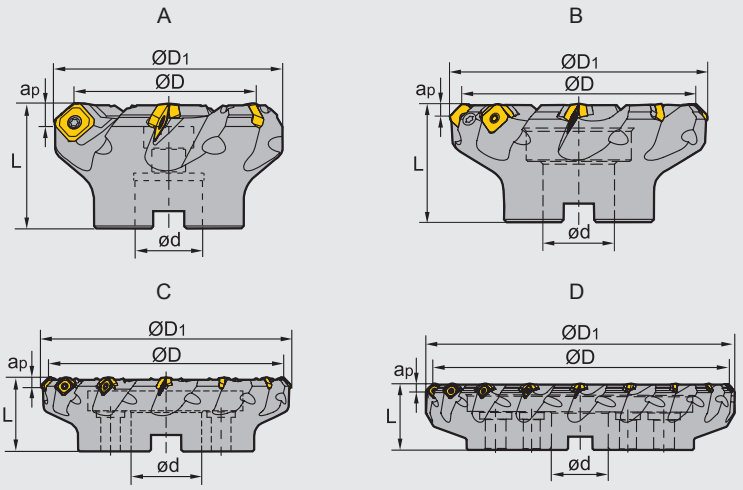
Kr:45°



FMA01 P M K N S



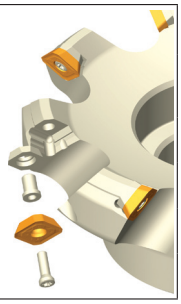
Fine pitch
Enge Teilung



Specification of tools · Werkzeug Beschreibung

Type · Typ		Stock Lager		Dimension (mm) Abmessung					No. of teeth Zähne	Coupling Aufnahme	Weight Gewicht (kg)
		R	L	Ø D	Ø D1	Ø D	L	apmax			
FMA01	**-050-A22-SE12-04**	●	○	50	61	22	40	6	4	A	0.3
	-063-A22-SE12-05	●	○	63	74	22	40	6	5	A	0.5
	-080-A27-SE12-06	●	○	80	91	27	50	6	6	A	1.2
	-100-B32-SE12-07	●	○	100	107	32	50	6	7	B	1.2
	-125-B40-SE12-08	●	○	125	136	40	63	6	8	B	2.6
	-160-B40-SE12-10	●	○	160	170	40	63	6	10	B	4.3
	-200-C60-SE12-12	●	○	200	210	60	63	6	12	C	7.6
	-250-C60-SE12-14	●	○	250	260	60	63	6	14	C	13.5
	-315-D60-SE12-18	●	○	315	325	60	70	6	18	D	20.8

Spare Parts · Ersatzteile

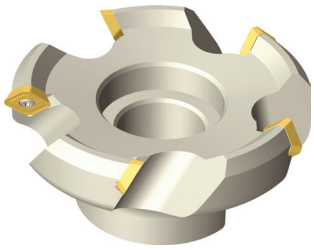
Diameter Durchmesser Ø D	Screw Schraube	Shim Unterlage	Shim screw Unterlagenschraube	Wrench Schlüssel	Wrench Schlüssel	
						
Ø50 -Ø100	I60M3.5×10	--	--	WT15IS	--	
Ø125-Ø315	I60M3.5×12	S13BS	SM5×7XA		WH35L	

● Ex Stock / ab Lager ○ On demand / auf Anfrage

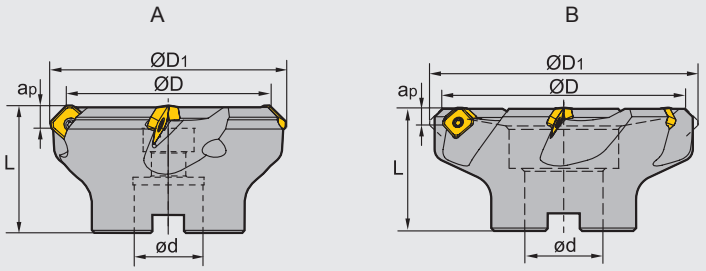
Face Milling Tools · Planfräser

Kr:45°

FMA02 P M K N S



Coarse and differential pitch
Normale und weite Teilung



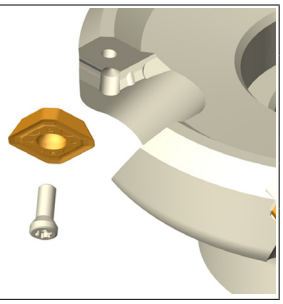
Specification of tools · Werkzeug Beschreibung

Type · Typ		Stock Lager R	Stock Lager L	Dimension (mm) Abmessung Ø D	Ø D1	Ø D	L	apmax	No. of teeth Zähne	Coupling Aufnahme	Weight Gewicht (kg)
FMA02	-050-A22-SE12-03	●	○	50	61	22	40	6	3	A	0.4
	-063-A22-SE12-04	●	○	63	74	22	40	6	4	A	0.6
	-080-A27-SE12-04	●	○	80	91	27	50	6	4	A	1.3
	-100-B32-SE12-05	●	○	100	107	32	50	6	5	B	1.3
	-125-B40-SE12-06	●	○	125	131	40	63	6	6	B	2.6

● Ex Stock / ab Lager ○ On demand / auf Anfrage

Spare Parts · Ersatzteile

Diameter Durchmesser Ø D	Screw Schraube	Wrench Schlüssel
Ø50-Ø125	I60M3.5×10	WT15IS



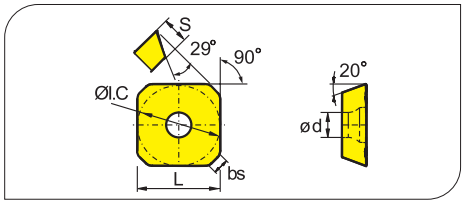
Applicable tool B9-B15 Werkzeug
Tools code key B22-B23 Werkzeug ISO
Grade selection guide B16-B20 Sortenauswahl
Technical data B183-B188 Technische Daten

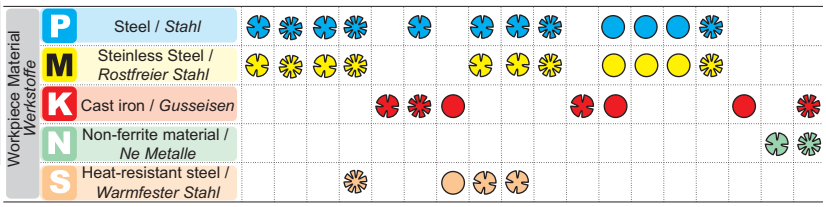
Ideal Machining Condition
Gute Bearbeitungsbedingungen

Normal Machining Condition
Normale Bearbeitungsbedingungen

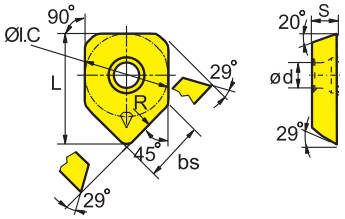
Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen

Applicable inserts · Wendeschneidplatten





Insert shape Plattenform	Type · Typ	Dimension (mm) Abmessung						CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall			
		L	ØI.C	S	ød	bs	R	YBC301	YBC401	YBM251	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**SEET12T3-DF**	13.4	13.4	3.97	4.1	2.55		●			●				●					○					
	SEET12T3-CF	13.4	13.4	3.97	4.1	2.55						●		●											
	SEET12T3-EF	13.4	13.4	3.97	4.1	2.55									●		●								
	**SEET12T3-DM**	13.4	13.4	3.97	4.1	2.55		●	●	●	●				●										
	SEET12T3-CM	13.4	13.4	3.97	4.1	2.55						●		●											
	SEET12T3-EM	13.4	13.4	3.97	4.1	2.55				●	●				●		●								
	**SEET12T3-DR**	13.4	13.4	3.97	4.1	2.55		●	●	●	●		●		○		○								
	SEET12T3-CR	13.4	13.4	3.97	4.1	2.55						●	○												
	**SEET12T3-LH**	13.4	13.4	3.97	4.1	2.55																		●	●
	**SEET12T3-W**	17.82	13.4	3.97	4.1	9.46	500					●			●		○								○



● Ex Stock / ab Lager ○ On demand / auf Anfrage

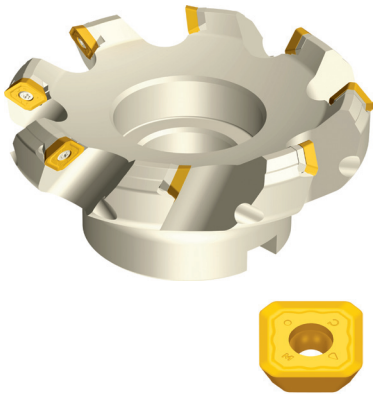
Chipbreaker Selection for FMA01 · Spanbrecher Auswahl für FMA01

Application Anwendung	Finishing Schlichten	Semi-Finishing Mittlere Bearbeitung	Roughing Schruppen
P	-DF	-DM	-DR
M S	-EF	-EM	
K	-CF	-CM	-CR
N	-LH		

Recommended cutting data · Empfohlene Schnittdaten

Workpiece material Werkstückstoff		Hardness HB Härte	Grade Sorte	Cutting data · Schnittdaten			
				V (m/min)	f (mm/z)		
					-DF	-DM	-DR
P	Low-carbon steel Soft steel Niedrig legierter Kohlenstoffstahl Baustahl	≤180	YBM251 YBC301	270(220-350)	0.15(0.1-0.2)	0.2 (0.1-0.3)	0.3(0.2-0.4)
			YBG202 YBG205	270(200-360)	0.15(0.1-0.2)	0.2 (0.1-0.3)	0.3(0.2-0.4)
			YBG302	230(180-350)	0.15(0.1-0.2)	0.2 (0.1-0.3)	0.3(0.2-0.4)
			YBM351 YBC401	220(170-300)	0.15(0.1-0.2)	0.2 (0.1-0.3)	0.3(0.2-0.4)
	High-carbon steel Alloy steel Hoch Leg. Kohlenstoffstahl	180-280	YBM251 YBC301	240 (200-320)	0.15(0.1-0.2)	0.2 (0.1-0.3)	0.3(0.2-0.4)
			YBG202 YBG205	240 (180-350)	0.15(0.1-0.2)	0.2 (0.1-0.3)	0.3(0.2-0.4)
			YBG302	220 (150-330)	0.15(0.1-0.2)	0.2 (0.1-0.3)	0.3(0.2-0.4)
			YBM351 YBC401	200 (150-280)	0.15(0.1-0.2)	0.2 (0.1-0.3)	0.3(0.2-0.4)
	Alloy tool steel Leg. Werkzeugstahl	280-350	YBM251 YBC301 YBD252	220 (180-300)	0.15(0.1-0.2)	0.2 (0.1-0.3)	0.3(0.2-0.4)
			YBG202 YBG205	220 (170-340)	0.15(0.1-0.2)	0.2 (0.1-0.3)	0.3(0.2-0.4)
			YBG302	190 (130-300)	0.15(0.1-0.2)	0.2 (0.1-0.3)	0.3(0.2-0.4)
			YBM351 YBC401	180 (150-250)	0.15(0.1-0.2)	0.2 (0.1-0.3)	0.3(0.2-0.4)
M					-EF	-EM	
	Stainless steel Rostfreier Stahl	≤270	YBM251	150 (120-240)	0.15(0.1-0.2)	0.2 (0.1-0.3)	
			YBG202 YBG205	160 (110-270)	0.15(0.1-0.2)	0.2 (0.1-0.3)	
			YBG302	140 (100-250)	0.15(0.1-0.2)	0.2 (0.1-0.3)	
			YBM351 YBC401	140 (100-220)	0.15(0.1-0.2)	0.2 (0.1-0.3)	
K					-CF	-CM	-CR
	Cast iron Gusseisen	180-250	YBG102	210 (120-300)	0.15(0.1-0.2)	0.2 (0.1-0.3)	0.3(0.2-0.4)
			YBD152	240 (180-300)	0.15(0.1-0.2)	0.2 (0.1-0.3)	0.3(0.2-0.4)
N					-LH		
	Al alloy NE-Metalle	-	YD101	300-	0.25 (0.1-0.4)		
			YD201	300-			
S					-EF	-EM	
	High temperature alloy Hoch warmfeste Leg.	≤400	YBG202	40(20-50)	0.1 (0.1-0.2)	0.15 (0.1-0.3)	

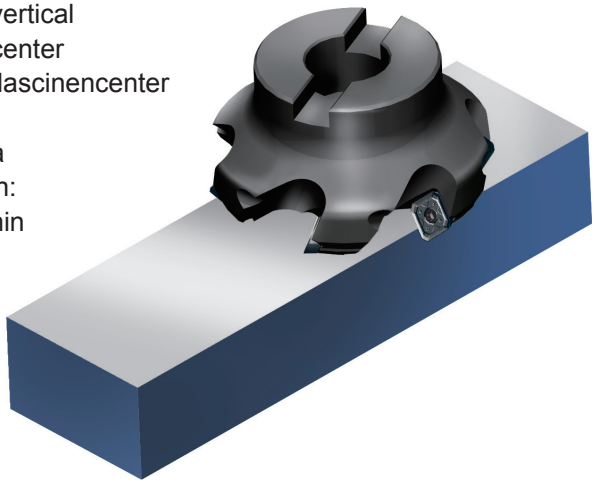
Case study for FMA 01
Bearbeitungsbeispiel für FMA 01



Workpiece material
Werkstückstoff: 1Cr18Ni9Ti (HB180)
Cooling system
Kühlsystem: dry cutting, trocken

Machine
Maschine: vertical machining center
vertikales Mascinencenter

Cutting data
Schnittdaten:
Vc=160m/min
ap=1mm
fz=0.2mm/z
ae=60mm



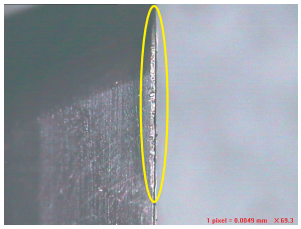
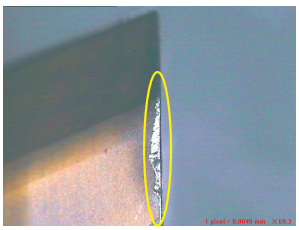
- Tool · Werkzeug: FMR01-080-A27-SE12-06
- Inserts · WSP: SEET12T3-DM/YBG202

Surface roughness of workpiece
Rauhtiefe des Material

ZCC-CT:Ra1.2

Other company product: Ra1.6

- **Wear comparison of insert.**
- **Verschleißvergleich der WSP**

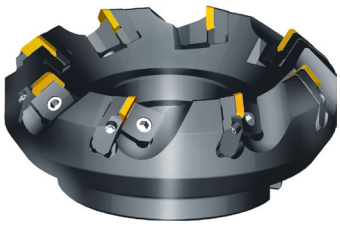
	ZCC-CT	Other company product
17'30"		
29'30"		
33'30"		

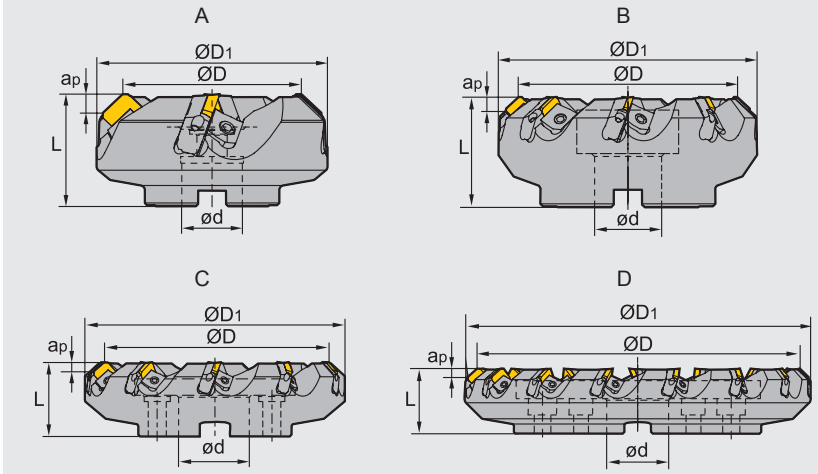
● Ex Stock / ab Lager ○ On demand / auf Anfrage

Face Milling Tools · Planfräser

Kr:45°

FMA03 P M K



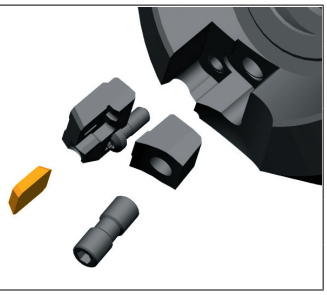


Specification of tools · Werkzeug Beschreibung

Type · Typ		Stock Lager R	Stock Lager L	Dimension (mm) Abmessung Ø D	Ø D1	Ø D	L	apmax	No. of teeth Zähne	Coupling Aufnahme	Weight Gewicht (kg)
FMA03	**-080-A27-SE12-04**	○	○	80	103	27	50	5.5	4	A	1.8
	-100-B32-SE12-05	○	○	100	122	32	50	5.5	5	B	2.4
	-125-B40-SE12-06	○	○	125	147	40	63	5.5	6	B	4.4
	-160-B40-SE12-08	○	○	160	181	40	63	5.5	8	B	6.4
	-200-C60-SE12-10	○	○	200	221	60	63	5.5	10	C	8.5
	-250-C60-SE12-12	○	○	250	270	60	63	5.5	12	C	14.1
	-315-D60-SE12-15	○	○	315	353	60	63	5.5	15	D	22.2
	-080-A27-SE15-04	○	○	80	103	27	50	7.5	4	A	1.7
	-100-B32-SE15-05	○	○	100	122	32	50	7.5	5	B	2.3
	-125-B40-SE15-06	○	○	125	147	40	63	7.5	6	B	4.2
	-160-B40-SE15-08	○	○	160	181	40	63	7.5	8	B	6.1
	-200-C60-SE15-10	○	○	200	221	60	63	7.5	10	C	8.3
	-250-C60-SE15-12	○	○	250	270	60	63	7.5	12	C	13.6
	-315-D60-SE15-15	○	○	315	353	60	63	7.5	15	D	21.8

Parts · Ersatzteile

Diameter Durchmesser Ø D	Insert Platte	Cassette Kassette	Wedge Keil	Wedge screw Keilschraube	Locator screw Schraube	Wrench Schlüssel
Ø80-Ø315	SE12	LSE12R/L	W01R/L	DM8×21X	LOM5×15.1	WT20T WH40T
Ø80-Ø315	SE15	LSE15R/L				



● Ex Stock / ab Lager ○ On demand / auf Anfrage

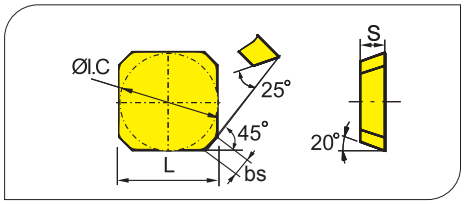
Applicable tool B9-B15 Werkzeug
Tools code key B22-B23 Werkzeug ISO
Grade selection guide B16-B20 Sortenauswahl
Technical data B183-B188 Technische Daten

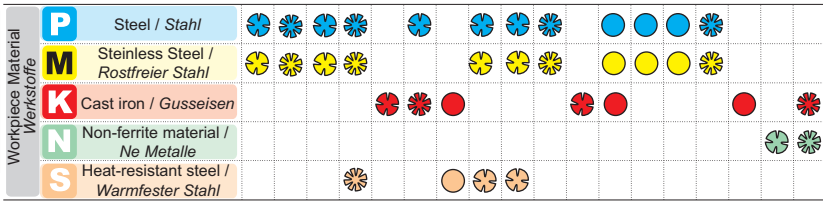
Ideal Machining Condition
Gute Bearbeitungsbedingungen

Normal Machining Condition
Normale Bearbeitungsbedingungen

Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen

Applicable inserts · Wendeschneidplatten





Insert shape Plattenform	Type · Typ	Dimension (mm) Abmessung				CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall			
		L	I.C	S	bs	YBC301	YBC401	YBM251	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**SEEN1203AFTN**	12.7	12.7	3.18	1.8																		
	SEKN1203AFFN	12.7	12.7	3.18	1.8																		
	SEKN1203AFN	12.7	12.7	3.18	1.8	●														○		●	
	SEKN1203AFTN	12.7	12.7	3.18	1.8	●		●										●		●			○
	**SEKR1203AFN**	12.7	12.7	3.18	1.8	●	○						●										
	**SEKN1504AFN**	15.875	15.875	4.76	1.6	○																○	○
	SEKN1504AFTN	15.875	15.875	4.76	1.6	●	●	●												●			
	**SEKR1504AFN**	15.875	15.875	4.76	1.6																		

● Ex Stock / ab Lager ○ On demand / auf Anfrage

Recommended cutting data · Empfohlene Schnittdaten

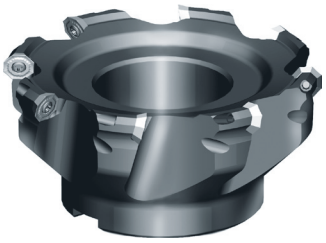
Workpiece material Werkstückstoff		Hardness HB Härte	Garde Sorte	Cutting data · Schnittdaten	
				V (m/min)	f (mm/z)
P	Low-carbon steel Soft steel Niedrig legierter Kohlenstoffstahl Baustahl	≤180	YNG151	430 (340-500)	0.2 (0.1-0.4)
			YBM251 YBC301	270 (220-350)	0.2 (0.1-0.4)
			YBM351	220 (180-300)	0.25 (0.15-0.3)
			YBG202 YBG205	270 (200-360)	0.2 (0.1-0.3)
			YC30S	140 (100-220)	0.27 (0.1-0.4)
	High-carbon steel Alloy steel Hoch Leg. Kohlenstoffstahl	180-280	YNG151	400 (320-480)	0.2 (0.1-0.4)
			YBM251 YBC301	240 (200-320)	0.2 (0.1-0.4)
			YBM351	200 (160-280)	0.25 (0.15-0.3)
			YBG202 YBG205	240 (180-350)	0.2 (0.1-0.3)
			YC30S	120 (80-200)	0.27 (0.1-0.4)
	Alloy tool steel Leg. Werkzeugstahl	280-350	YNG151	350 (300-450)	0.2 (0.1-0.4)
			YBM251 YBC301	220 (180-300)	0.2 (0.1-0.4)
			YBM351	180 (150-250)	0.25 (0.15-0.3)
			YBG202 YBG205	220 (170-340)	0.2 (0.1-0.3)
			YC30S	100 (60-180)	0.27 (0.1-0.4)
M	Stainless steel Rostfreier Stahl	≤270	YNG151	220 (160-280)	0.2 (0.1-0.4)
			YBM251	130 (100-220)	0.2 (0.1-0.4)
			YBM351	140 (100-240)	0.25 (0.15-0.3)
			YBG202 YBG205	140 (100-250)	0.2 (0.1-0.3)
K	Cast iron Gusseisen	180-250	YBG102	210 (120-300)	0.2 (0.1-0.3)
			YBD252	200 (150-250)	0.2 (0.1-0.4)
			YD201	100 (80-160)	0.25 (0.1-0.4)

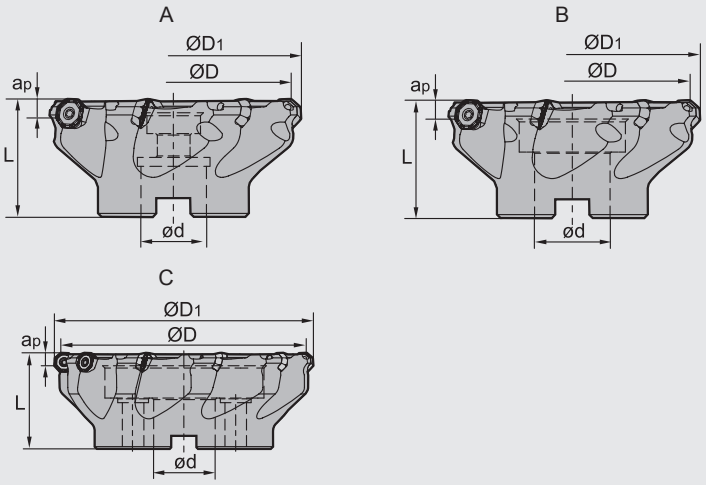
Applicable tool B9-B15 Werkzeug
Tools code key B22-B23 Werkzeug ISO
Grade selection guide B16-B20 Sortenauswahl
Technical data B183-B188 Technische Daten

Face Milling Tools · Planfräser

Kr:45°

FMA04 P M K N

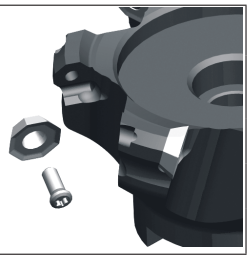




Specification of tools · Werkzeug Beschreibung

Type · Typ		Stock Lager		Dimension (mm) Abmessung					No. of teeth Zähne	Coupling Aufnahme	Weight Gewicht (kg)
		R	L	Ø D	Ø D1	Ø D	L	apmax			
FMA04	**-050-A22-OF05-04**	●	○	50	56	22	40	3.5	4	A	0.3
	-050-A22-OF05-05	●	○	50	56	22	40	3.5	5	A	0.4
	-050-A22-OF05-05C	○	○	50	56	22	40	3.5	5	A	0.4
	-063-A22-OF05-05	●	○	63	69	22	40	3.5	5	A	0.5
	-063-A22-OF05-05C	○	○	63	69	22	40	3.5	5	A	0.5
	-080-A27-OF05-06	●	○	80	86	27	50	3.5	6	A	0.8
	-080-A27-OF05-06C	○	○	80	86	27	50	3.5	6	A	0.8
	-100-B32-OF05-07	●	○	100	106	32	50	3.5	7	B	1.2
	-100-B32-OF05-07C	○	○	100	106	32	50	3.5	7	B	1.2
	-125-B40-OF05-08	●	○	125	130	40	63	3.5	8	B	2.7
	-125-B40-OF05-08C	○	○	125	130	40	63	3.5	8	B	2.7
	-160-B40-OF05-10	●	○	160	165	40	63	3.5	10	B	5.1
	-160-C40-OF05-10			160	165	40	63	3.5	10	C	4.1

Parts · Ersatzteile

Diameter Durchmesser Ø D	Screw Schraube	Wrench Schlüssel	
			
Ø50- Ø63	I60M4×8.4	WT15IS	
Ø80 -Ø160	I60M4×10		

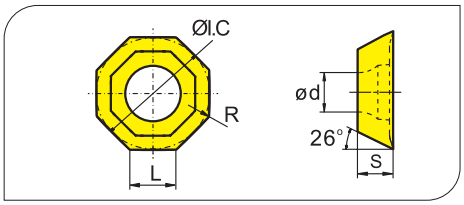
● Ex Stock / ab Lager ○ On demand / auf Anfrage

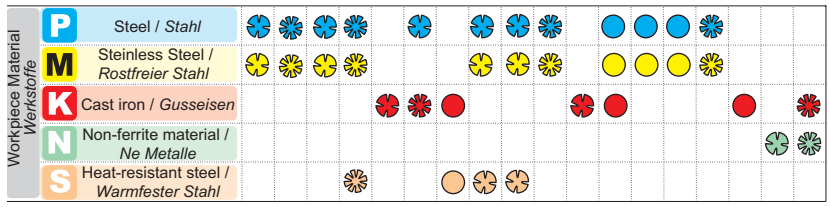
Ideal Machining Condition
Gute Bearbeitungsbedingungen

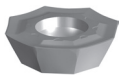
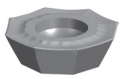
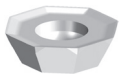
Normal Machining Condition
Normale Bearbeitungsbedingungen

Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen

Applicable inserts · Wendeschneidplatten





Insert shape Plattenform	Type · Typ	Dimension (mm) Abmessung					CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall			
		L	I.C	S	d	R	YBC301	YBC401	YBM251	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**OFKT05T3-DF**	5.26	12.7	3.97	4.4	0.5			○	○			●	●		●								
	**OFKT05T3-DM**	5.26	12.7	3.97	4.4	0.5			○		●		●	●		●								
	**OFKT05T3-LH**	5.26	12.7	3.97	4.4	0.5																	●	

Chipbreaker Selection FMA04 · Spanbrecher Auswahl FMA04

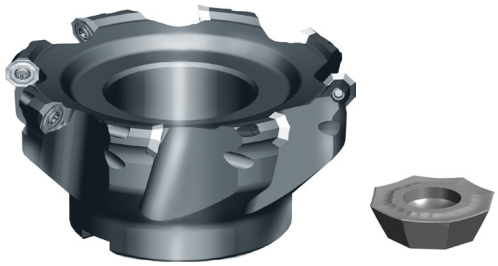
Application Anwendung	Finishing Schlichten	Semi-Finishing Mittlere Bearbeitung
P	-DF	-DM
M		
K		
AL	-LH	

Applicable tool B9-B15 Werkzeug
Tools code key B22-B23 Werkzeug ISO
Grade selection guide B16-B20 Sortenauswahl
Technical data B183-B188 Technische Daten

Recommended cutting data · Empfohlene Schnittdaten

Workpiece material Werkstückstoff		Hardness HB Härte	Grade Sorte	Cutting data · Schnittdaten		
				V (m/min)	f (mm/z)	
					-DF	-DM
P	Low-carbon steel Soft steel Niedrig legierter Kohlenstoffstahl Baustahl	≤180	YBM251	270 (220-350)	0.2 (0.1-0.3)	0.25 (0.1-0.4)
			YBG202 YBG205	270 (200-360)	0.2 (0.1-0.3)	0.25 (0.1-0.4)
			YBM351	220 (180-300)	0.2 (0.1-0.3)	0.25 (0.1-0.4)
			YBG302	230 (170-350)	0.2 (0.1-0.3)	0.25 (0.1-0.4)
	High-carbon steel Alloy steel Hoch Leg. Kohlenstoffstahl	180-280	YBM251	240 (200-320)	0.15 (0.1-0.3)	0.2 (0.1-0.4)
			YBG202 YBG205	240 (180-350)	0.15 (0.1-0.3)	0.2 (0.1-0.4)
			YBM351	200 (160-280)	0.2 (0.1-0.3)	0.25 (0.1-0.4)
			YBG302	220 (150-330)	0.2 (0.1-0.3)	0.25 (0.1-0.4)
	Alloy tool steel Leg. Werkzeugstahl	280-350	YBM251	220 (180-300)	0.15 (0.1-0.3)	0.2 (0.1-0.4)
			YBG202 YBG205	220 (170-340)	0.15 (0.1-0.3)	0.2 (0.1-0.4)
			YBM351	180 (150-250)	0.2 (0.1-0.3)	0.25 (0.1-0.4)
			YBG302	190 (130-300)	0.2 (0.1-0.3)	0.25 (0.1-0.4)
M	Stainless steel Rostfreier Stahl	≤270	YBG202 YBG205	160 (110-270)	0.15 (0.1-0.3)	0.2 (0.1-0.4)
			YBG302	140 (100-250)	0.15 (0.1-0.3)	0.2 (0.1-0.4)
			YBM251	150 (120-250)	0.15 (0.1-0.3)	0.2 (0.1-0.4)
K	Cast iron Gusseisen	180-250	YBG102	210 (120-300)	0.2 (0.1-0.3)	0.25 (0.1-0.4)
			YBD152	240 (180-300)	0.2 (0.1-0.3)	0.25 (0.1-0.4)
					-LH	
N	Al alloy leg. Alu	-	YD101	300-	0.15 (0.05-0.3)	

Case study for FMA04
Bearbeitungsbeispiel für FMA04

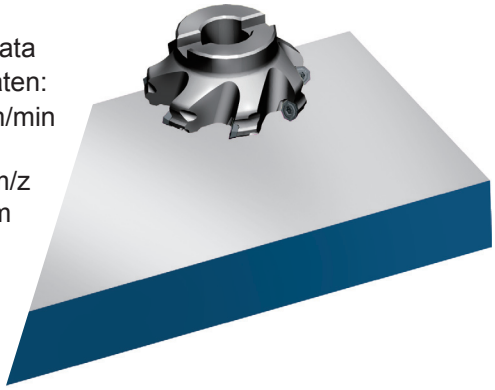


■ Tool · Werkzeug: FMA04-100-B32-OF05-07
■ Inserts · WSP: OFKT05T3-DM/YBG202

Workpiece material
Werkstückstoff: 42CrMo (HB200)
Cooling system
Kühlsystem: dry cutting, trocken

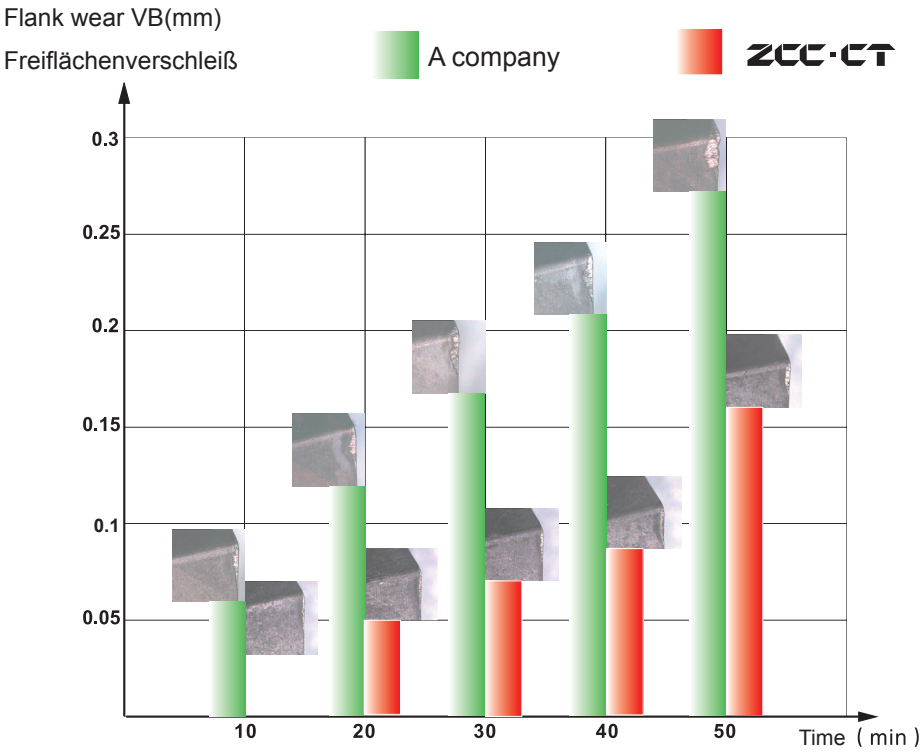
Machine:vertical machining center
Maschine: vertikales Maschinencenter

Cutting data
Schnittdaten:
Vc=180m/min
ap=1mm
fz=0.2mm/z
ae=60mm



Surface roughness
Rauhtiefe
ZCC-CT: Ra1.2
Other company product Ra1.6

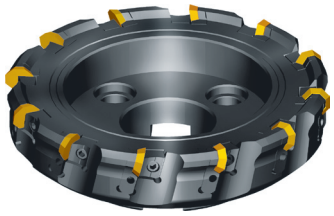
- **Wear comparison of insert**
- **Verschleißvergleich der WSP**



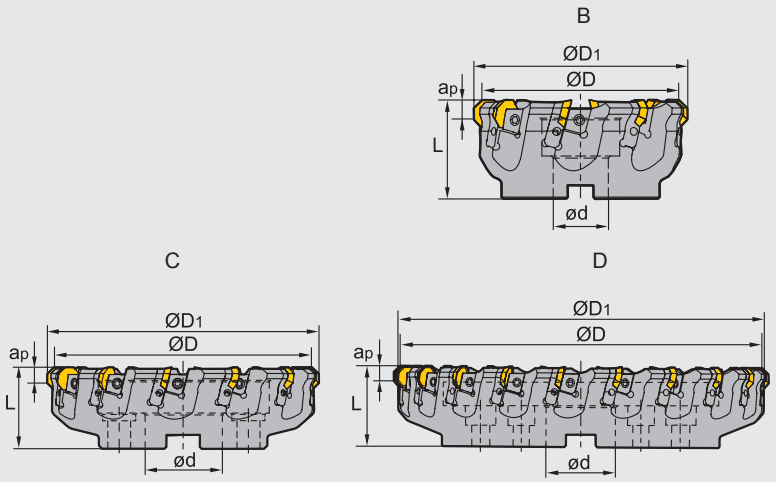
Face Milling Tools · Planfräser

Kr:45°

FMA04 P M K



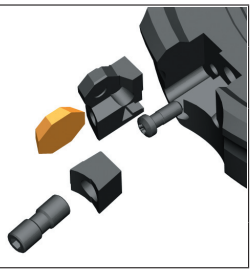
Wedge
Keil



Specification of tools · Werkzeug Beschreibung

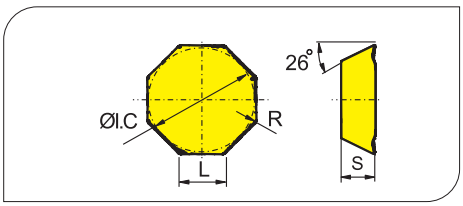
Type · Typ		Stock Lager		Dimension (mm) Abmessung					No. of teeth Zähne	Coupling Aufnahme	Weight Gewicht (kg)
		R	L	Ø D	Ø D1	Ø D	L	apmax			
FMA04	**-125-B40-OF07-08**	●	○	125	136	40	63	5	8	B	3.9
	-160-B40-OF07-10	●	○	160	171	40	63	5	10	B	5.9
	-200-C60-OF07-12	●	○	200	211	60	63	5	12	C	7.6
	-250-C60-OF07-16	●	○	250	261	60	63	5	16	C	13.3
	-315-D60-OF07-20	●	○	315	321	60	63	5	20	D	20.3

Parts · Ersatzteile

Diameter Durchmesser Ø D	Cassette Kassette	Wedge Keil	Wedge screw Keilschraube	Locator screw Einstellschraube	Wrench Schlüssel	
						
Ø125-Ø315	LOF07R/L	W02R/L	DM8×21X	LOM5×15.1	WT20T WH40T	

● Ex Stock / ab Lager ○ On demand / auf Anfrage

Applicable inserts · Wendeschneidplatten



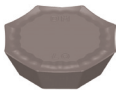
Ideal Machining Condition
Gute Bearbeitungsbedingungen

Normal Machining Condition
Normale Bearbeitungsbedingungen

Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen

Workpiece Material
Werkstoffe

P	Steel / *Stahl*	✱ ✱ ✱ ✱ ✱ ✱ ✱ ✱ ✱ ✱ ● ● ● ✱
M	Steinless Steel / *Rostfreier Stahl*	✱ ✱ ✱ ✱ ✱ ✱ ✱ ✱ ● ● ● ✱
K	Cast iron / *Gusseisen*	✱ ✱ ● ✱ ✱ ● ✱
N	Non-ferrite material / *Ne Metalle*	✱ ✱
S	Heat-resistant steel / *Warmfester Stahl*	✱ ● ✱ ✱

Insert shape Plattenform	Type · Typ	Dimension (mm) Abmessung				CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall			
		L	I.C	S	R	YBC301	YBC401	YBM251	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**OFKR0704-DF**	7.45	17.94	4.76	0.8			●					●										
	**OFKR0704-DM**	7.45	17.94	4.76	0.8	●	●	●	●	●	●	●	●		○								
	OFKR0704W-DM	7.45	17.94	4.76		●					●		●	●									
	wiper																						
	**OFKR0704-LH**	7.45	19.94	4.76																			○

Chipbreaker Selection FMA04 · Spanbrecher Auswahl FMA04

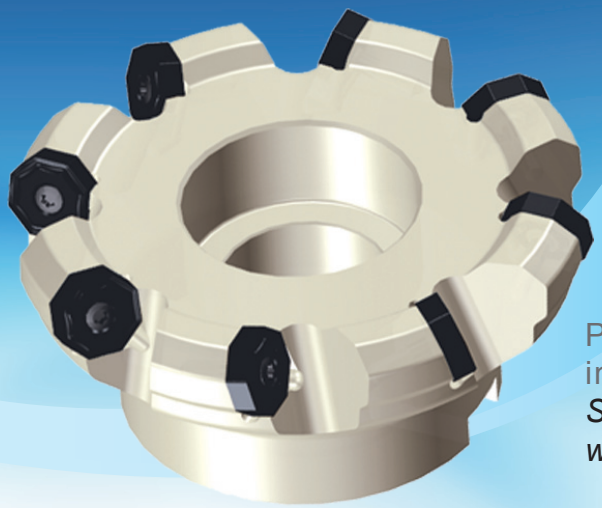
Application Anwendung	Finishing Schlichten	Semi-Finishing Mittlere Bearbeitung
P	-DF	-DM
M		
K		
N	LH	LH

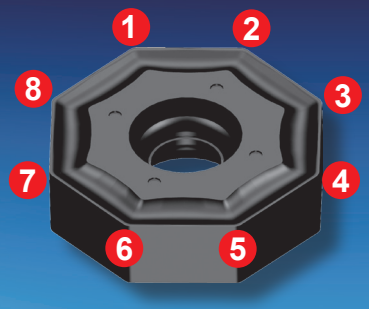
Applicable tool B9-B15 Werkzeug
Tools code key B22-B23 Werkzeug ISO
Grade selection guide B16-B20 Sortenauswahl
Technical data B183-B188 Technische Daten

Recommended cutting data · Empfohlene Schnittdaten

Workpiece material Werkstückstoff		Hardness HB Härte	Grade Sorte	Cutting data · Schnittdaten		
				V (m/min)	f (mm/z)	
					-DF	-DM
P	Low-carbon steel Soft steel Niedrig legierter Kohlenstoffstahl Baustahl	≤180	YBM251 YBC301	270 (220-350)	0.2 (0.1-0.3)	0.25 (0.1-0.4)
			YBG202 YBG205	270 (200-360)	0.2 (0.1-0.3)	0.25 (0.1-0.4)
			YBM351	220 (180-300)	0.2 (0.1-0.3)	0.25 (0.1-0.4)
			YBG302	230 (170-350)	0.2 (0.1-0.3)	0.25 (0.1-0.4)
	High-carbon steel Alloy steel Hoch Leg. Kohlenstoffstahl	180-280	YBM251 YBC301	240 (200-320)	0.15 (0.1-0.3)	0.2 (0.1-0.4)
			YBG202 YBG205	240 (180-350)	0.15 (0.1-0.3)	0.2 (0.1-0.4)
			YBM351	200 (160-280)	0.2 (0.1-0.3)	0.25 (0.1-0.4)
			YBG302	220 (150-330)	0.2 (0.1-0.3)	0.25 (0.1-0.4)
	Alloy tool steel Leg. Werkzeugstahl	280-350	YBM251 YBC301 YBD252	220 (180-300)	0.15 (0.1-0.3)	0.2 (0.1-0.4)
			YBG202 YBG205	220 (170-340)	0.15 (0.1-0.3)	0.2 (0.1-0.4)
			YBM351	180 (150-250)	0.2 (0.1-0.3)	0.25 (0.1-0.4)
			YBG302	190 (130-300)	0.2 (0.1-0.3)	0.25 (0.1-0.4)
M	Stainless steel Rostfreier Stahl	≤270	YBG202 YBG205	160 (110-270)	0.15 (0.1-0.3)	0.2 (0.1-0.4)
			YBG302	140 (100-250)	0.15 (0.1-0.3)	0.2 (0.1-0.4)
			YBM251	150 (120-250)	0.15 (0.1-0.3)	0.2 (0.1-0.4)
K	Cast iron Gusseisen	180-250	YBG102	210 (120-300)	0.2 (0.1-0.3)	0.25 (0.1-0.4)
			YBD152	240 (180-300)	0.2 (0.1-0.3)	0.25 (0.1-0.4)
			YBD252	200 (150-250)	0.2 (0.1-0.3)	0.25 (0.1-0.4)

FMA07





Stable double side insert with 16 cutting edge for high productivity / *Stabile doppelseitige Wendeschneidplatte mit 16 Schneidecken für hohe Wirtschaftlichkeit*

Positive light cutting chip breaker for finishing to roughing in wide application field / *Positive, leicht schneidende Spanbrecherform für die Schlicht- bis Schruppbearbeitung mit weitem Anwendungsspektrum*

Cutter body diameter Ø25 to Ø315, inserts ONHU06**-PM and ONHU08**-PM, Grades YBM253, YBD152, YBM351 and YBG202 / *Fräserdurchmesser Ø25 bis Ø315, WSP ONHU06**-PM und ONHU08**-PM, in den Sorten YBM253,YBD152, YBM351 und YBG202.*

Face milling / Planfräser

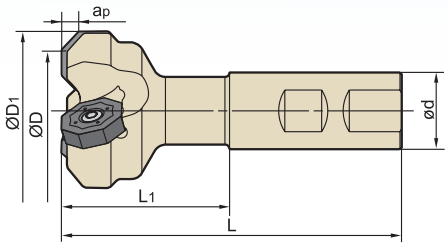
Kr:45°





FMA07 P M K

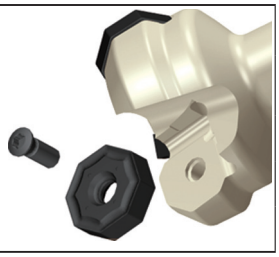




Type Typ		Stock Lager R	Stock Lager L	Dimension Abmessung (mm) ØD	ØD1	ød	L	L1	apmax	Tooth Zähne Z	Weight Gewicht (kg)
FMA07	**-025-XP20-ON06-02**	○	○	25	37	20	95	45	4	2	0.2
	-040-XP25-ON06-03	○	○	40	52	25	106	50	4	3	0.4
	-032-XP25-ON08-02	●	○	32	47	25	111	55	5	2	0.4
	-040-XP25-ON08-03	●	○	40	55	25	111	55	5	3	0.5
	-050-XP25-ON08-04	●	○	50	65	25	111	55	5	4	0.6

● Ex stock / ab Lager ○ On demand / auf Anfrage

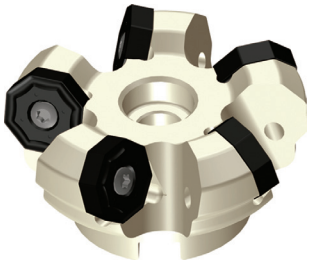
Diameter Durchmesser ØD	Insert WSP	Screw Schraube	Wrench Schlüssel		
					
Ø25 -Ø40	ONHU06**-PM	I60M4×10	--	WT15IS	
Ø32 -Ø50	ONHU08**-PM	I60M5×13	WT20IT	--	

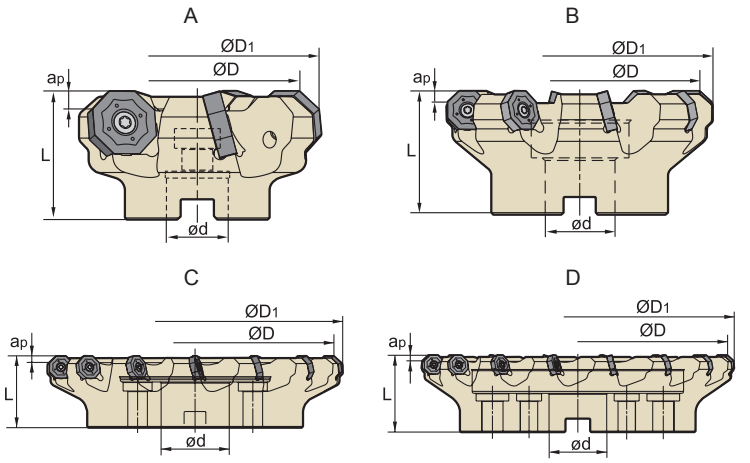


Face milling / Planfräser

Kr:45°

FMA07 P M K

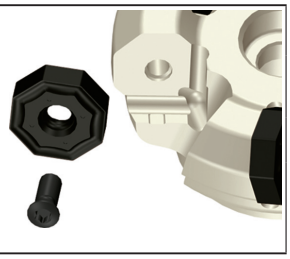




Type Typ		Stock Lager R	Stock Lager L	Dimension Abmessung (mm) ØD	ØD1	ød	L	apmax	Tooth Zähne Z	Coupling Aufnahme	Weight Gewicht (kg)
FMA07	**-050-A22-ON06-05**	●	○	50	62	22	40	4	5	A	0.3
	-063-A22-ON06-06	●	○	63	75	22	40	4	6	A	0.5
	-080-B27-ON06-07	●	○	80	92	27	50	4	7	B	1.0
	-100-B32-ON06-08	●	○	100	112	32	63	4	8	B	1.9
	-125-B40-ON06-09	●	○	125	137	40	63	4	9	B	3.5
	-160-C40-ON06-11	○	○	160	172	40	63	4	11	C	4.3
	-200-C60-ON06-13	○	○	200	212	60	63	4	13	C	6.4
	-250-C60-ON06-15	○	○	250	262	60	63	4	15	C	13.4
	-315-D60-ON06-17	○	○	315	327	60	80	4	17	D	21.9
	-063-A22-ON08-05	●	○	63	78	22	40	5	5	A	0.5
	-080-B27-ON08-06	●	○	80	95	27	50	5	6	B	0.9
	-100-B32-ON08-07	●	○	100	115	32	63	5	7	B	1.8
	-125-B40-ON08-08	●	○	125	140	40	63	5	8	B	3.1
	-160-C40-ON08-10	●	○	160	175	40	63	5	10	C	4.1
	-200-C60-ON08-12	●	○	200	215	60	63	5	12	C	6.1
	-250-C60-ON08-14	●	○	250	265	60	63	5	14	C	12.0
	-315-D60-ON08-16	●	○	315	330	60	80	5	16	D	21.0

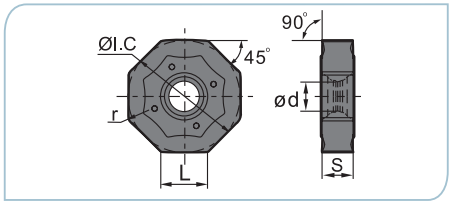
● Ex stock / ab Lager ○ On demand / auf Anfrage

Diameter Durchmesser ØD	Insert WSP	Screw Schraube	Wrench Schlüssel	
				
Ø50 -Ø315	ONHU06**-PM	I60M4×10	--	WT15IS
Ø63 -Ø315	ONHU08**-PM	I60M5×13	WT20IT	--



● Ex Stock / ab Lager ○ On demand / auf Anfrage

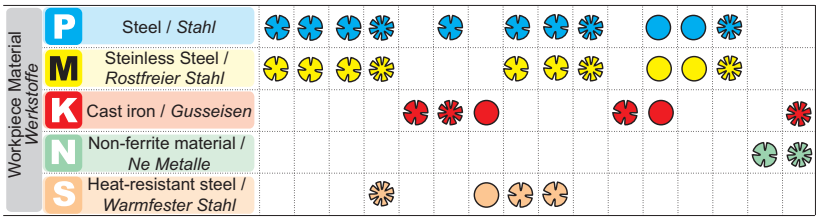
Applicable inserts
Wendeschneidplatten



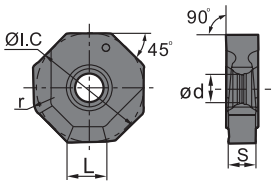
Ideal Machining Condition
Gute Bearbeitungsbedingungen

Normal Machining Condition
Normale Bearbeitungsbedingungen

Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen



Insert WSP	Type Typ	Dimension Abmessung (mm)					CVD Coating CVD Beschlicht.						PVD Coating PVD Beschicht.					Cermet		Carbide uncoat. unb. Hartmetall		
		L	ØI.C	S	ød	r	YBC301	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YNG151	YNG151C	YC30S	YD101	YD201
	ONHU060408-PF	6.58	15.875	4.76	4.4	0.83					●			●								
	ONHU060408-PM	6.58	15.875	4.76	4.4	0.83			●	●	●											
	ONHU08T508-PF	8.39	20.2	5.79	5.3	0.83					●			●								
	ONHU08T508-PM	8.39	20.2	5.79	5.3	0.83			●	●	●											
	ONHU08T508-W	6.9	20.5	6.00	5.3	0.80					●		○									



● Ex stock / ab Lager ○ On demand / auf Anfrage

Cutting Data /Schnittdaten

Workpiece material Werkstück Material		Hardness HB Härte	Grade Sorte	Cutting data · Schnittdaten			
				V_c(m/min)	f_z(mm/z)	a_e(mm)	
						ONHU06**-PM	ONHU08**-PM
P	Low-carbon steel Soft steel Niedrig legierter Kohlenstoffstahl Baustahl	≤180	YBG202 YBM253 YBM351	270 (220-350)	0.2 (0.1-0.4)	4	5
P	High-carbon steel Alloy steel Hoch leg. Kohlenstoffstahl Leg. Stahl	180-280	YBG202	240 (180-350)	0.2 (0.1-0.4)	4	5
P			YBM253	260 (200-320)	0.2 (0.1-0.4)	4	5
P			YBM351	200 (180-280)	0.2 (0.1-0.4)	4	5
P	Alloy tool steel Leg. Werkzeugstahl	280-350	YBM253	240 (180-300)	0.2 (0.1-0.4)	4	5
P			YBM351	180 (150-250)	0.2 (0.1-0.4)	4	5
M	Stainless steel Rostfreier Stahl	≤270	YBM253	230(180-300)	0.2(0.1-0.3)	4	5
K	Cast iron Gusseisen	180-250	YBD152	270 (150-300)	0.4 (0.1-0.5)	4	5

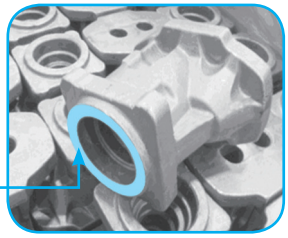
For Example / Beispiele

Milling Tools / *Fräser:* FMA07-100-B32-ON08-07
Insert / *WSP:* ONHU08T508-PM YBD152
Parts / *Teile:* Case of gear pump / *Pumpengehäuse*
Workpiece material / *Werkstückstoff:* HT400
Cooling system / *Kühlsystem:* dry cutting / *trocken*

Machine / *Maschine:* CNC floor Type / *CNC Maschine*

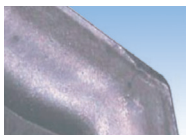
Cutting data / *Schnittdaten:* V_c=267m/min f_z=0.42mm/z
a_p=1.5mm a_e=80mm

Direction / *Richtung* Climb milling / *Gleichlauffräsen*
Processing site / *Bearbeitungsebene* End face / *Planfläche*



● Wear comparison of insert
Verschleißvergleich der WSP

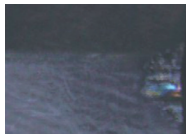
tool wear / Verschleiß


ZCC-CT


Competitor / Wettbewerb A

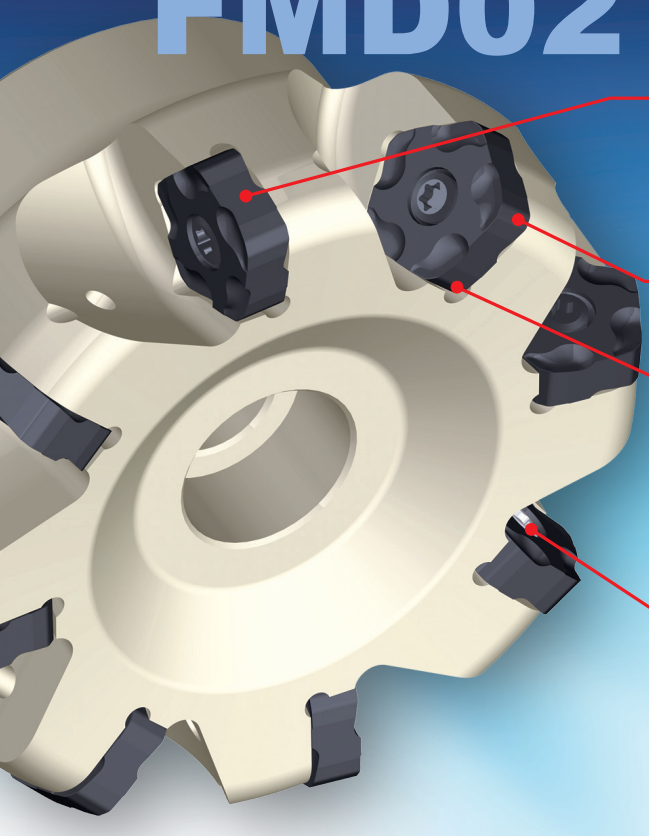
flank wear / Freiflächenverschleiß


ZCC-CT


Competitor / Wettbewerb A

Applicable tool / Werkzeug B9-B15
Tools code key / Werkzeug ISO B22-B23
Grade selection guide / Sortenauswahl B16-B20
Technical data / Technische Daten B183-B188

FMD02



Rake angle Kr=67°
Anstellwinkel Kr=67°



Wiper / *Wiper*



10 Cutting edges
10 Schneidkanten



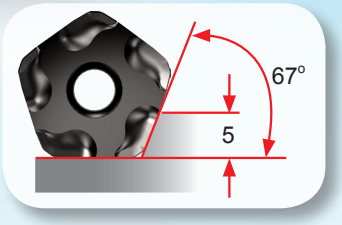
Screw clamping
Schraubenspannsystem



Clamping by wedge for highest accuracy and reliability.

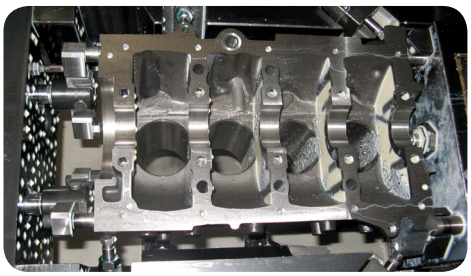
Klemmkeilspannung für höchste Stabilität und Wiederholgenauigkeit.

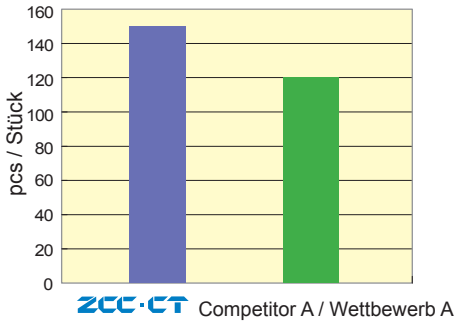




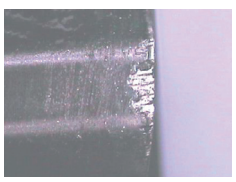
Machining of cast iron, $a_{p\ max}$=5mm
Gussbearbeitung, $a_{p\ max}$=5mm

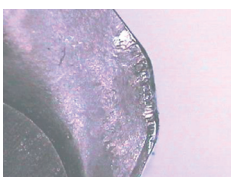
Holder/Halter	FMD02-100-B32-PN11-10 ZCC·CT	Competitor A / Wettbewerb A
Insert/WSP	PNEG110512R-CR/YBD152	
Cutting data Schnittdaten	D=100mm a_p=3~5mm Vc=243m/min f_z=0.15mm/Z 145~155 pcs/Stück	D=100mm a_p=3~5mm Vc=243m/min f_z=0.12mm/Z 120~133 pcs/Stück



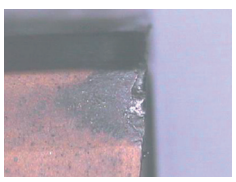


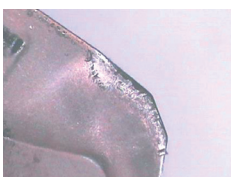
• Comparing of wear / Vergleich





ZCC·CT after 80 min/ nach 80 min

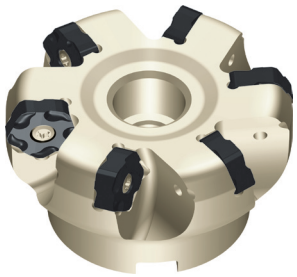


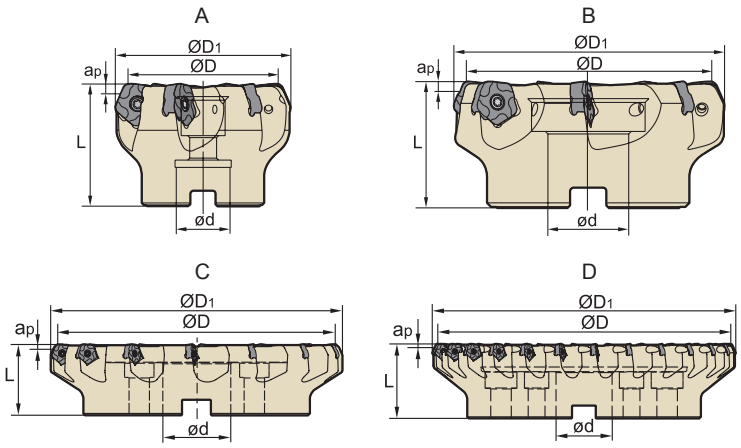


Competitor A / Wettbewerb A after 48min / nach 48 min

Face milling / Planfräser Kr:67°

FMD02 K

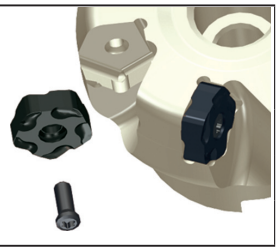




Type Typ		Stock Lager R	Stock Lager L	Dimension Abmessung (mm) ØD	ØD1	ød	L	apmax	Tooth Zähne Z	Coupling Aufnahme	Weight Gewicht (kg)
FMD02	**-050-A22-PN11-04**	●	○	50	60.1	22	50	5	4	A	0.6
	-063-A22-PN11-05	●	○	63	73.1	22	50	5	5	A	0.8
	-080-A27-PN11-06	●	○	80	90.1	27	50	5	6	A	1.1
	-100-B32-PN11-07	●	○	100	110.1	32	50	5	7	B	1.8
	-125-B40-PN11-08	●	○	125	135.1	40	63	5	8	B	2.9
	-160-B40-PN11-10	●	○	160	170.1	40	63	5	10	B	5.6
	-200-C60-PN11-12	●	○	200	210.1	60	63	5	12	C	7.9
	-250-C60-PN11-14	●	○	250	260.1	60	63	5	14	C	13.4
	-050-A22-PN11-05	●	○	50	60.1	22	50	5	5	A	0.6
	-063-A22-PN11-06	●	○	63	73.1	22	50	5	6	A	0.9
	-080-A27-PN11-08	●	○	80	90.1	27	50	5	8	A	1.2
	-100-B32-PN11-10	●	○	100	110.1	32	50	5	10	B	1.9
	-125-B40-PN11-12	●	○	125	135.1	40	63	5	12	B	3.2
	-160-B40-PN11-14	●	○	160	170.1	40	63	5	14	B	6.4
	-200-C60-PN11-16	●	○	200	210.1	60	63	5	16	C	8.5
	-250-C60-PN11-18	●	○	250	260.1	60	63	5	18	C	18.0
	-315-D60-PN11-26	●	○	315	325.1	60	80	5	26	D	24.5

● Ex stock / ab Lager ○ On demand / auf Anfrage

Spare parts / Ersatzteilen

ØD	Screw / Schraube	Wrench / Schlüssel	
			
Ø50 -Ø315	I60M4×10	WT15IS	

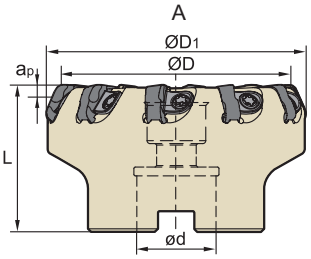
Applicable tool B9-B15 Werkzeug
Tools code key B22-B23 Werkzeug ISO
Grade selection guide B16-B20 Sortenauswahl
Technical data B183-B188 Technische Daten

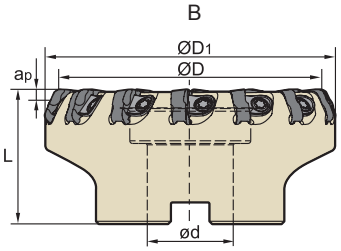
Face Milling Tools · Planfräser

Kr:67°

FMD02 K

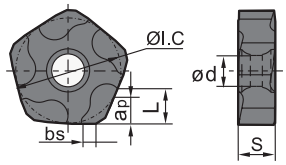






Type Typ		Stock Lager R	Stock Lager L	Dimension Abmessung (mm) ØD	ØD1	ød	L	apmax	Shim Unterlage	Screw Schraube	Tooth Zähne Z	Coupling Aufnahme	Weight Gewicht (kg)
FMD02	-080-A27-PN11-10	●	○	80	90.1	27	50	5	W18N	DM6x20	10	A	1.3
	-100-B32-PN11-14	●	○	100	110.1	32	50	5			14	B	1.6
	-125-B40-PN11-18	●	○	125	135.1	40	63	5			18	B	3.2
	-160-B40-PN11-22	●	○	160	170.1	40	63	5			22	B	5.8

Applicable inserts
Wendeschneidplatten

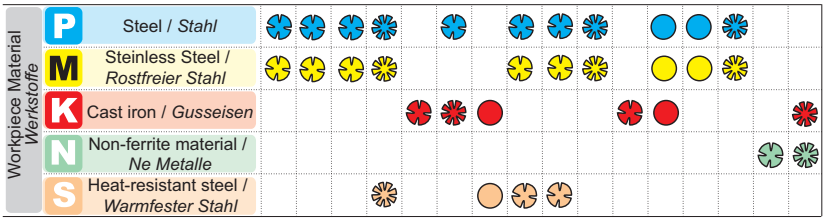


Ideal Machining Condition
Gute Bearbeitungsbedingungen

Normal Machining Condition
Normale Bearbeitungsbedingungen

Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen

Workpiece Material *Werkstoffe*



Insert WSP	Type Typ	Dimension Abmessung (mm) L	ØI.C	S	ød	bs	ap	CVD Coating CVD Beschlicht. YBC301	YBM251	YBM253	YBM351	YBD152	YBD252	PVD Coating PVD Beschicht. YBG102	YBG202	YBG205	YBG302	YBG152	Cermet YNG151	YNG151C	Carbide uncoat. unb. Hartmetall YC30S	YD101	YD201
	PNEG110512R-CR	5.4	15.875	5.56	4.64	1.6	5					●	○										
	PNEG110512R-CM	5.4	15.875	5.56	4.64	1.6	5					●											

Cutting Data /Schnittdaten

	Workpiece material Werkstück Material	Hardness HB Härte	Grade Sorte	Cutting data / *Schnittdaten* Vc(m/min)	fz(mm/z)	apmax(mm)
K	Cast iron Gusseisen	180-250	YBD152	270 (150-300)	0.2 (0.1-0.4)	5
		180-250	YBD252	200 (150-250)	0.2 (0.1-0.4)	5

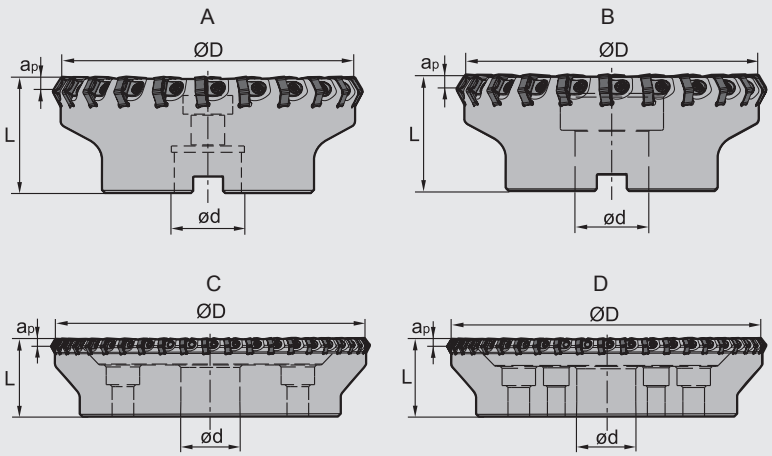
● Ex Stock / ab Lager ○ On demand / auf Anfrage

Face Milling Tools · Planfräser

Kr:55°

FMD02 K

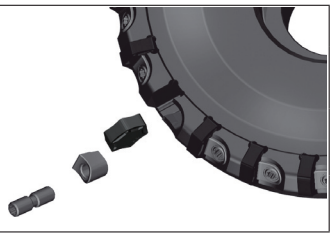




Specification of tools · Werkzeug Beschreibung

Type · Typ		Stock Lager		Dimension (mm) Abmessung				No. of teeth Zähne	Coupling Aufnahme	Weight Gewicht (kg)
		R	L	ØD	ød	L	apmax			
FMD02	-080-A27-HN09-10	○	○	80	27	50	6	10	A	1.1
	-100-B32-HN09-14	○	○	100	32	63	6	14	B	2.6
	-125-B40-HN09-18	○	○	125	40	70	6	18	B	3.7
	-160-B40-HN09-22	○	○	160	40	63	6	22	B	5.6
	-200-C60-HN09-28	○	○	200	60	63	6	28	C	6.3
	-250-C60-HN09-36	○	○	250	60	63	6	36	C	10.3
	-315-D60-HN09-44	○	○	315	60	63	6	44	D	21.7

Parts · Ersatzteile

Diameter Durchmesser Ø D	Wedge Keil	Wedge screw Keilschraube	Wrench Schlüssel	
				
Ø80-Ø315	W18N	DM6×20A	WT15IT	

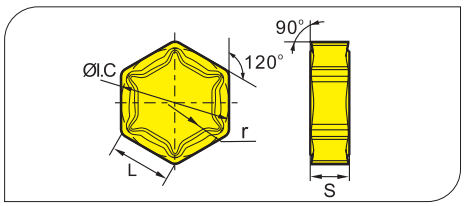
Applicable tool D24-D28
Tools code key B24-B25
Grade selection guide B17-B21
Technical data B203-B208

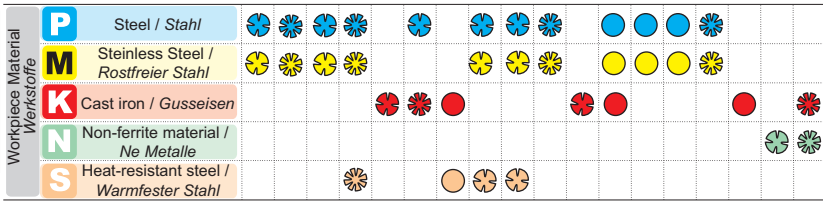
Applicable inserts · Wendeschneidplatten

Ideal Machining Condition
Gute Bearbeitungsbedingungen

Normal Machining Condition
Normale Bearbeitungsbedingungen

Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen





Insert shape Plattenform	Type · Typ	Dimension (mm) Abmessung				CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall			
		L	I.C	S	r	YBC301	YBC401	YBM251	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**HNEX090512-DF**	9.16	15.875	5.56	1.2					○													
	**HNEX090512-DM**	9.16	15.875	5.56	1.2					○													
	**HNEX090512-DR**	9.16	15.875	5.56	1.2					●	●												

Chipbreaker Selection FMD02 · Spanbrecher Auswahl FMD02

Application Anwendung	Finishing Schlichten	Semi-Finishing Mittlere Bearbeitung	Roughing Schruppen
K	-DF	-DM	-DR

Recommended cutting data · Empfohlene Schnittdaten

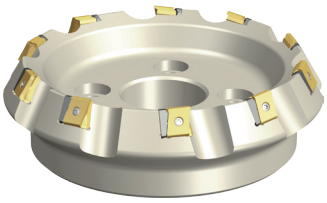
Workpiece material Werkstückstoff		Hardness HB Härte	Grade Sorte	Cutting data · Schnittdaten			
				V (m/min)	f (mm/z)		
					-DF	-DM	-DR
K	Cast iron Gusseisen	180-250	YBD152	180 (110-250)	0.15(0.1-0.2)	0.2 (0.1-0.3)	0.3(0.2-0.5)
			YBD252	130 (110-200)	0.2(0.1-0.2)	0.25 (0.1-0.3)	0.3(0.2-0.5)

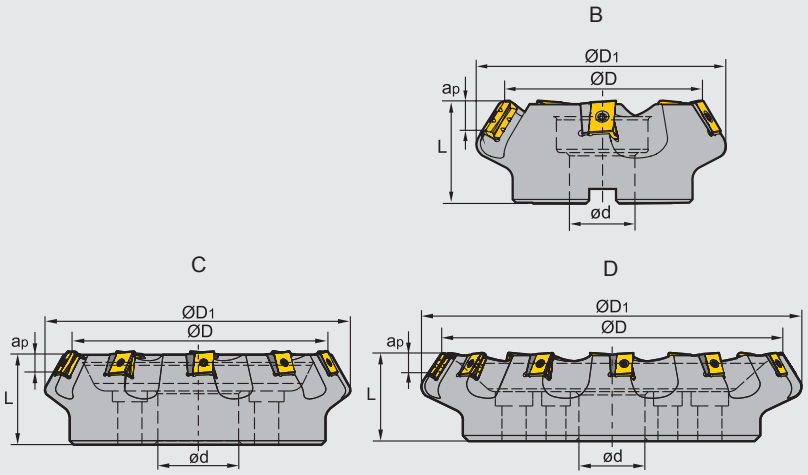
● Ex Stock / ab Lager ○ On demand / auf Anfrage

Face Milling Tools · Planfräser

Kr:60°

FMD03 P M K



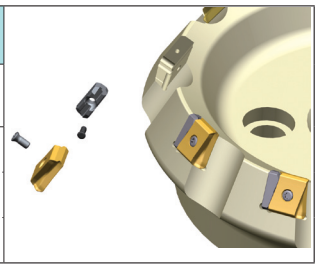


Specification of tools · Werkzeug Beschreibung

Type · Typ		Stock		Dimension(mm) Abmessung					No.of Teeth Zähne	Insert WSP	Coupling Aufnahme	Weight Gewicht (kg)
		R	L	ØD	ØD1	Ød	L	a_{pmax}				
FMD03	-125-B40-LN20-06	●	○	125	153	40	63	12	6	LNKT2007DN-ZR	B	4.5
	-160-C40-LN20-08	●	○	160	187	40	63	12	8		C	6.9
	-200-C60-LN20-10	●	○	200	227	60	70	12	10		C	10.5
	-250-C60-LN20-12	●	○	250	276	60	70	12	12		C	13.4
	-315-D60-LN20-15	●	○	315	339	60	80	12	15		D	26.2
	-125-B40-LN25-05	●	○	125	154	40	63	17	5	LNKT2510-ZR	B	4.5
	-160-C40-LN25-06	●	○	160	189	40	63	17	6		C	6.9
	-200-C60-LN25-08	●	○	200	229	60	70	17	8		C	10.5
	-250-C60-LN25-10	●	○	250	278	60	70	17	10		C	16.7
	-315-D60-LN25-12	●	○	315	346	60	80	17	12		D	27.3
	-400-D60-LN25-16	●	○	400	427	60	80	17	16		D	47.1

Parts · Ersatzteile

Insert Platte	Cassette Kassette	Wedge screw Keilschraube	Locator screw Einstellschraube	Wrench Schlüssel	
					
LNKT2007DN-ZR	LLN20R-ZR	I60M3×7	I60M4×15	WT15IS	WT10IS
LNKT2510-ZR	LLN25R-ZR	I60M3.5×10.4	I60M5×17	WT20IT	WT15IS



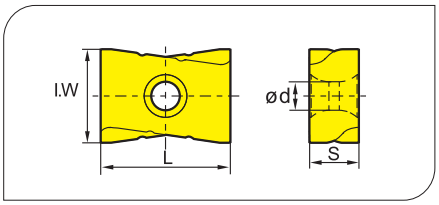
Applicable tool B9-B15 Werkzeug
Tools code key B22-B23 Werkzeug ISO
Grade selection guide B16-B20 Sortenauswahl
Technical data B183-B188 Technische Daten

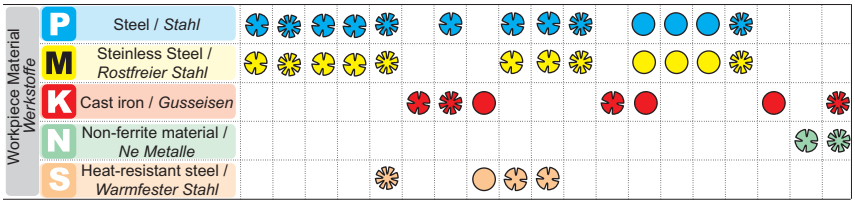
Ideal Machining Condition
Gute Bearbeitungsbedingungen

Normal Machining Condition
Normale Bearbeitungsbedingungen

Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen

Applicable inserts · Wendeschneidplatten





Insert shape Plattenform	Type · Typ	Dimension(mm) Abmessung				CVD Coating CVD Beschicht						PVD Coating PVD Beschicht						Cermet		Carbide uncoat. unbe. Hartmetal			
		L	l.W	S	ød	YBC301	YBC401	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**LNKT2007DN-ZR**	20	17	7.94	4.6					●	○	●				○								
	**LNKT2510-ZR**	25	18	9.525	5.5					●		○				●								

Recommended cutting data · Empfohlene Schnittdaten

Workpiece material Werkstückstoff		Hardness HB Härte	Grade Sorte	Cutting data · Schnittdaten	
				V (m/min)	f (mm/z)
P	Low-carbon steel Soft steel	≤180	YBG302	180 (150-300)	0.5 (0.2-0.8)
			YBM351	180 (150-300)	0.5 (0.2-0.8)
	High-carbon steel Alloy steel	180-280	YBG302	150 (120-280)	0.5 (0.2-0.8)
			YBM351	140 (120-280)	0.5 (0.2-0.8)
	Alloy tool steel Leg. Werkzeugstahl	280-350	YBG302	120 (80-250)	0.45 (0.2-0.6)
			YBM351	100 (80-250)	0.45 (0.2-0.6)
M	Stainless steel Rostfreier Stahl	≤270	YBG302	120 (80-200)	0.45 (0.2-0.6)
			YBM351	100 (80-200)	0.45 (0.2-0.6)
K	Cast iron Gusseisen	180-250	YBM351	100 (80-180)	0.5 (0.2-0.8)
			YBD252	130 (110-200)	0.5 (0.2-0.8)

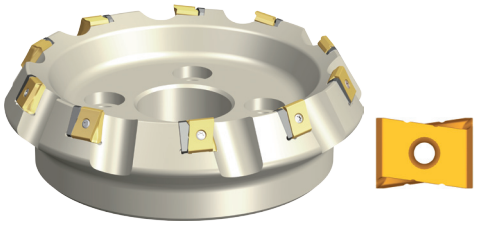
Applicable tool B9-B15
Werkzeug

Tools code key B22-B23
Werkzeug ISO

Grade selection guide B16-B20
Sortenauswahl

Technical data B183-B188
Technische Daten

Case study for FMD03
Bearbeitungsbeispiel für FMD03



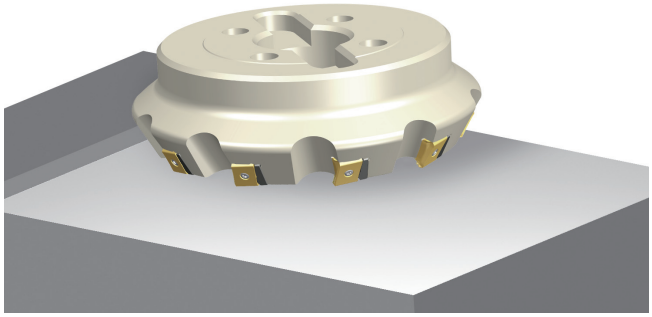
■ Tool · Werkzeug: FMD03-315-D60-LN25-12
■ Inserts · WSP: LNKT2510-ZR/YBG302

Workpiece material
Werkstückstoff: ASTMA743 CA-6NM class(HB200)

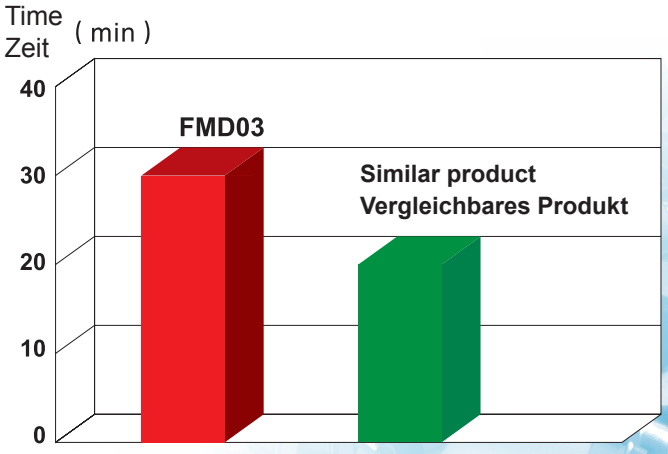
Cooling system
Kühlsystem: dry cutting, trocken

Machine
Maschine:
NC floor Type · Typ boring and milling machine,
spindle power≥30KW
Bohr-Fräszentrum Spindelkraft 230 KW

Cutting data
Schnittdaten:
Vc=200m/min
fz=0.6mm/z
ap=10mm



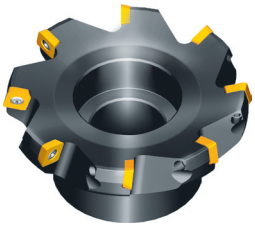
- **Wear comparison of insert**
- **Verschleißvergleich der WSP**

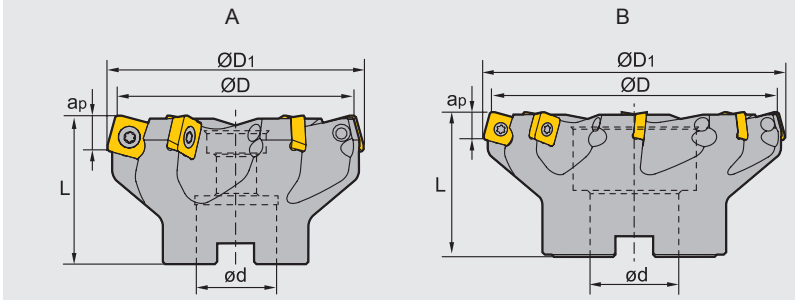


Face Milling Tools · Planfräser

Kr:75°

FME02 P M K





Specification of tools · Werkzeug Beschreibung

Type · Typ		Stock Lager	Dimension (mm) Abmessung					No. of teeth Zähne	Coupling Aufnahme	Weight Gewicht (kg)
			Ø D	Ø D_1	Ø D	L	a_{pmax}			
FME02	**-050-A22-SP12-04**	○	50	54	22	40	6	4	A	0.3
	-063-A22-SP12-05	○	63	66	22	50	6	5	A	0.6
	-080-A27-SP12-06	○	80	83	27	50	6	6	A	0.9
	-100-B32-SP12-07	○	100	103	32	50	6	7	B	1.4
	-125-B40-SP12-08	○	125	128	40	63	6	8	B	2.5

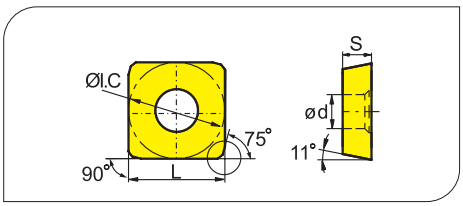
Spare Parts · Ersatzteile

Diameter Durchmesser Ø D	Screw Schraube	Wrench Schlüssel	
			
Ø50-Ø125	I60M5×13.2	WT20IS	



● Ex Stock / ab Lager ○ On demand / auf Anfrage

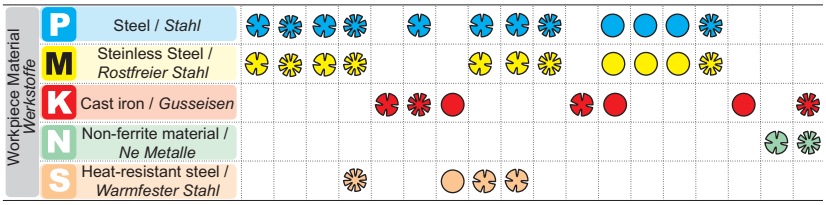
Applicable inserts · Wendeschneidplatten



Ideal Machining Condition
Gute Bearbeitungsbedingungen

Normal Machining Condition
Normale Bearbeitungsbedingungen

Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen



Insert shape Plattenform	Type · Typ	Dimension (mm) Abmessung				CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall			
		L	I.C	S	d	YBC301	YBC401	YBM251	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**SPKW1204EDFR**	12.7	12.7	4.76	5.56								●										
	SPKW1204EDSR	12.7	12.7	4.76	5.56								●										
	**SPKT1204EDR**	12.7	12.7	4.76	5.56								●										

Chipbreaker Selection FME02 · Spanbrecher Auswahl FME02

Application Anwendung	Finishing Schlichten	Semi-Finishing Mittlere Bearbeitung	Roughing Schruppen
P	EDFR	EDR	EDSR
M	EDFR	EDR	
K	EDFR	EDR	

Recommended cutting data · Empfohlene Schnittdaten

Workpiece material Werkstückstoff		Hardness HB Härte	Grade Sorte	Cutting data · Schnittdaten	
				V (m/min)	f (mm/z)
P	Low-carbon steel Soft steel	≤180	YBG202	270(200-360)	0.2 (0.1-0.3)
	High-carbon steel Alloy steel	180-280	YBG202	240 (180-350)	0.2 (0.1-0.3)
	Alloy tool steel Leg. Werkzeugstahl	280-350	YBG202	220 (170-340)	0.2 (0.1-0.3)
M	Stainless steel Rostfreier Stahl	≤270	YBG202	160 (110-270)	0.2 (0.1-0.3)
K	Cast iron Gusseisen	180-250	YBG202	160 (120-200)	0.2 (0.1-0.3)

Applicable tool B9-B15
Werkzeug

Tools code key B22-B23
Werkzeug ISO

Grade selection guide B16-B20
Sortenauswahl

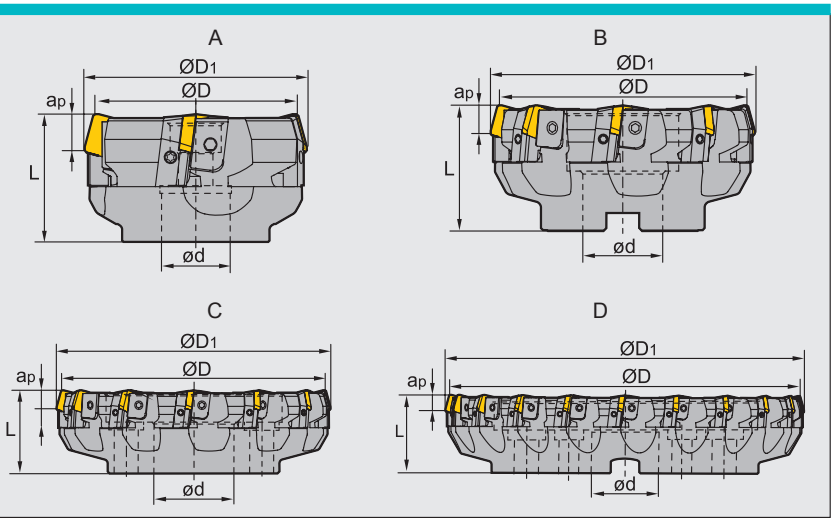
Technical data B183-B188
Technische Daten

Face Milling Tools · Planfräser

Kr:75°

FME03 P M K

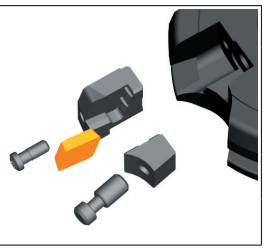




Specification of tools · Werkzeug Beschreibung

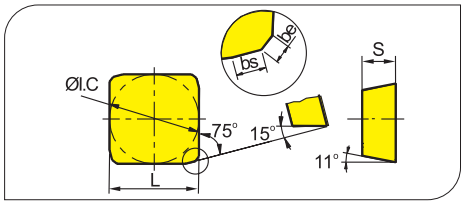
Type · Typ		Stock Lager		Dimension (mm) Abmessung					No. of teeth Zähne	Coupling Aufnahme	Weight Gewicht (kg)
		R	L	Ø D	Ø D1	Ø D	L	apmax			
FME03	**-080-A27-SP12-04**	○	○	80	84	27	50	6	4	A	1.1
	-100-B32-SP12-06	○	○	100	104	32	50	6	6	B	1.9
	-125-B40-SP12-08	○	○	125	129	40	63	6	8	B	3.5
	-160-B40-SP12-10	○	○	160	164	40	63	6	10	B	5.7
	-200-C60-SP12-12	○	○	200	203	60	63	6	12	C	8.2
	-250-C60-SP12-16	○	○	250	253	60	63	6	16	C	13.8
	-315-D60-SP12-20	○	○	315	318	60	70	6	20	D	23.5
	-080-A27-SP15-04	○	○	80	84	27	50	8	4	A	1.0
	-100-B27-SP15-06	○	○	100	104	27	50	8	6	B	1.8
	-125-B40-SP15-08	○	○	125	129	40	63	8	8	B	3.3
	-160-B40-SP15-10	○	○	160	164	40	63	8	10	B	5.4
	-200-C60-SP15-12	○	○	200	204	60	63	8	12	C	7.9
	-250-C60-SP15-16	○	○	250	253	60	63	8	16	C	13.6
	-315-D60-SP15-20	○	○	315	318	60	70	8	20	D	23.1

Spare Parts · Ersatzteile

Diameter Durchmesser Ø D	Insert Platte	Cassette Kassette	Wedge Keil	Screw Schraube	Locator screw Schraube	Wrench Schlüssel	
Ø80-Ø100	SP12	LSP12R/L	W04R/L	WM8×17	LOM5×15.1	WT20T WT25T	
Ø125-Ø315				WM8×22			
Ø80-Ø315	SP15	LSP15R/L	W04R/L	WM8×22			

● Ex Stock / ab Lager ○ On demand / auf Anfrage

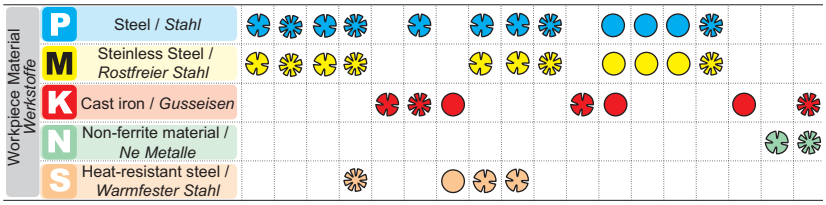
Applicable inserts · Wendeschneidplatten



Ideal Machining Condition
Gute Bearbeitungsbedingungen

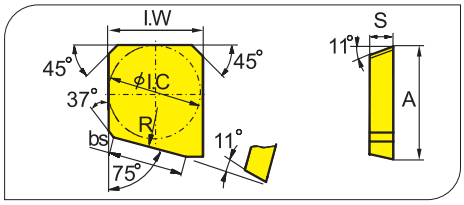
Normal Machining Condition
Normale Bearbeitungsbedingungen

Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen



Insert WSP	Type · Typ	Dimensions (mm) · Abmessungen					CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall			
		L	I.C	S	be	bs	YBC301	YBC401	YBM251	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	SPKN1203EDER	12.7	12.7	3.18	1	1.4																		
	SPKN1203EDEL	12.7	12.7	3.18	1	1.4																		
	SPKN1203EDFR	12.7	12.7	3.18	1	1.4																	○	●
	SPKN1203EDFL (SPKN1203EDL)	12.7	12.7	3.18	1	1.4																		●
	SPKN1203EDSKR (SPKN1203EDR)	12.7	12.7	3.18	1	1.4	●						●	●		○					●			
	SPKN1203EDSKL (SPKN1203EDL)	12.7	12.7	3.18	1	1.4								●							●			
	SPKN1203EDTKR	12.7	12.7	3.18	1	1.4																		
	SPKN1203EDTKL	12.7	12.7	3.18	1	1.4																		
	SPKN1203EDS31PR (SPKN1203EDT31R)	12.7	12.7	3.18	1	1.4								○										
	SPKN1203EDS31PL (SPKN1203EDT31L)	12.7	12.7	3.18	1	1.4																		
	SPKN1203EDT31R	12.7	12.7	3.18	1	1.4																		
	SPKN1203EDT31L	12.7	12.7	3.18	1	1.4																		
	SPKR1203EDR-GM	12.7	12.7	3.18	1	1.4			●					○										
	SPKR1203EDI-GM	12.7	12.7	3.18	1	1.4			●					○										
	SPKN1204EDFL (SPKN1204EDL)	12.7	12.7	4.76	1	1.4																		
	SPKN1204EDER (SPKN1204EDR)	12.7	12.7	4.76	1	1.4	○																	
	SPKN1204EDFR	12.7	12.7	4.76	1	1.4																		
	SPKN1204EDSKR	12.7	12.7	4.76	1	1.4						○												
	SPKN1504EDER	15.875	15.875	4.76	1	1.4																		
	SPKN1504EDEL	15.875	15.875	4.76	1	1.4																		
	SPKN1504EDFR	15.875	15.875	4.76	1	1.4																		●
	SPKN1504EDFL (SPKN1504EDL)	15.875	15.875	4.76	1	1.4																		●
	SPKN1504EDSKR (SPKN1504EDR)	15.875	15.875	4.76	1	1.4	●							●		●					●			
	SPKN1504EDSKL (SPKN1504EDL)	15.875	15.875	4.76	1	1.4															●			
	SPKN1504EDTKR (SPKN1504EDR)	15.875	15.875	4.76	1	1.4							●											
	SPKN1504EDTKL	15.875	15.875	4.76	1	1.4																		
	SPKN1504EDS32PR (SPKN1504EDT32R)	15.875	15.875	4.76	1	1.4								●										
	SPKN1504EDS32PL (SPKN1504EDTL)	15.875	15.875	4.76	1	1.4																		
	SPKN1504EDT32PR (SPKN1504EDTR)	15.875	15.875	4.76	1	1.4	●																	
	SPKN1504EDT32PL (SPKN1504EDTL)	15.875	15.875	4.76	1	1.4																		
	SPKR1904EDFL	19.05	19.05	4.76	1	1.4																		
	SPKR1904EDFR	19.05	19.05	4.76	1	1.4																		
	SPKR1504EDR-GM	19.05	19.05	4.76	1	1.4			●					●										
	SPKR1504EDL-GM	19.05	19.05	4.76	1	1.4			●					●										

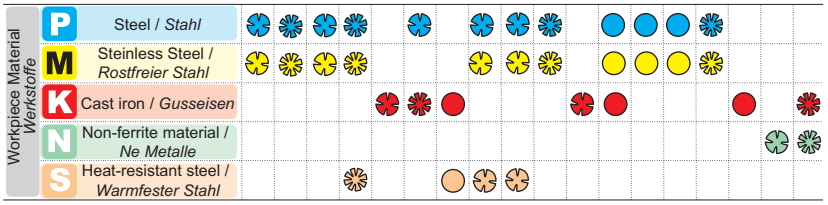
SPKN1203EDT31R **chamfer** · Fase 20° X 0.15 mm



Ideal Machining Condition
Gute Bearbeitungsbedingungen

Normal Machining Condition
Normale Bearbeitungsbedingungen

Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen



Insert shape Plattenform	Type · Typ	Dimension (mm) Abmessung						CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall			
		A	I.C	I.W	S	bs	R	YBC301	YBC401	YBM251	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**SPEX1203EDL-1**	15	12.7	12.7	3.18	10	500																		○
	SPEX1203EDR-1	15	12.7	12.7	3.18	10	500																		○
	SPEX1504EDL-1	18.2	15.875	15.875	4.76	10	500																		○
	SPEX1504EDR-1	18.2	15.875	15.875	4.76	10	500																		○

Edge preperation for FME03
Schneidkantenausführung für FME03

Edge preperation Schneidkantenausführung	Recommended selection · Beschreibung
SPEDER/L**	Honing edge is suitable for semi-finish and finish machining steel and stainless steel. Verrundete Schneidkante für mittlere bis Schlichtbearbeitung von Stahl und rostfreiem Stahl.
SPEDFR/L**	Sharp cutting edge is suitable for finish machining cast iron materials. Scharfe Schneidkante für die Schlichtbearbeitung von Gussmaterial.
SPEDSKR/L** **SP**EDS**R/L**	After chamfering and honing, the edge has strong capability of anti-breakage, suitable for rough machining steel parts in poor conditions. Gefaste Schneidkante mit Verrundung und guter Stabilität. Für Schruppbearbeitung von Stahl auch bei ungünstigen Verhältnissen.
SPEDTKR/L** **SP**EDT**R/L**	Chamfering edge is suitable for semi-finish and finish machining steel, stainless steel and cast iron materials. Gefaste Schneide für mittlere bis Schlichtbearbeitung von Stahl und rostfreiem Stahl sowie Guss.
SPEDR/L-GM**	3D chipbreaker to reduce cutting force, reinforce the capability of chip control, improve insert life. Widely applied for semi-finish machining steel, stainless steel and cast iron materials. 3-D Spanbrecher für weniger Schnittkräfte, für gute Spankontrolle und höhere Standzeiten. Großer Anwendungsbereich bei der mittlere Bearbeitung von Stahl, rostfreiem Stahl und Guss.

● Ex Stock / ab Lager ○ On demand / auf Anfrage

Recommended cutting data · Empfohlene Schnittdaten

Workpiece material Werkstückstoff		Hardness HB Härte	Grade Sorte	Cutting data · Schnittdaten	
				V (m/min)	f (mm/z)
P	Low-carbon steel Soft steel Niedrig legierter Kohlenstoffstahl Baustahl	≤180	YBG202 YBG205	270(200-360)	0.2 (0.1-0.4)
			YBG302	230 (170-350)	0.24 (0.1-0.3)
			YBM251 YBC301	270(220-350)	0.2 (0.1-0.4)
			YBM351	220 (180-300)	0.25 (0.15-0.3)
			YC30S	140 (100-220)	0.22 (0.1-0.3)
	High-carbon steel Alloy steel Hoch Leg. Kohlenstoffstahl	180-280	YBG202 YBG205	240 (180-350)	0.2 (0.1-0.3)
			YBG302	220 (150-330)	0.24 (0.1-0.3)
			YBM251 YBC301	240 (200-320)	0.2 (0.1-0.4)
			YBM351	200 (160-280)	0.25 (0.15-0.3)
			YC30S	120 (80-200)	0.22 (0.1-0.3)
	Alloy tool steel Leg. Werkzeugstahl	280-350	YBG202 YBG205	220 (170-340)	0.2 (0.1-0.3)
			YBG302	190 (130-300)	0.24 (0.1-0.3)
			YBM251 YBC301	220 (180-300)	0.2 (0.1-0.4)
			YBM351	180 (150-250)	0.25 (0.15-0.3)
			YC30S	100 (60-180)	0.22 (0.1-0.3)
M	Stainless steel Rostfreier Stahl	≤270	YBG202 YBG205	160 (110-270)	0.2 (0.1-0.3)
			YBG302	140 (100-250)	0.24 (0.1-0.3)
			YBM251	150 (120-240)	0.2 (0.1-0.4)
			YBM351	140 (100-240)	0.25 (0.15-0.3)
K	Cast iron Gusseisen	180-250	YBG102	210 (120-300)	0.12 (0.08-0.3)
			YBG302	160 (120-200)	0.2 (0.1-0.3)
			YD201	100 (80-160)	0.24 (0.15-0.4)

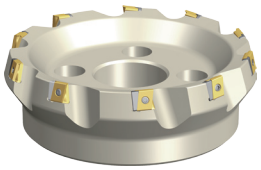
Applicable tool B9-B15
Werkzeug
Tools code key B22-B23
Werkzeug ISO
Grade selection guide B16-B20
Sortenauswahl
Technical data B183-B188
Technische Daten

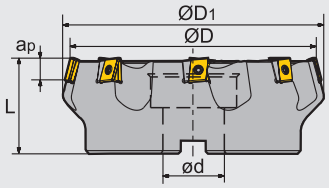
Face Milling Tools · Planfräser

Kr:75°



FME04 P M K



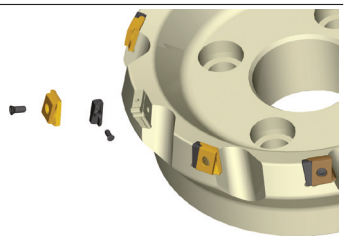


Specification of tools · Werkzeug Beschreibung

Type · Typ		Stock Lager R	Stock Lager L	Dimension (mm) Abmessung Ø D	Ø D1	Ø D	L	apmax	No. of teeth Zähne	Coupling Aufnahme	Weight Gewicht (kg)
FME04	**-125-B40-LN15-06**	●	○	125	137	40	63	8	6	B	3.8
	-160-B40-LN15-08	●	○	160	170	40	63	8	8	C	6.6
	-200-C60-LN15-10	●	○	200	208	60	70	8	10	C	9.6
	-250-C60-LN15-12	●	○	250	257	60	70	8	12	C	13.4
	-315-D60-LN15-16	○	○	315	328	60	80	8	16	D	25.2

Spare Parts · Ersatzteile

Diameter Durchmesser Ø D	Shim Unterlage	Wedge Keil	Screw Schraube	Wrench Schlüssel
				
Ø80 Ø100	LLN15-ZR	I60M3×7	I60M4×15	WT15IS
Ø125 ~ Ø315				WT10IS



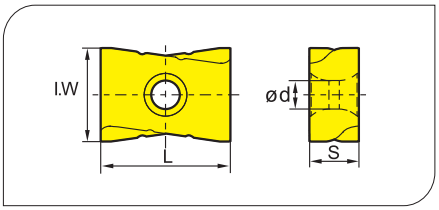
● Ex Stock / ab Lager ○ On demand / auf Anfrage

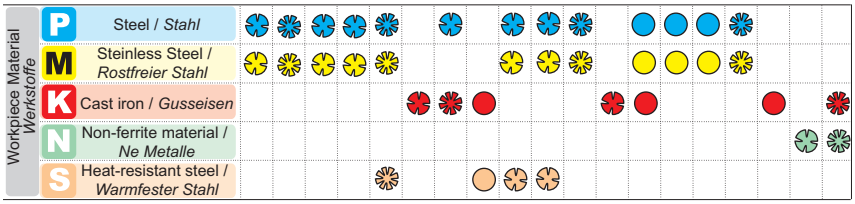
Ideal Machining Condition
Gute Bearbeitungsbedingungen

Normal Machining Condition
Normale Bearbeitungsbedingungen

Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen

Applicable inserts · Wendeschneidplatten





Insert shape Plattenform	Type · Typ	Dimension (mm) Abmessung				CVD Coating CVD Beschicht.							PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall			
		L	l.W	S	d	YBC301	YBC401	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**LNKT1506EN-ZR**	15.875	14	6.35	4.6	●		●		●	●	●				●								

Recommended cutting data · Empfohlene Schnittdaten

Workpiece material		Hardness HB Härte	Grade Sorte	Cutting data · Schnittdaten	
				V (m/min)	f (mm/z)
P	Low-carbon steel Soft steel	≤180	YBG302	180 (150-300)	0.5 (0.2-0.8)
			YBM351	180 (150-300)	0.5 (0.2-0.8)
	High-carbon steel Alloy steel	180-280	YBG302	150 (120-280)	0.5 (0.2-0.8)
			YBM351	140 (120-280)	0.5 (0.2-0.8)
	Alloy tool steel Leg. Werkzeugstahl	280-350	YBG302	120 (80-250)	0.45 (0.2-0.6)
			YBM351	100 (80-250)	0.45 (0.2-0.6)
M	Stainless steel Rostfreier Stahl	≤270	YBG302	120 (80-200)	0.45 (0.2-0.6)
			YBM351	100 (80-200)	0.45 (0.2-0.6)
K	Cast iron Gusseisen	180-250	YBD152	150 (120-200)	0.3 (0.2-0.5)
			YBD252	130 (110-200)	0.3 (0.2-0.5)

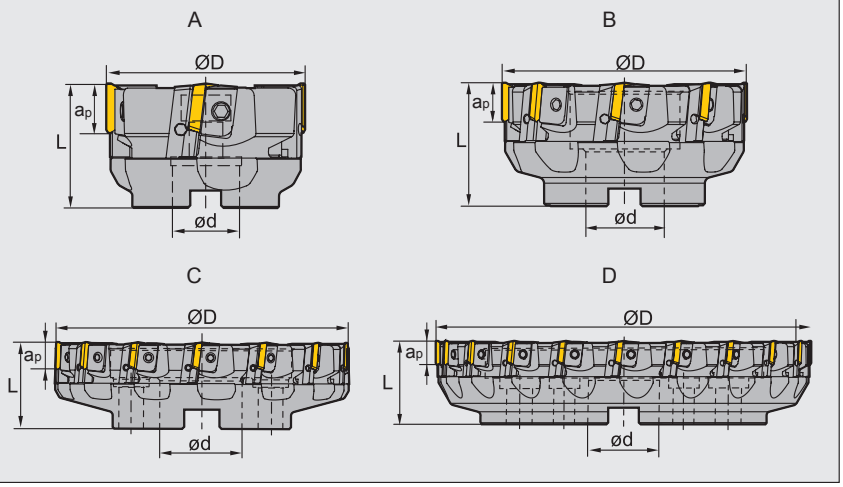
Applicable tool B9-B15
Werkzeug
Tools code key B22-B23
Werkzeug ISO
Grade selection guide B16-B20
Sortenauswahl
Technical data B183-B188
Technische Daten

Face Milling Tools · Planfräser

Kr:90°

FMP01 P M K

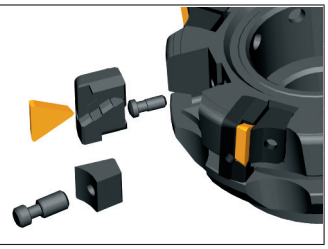




Specification of tools · Werkzeug Beschreibung

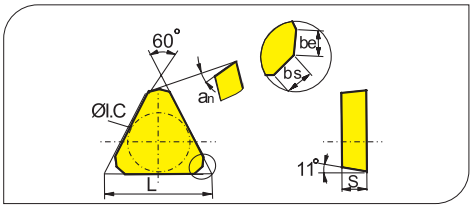
Type · Typ		Stock Lager		Dimension (mm) Abmessung				No. of teeth Zähne	Coupling Aufnahme	Weight Gewicht (kg)
		R	L	Ø D	Ø D	L	$a_p$max			
FMP01	**-080-A27-TP22-04**	●	○	80	27	50	18	4	A	1.2
	-100-B32-TP22-06	●	○	100	32	50	18	6	B	1.7
	-125-B40-TP22-08	●	○	125	40	63	18	8	B	3.2
	-160-B40-TP22-10	●	○	160	40	63	18	10	B	5.1
	-200-C60-TP22-12	●	○	200	60	63	18	12	C	7.4
	-250-C60-TP22-16	○	○	250	60	63	18	16	C	12.3
	-315-D60-TP22-20	○	○	315	60	70	18	20	D	21.9

Spare Parts · Ersatzteile

Diameter Durchmesser Ø D	Cassette Kassette	Wedge Keil	Screw Schraube	Locator screw Schraube	Wrench Schlüssel	
Ø80 Ø100	LTP4R1/L1	W04R/L	WM8×17	LOM5×15.1	WT20T WT25T	
Ø125 ~ Ø315	LTP4R/L		WM8×22			

● Ex Stock / ab Lager ○ On demand / auf Anfrage

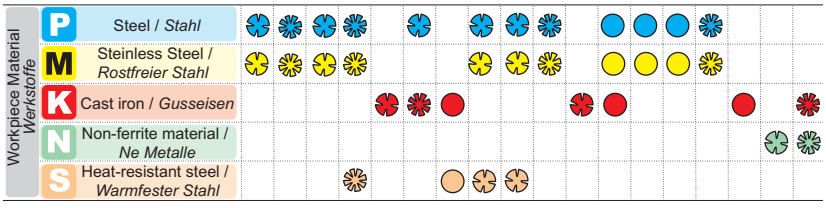
Applicable inserts · Wendeschneidplatten



Ideal Machining Condition
Gute Bearbeitungsbedingungen

Normal Machining Condition
Normale Bearbeitungsbedingungen

Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen



Insert WSP	Type · Typ	Dimensions (mm) · Abmessungen						CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall			
		L	I.C	S	be	bs	an	YBC301	YBC401	YBM251	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**TPKN2204PDTKR**	22	12.7	4.76	1.4	0.7	11°							○											
	TPKN2204PDFR	22	12.7	4.76	1.4	0.7	11°																		○
	TPKN2204PDFL	22	12.7	4.76	1.4	0.7	11°																		○
	TPKN2204PDSKR (TPKN2204PDR)	22	12.7	4.76	1.4	0.7	11°	●	●		○				●	●						●			
	TPKN2204PDL	22	12.7	4.76	1.4	0.7	11°	●														●			
	TPKN2204PDTR	22	12.7	4.76	1.4	0.7	11°	○							○							●			

(old Material No. / alte Artikelnr.)

Recommended cutting data · Empfohlene Schnittdaten

Workpiece material Werkstückstoff		Hardness HB Härte	Grade Sorte	Cutting data · Schnittdaten	
				V (m/min)	f (mm/z)
P	Low-carbon steel Soft steel Niedrig legierter Kohlenstoffstahl Baustahl	≤180	YBC301	270 (220-350)	0.2 (0.1-0.4)
			YBM351	220 (180-300)	0.2 (0.08-0.3)
			YBG202	270 (200-360)	0.2 (0.1-0.3)
			YC30S	140 (100-220)	0.22 (0.1-0.3)
	High-carbon steel Alloy steel Hoch Leg. Kohlenstoffstahl	180—280	YBC301	240 (200-320)	0.2 (0.1-0.4)
			YBM351	200 (160-280)	0.2 (0.08-0.3)
			YBG202	240 (180-350)	0.2 (0.1-0.3)
			YC30S	120 (80-200)	0.22 (0.1-0.3)
	Alloy tool steel Leg. Werkzeugstahl	280—350	YBC301	220 (180-300)	0.2 (0.1-0.4)
			YBM351	180 (150-250)	0.2 (0.08-0.3)
			YBG202	220 (170-340)	0.2 (0.1-0.3)
			YC30S	100 (60-180)	0.22 (0.1-0.3)
M	Stainless steel Rostfreier Stahl	≤270	YBM351	140 (100-240)	0.2 (0.08-0.3)
			YBG202	140 (100-250)	0.2 (0.1-0.3)
K	Cast iron Gusseisen	180—250	YBG102	210 (120-300)	0.2 (0.1-0.3)
			YBG302	160 (120-200)	0.35 (0.10-0.4)
			YD201	100 (80-160)	0.24 (0.15-0.4)

Applicable tool B9-B15
Werkzeug

Tools code key B22-B23
Werkzeug ISO

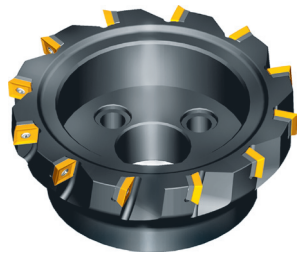
Grade selection guide B16-B20
Sortenauswahl

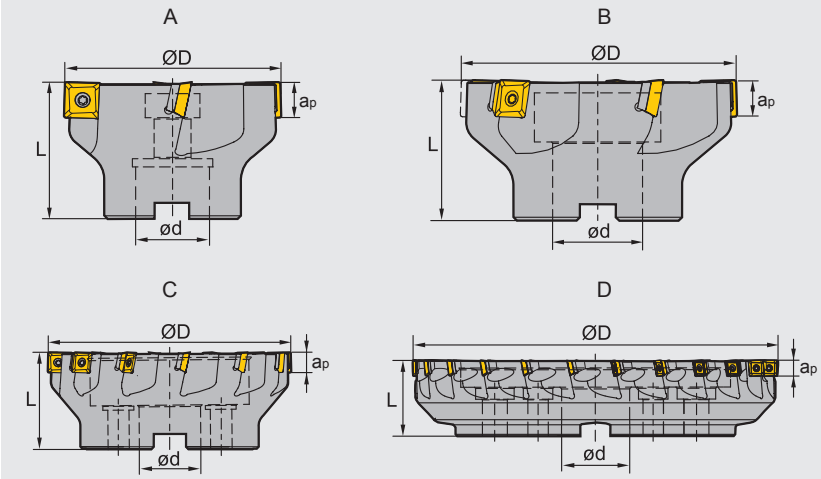
Technical data B183-B188
Technische Daten

Face Milling Tools · Planfräser

Kr:90°

FMP02 P M K





Specification of tools · Werkzeug Beschreibung

Type · Typ		Stock Lager	Dimension (mm) Abmessung				No. of teeth Zähne	Coupling Aufnahme	Weight Gewicht (kg)
			Ø D	Ø D	L	a_{pmax}			
FMP02	**-050-A22-SE09-05**	●	50	22	40	6.7	5	A	0.3
	-063-A22-SE09-06	●	63	22	40	6.7	6	A	0.5
	-080-A27-SE09-08	●	80	27	50	6.7	8	A	0.9
	-100-B32-SE09-08	○	100	32	50	6.7	8	B	1.7
	-100-B32-SE09-10	○	100	32	50	6.7	10	B	1.7
	-125-B40-SE09-12	○	125	40	63	6.7	12	B	2.6

● Ex Stock / ab Lager ○ On demand / auf Anfrage

Specification of tools · Werkzeug Beschreibung

Type · Typ		Stock Lager	Dimension (mm) Abmessung				No. of teeth Zähne	Coupling Aufnahme	Weight Gewicht (kg)
			Ø D	Ø D	L	a_{pmax}			
FMP02	**-050-A22-SE12-03**	○	50	22	40	10.8	3	A	0.3
	-063-A22-SE12-04	○	63	22	40	10.8	4	A	0.4
	-080-A27-SE12-04	○	80	27	50	10.8	4	A	0.9
	-100-B32-SE12-05	○	100	32	50	10.8	5	B	1.2
	-125-B40-SE12-06	○	125	40	63	10.8	6	B	3.1
	-160-C40-SE12-08	○	160	40	63	10.8	8	C	4.1
	-250-C60-SE12-12	○	250	60	63	10.8	12	C	11.1
	-050-A22-SE12-04	●	50	22	40	10.8	4	A	0.3
	-063-A22-SE12-05	●	63	22	40	10.8	5	A	0.4
	-080-A27-SE12-06	●	80	27	50	10.8	6	A	0.8
	-100-B32-SE12-07	●	100	32	50	10.8	7	B	1.2
	-125-B40-SE12-08	●	125	40	63	10.8	8	B	3.0
	-160-C40-SE12-12	●	160	40	63	10.8	12	C	3.9
	-050-A22-SE12-05	●	50	22	40	10.8	5	A	0.2
	-063-A22-SE12-06	●	63	22	40	10.8	6	A	0.4
	-080-A27-SE12-08	●	80	27	50	10.8	8	A	0.8
	-100-B32-SE12-10	●	100	32	50	10.8	10	B	1.2
	-125-B40-SE12-12	●	125	40	63	10.8	12	B	2.9
	-200-C60-SE12-16	●	200	60	63	10.8	16	C	6.1
	-250-C60-SE12-18	●	250	60	63	10.8	18	C	10.9
	-315-D60-SE12-24	○	315	60	63	10.8	24	D	21.6

Spare Parts · Ersatzteile

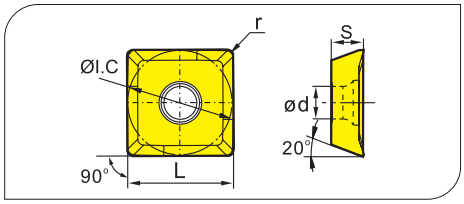
Diameter Durchmesser Ø D	Insert Platte	shim Unterlage	Screw Schraube	shim Unterlage Screw Schraube	Wrench Schlüssel	Wrench Schlüssel	
							
Ø50 ~ Ø125	SE09	--	I60M3×7	--	WT09IS	--	
Ø50	SE12	--	I60M3.5×10	--	WT15IS	--	
Ø63 ~ Ø315		S12BSX	I60M3.5×12	SM5×7XA		WH35L	

Applicable tool B9-B15
Werkzeug
Tools code key B22-B23
Werkzeug ISO
Grade selection guide B16-B20
Sortenauswahl
Technical data B183-B188
Technische Daten

B

Milling Tools · Fräser

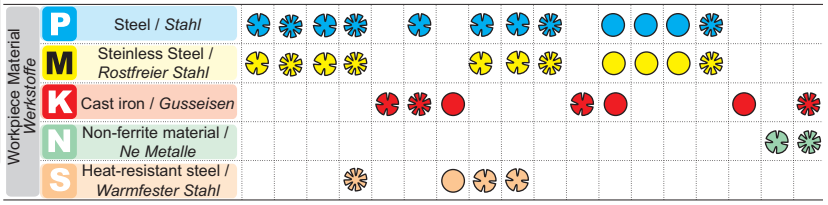
Applicable inserts · Wendeschneidplatten



Ideal Machining Condition
Gute Bearbeitungsbedingungen

Normal Machining Condition
Normale Bearbeitungsbedingungen

Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen



Insert shape Plattenform	Type · Typ	Dimension (mm) Abmessung					CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall			
		L	I.C	S	d	r	YBC301	YBC401	YBM251	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**SEET09T308PER-PF**	9.525	9.525	4.01	3.3	0.8								●										
	**SEET09T308PER-PM**	9.525	9.525	4.01	3.3	0.8					●			●										
	**SEET09T308PER-PR**	9.525	9.525	4.01	3.3	0.8					●	●												
	**SEET120308PER-PF**	13.308	13.308	4.04	4.1	0.8	●			●				●										
	**SEET120308PER-PM**	13.308	13.308	4.04	4.1	0.8			●	●	●	●	●	●		●								
	**SEET120308PER-PR**	13.308	13.308	4.04	4.1	0.8			●	●		●	○	○										
	**SEET120308-LH**	13.308	13.308	4.04	4.1	0.8							○										●	

Chipbreaker Selection FMP02 · Spanbrecher Auswahl FMP02

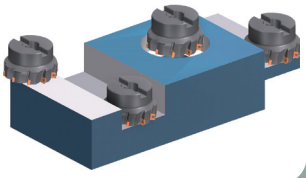
Application Anwendung	Finishing Schlichten	Semi-Finishing Mittlere Bearbeitung	Roughing Schruppen
P	PF 	PM 	PR 
M			
K			
N	LH		

● Ex Stock / ab Lager ○ On demand / auf Anfrage

Features of FMP02 series milling cutters
Merkmale des Frässystems

High economical efficiency

Hohe wirtschaftliche Effizienz

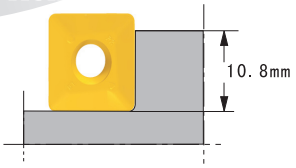


FMP02 series square shoulder mills can carry out a variety of cutting operations including face, vertical square shoulder, slot etc. Coarse pitch, fine pitch and extra fine pitch, each has a unique merit. Inserts' chipbreakers and grades are applied and optimized for a long tool life, they can achieve high efficiency machining in different condition. Each insert has 4 cutting edge, high economical efficiency.

Das universelle Frässystem FMP02 wird für unterschiedliche Fräsoperationen eingesetzt, z.B. Planfräsen, Eckfräsen, Nutenfräsen etc.
Fräser mit weiter, enger und extraenger Teilung , Wendeschneidplatten in verschiedenen Sorten und Spanbrechern ermöglichen eine optimale Bearbeitung mit hoher Wirtschaftlichkeit; jede Wendeschneidplatte hat 4 Schneidkanten.

High productivity

Hohe Produktivität



The major cutting edge is a α-curve, therefore the S Type inserts makes the tool obtain a ideal 90° approach angle while the minor cutting edge angle is enough. It ensures stable cutting operation. The maximum cutting depth can reach 10.8 mm, and the maximum feed rate can reach 0.3mm/z

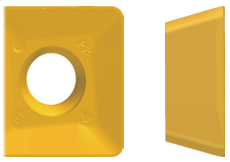
Die Hauptschneide ist wellenförmig ausgebildet, erzielt einen idealen 90 Grad Einstellwinkel und eine stabile Bearbeitung. Die maximale Schnitttiefe beträgt 10,8 mm bei einem maximalen Vorschub von 0,3 mm/z.

Less cutting force

Geringe Schnittkräfte

Large positive rake angle design makes cutting light and fast.

Großer positiver Spanwinkel für leichte und schnelle Bearbeitung.





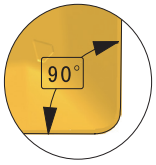
Simple screw clamping, inserts displacement is convenient. The chip pocket of rake face is big enough for smooth chip removal.

Durch die Schraubenklemmung ist einfacher Schneiden- bzw. Schneidplattenwechsel gegeben.

Easy & convenient to apply
Einfacher & schneller Schneidenwechsel

High precision

Hohe Präzision



Special structure design and fine manufacture make the tools possess very high precision, greatly improve the workpiece precision and surface quality.

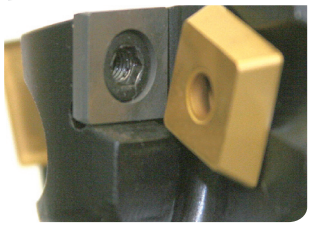
Die spezielle Konstruktion und die präzise Herstellung der Schneidplatte garantieren eine verbesserte Genauigkeit und Oberfläche des Werkstückes.

Adopting the carbide shim machined precisely to protect tool body, enable tool durable and long life.

Die präzise Hartmetall-Zwischenlage schützt den Fräskörper und bringt eine hohe Werkzeuglebensdauer.

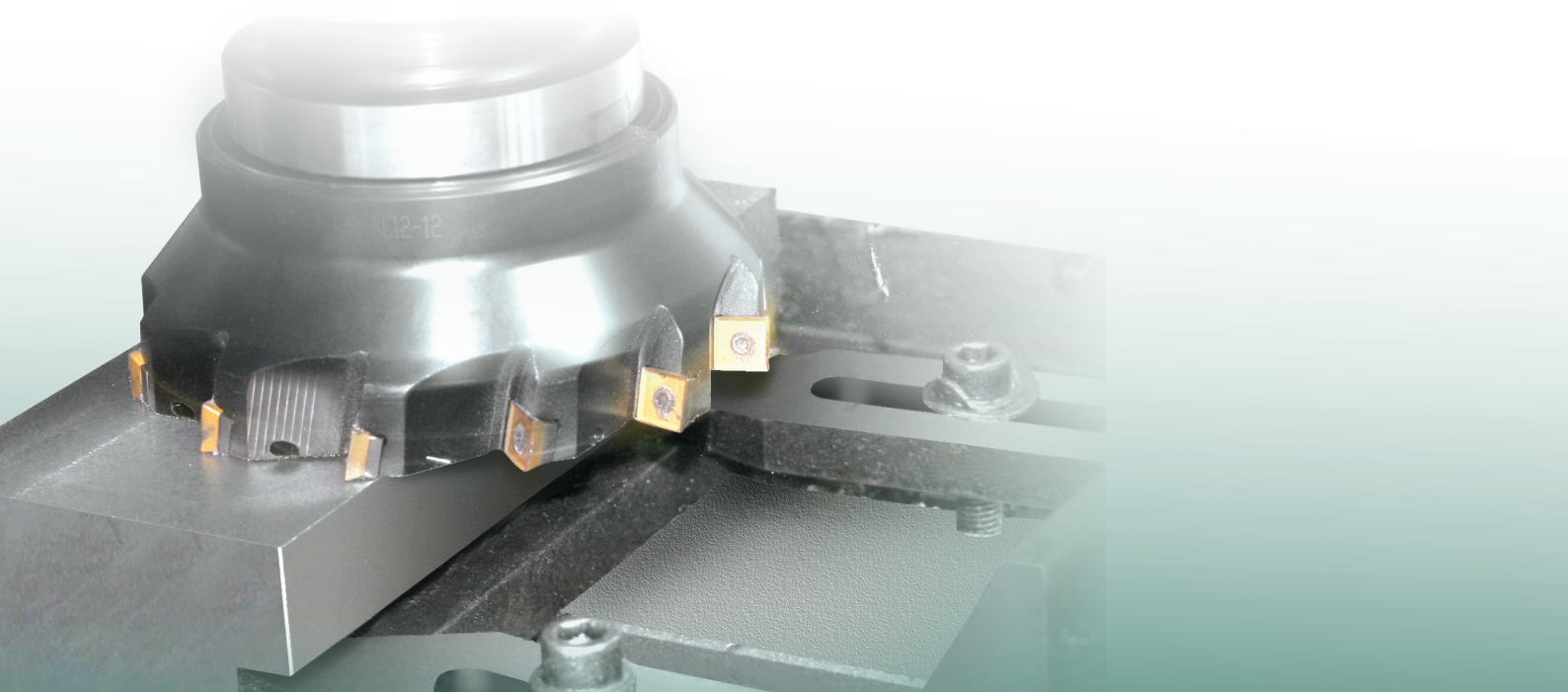
High reliability

Hohe Werkzeug-stabilität & Sicherheit

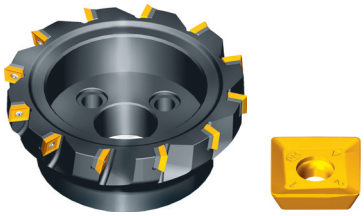


Recommended cutting data · Empfohlene Schnittdaten

Workpiece material Werkstückstoff		Hardness HB Härte	Grade Sorte	Cutting data · Schnittdaten			
				V (m/min)	f (mm/z)		
					-PF	-PM	-PR
P	Low-carbon steel Soft steel Niedrig legierter Kohlenstoffstahl Baustahl	≤180	YBM251	270(220-350)	0.15(0.1-0.2)	0.2 (0.1-0.3)	0.3 (0.2-0.4)
			YBG202	270(200-360)	0.15(0.1-0.2)	0.2 (0.1-0.3)	0.3 (0.2-0.4)
			YBG302	230 (170-350)	0.15(0.1-0.2)	0.2 (0.1-0.3)	0.3 (0.2-0.4)
	High-carbon steel Alloy steel Hoch Leg. Kohlenstoffstahl Leg. Stahl	180—280	YBM251	240 (200-320)	0.15(0.1-0.2)	0.2 (0.1-0.3)	0.3 (0.2-0.4)
			YBG202	240 (180-350)	0.15(0.1-0.2)	0.2 (0.1-0.3)	0.3 (0.2-0.4)
			YBG302	220 (150-330)	0.15(0.1-0.2)	0.2 (0.1-0.3)	0.3 (0.2-0.4)
	Alloy tool steel Leg. Werkzeugstahl	280—350	YBM251	220 (180-300)	0.1(0.1-0.2)	0.2 (0.1-0.3)	0.3 (0.2-0.4)
			YBG202	220 (170-340)	0.1(0.1-0.2)	0.2 (0.1-0.3)	0.3 (0.2-0.4)
			YBG302	190 (130-300)	0.15(0.1-0.2)	0.2 (0.1-0.3)	0.3 (0.2-0.4)
M	Stainless steel Rostfreier Stahl	≤270	YBM251	150 (120-240)	0.1(0.1-0.2)	0.2 (0.1-0.3)	0.3 (0.2-0.4)
			YBG202	160 (110-270)	0.1(0.1-0.2)	0.2 (0.1-0.3)	0.3 (0.2-0.4)
			YBG302	140 (100-250)	0.15(0.1-0.2)	0.2 (0.1-0.3)	0.3 (0.2-0.4)
K	Cast iron Gusseisen	180—250	YBG102	210 (120-300)	0.15(0.1-0.2)	0.2 (0.1-0.3)	0.3 (0.2-0.4)
			YBD152	240 (180-300)	0.15(0.1-0.2)	0.2 (0.1-0.3)	0.3 (0.2-0.4)
			YBD252	200 (150-250)	0.15(0.1-0.2)	0.2 (0.1-0.3)	0.3 (0.2-0.4)
					-LH		
N	Al alloy leg. Alu	-	YD101	300-	0.15 (0.05-0.3)		



Case study for FMP02
Bearbeitungsbeispiel für FMP02

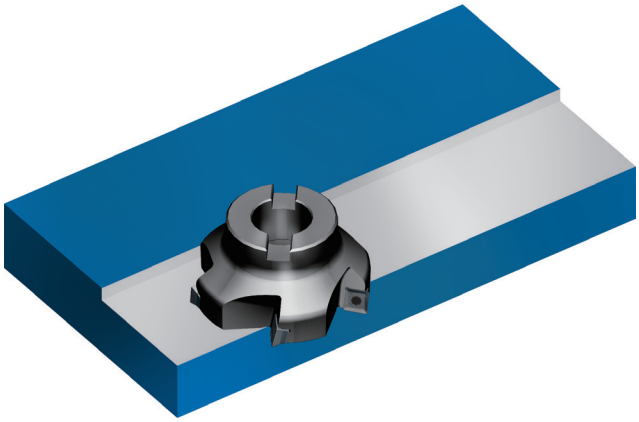


■ Tool · Werkzeug: FMP02-100-B32-SE12-054
■ Inserts · WSP: SEET120308PER-PM/YBD252

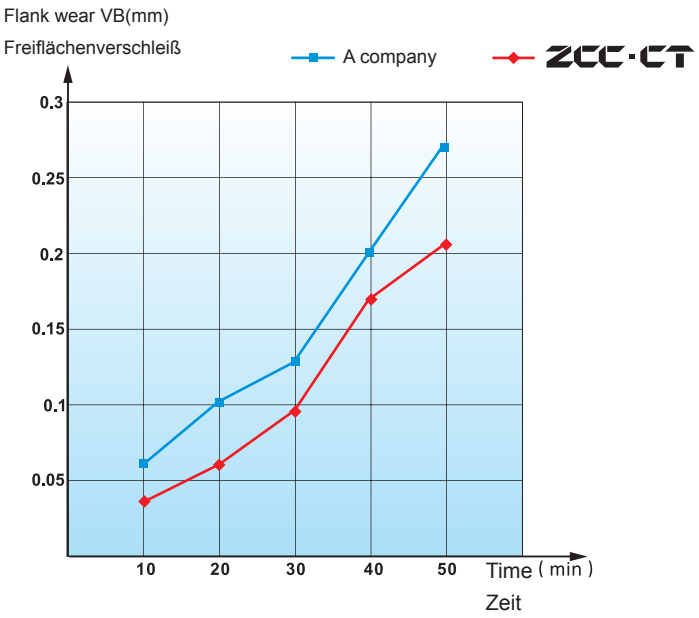
Workpiece material
Werkstückstoff: HT300/ GG30 (HB150)
Cooling system
Kühlsystem: dry cutting, trocken

Machine: vertical machining center
Maschine: vertikales Maschinencenter

Cutting data
Schnittdaten:
Vc=200m/min
ap=3mm
fz=0.2mm/z
ae=80mm



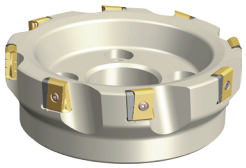
● Wear comparison of insert.
● Verschleißvergleich der WSP.

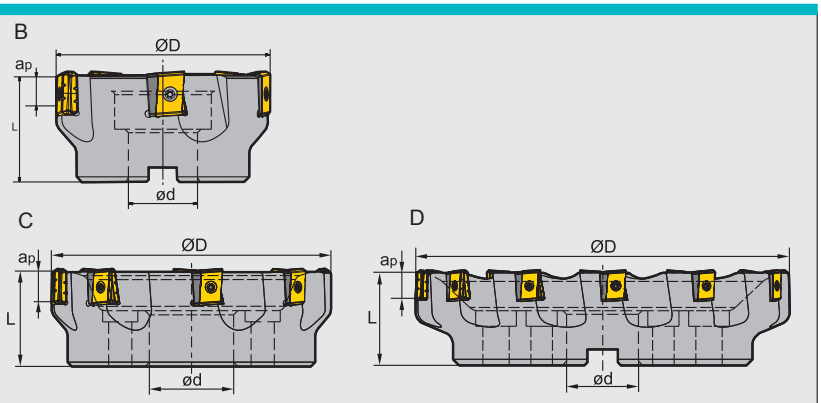


Face Milling Tools · Planfräser

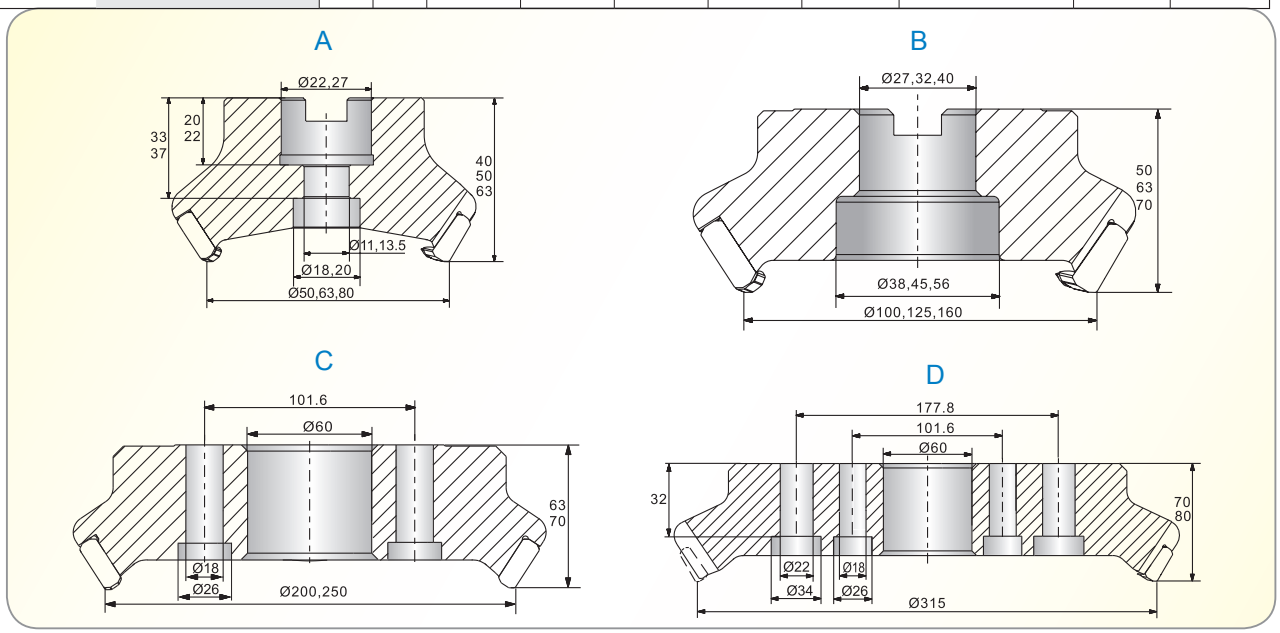
Kr:89°

FMP03 P M K





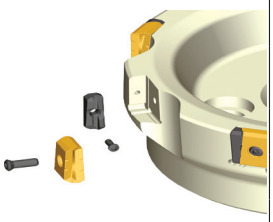
Type · Typ		Stock Lager R	Stock Lager L	Ø D	Ø D	L	a_{pmax}	No. of teeth Zähne	Insert · WSP	Coupling Aufnahme	Weight Gewicht (kg)
FMP03	**-125-B40-LN15-06**	●	○	125	40	63	8	6		B	3.2
	-160-C40-LN15-08	●	○	160	40	63	8	8		C	5.1
	-200-C60-LN15-10	●	○	200	60	70	8	10	LNKT1506EN-ZR	C	7.5
	-250-C60-LN15-12	●	○	250	60	70	8	12		C	12.2
	-315-D60-LN15-16	●	○	315	60	80	8	16		D	23.7
	-125-B40-LN20-06	○	○	125	40	63	12	6		B	3.3
	-160-C40-LN20-08	●	○	160	40	63	12	8		C	5.3
	-200-C60-LN20-10	●	○	200	60	70	12	10	LNKT2007DN-ZR	C	8.8
	-250-C60-LN20-12	●	○	250	60	70	12	12		C	14.0
	-315-D60-LN20-15	○	○	315	60	80	12	15		D	23.9
	-125-B40-LN25-05	●	○	125	40	63	15	5		B	3.3
	-160-C40-LN25-06	●	○	160	40	63	15	6		C	5.1
	-200-C60-LN25-08	●	○	200	60	70	15	8	LNKT2510-ZR	C	8.9
	-250-C60-LN25-10	●	○	250	60	70	15	10		C	12.0
	-315-D60-LN25-12	●	○	315	60	80	15	12		D	21.9



● Ex Stock / ab Lager ○ On demand / auf Anfrage

Spare Parts · Ersatzteile

Diameter Durchmesser Ø D	Insert Platte	shim Unterlage	Screw Schraube	Shim Screw Unterlage Schraube	Wrench Schlüssel	Wrench Schlüssel
Ø125 ~ Ø315	LN15	LLN15-ZR	I60M3×7	I60M4×15	WT15IS	WT10IS
Ø125 ~ Ø315	LN20	LLN20R-ZR	I60M3×7	I60M4×15	WT15IS	WT10IS
Ø125 ~ Ø315	LN25	LLN25R-ZR	I60M3.5×10.4	I60M5×17	WT20IT	WT15IS

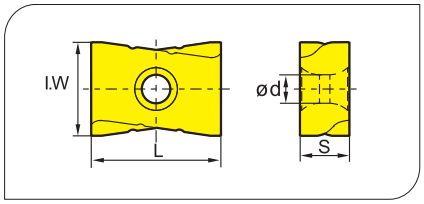


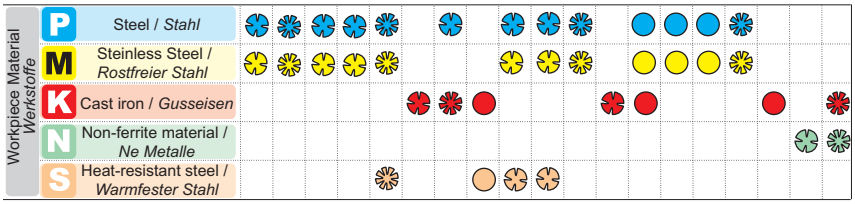
Applicable inserts · Wendeschneidplatten

Ideal Machining Condition
Gute Bearbeitungsbedingungen

Normal Machining Condition
Normale Bearbeitungsbedingungen

Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen





Insert shape Plattenform	Type · Typ	Dimension (mm) Abmessung L	I.W	S	d	CVD Coating CVD Beschicht. YBC301	YBC401	YBM251	YBM253	YBM351	YBD152	YBD252	PVD Coating PVD Beschicht. YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	Cermet YNG151	YNG151C	Carbide uncoat. unbe. Hartmetall YC30S	YD051	YD101	YD201
	**LNKT1506EN-ZR**	15.875	14	6.35	4.6	●		●		●	●	●				●								
	LNKT2007DN-ZR	20	17	7.94	4.6					●		●				●								
	LNKT2510-ZR	25	18	9.525	5.5					●		○				●								

Recommended cutting data · Empfohlene Schnittdaten

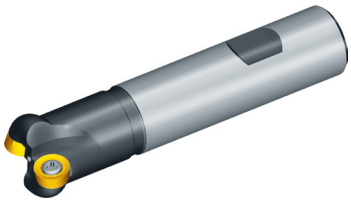
Workpiece material Werkstückstoff		Hardness HB Härte	Grade Sorte	Cutting data · Schnittdaten V (m/min)	f (mm/z)
P	Low-carbon steel Soft steel Niedrig legierter Kohlenstoffstahl Baustahl	≤180	YBG302	180 (150-300)	0.5 (0.2-0.8)
			YBM351	180 (150-300)	0.5 (0.2-0.8)
	High-carbon steel Alloy steel Hoch Leg. Kohlenstoffstahl Leg. Stahl	180-280	YBG302	150 (120-280)	0.5 (0.2-0.8)
			YBM351	140 (120-280)	0.5 (0.2-0.8)
	Alloy tool steel Leg. Werkzeugstahl	280-350	YBG302	120 (80-250)	0.45 (0.2-0.6)
			YBM351	100 (80-250)	0.45 (0.2-0.6)
M	Stainless steel Rostfreier Stahl	≤270	YBG302	120 (80-200)	0.45 (0.2-0.6)
			YBM351	100 (80-200)	0.45 (0.2-0.6)
K	Cast iron Gusseisen	180-250	YBD152	150 (120-200)	0.3 (0.2-0.5)
			YBD252	130 (110-200)	0.3 (0.2-0.5)

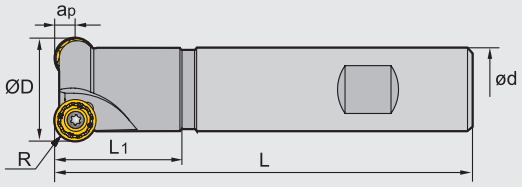
Applicable tool B9-B15 Werkzeug
Tools code key B22-B23 Werkzeug ISO
Grade selection guide B16-B20 Sortenauswahl
Technical data B183-B188 Technische Daten

Face Milling Tools · Planfräser



FMR01 P M K



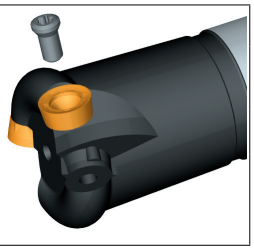


Specification of tools · Werkzeug Beschreibung

Type · Typ		Stock Lager	Dimension (mm) Abmessung						No. of teeth Zähne	Weight Gewicht (kg)
			Ø D	Ø D	L	L_1	R	a_{pmax}		
FMR01	**-025-XP20-RC10-02**	●	25	20	100	30	5	5	2	0.2
	-032-XP25-RC10-02	●	32	25	120	35	5	5	2	0.5
	-040-XP32-RC12-03	●	40	32	120	40	6	6	3	0.7
	-050-XP32-RC12-03	●	50	32	120	40	6	6	3	0.8

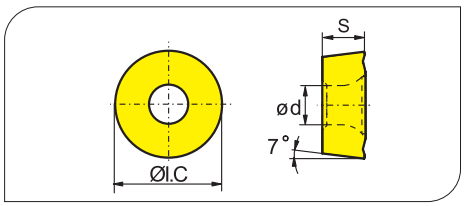
Spare Parts · Ersatzteile

Diameter Durchmesser Ø D	Wrench Schlüssel	Wrench Schlüssel
		
Ø25 -Ø32	I60M4×8.4	WT15S
Ø40 -Ø50	I60M3.5×10	

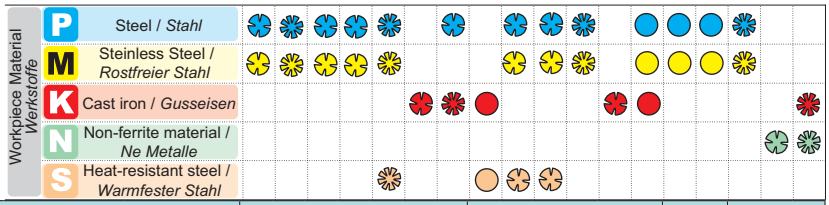


● Ex Stock / ab Lager ○ On demand / auf Anfrage

Applicable inserts · Wendeschneidplatten



Ideal Machining Condition
Gute Bearbeitungsbedingungen
Normal Machining Condition
Normale Bearbeitungsbedingungen
Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen



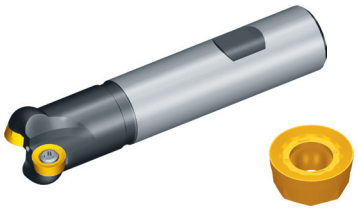
Insert shape Plattenform	Type · Typ	Dimension (mm) Abmessung			CVD Coating CVD Beschicht.							PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall		
		I.C	S	d	YBC301	YBC401	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD101	YD201
	**RCKT10T3MO-DM**	10.0	3.97	4.4	●	●							○		○							
	**RCKT1204MO-DM**	12.0	4.76	4.0	●	●	●		●	○			●									
	**RCKT1204MO-DR**	12.0	4.76	4.0	●	●	●		●													
	**RCKT1204MO-ER**	12.0	4.76	4.0				○	○													

Recommended cutting data · Empfohlene Schnittdaten

Workpiece material Werkstückstoff		Hardness HB Härte	Grade Sorte	Cutting data · Schnittdaten		
				V (m/min)	f (mm/z)	
					-DM	-DR
P	Low-carbon steel Soft steel Niedrig legierter Kohlenstoffstahl Baustahl	≤180	YBM251 YBC301	270 (220-350)	0.2(0.1-0.5)	0.3 (0.2-0.8)
			YBM351 YBC401	220 (180-300)	0.25(0.1-0.5)	0.3 (0.2-0.8)
			YBG202	270 (200-360)	0.2(0.1-0.5)	0.3 (0.2-0.8)
	High-carbon steel Alloy steel Hoch Leg. Kohlenstoffstahl Leg. Stahl	180-280	YBM251 YBM253	240 (200-320)	0.2(0.1-0.5)	0.3 (0.2-0.8)
			YBC301			
			YBM351 YBC401	200 (160-280)	0.25(0.1-0.5)	0.3 (0.2-0.8)
			YBG202	240 (180-350)	0.2(0.1-0.5)	0.3 (0.2-0.8)
	Alloy tool steel Leg. Werkzeugstahl	280-350	YBM251 YBM253	220 (180-300)	0.2(0.1-0.4)	0.3 (0.2-0.6)
			YBC301			
			YBM351 YBC401	180 (150-250)	0.2(0.1-0.5)	0.3 (0.2-0.8)
			YBG202	220 (170-340)	0.2(0.1-0.4)	0.3 (0.2-0.6)
M	Stainless steel Rostfreier Stahl	≤270	YBM251 YBM253	150 (120-240)	0.2(0.1-0.4)	0.3 (0.2-0.6)
			YBM351 YBC401	150 (100-220)	0.2(0.1-0.4)	0.3 (0.2-0.6)
			YBG202	160 (110-270)	0.2(0.1-0.4)	0.3 (0.2-0.6)
K	Cast iron Gusseisen	180-250	YBD152	210 (120-300)	0.2(0.1-0.5)	0.3 (0.2-0.8)

Applicable tool B9-B15
Werkzeug
Tools code key B22-B23
Werkzeug ISO
Grade selection guide B16-B20
Sortenauswahl
Technical data B183-B188
Technische Daten

Case study for FMR01
Bearbeitungsbeispiel für FMR01

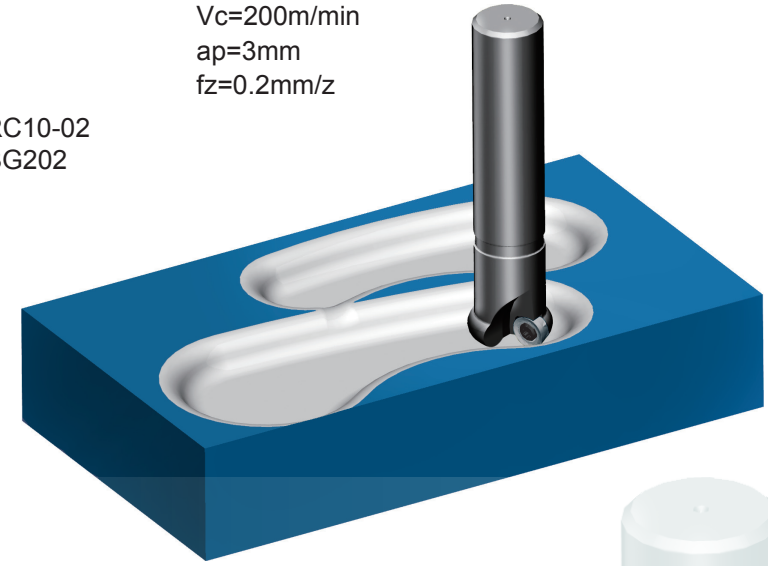


Workpiece material
Werkstückstoff: 42CrMo (HRC35)
Cooling system
Kühlsystem: dry cutting, trocken

Machine: vertical machining center
Maschine: vertikales Maschinencenter

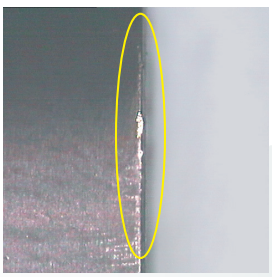
Cutting data
Schnittdaten:
Vc=200m/min
ap=3mm
fz=0.2mm/z

■ Tool · Werkzeug: FMR01-025-XP20-RC10-02
■ Inserts · WSP: RCKT10T3MO-DM/YBG202



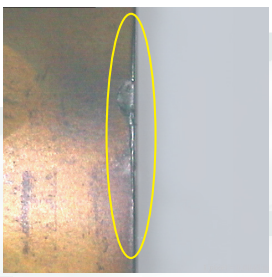
- **Wear comparison of insert.**
- **Verschleißvergleich der WSP.**

ZCC-CT



22 minutes later

Other company product



22 minutes later

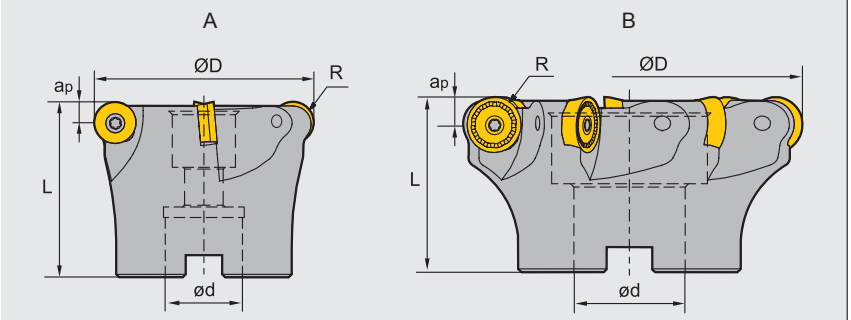
● Ex Stock / ab Lager ○ On demand / auf Anfrage

Face Milling Tools · Planfräser



FMR02 P M K



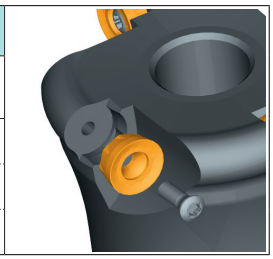


Specification of tools · Werkzeug Beschreibung

Type · Typ		Stock Lager	Dimension (mm) Abmessung Ø D	Ø D	L	R	apmax	No. of teeth Zähne	Coupling Aufnahme	Weight Gewicht (kg)
FMR02	**050-A22-RC12-05C**	○	50	22	50	6	6	5	A	0.7
	052-A22-RC12-05C	○	52	22	50	6	6	5	A	0.7
	063-A22-RC12-04	●	63	22	50	6	6	4	A	0.7
	063-A22-RC12-06C	○	63	22	50	6	6	4	A	0.7
	063-A22-RC12-06	●	63	22	50	6	6	6	A	0.7
	063-A22-RC16-04	●	63	22	50	8	8	4	A	0.7
	080-A27-RC12-07C	○	80	27	50	6	6	7	B	0.7
	080-B27-RC16-05	●	80	27	50	8	8	5	B	0.7
	080-B27-RC16-05C	○	80	27	50	8	8	5	B	0.7
	080-A27-RC20-04	○	80	27	50	10	10	4	A	0.7
	100-B32-RC16-06	●	100	32	63	8	8	6	B	1.2
	100-B32-RC20-05	●	100	32	63	10	10	5	B	1.2
	100-B32-RC20-06	○	100	32	63	10	10	6	B	1.2
	125-B40-RC20-06	●	125	40	63	10	10	6	B	1.2
	125-B40-RC20-07	●	125	40	63	10	10	7	B	2.2
	160-B40-RC20-08	●	160	40	63	10	10	8	B	4.2
	250-B40-RC20-10	○	250	40	63	10	10	10	B	

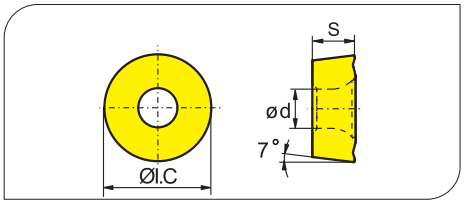
Spare Parts · Ersatzteile

Diameter Durchmesser Ø D	Insert WSP	Screw Schraube	Wrench Schlüssel	
Ø63-Ø80	RC12	I60M3.5×10	WT15IS	--
Ø63 -Ø100	RC16	I60M5×13	--	WT20IT
Ø80 -Ø250	RC20	I43M6×16	--	WT25IT



Applicable tool B9-B15 Werkzeug
Tools code key B22-B23 Werkzeug ISO
Grade selection guide B16-B20 Sortenauswahl
Technical data B183-B188 Technische Daten

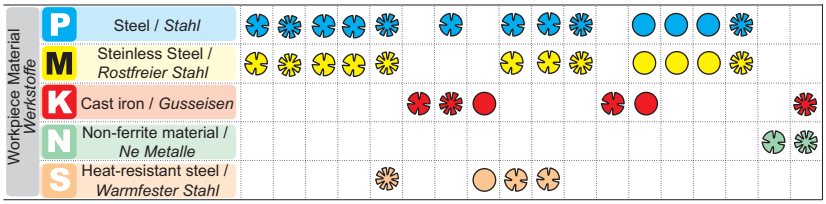
Applicable inserts · Wendeschneidplatten

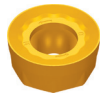
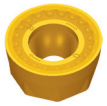
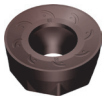


Ideal Machining Condition
Gute Bearbeitungsbedingungen

Normal Machining Condition
Normale Bearbeitungsbedingungen

Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen



Insert shape Plattenform	Type · Typ	Dimension (mm) Abmessung			CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall		
		I.C	S	d	YBC301	YBC401	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD101	YD201
	**RCKT1204MO-DM**	12.0	4.76	4.0	●	●	●		●				●									
	RCKT1606MO-DM	16.0	6.35	5.56	●	●									●							
	RCKT2006MO-DM	20.0	6.35	6.55	○	○																
	**RCKT1204MO-DR**	12.0	4.76	4.0	●	●	●		●													
	RCKT1606MO-DR	16.0	6.35	5.56	●	●			●		●											
	RCKT2006MO-DR	20.0	6.35	6.55	●	●			●		●											
	**RCKT1204MO-ER**	12.0	4.76	4.0				○	○													
	RCKT1606MO-ER	16.0	6.35	5.56				○	○													
	RCKT2006MO-ER	20.0	6.35	6.55				○	○													

Recommended cutting data · Empfohlene Schnittdaten

Workpiece material Werkstückstoff		Hardness HB Härte	Grade Sorte	Cutting data · Schnittdaten		
				V (m/min)	f (mm/z)	
					-DM	-DR
P	Low-carbon steel Soft steel Niedrig legierter Kohlenstoffstahl Baustahl	≤180	YBM251 YBC301	270 (220-350)	0.2(0.1-0.5)	0.3 (0.2-0.8)
			YBM351 YBC401	220 (180-300)	0.25(0.1-0.5)	0.3 (0.2-0.8)
			YBG202	270 (200-360)	0.2(0.1-0.5)	0.3 (0.2-0.8)
	High-carbon steel Alloy steel Hoch Leg. Kohlenstoffstahl	180-280	YBM251 YBC301	240 (200-320)	0.2(0.1-0.5)	0.3 (0.2-0.8)
			YBM351 YBC401	200 (160-280)	0.25(0.1-0.5)	0.3 (0.2-0.8)
			YBG202	240 (180-350)	0.2(0.1-0.5)	0.3 (0.2-0.8)
	Alloy tool steel Leg. Werkzeugstahl	280-350	YBM251 YBC301	220 (180-300)	0.2(0.1-0.4)	0.3 (0.2-0.6)
			YBM351 YBC401	180 (150-250)	0.2(0.1-0.5)	0.3 (0.2-0.8)
			YBG202	220 (170-340)	0.2(0.1-0.4)	0.3 (0.2-0.6)
M	Stainless steel Rostfreier Stahl	≤270	YBM251 YBM253	150 (120-240)	0.2(0.1-0.4)	0.3 (0.2-0.6)
			YBM351 YBC401	150 (100-220)	0.2(0.1-0.4)	0.3 (0.2-0.6)
			YBG202	160 (110-270)	0.2(0.1-0.4)	0.3 (0.2-0.6)
K	Cast iron Gusseisen	180-250	YBD152	210 (120-300)	0.2(0.1-0.5)	0.3 (0.2-0.8)

Applicable tool B9-B15
Werkzeug

Tools code key B22-B23
Werkzeug ISO

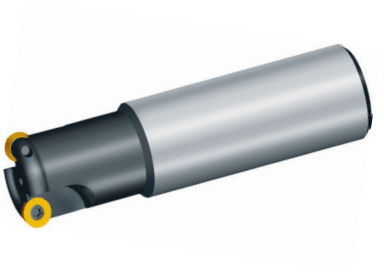
Grade selection guide B16-B20
Sortenauswahl

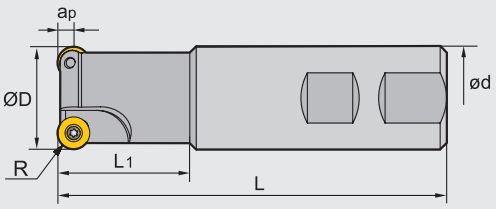
Technical data B183-B188
Technische Daten

Face Milling Tools · Planfräser



FMR03 P M K



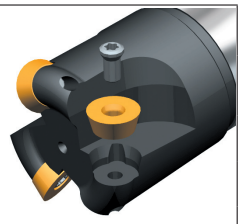


Specification of tools · Werkzeug Beschreibung

Type · Typ		Stock Lager	Dimension (mm) Abmessung						No. of teeth Zähne	Weight Gewicht (kg)
			Ø D	Ø d	L	L_1	R	a_{pmax}		
FMR03	**-016-XP16-RD08-02**	○	16	16	100	25	4	4	2	0.1
	-025-XP25-RD08-02	●	25	25	100	30	4	4	2	0.3
	-032-XP32-RD10-02	●	32	32	120	40	5	5	2	0.7
	-040-XP32-RD12-03	●	40	32	120	40	6	6	3	0.7
	-050-XP32-RD12-04	●	50	32	120	40	6	6	4	0.8

Spare Parts · Ersatzteile

Diameter Durchmesser Ø D	Screw Schraube	Wrench Schlüssel
Ø25	I60M3×7	WT09IP
Ø32-Ø50	I60M4×10	WT15IP



Applicable tool B9-B15
Werkzeug

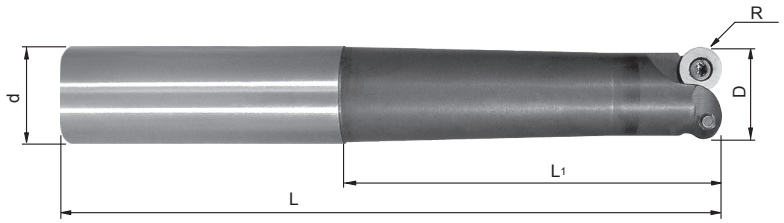
Tools code key B22-B23
Werkzeug ISO

Grade selection guide B16-B20
Sortenauswahl

Technical data B183-B188
Technische Daten

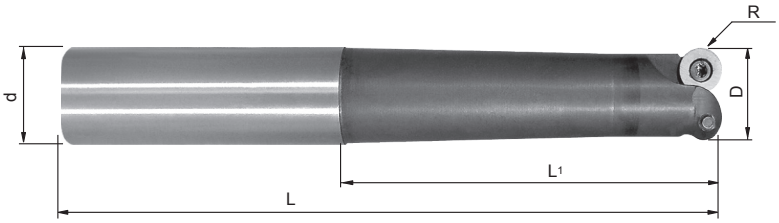
Face Milling Tools · Planfräser

FMR03 P M K



Type · Typ		Stock Lager	Dimension (mm) Abmessung						No. of teeth Zähne
			Ø D	Ø d	L	L1	R	apmax	
FMR03	**-015-G16-XS RD0702-02**	●	15	16	88	40	3.5	3.5	2
	-015-G16-S RD0702-02	●	15	16	108	60	3.5	3.5	2
	-015-G20-M RD0702-02	○	15	20	130	80	3.5	3.5	2
	-015-G20-L RD0702-02	○	15	20	150	100	3.5	3.5	2
	-015-G25-XL RD0702-02	○	15	25	120	176	3.5	3.5	2

Inserts · WSP: RDKW0702MO**/ RDKW1003MO**



Type · Typ		Stock Lager	Dimension (mm) Abmessung						No. of teeth Zähne
			Ø D	Ø d	L	L1	R	apmax	
FMR03	**-020-G20-XS RD1003-02**	○	20	20	90	40	5	5	2
	-020-G20-S RD1003-02	●	20	20	110	60	5	5	2
	-020-G25-M RD1003-02	●	20	25	136	80	5	5	2
	-020-G25-L RD1003-02	●	20	25	156	100	5	5	2
	-020-G25-XL RD1003-02	○	20	25	176	120	5	5	2

Inserts · WSP: RDKW0702MO**/ RDKW1003MO**

Spare Parts · Ersatzteile

Type Typ	Screw Schraube	Wrench Schlüssel	
			
FMR03**RD0702	I60M2,5 x 5,0	WT07P	
FMR03**RD1003	I60M3,5 x 7,7	WT15P	

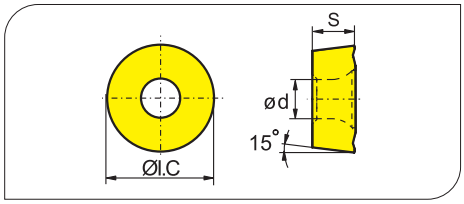
Applicable tool B9-B15
Werkzeug
Tools code key B22-B23
Werkzeug ISO
Grade selection guide B16-B20
Sortenauswahl
Technical data B183-B188
Technische Daten

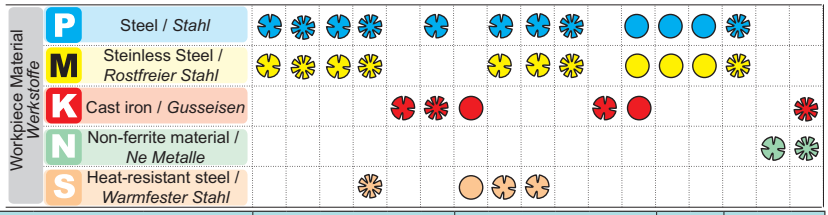
Ideal Machining Condition
Gute Bearbeitungsbedingungen

Normal Machining Condition
Normale Bearbeitungsbedingungen

Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen

Applicable inserts · Wendeschneidplatten





Insert shape Plattenform	Type · Typ	Dimension (mm) Abmessung			CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall		
		I.C	S	d	YBC301	YBC401	YBM251	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD101	YD201
	**RDKW0702MO**	7.0	2.38	2.7				●			●	●									
	RDKW0803MO	8.0	3.18	3.4				●				●									
	RDKW1003MO	10.0	3.18	3.9			●	●			●	●									
	RDKW10T3MO	10.0	3.97	4.4	○			●			●	●									
	RDKW1204MO	12.0	4.76	4.4			○	●			●	●									
	RDKW12T3MO	12.0	3.97	3.9		○	●	●			●	●								○	
	RDKW1604MO	16.0	4.76	5.2				●			●	●									
	RDKW1605MO	16.0	5.56	5.5				●			●	●	○								
	RDKW2006MO	20.0	6.35	6.5				●		○											

Recommended cutting data · Empfohlene Schnittdaten

Workpiece material Werkstückstoff		Hardness HB Härte	Grade Sorte	Cutting data · Schnittdaten	
				V (m/min)	f (mm/z)
P	Low-carbon steel Soft steel Niedrig legierter Kohlenstoffstahl Baustahl	≤180	YBM251 YBC301	270 (220-350)	0.2 (0.08-0.45)
			YBM351 YBG302	220 (180-300)	0.25 (0.15-0.45)
			YBG202	270 (200-360)	0.2 (0.1-0.45)
	High-carbon steel Alloy steel Hoch Leg. Kohlenstoffstahl	180-280	YBM251 YBC301	240 (200-320)	0.2 (0.08-0.45)
			YBM351 YBG302	200 (160-280)	0.25 (0.15-0.45)
			YBG202	240 (180-350)	0.2 (0.1-0.45)
	Alloy tool steel Leg. Werkzeugstahl	280-350	YBM251 YBC301	220 (180-300)	0.2 (0.08-0.45)
			YBM351 YBG302	180 (150-250)	0.25 (0.15-0.45)
			YBG202	220 (170-340)	0.2 (0.1-0.45)
M	Stainless steel Rostfreier Stahl	≤270	YBM251	150 (120-240)	0.2 (0.08-0.45)
			YBM351 YBG302	150 (100-220)	0.25 (0.1-0.45)
			YBG202	160 (110-270)	0.2 (0.1-0.45)
K	Cast iron Gusseisen	180-250	YBG102	210 (120-300)	0.2 (0.1-0.45)

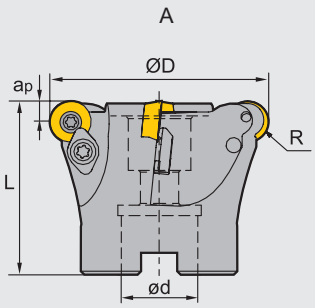
Applicable tool Werkzeug B9-B15
Tools code key Werkzeug ISO B22-B23
Grade selection guide Sortenauswahl B16-B20
Technical data Technische Daten B183-B188

Face Milling Tools · Planfräser



FMR04 P M K



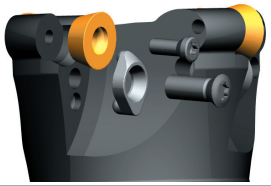


Specification of tools · Werkzeug Beschreibung

Type · Typ		Stock Lager	Dimension (mm) Abmessung					No. of teeth Zähne	Coupling Aufnahme	Weight Gewicht (kg)
			Ø D	Ø D	L	R	a_{pmax}			
FMR04	**050-A22-RD12-03**	●	50	22	40	6	6	3	A	0.3
	063-A22-RD12-04	●	63	22	50	6	6	4	A	0.5
	080-B27-RD16-05	●	80	27	50	8	8	5	B	1.2
	100-B32-RD16-06	●	100	32	50	8	8	6	B	1.0
	125-B40-RD20-06	○	125	40	63	10	10	6	B	1.9
	160-B40-RD20-07	○	160	40	63	10	10	7	B	3.7

Inserts · WSP: RDKW1204MO**/ RDKW1605MO**/ RDKW2006MO

Spare Parts · Ersatzteile

Diameter Durchmesser Ø D	Screw Schraube	Clamp Pratze	Clamp Screw Schraube (Pratze)	Wrench Schlüssel		
						
Ø50-Ø63	I60M3.5×10	WD-204	I60M4×10	WT15IP	--	
Ø80 -Ø100	I60M5×13	--	--	--	WT20IT	
Ø125 -Ø160	I43M6×16			--	WT25IT	

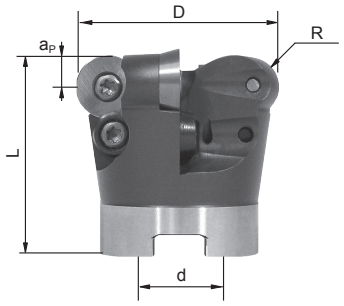
Applicable tool B9-B15
Werkzeug
Tools code key B22-B23
Werkzeug ISO
Grade selection guide B16-B20
Sortenauswahl
Technical data B183-B188
Technische Daten

Face Milling Tools · Planfräser



FMR04 P M K





Type · Typ		Stock Lager	Dimension (mm) Abmessung					No. of teeth Zähne
			Ø D	Ø d	L	R	$a_p$max	
FMR04	**042-A16-RD1003-06**	●	42	16	44	5	5	6
	052-A22-RD1003-07	●	52	22	50	5	5	7

Inserts · WSP: RDKW1003MO**

Type · Typ		Stock Lager	Dimension (mm) Abmessung					No. of teeth Zähne
			Ø D	Ø d	L	R	$a_p$max	
FMR04	**042-A16-RD12T3-05**	●	42	16	42	6	6	5
	052-A22-RD12T3-05	●	52	22	50	6	6	5
	066-A27-RD12T3-06	●	66	27	50	6	6	6
	080-A27-RD12T3-07	●	80	27	50	6	6	7

Inserts · WSP: RDKW12T3MO**

Type · Typ		Stock Lager	Dimension (mm) Abmessung					No. of teeth Zähne
			Ø D	Ø d	L	R	$a_p$max	
FMR04	***052-A22-RD1604-04**	●	52	22	50	8	8	4
	***052-A22-RD1604-05**	●	52	22	50	8	8	5
	066-A27-RD1604-05	●	66	27	50	8	8	5
	080-A27-RD1604-06	●	80	27	52	8	8	6
	100-B32-RD1604-07	○	100	32	52	8	8	7
	125-B40-RD1604-08	○	125	40	52	8	8	8
	160-B40-RD1604-09	○	160	40	52	8	8	9

Inserts · WSP: RDKW1604MO**

*= WX16N (außer für FMP04-052) (expect for FMP04-052)
**= nur ab (Ø 052) from (Ø 052)

Spare Parts · Ersatzteile

Type Typ	Screw Schraube	Clamp Klemmscheibe	Clamp Screw Klemmschraube	Wrench Schlüssel
				
FMR04**RD1003	I60M3,5 x 7,7	-	-	WT15P
FMR04**RD12T3	I60M3,5 x 7,7	-	**LOM 3,5 x 7,1	WT15P
FMR04**RD1604	I60M4,5 x 1,0	*WX16N	-	WT20T

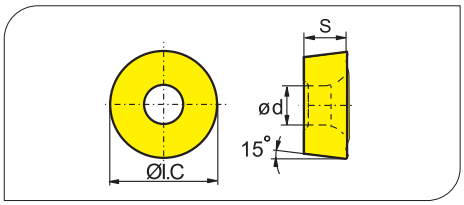
Applicable tool B9-B15 Werkzeug
Tools code key B22-B23 Werkzeug ISO
Grade selection guide B16-B20 Sortenauswahl
Technical data B183-B188 Technische Daten

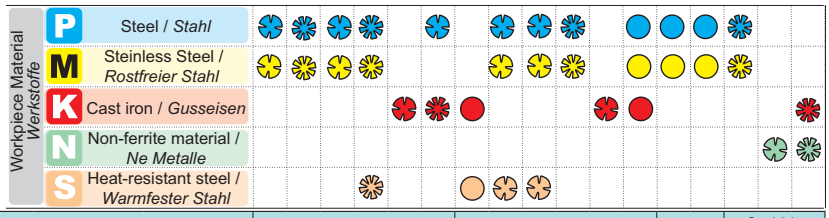
Ideal Machining Condition
Gute Bearbeitungsbedingungen

Normal Machining Condition
Normale Bearbeitungsbedingungen

Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen

Applicable inserts · Wendeschneidplatten





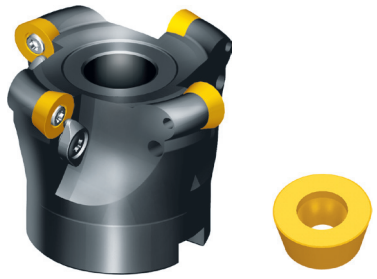
Insert shape Plattenform	Type · Typ	Dimension (mm) Abmessung			CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall		
		I.C	S	d	YBC301	YBC401	YBM251	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD101	YD201
	**RDKW0702MO**	7.0	2.38	2.7				●			●	●									
	RDKW0803MO	8.0	3.18	3.4				●				●									
	RDKW1003MO	10.0	3.18	3.9			●	●			●	●									
	RDKW10T3MO	10.0	3.97	4.4	○			●			●	●									
	RDKW1204MO	12.0	4.76	4.4			○	●			●	●									
	RDKW12T3MO	12.0	3.97	3.9		○	●	●			●	●								○	
	RDKW1604MO	16.0	4.76	5.2				●			●	●									
	RDKW1605MO	16.0	5.56	5.5				●			●	●	○								
	RDKW2006MO	20.0	6.35	6.5				●		○											

Recommended cutting data · Empfohlene Schnittdaten

Workpiece material Werkstückstoff		Hardness HB Härte	Grade Sorte	Cutting data · Schnittdaten	
				V (m/min)	f (mm/z)
P	Low-carbon steel Soft steel Niedrig legierter Kohlenstoffstahl Baustahl	≤180	YBM251 YBC301	270 (220-350)	0.2 (0.08-0.45)
			YBM351 YBG302	220 (180-300)	0.25 (0.15-0.45)
			YBG202	270 (200-360)	0.2 (0.1-0.45)
	High-carbon steel Alloy steel Hoch Leg. Kohlenstoffstahl	180-280	YBM251 YBC301	240 (200-320)	0.2 (0.08-0.45)
			YBM351 YBG302	200 (160-280)	0.25 (0.15-0.45)
			YBG202	240 (180-350)	0.2 (0.1-0.45)
	Alloy tool steel Leg. Werkzeugstahl	280-350	YBM251 YBC301	220 (180-300)	0.2 (0.08-0.45)
			YBM351 YBG302	180 (150-250)	0.25 (0.15-0.45)
			YBG202	220 (170-340)	0.2 (0.1-0.45)
M	Stainless steel Rostfreier Stahl	≤270	YBM251	150 (120-240)	0.2 (0.08-0.45)
			YBM351 YBG302	150 (100-220)	0.25 (0.1-0.45)
			YBG202	160 (110-270)	0.2 (0.1-0.45)
K	Cast iron Gusseisen	180-250	YBG102	210 (120-300)	0.2 (0.1-0.45)

Applicable tool Werkzeug B9-B15
Tools code key Werkzeug ISO B22-B23
Grade selection guide Sortenauswahl B16-B20
Technical data Technische Daten B183-B188

Case study for FMR04
Bearbeitungsbeispiel für FMA04



Workpiece material
Werkstückstoff: 42CrMo (HRC35)
Cooling system
Kühlsystem: dry cutting, trocken

Machine
Maschine: vertical machining center

Cutting data
Schnittdaten:
Vc=200m/min
ap=3mm
fz=0.3mm/z

- Tool · Werkzeug: FMR04-063-A22-RD12-04
- Inserts · WSP: RDKW1204MO/YBG202



● Wear comparison after 90 min.
● Verschleißvergleich nach 90 min.

ZCC-CT



A company

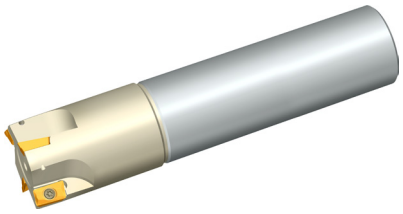


Square shoulder milling tools · Eckfräser

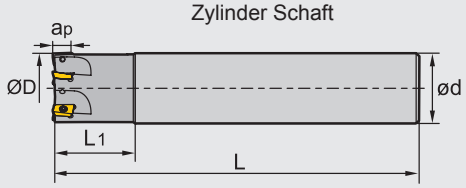
Kr:90°



EMP01 P M K N



Straight shank
Zylinder Schaft

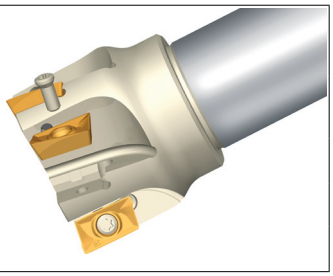


Specification of tools · Werkzeug Beschreibung

Type · Typ		Stock Lager	Dimensions (mm) · Abmessungen					No. of teeth Zähne	Weight Gewicht (kg)
			Ø D	Ø d	L	L_1	a_{pmax}		
EMP01 Straight shank Zylinder Schaft	**012-G16-AP11-01**	●	12	16	85	25	10.5	1	0.1
	016-G16-AP11-02	●	16	16	90	25	10.5	2	0.1
	020-G20-AP11-02	●	20	20	100	30	10.5	2	0.2
	020-G20-AP11-03	●	20	20	100	30	10.5	3	0.2
	020-G20-AP11-03C	○	20	20	100	30	10.5	3	0.2
	025-G25-AP11-03	●	25	25	115	35	10.5	3	0.4
	025-G25-AP11-04	●	25	25	115	35	10.5	4	0.4
	025-G25-AP11-04C	○	25	25	115	35	10.5	4	0.4
	032-G32-AP11-04	●	32	32	125	40	10.5	4	0.7
	025-G25-AP16-02	●	25	25	115	35	15.5	2	0.4
	032-G32-AP16-03	●	32	32	125	40	15.5	3	0.7
	040-G32-AP16-03	●	40	32	130	42	15.5	3	0.7
	040-G32-AP16-04	●	40	32	130	42	15.5	4	0.8
	050-G32-AP16-05	●	50	32	135	45	15.5	5	1.0
	063-G32-AP16-06	●	63	32	135	45	15.5	6	1.4

Spare Parts · Ersatzteile

Diameter Durchmesser Ø D	Insert WSP	Screw Schraube	Wrench Schlüssel	
				
Ø12-Ø32	AP11	I60M2.5×6.5T	WT08IP	--
Ø25-Ø63	AP16	I60M4×8.4	--	WT15IS

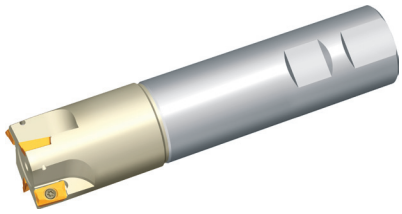


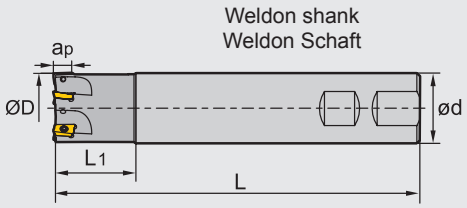
● Ex Stock / ab Lager ○ On demand / auf Anfrage

Square shoulder milling tools · Eckfräser

Kr:90°

EMP01 P M K N



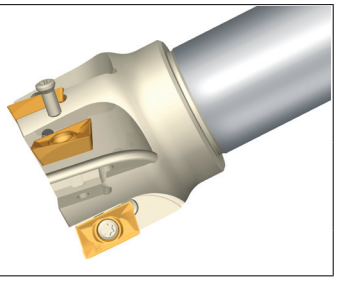


Specification of tools · Werkzeug Beschreibung

Type · Typ		Stock Lager	Dimensions (mm) · Abmessungen					No. of teeth Zähne	Weight Gewicht (kg)
			Ø D	Ø D	L	L_1	a_{pmax}		
EMP01	**012-XP16-AP11-01**	●	12	16	85	25	10.5	1	0.1
Weldon shank	**016-XP16-AP11-02**	●	16	16	90	25	10.5	2	0.1
	020-XP20-AP11-02	●	20	20	100	30	10.5	2	0.2
Weldon Schaft	**020-XP20-AP11-03**	●	20	20	100	30	10.5	3	0.2
	020-XP20-AP11-03C	○	20	20	100	30	10.5	3	0.2
	025-XP25-AP11-03	●	25	25	115	35	10.5	3	0.4
	025-XP25-AP11-04	●	25	25	115	35	10.5	4	0.4
	025-XP25-AP11-04C	○	25	25	115	35	10.5	4	0.4
	032-XP32-AP11-04	●	32	32	125	40	10.5	4	0.7
	025-XP25-AP16-02	●	25	25	115	35	15.5	2	0.4
	032-XP32-AP16-03	●	32	32	125	40	15.5	3	0.7
	040-XP32-AP16-04	●	40	32	130	42	15.5	4	0.8
	050-XP32-AP16-05	●	50	32	135	45	15.5	5	1.0
	063-XP32-AP16-06	○	63	32	135	45	15.5	6	1.4

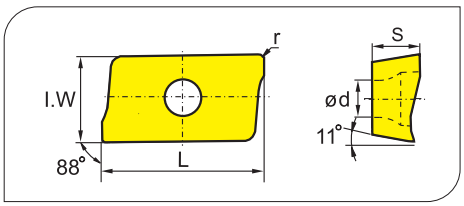
Spare Parts · Ersatzteile

Diameter Durchmesser Ø D	Insert WSP	Screw Schraube	Wrench Schlüssel	
				
Ø12-Ø32	AP11	I60M2.5×6.5T	WT08IP	--
Ø25-Ø63	AP16	I60M4×8.4	--	WT15IS



Applicable tool B9-B15 Werkzeug
Tools code key B22-B23 Werkzeug ISO
Grade selection guide B16-B20 Sortenauswahl
Technical data B183-B188 Technische Daten

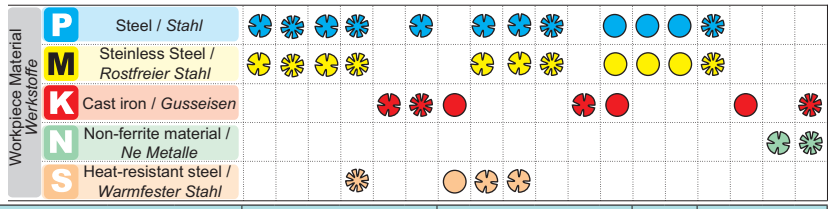
Applicable inserts · Wendeschneidplatten

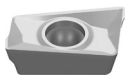


Ideal Machining Condition
Gute Bearbeitungsbedingungen

Normal Machining Condition
Normale Bearbeitungsbedingungen

Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen



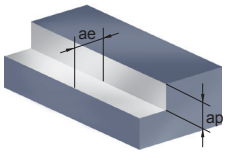
Insert shape Plattenform	Type · Typ	Dimensions (mm) · Abmessungen					CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall			
		L	I.W	S	d	r	YBC301	YBC401	YBM251	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	APKT11T304-PF	12.24	6.5	3.6	2.8	0.4	○		●	●				●		●								
	APKT11T308-PF	12.24	6.5	3.6	2.8	0.8			●					●										
	APKT11T312-PF	12.24	6.5	3.6	2.8	1.2								○										
	APKT11T316-PF	12.24	6.5	3.6	2.8	1.6								●										
	APKT160408-PF	17.877	9.33	5.76	4.4	0.8	●		●	●				●		●								
	APKT11T304-PM	12.24	6.5	3.6	2.8	0.4	●	●	●	●			●	●		●								
	APKT11T308-PM	12.24	6.5	3.6	2.8	0.8	●		●	●	●		●	●		●								
	APKT11T312-PM	12.24	6.5	3.6	2.8	1.2			●					●										
	APKT11T316-PM	12.24	6.5	3.6	2.8	1.6			●					●										
	APKT160408-PM	17.877	9.33	5.76	4.4	0.8	●	●	●	●	●	●	●	●	●	●								
	APKT11T304-PR	12.24	6.5	3.6	2.8	0.4		●		●						●								
	APKT11T308-PR	12.24	6.5	3.6	2.8	0.8																		
	APKT11T312-PR	12.24	6.5	3.6	2.8	1.2																		
	APKT11T316-PR	12.24	6.5	3.6	2.8	1.6																		
	APKT160408-PR	17.877	9.33	5.76	4.4	0.8																		
	APKT11T304-LH	12.24	6.5	3.6	2.8	0.4																	●	●
	APKT11T308-LH	12.24	6.5	3.6	2.8	0.8																	●	●
	APKT160408-LH	17.877	9.33	5.76	4.4	0.8																	●	●

● Ex Stock / ab Lager ○ On demand / auf Anfrage

Chipbreaker Selection EMP01 · Spanbrecher Auswahl EMP01

Application Anwendung	Finishing Schlichten	Semi-Finishing Mittlere Bearbeitung	Roughing Schruppen
P	-PF	-PM	-PR
M	-PF	-PM	-PR
K	-PF	-PM	
AL	-LH		

1 Square shoulder milling
1 Eckfräsen

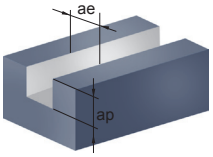


Recommended cutting data · Empfohlene Schnittdaten

Workpiece material Werkstück Material		Hardness HB Härte	Grade Sorte	Cutting data · Schnittdaten				
				V(m/min)	f(mm/z)			a_e(mm)
					-PF	-PM	-PR	
P	Low-carbon steel Soft steel Niedrig legierter Kohlenstoffstahl Baustahl	≤180	YBM251 YBC301	320 (240-400)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25(0.2-0.35)	≤0.5D
			YBM351	260 (180-380)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25(0.2-0.35)	≤0.5D
			YBG202 YBG205	320 (200-400)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25(0.2-0.35)	≤0.5D
			YBG302	280 (180-400)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25(0.2-0.35)	≤0.5D
	High-carbon steel Alloy steel Hoch Leg. Kohlenstoffstahl Leg. Stahl	180-280	YBM251 YBC301	280 (210-380)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25(0.2-0.3)	≤0.5D
			YBM351	240 (160-320)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25(0.2-0.35)	≤0.5D
			YBG202 YBG205	280 (180-350)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25(0.2-0.3)	≤0.5D
			YBG302	260 (150-380)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25(0.2-0.35)	≤0.5D
	Alloy tool steel Leg. Werkzeugstahl	280-350	YBM251 YBC301	260 (180-350)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25(0.2-0.3)	≤0.5D
			YBM351	220 (150-280)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25(0.2-0.35)	≤0.5D
			YBG202 YBG205	260 (160-330)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25(0.2-0.3)	≤0.5D
			YBG302	240 (120-350)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25(0.2-0.35)	≤0.5D
M	Stainless steel Rostfreier Stahl	≤270	YBM251	200 (120-270)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25(0.2-0.3)	≤0.5D
			YBM351	180 (150-300)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25(0.2-0.3)	≤0.5D
			YBG202 YBG205	200 (110-300)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25(0.2-0.3)	≤0.5D
			YBG302	170 (100-280)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25(0.2-0.3)	≤0.5D
K	Cast iron Gusseisen	180-250	YBG102	220 (120-250)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	-	≤0.5D
			YBD152	240 (180-300)	-	0.2 (0.1-0.3)	-	≤0.5D
			YBD252	200 (120-320)	-	0.2 (0.1-0.3)	-	≤0.5D
N					-LH			
	Al alloy Al Leg.	----	YD101	300-	0.2 (0.08-0.4)			≤0.5D
			YD201	300-	0.2 (0.08-0.4)			≤0.5D

Applicable tool B9-B15 Werkzeug
Tools code key B22-B23 Werkzeug ISO
Grade selection guide B16-B20 Sortenauswahl
Technical data B183-B188 Technische Daten

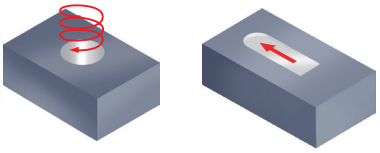
2 Slot milling
2 Nutenfräsen



Recommended cutting data · Empfohlene Schnittdaten

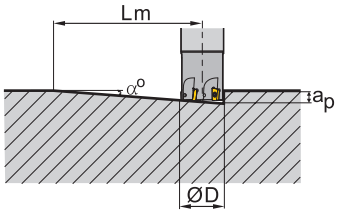
Workpiece material Werkstück Material		Hardness HB Härte	Grade Sorte	Cutting data · Schnittdaten				
				V(m/min)	f(mm/z)			a_e(mm)
					-PF	-PM	-PR	
P	Low-carbon steel Soft steel Niedrig legierter Kohlenstoffstahl Baustahl	≤180	YBM251 YBC301	190 (170-250)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	0.2 (0.2-0.3)	D
			YBM351	150 (130-210)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	0.2 (0.2-0.3)	D
			YBG202 YBG205	190 (140-250)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	0.2 (0.2-0.3)	D
			YBG302	170 (130-250)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	0.2 (0.2-0.3)	D
	High-carbon steel Alloy steel Hoch Leg. Kohlenstoffstahl Leg. Stahl	180-280	YBM251 YBC301	170 (150-220)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	0.2 (0.2-0.3)	D
			YBM351	140 (110-200)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	0.2 (0.2-0.3)	D
			YBG202 YBG205	170 (130-250)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	0.2 (0.2-0.3)	D
			YBG302	150 (110-230)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	0.2 (0.2-0.3)	D
	Alloy tool steel Leg. Werkzeugstahl	280-350	YBM251 YBC301	150 (130-210)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	0.2 (0.2-0.3)	D
			YBM351	130 (100-180)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	0.2 (0.2-0.3)	D
			YBG202 YBG205	150 (110-240)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	0.2 (0.2-0.3)	D
			YBG302	140 (80-210)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	0.2 (0.2-0.3)	D
M	Stainless steel Rostfreier Stahl	≤270	YBM251	110 (80-190)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	0.2 (0.2-0.3)	D
			YBM351	100 (80-170)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	0.2 (0.2-0.3)	D
			YBG202 YBG205	120 (80-190)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	0.2 (0.2-0.3)	D
			YBG302	100 (70-180)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	0.2 (0.2-0.3)	D
K	Cast iron Gusseisen	180-250	YBG102	130 (80-180)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	-	D
			YBD152	140 (80-210)	-	0.15 (0.1-0.25)	-	D
			YBD252	120 (80-210)	-	0.15 (0.1-0.25)	-	D
N					-LH			
	Al alloy Al Leg.	----	YD101	300-	0.2 (0.08-0.3)			D
			YD201	300-	0.2 (0.08-0.3)			D

3 Ramp milling, helical interpolation milling
3 Tauchfräsen, Spiral Interpolationsfräsen



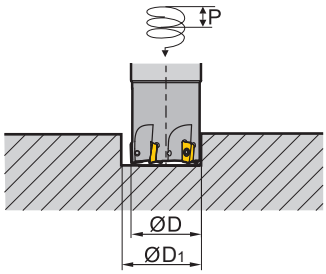
Recommended cutting data · Empfohlene Schnittdaten

- Ramp milling
  Tauchfräsen



$$L_m = \frac{a_p}{tg\alpha}$$ (α:Maximum ramp angle)

- Helical interpolation milling
  Spiral Interpolationsfräsen

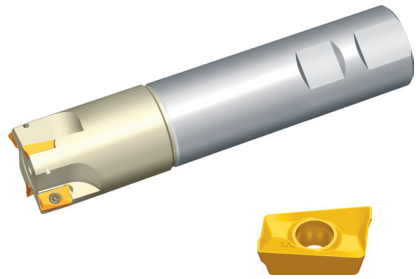


$$tg\alpha = \frac{P}{\pi D_1}$$ (α:helical angle)

Diameter Durchmesser Ø D (mm)	APKT Ramp milling, helical interpolation milling (Inserts—11) APKT Tauchfräsen, Spiral Interpolationsfräsen				
	Ramp milling Tauchfräsen			Helical interpolation milling Spiral Interpolationsfräsen	
	Max. cutting depth Schnitttiefe a_p(mm)	Max. ramp angle α°	Min. length Länge L_m(mm)	Min. diameter Durchmesser Ø D_1(mm)	Max. pitch Steigung (mm)
16	10.0	10.0	56.7	20.0	2.0
20	10.0	5.0	114.4	28.0	2.0
25	10.0	4.5	127.0	40.0	2.0
32	10.0	3.0	190.8	56.0	2.0
40	10.0	2.0	286.4	70.0	2.0

Applicable tool B9-B15
Werkzeug
Tools code key B22-B23
Werkzeug ISO
Grade selection guide B16-B20
Sortenauswahl
Technical data B183-B188
Technische Daten

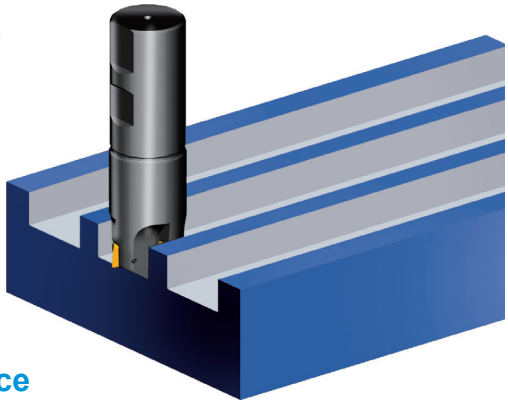
Case study for EMP01
Bearbeitungsbeispiel für EMP01



Workpiece material
Werkstück Material: Cast Stee (HB220)
Cooling system
Kühlsystem: dry cutting, trocken

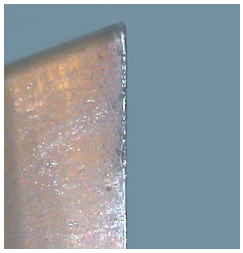
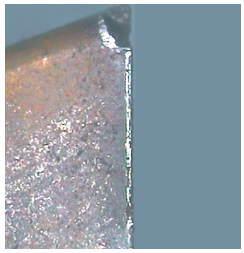
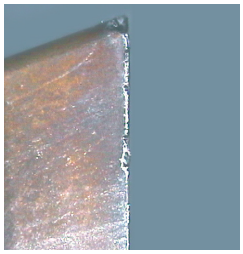
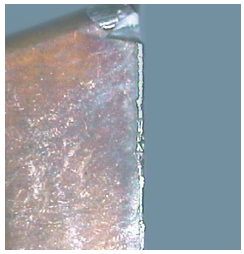
Machine: vertical machining center
Maschine: vertikales Maschinen Center

Cutting data
Schnittdaten:
Vc=180m/min
ap=3mm
fz=0.1mm/z



■ Tool · Werkzeug: APKT160408-PM/YBC301
■ Inserts · WSP: EMP01-040-XP32-AP16-04

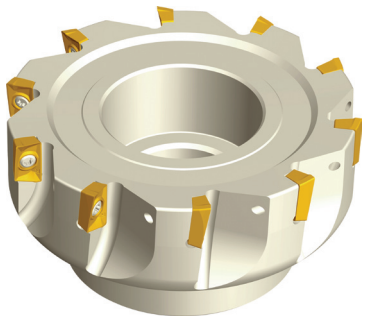
- **Wear comparison of insert after milling curved face**
- **Verschleißvergleich der WSP**

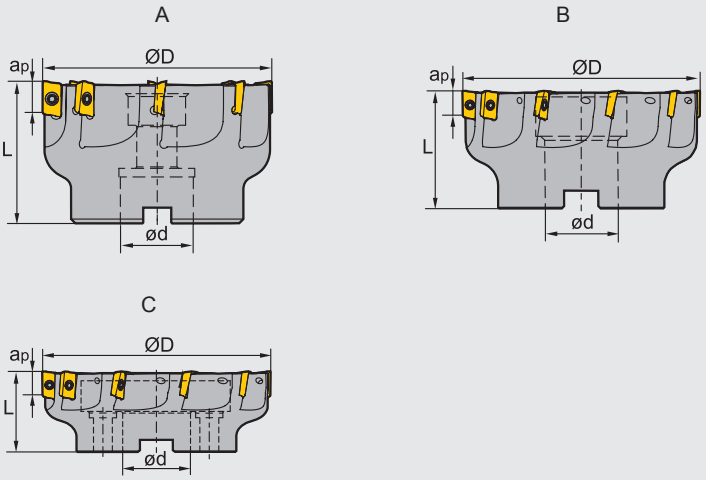
	ZCC-CT	Other company product
15'		
25'		

Square shoulder milling tools · Eckfräser

Kr:90°

EMP02 P M K N



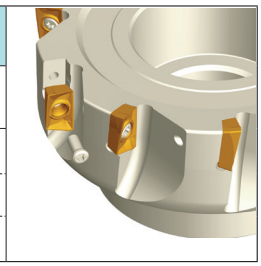


Specification of tools · Werkzeug Beschreibung

Type · Typ		Stock Lager	Dimensions (mm) · Abmessungen				No. of teeth Zähne	Coupling Aufnahme	Weight Gewicht (kg)
			Ø D	Ø D	L	a_{pmax}			
EMP02	**050-A22-AP11-06**	●	50	22	40	11	6	A	0.3
	063-A22-AP11-08	●	63	22	40	11	8	A	0.6
	080-A27-AP11-08	●	80	27	50	11	8	A	1.2
	100-B32-AP11-10	●	100	32	50	11	10	B	1.7
	050-A22-AP16-05	●	50	22	40	15.5	5	A	0.3
	063-A22-AP16-06	●	63	22	40	15.5	6	A	0.5
	080-A27-AP16-07	●	80	27	50	15.5	7	A	1.1
	100-B32-AP16-08	●	100	32	50	15.5	8	B	1.6
	125-B40-AP16-10	●	125	40	63	15.5	10	B	3.2
	160-B40-AP16-10	●	160	40	63	15.5	10	B	6.3
	200-C60-AP16-12	○	200	60	63	15.5	12	C	8.1
	250-C60-AP16-12	○	250	60	63	15.5	12	C	11.2

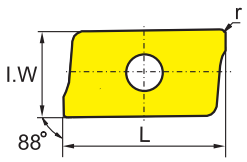
Spare Parts · Ersatzteile

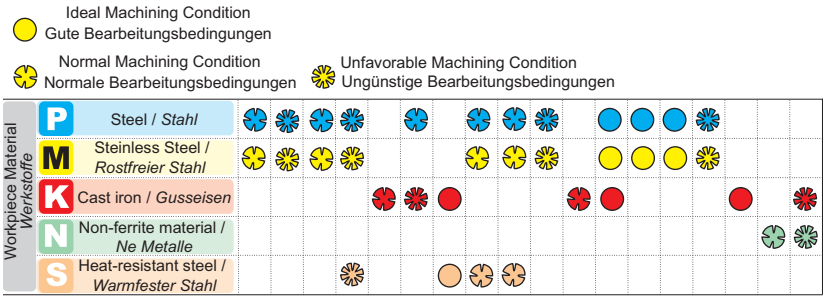
Diameter Durchmesser Ø D	Insert WSP	Screw Schraube	Wrench Schlüssel
			
Ø50-Ø250	AP11	I60M2.5×6.5T	WT08IS
Ø50-Ø250	AP16	I60M4×10	WT15IS

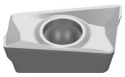


Applicable tool B9-B15
Werkzeug
Tools code key B22-B23
Werkzeug ISO
Grade selection guide B16-B20
Sortenauswahl
Technical data B183-B188
Technische Daten

Applicable inserts · Wendeschneidplatten





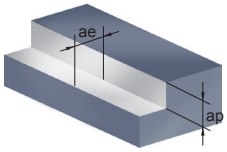
Insert shape Plattenform	Type · Typ	Dimensions (mm) · Abmessungen					CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall			
		L	I.W	S	d	r	YBC301	YBC401	YBM251	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	APKT11T304-PF	12.24	6.5	3.6	2.8	0.4	○		●	●				●		●								
	APKT11T308-PF	12.24	6.5	3.6	2.8	0.8			●					●										
	APKT11T312-PF	12.24	6.5	3.6	2.8	1.2								○										
	APKT11T316-PF	12.24	6.5	3.6	2.8	1.6								●										
	APKT160408-PF	17.877	9.33	5.76	4.4	0.8	●		●	●				●		●								
	APKT11T304-PM	12.24	6.5	3.6	2.8	0.4	●	●	●	●			●	●		●								
	APKT11T308-PM	12.24	6.5	3.6	2.8	0.8	●		●	●	●		●	●		●								
	APKT11T312-PM	12.24	6.5	3.6	2.8	1.2			●					●										
	APKT11T316-PM	12.24	6.5	3.6	2.8	1.6			●					●										
	APKT160408-PM	17.877	9.33	5.76	4.4	0.8	●	●	●	●	●	●	●	●	●	●								
	APKT11T304-PR	12.24	6.5	3.6	2.8	0.4		●		●						●								
	APKT11T308-PR	12.24	6.5	3.6	2.8	0.4																		
	APKT11T312-PR	12.24	6.5	3.6	2.8	0.4																		
	APKT11T316-PR	12.24	6.5	3.6	2.8	0.4																		
	APKT160408-PR	17.877	9.33	5.76	4.4	0.8																		
	APKT11T304-LH	12.24	6.5	3.6	2.8	0.4																	●	●
	APKT11T308-LH	12.24	6.5	3.6	2.8	0.8																	●	●
	APKT160408-LH	17.877	9.33	5.76	4.4	0.8																	●	●

● Ex Stock / ab Lager ○ On demand / auf Anfrage

Chipbreaker Selection · Spanbrecher Auswahl

Application Anwendung	Finishing Schlichten	Semi-Finishing Mittlere Bearbeitung	Roughing Schruppen
P	-PF	-PM	-PR
M	-PF	-PM	-PR
K	-PF	-PM	
AL	-LH		

Square shoulder milling
Eckfräsen



Recommended cutting data · Empfohlene Schnittdaten

Workpiece material Werkstück Material		Hardness HB Härte	Grade Sorte	Cutting data · Schnittdaten				
				V(m/min)	f(mm/z)			a_e(mm)
					-PF	-PM	-PR	
P	Low-carbon steel Soft steel Niedrig legierter Kohlenstoffstahl Baustahl	≤180	YBM251 YBC301	320 (240-400)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25(0.2-0.35)	≤0.5D
			YBM351	260 (180-380)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25(0.2-0.35)	≤0.5D
			YBG202 YBG205	320 (200-400)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25(0.2-0.35)	≤0.5D
			YBG302	280 (180-400)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25(0.2-0.35)	≤0.5D
	High-carbon steel Alloy steel Hoch Leg. Kohlenstoffstahl Leg. Stahl	180-280	YBM251 YBC301	280 (210-380)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25(0.2-0.3)	≤0.5D
			YBM351	240 (160-320)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25(0.2-0.35)	≤0.5D
			YBG202 YBG205	280 (180-350)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25(0.2-0.3)	≤0.5D
			YBG302	260 (150-380)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25(0.2-0.35)	≤0.5D
	Alloy tool steel Leg. Werkzeugstahl	280-350	YBM251 YBC301	260 (180-350)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25(0.2-0.3)	≤0.5D
			YBM351	220 (150-280)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25(0.2-0.35)	≤0.5D
			YBG202	260 (160-330)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25(0.2-0.3)	≤0.5D
			YBG302	240 (120-350)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25(0.2-0.35)	≤0.5D
M	Stainless steel Rostfreier Stahl	≤270	YBM251	200 (120-270)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25(0.2-0.3)	≤0.5D
			YBM351	180 (150-300)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25(0.2-0.3)	≤0.5D
			YBG202	200 (110-300)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25(0.2-0.3)	≤0.5D
			YBG302	170 (100-280)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25(0.2-0.3)	≤0.5D
K	Cast iron Gusseisen	180-250	YBG102	220 (120-250)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	-	≤0.5D
			YBD152	240 (180-300)	-	0.2 (0.1-0.3)	-	≤0.5D
			YBD252	200 (120-320)	-	0.2 (0.1-0.3)	-	≤0.5D
N					-LH			
	Al alloy Al Leg.	----	YD101	300-	0.2 (0.08-0.4)			≤0.5D
			YD201	300-	0.2 (0.08-0.4)			≤0.5D

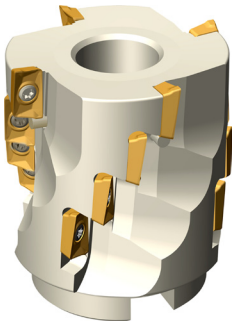
Applicable tool B9-B15
Werkzeug
Tools code key B22-B23
Werkzeug ISO
Grade selection guide B16-B20
Sortenauswahl
Technical data B183-B188
Technische Daten

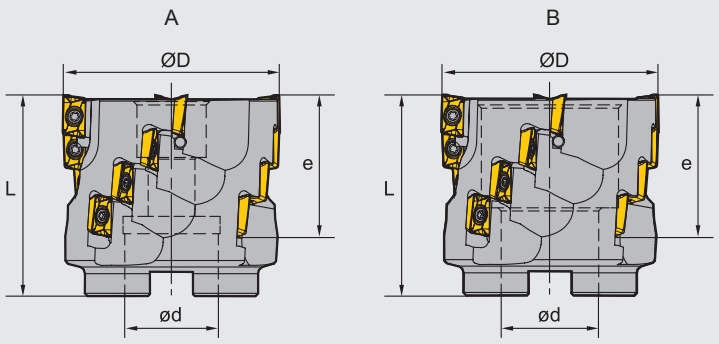
Square shoulder milling tools · Eckfräser

Kr:90°



EMP03 P M K N



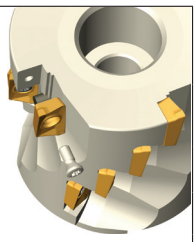


Specification of tools · Werkzeug Beschreibung

Type · Typ		Stock Lager	Dimensions (mm) · Abmessungen				Flute number z	No. of inserts WSP Anzahl	Coupling Aufnahme	Weight Gewicht (kg)
			Ø D	Ø D	L	e				
EMP03	**-050-A22-AP11-04**	●	50	22	58	39	4	16	A	0.5
	-063-A27-AP11-04	●	63	27	58	39	4	16	A	0.9
	-080-B32-AP11-05	●	80	32	63	39	5	20	B	1.3
	-100-B40-AP11-06	○	100	40	63	39	6	24	B	2.0

Spare Parts · Ersatzteile

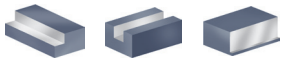
Diameter Durchmesser Ø D	Screw Schraube	Wrench Schlüssel	
			
Ø50-Ø100	I60M2.5×6.5T	WT08IS	



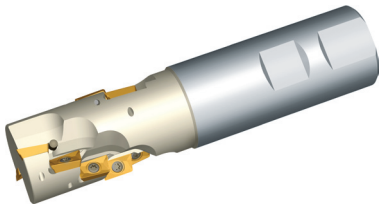
● Ex Stock / ab Lager ○ On demand / auf Anfrage

Square shoulder milling tools · Eckfräser

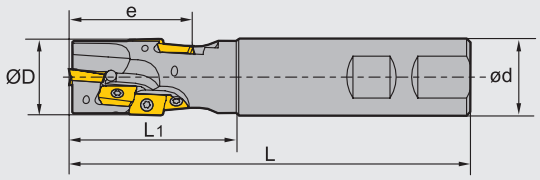
Kr:90°



EMP04 P M K N



Weldon shank
Weldon Schaft

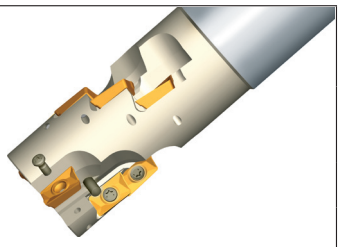


Specification of tools · Werkzeug Beschreibung

Type · Typ		Stock Lager	Dimensions (mm) · Abmessungen					Flute number	No. of inserts WSP Anzahl	Weight Gewicht (kg)
			Ø D	Ø D	L	L_1	e			
EMP04	**-020-XP20-AP11-01**	●	20	20	120	45	29.4	1	3	0.3
	-025-XP25-AP11-02	●	25	25	130	55	38.9	2	8	0.4
	-032-XP32-AP11-02	●	32	32	140	65	48.5	2	10	0.7
	-040-XP40-AP11-02	●	40	40	150	75	58.0	2	14	1.3

Spare Parts · Ersatzteile

Diameter Durchmesser Ø D	Screw Schraube	Wrench Schlüssel	
			
Ø20-Ø40	I60M2.5×6.5T	WT08IS	



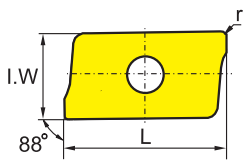
Applicable tool B9-B15
Werkzeug

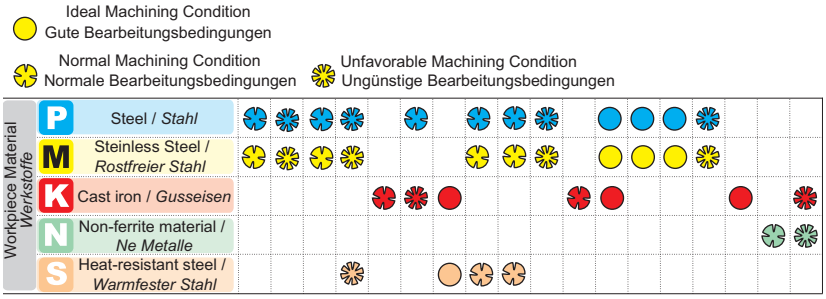
Tools code key B22-B23
Werkzeug ISO

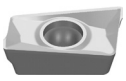
Grade selection guide B16-B20
Sortenauswahl

Technical data B183-B188
Technische Daten

Applicable inserts · Wendeschneidplatten





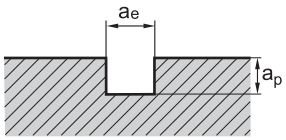
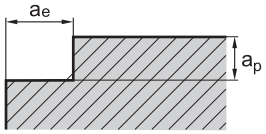
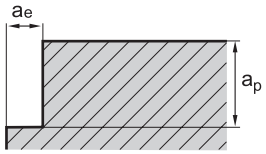
Insert shape Plattenform	Type · Typ	Dimensions (mm) · Abmessungen					CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall			
		L	I.W	S	d	r	YBC301	YBC401	YBM251	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**APKT11T304-PF**	12.24	6.5	3.6	2.8	0.4	○		●	●				●		●								
	APKT11T308-PF	12.24	6.5	3.6	2.8	0.8			●					●										
	APKT11T312-PF	12.24	6.5	3.6	2.8	1.2								○										
	APKT11T316-PF	12.24	6.5	3.6	2.8	1.6								●										
	**APKT11T304-PM**	12.24	6.5	3.6	2.8	0.4	●	●	●	●			●	●		●								
	APKT11T308-PM	12.24	6.5	3.6	2.8	0.8	●		●	●	●		●	●		●								
	APKT11T312-PM	12.24	6.5	3.6	2.8	1.2			●					●										
	APKT11T316-PM	12.24	6.5	3.6	2.8	1.6			●					●										
	**APKT11T304-PR**	12.24	6.5	3.6	2.8	0.4		●		●						●								
	APKT11T308-PR	12.24	6.5	3.6	2.8	0.4																		
	APKT11T312-PR	12.24	6.5	3.6	2.8	0.4																		
	APKT11T316-PR	12.24	6.5	3.6	2.8	0.4																		
	**APKT11T304-LH**	12.24	6.5	3.6	2.8	0.4																	●	●
	APKT11T308-LH	12.24	6.5	3.6	2.8	0.8																	●	●

Chipbreaker Selection · Spanbrecher Auswahl

Application Anwendung	Finishing Schlichten	Semi-Finishing Mittlere Bearbeitung	Roughing Schruppen
P	-PF	-PM	-PR
M	-PF	-PM	-PR
K	-PF	-PM	
AL	-LH		

● Ex Stock / ab Lager ○ On demand / auf Anfrage

Recommended cutting data · Empfohlene Schnittdaten

Slot milling · Nutenfräsen	Square shoulder milling Eckfräsen	Deep square shoulder milling Tiefes Eckfräsen
		
ae=D ap:≤0.5D	ae:≤0.5D ap:≤1.2D	ae:≤0.2D ap<Cutting length of insert Schneidkantenlänge

Workpiece material Werkstück Material		Hardness HB Härte	Grade Sorte	Cutting data · Schnittdaten			
				Square shoulder milling · Eckfräsen			
				V(m/min)	f(mm/z)		
					-PF	-PM	-PR
P	Low-carbon steel Soft steel Niedrig legierter Kohlenstoffstahl Baustahl	≤180	YBM251 YBC301	270 (240-350)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25(0.2-0.35)
			YBM351	220 (180-300)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25(0.2-0.35)
			YBG202 YBG205	270 (200-360)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25(0.2-0.35)
			YBG302	240 (180-350)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25(0.2-0.35)
	High-carbon steel Alloy steel Hoch Leg. Kohlenstoffstahl Leg. Stahl	180-280	YBM251 YBC301	240 (210-320)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25(0.2-0.35)
			YBM351	200 (160-280)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25(0.2-0.35)
			YBG202 YBG205	240 (180-360)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25(0.2-0.35)
			YBG302	220 (150-330)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25(0.2-0.35)
	Alloy tool steel Leg. Werkzeugstahl	280-350	YBM251 YBC301	220 (180-300)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25(0.2-0.35)
			YBM351	180 (150-250)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25(0.2-0.35)
			YBG202 YBG205	220 (160-340)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25(0.2-0.35)
			YBG302	200 (120-300)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25(0.2-0.35)
M	Stainless steel Rostfreier Stahl	≤270	YBM251	170 (120-240)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25(0.2-0.35)
			YBM351	160 (150-270)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25(0.2-0.35)
			YBG202 YBG205	150 (110-270)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25(0.2-0.35)
			YBG302	140 (100-250)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	0.25(0.2-0.35)
K	Cast iron Gusseisen	180-250	YBG102	200 (120-240)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	-
			YBD152	240 (180-300)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	-
			YBD252	180 (120-300)	-	0.2 (0.1-0.3)	-
N					-LH		
	Al alloy Al Leg.	----	YD101	300-	0.2 (0.08-0.4)		
			YD201	300-	0.2 (0.08-0.4)		

Applicable tool B9-B15
Werkzeug
Tools code key B22-B23
Werkzeug ISO
Grade selection guide B16-B20
Sortenauswahl
Technical data B183-B188
Technische Daten

Recommended cutting data · Empfohlene Schnittdaten

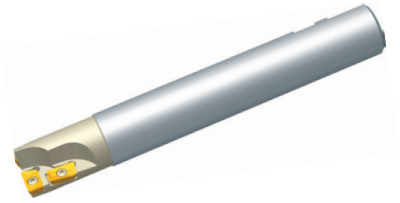
Workpiece material Werkstück Material		Hardness HB Härte	Grade Sorte	Cutting data · Schnittdaten			
				Slot milling, deep square shoulder milling Nutenfräsen, Eckfräsen			
				V(m/min)	f(mm/z)		
					-PF	-PM	-PR
P	Low-carbon steel Soft steel Niedrig legierter Kohlenstoffstahl Baustahl	≤180	YBM251 YBC301	270 (240-350)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	0.2 (0.2-0.3)
			YBM351	220 (180-300)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	0.2 (0.2-0.3)
			YBG202 YBG205	270 (200-360)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	0.2 (0.2-0.3)
			YBG302	240 (180-350)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	0.2 (0.2-0.3)
	High-carbon steel Alloy steel Hoch Leg. Kohlenstoffstahl Leg. Stahl	180-280	YBM251 YBC301	240 (210-320)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	0.2 (0.2-0.3)
			YBM351	200 (160-280)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	0.2 (0.2-0.3)
			YBG202 YBG205	240 (180-360)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	0.2 (0.2-0.3)
			YBG302	220 (150-330)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	0.2 (0.2-0.3)
	Alloy tool steel Leg. Werkzeugstahl	280-350	YBM251 YBC301	220 (180-300)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	0.2 (0.2-0.3)
			YBM351	180 (150-250)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	0.2 (0.2-0.3)
			YBG202 YBG205	220 (160-340)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	0.2 (0.2-0.3)
			YBG302	200 (120-300)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	0.2 (0.2-0.3)
M	Stainless steel Rostfreier Stahl	≤270	YBM251	170 (120-240)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	0.2 (0.2-0.3)
			YBM351	160 (150-270)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	0.2 (0.2-0.3)
			YBG202 YBG205	150 (110-270)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	0.2 (0.2-0.3)
			YBG302	140 (100-250)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	0.2 (0.2-0.3)
K	Cast iron Gusseisen	180-250	YBG102	200 (120-240)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	-
			YBD152	240 (180-300)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	-
			YBD252	180 (120-300)	-	0.15 (0.1-0.25)	-
N					-LH		
	Al alloy Al Leg.	----	YD101	300-	0.2 (0.08-0.3)		
			YD201	300-	0.2 (0.08-0.3)		

● Ex Stock / ab Lager ○ On demand / auf Anfrage

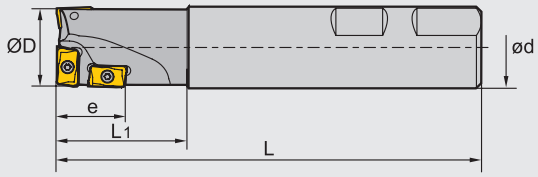
Square shoulder milling tools · Eckfräser

Kr:90°

EMP05 P M K



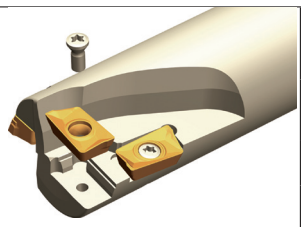
Weldon shank
Weldon Schaft



Specification of tools · Werkzeug Beschreibung

Type · Typ		Stock Lager	Dimensions (mm) · Abmessungen					No. of inserts WSP Anzahl		Weight Gewicht (kg)
		R	Ø D	Ø D	L	L_1	e	APMT11	APMT16	
EMP05	**-025-XP25**	●	25	25	130	40	20	3	--	0.5
	-032-XP32	●	32	32	140	50	30	--	3	0.8
	-040-XP32	●	40	32	150	60	40	--	4	1.0

Spare Parts · Ersatzteile

Diameter Durchmesser Ø D	Insert WSP	Screw Schraube	Wrench Schlüssel	
				
Ø25-Ø40	APMT11	I60M2.5×6.5T	WT08IP	
	APMT16	I60M4×10	WT15IP	

Applicable tool B9-B15
Werkzeug
Tools code key B22-B23
Werkzeug ISO
Grade selection guide B16-B20
Sortenauswahl
Technical data B183-B188
Technische Daten

B

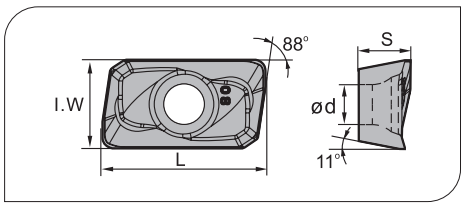
Milling Tools · Fräser

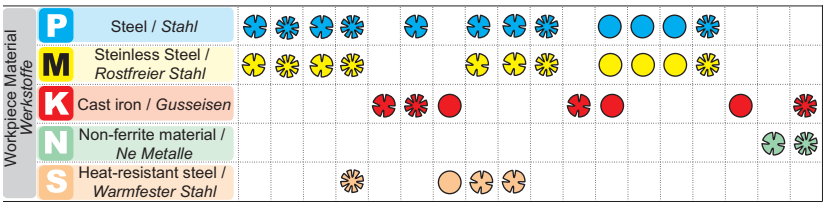
Applicable inserts · Wendeschneidplatten

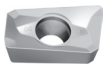
Ideal Machining Condition
Gute Bearbeitungsbedingungen

Normal Machining Condition
Normale Bearbeitungsbedingungen

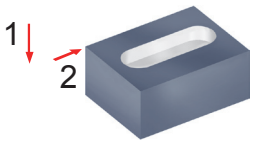
Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen





Insert shape Plattenform	Type · Typ	Dimensions (mm) · Abmessungen					CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall			
		L	I.W	S	d	r	YBC301	YBC401	YBM251	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**APMT1135PDR**	11.25	6.2	3.5	2.8	0.8			○					○	●									
	**APMT160408PDER**	17.25	9.25	4.76	4.4	0.8								○	●									

1 Drilling Bohren



Recommended cutting data · Empfohlene Schnittdaten

	Workpiece material Werkstück Material	Hardness HB Härte	Grade Sorte	Cutting data · Schnittdaten	
				V(m/min)	f(mm/z)
P	Low-carbon steel Soft steel Niedrig legierter Kohlenstoffstahl Baustahl	≤180	YBG202 YBG205	180 (150-220)	0.2 (0.08-0.25)
P	High-carbon steel Alloy steel Hoch Leg. Kohlenstoffstahl	180-280	YBG202 YBG205	160 (130-200)	0.15 (0.08-0.2)
P	Alloy tool steel Leg. Werkzeugstahl	280-350	YBG202 YBG205	140 (120-180)	0.12 (0.05-0.2)
M	Stainless steel Rostfreier Stahl	≤270	YBG202 YBG205	80 (50-150)	0.08 (0.03-0.15)
K	Cast iron Gusseisen	180-250	YBG202 YBG205	150 (100-220)	0.15 (0.08-0.2)

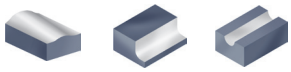
2 Milling Fräsen

Recommended cutting data · Empfohlene Schnittdaten

	Workpiece material Werkstück Material	Hardness HB Härte	Grade Sorte	Cutting data · Schnittdaten	
				V(m/min)	f(mm/z)
P	Low-carbon steel Soft steel Niedrig legierter Kohlenstoffstahl Baustahl	≤180	YBG202 YBG205	190 (140-250)	0.08 (0.04-0.15)
P	High-carbon steel Alloy steel Hoch Leg. Kohlenstoffstahl	180-280	YBG202 YBG205	170 (130-250)	0.08 (0.04-0.15)
P	Alloy tool steel Leg. Werkzeugstahl	280-350	YBG202 YBG205	150 (110-240)	0.08 (0.04-0.15)
M	Stainless steel Rostfreier Stahl	≤270	YBG202 YBG205	120 (80-190)	0.08 (0.04-0.15)
K	Cast iron Gusseisen	180-250	YBG202 YBG205	120 (80-210)	0.08 (0.04-0.15)

● Ex Stock / ab Lager ○ On demand / auf Anfrage

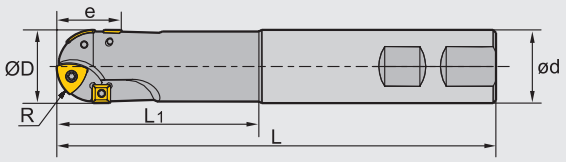
Profile milling tools · Profilfräser



BMR01 P M K



Weldon shank
Weldon Schaft

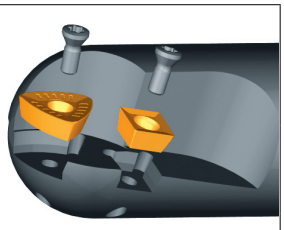


Specification of tools · Werkzeug Beschreibung

Type · Typ		Stock Lager	Dimensions (mm) · Abmessungen						Inserts · WSP				Weight Gewicht (kg)
			R	Ø D	e	ø d	L	L_1	Type · Typ	Quantity Anzahl	Type · Typ	Quantity Anzahl	
BMR01	**-020-XP20-S**	○	10	20	20	20	125	50	ZDET08T2CYR10	2	SPMT060304	2	0.3
	-020-XP20-M	○	10	20	20	20	150	75	ZDET08T2CYR10	2	SPMT060304	2	0.3
	-020-XP20-L	○	10	20	20	20	200	100	ZDET08T2CYR10	2	SPMT060304	2	0.4
	-025-XP25-S	○	12.5	25	23	25	150	70	ZDET1103CYR12.5	2	SPMT060304	2	0.5
	-025-XP25-M	○	12.5	25	23	25	175	95	ZDET1103CYR12.5	2	SPMT060304	2	0.6
	-025-XP25-L	○	12.5	25	23	25	200	100	ZDET1103CYR12.5	2	SPMT060304	2	0.7
	-032-XP32-S	○	16	32	31	32	175	85	ZDET13T3CYR16	2	SDMT090308	2	0.9
	-032-XP32-M	○	16	32	31	32	200	100	ZDET13T3CYR16	2	SDMT090308	2	1.1
	-032-XP32-L	○	16	32	31	32	250	150	ZDET13T3CYR16	2	SDMT090308	2	1.4
	-040-XP40-S	○	20	40	41	40	175	85	ZPNT2204CY(R20)	3	SPMT120408	2	1.4
	-040-XP40-M	○	20	40	41	40	200	100	ZPNT2204CY(R20)	3	SPMT120408	2	1.7
	-040-XP40-L	○	20	40	41	40	250	150	ZPNT2204CY(R20)	3	SPMT120408	2	2.1
	-050-XP40-S	○	25	50	45	40	200	100	ZPNT2204CY(R25)	3	SPMT120408	2	1.8
	-050-XP40-M	○	25	50	45	40	300	100	ZPNT2204CY(R25)	3	SPMT120408	2	2.8
	-063-XP40-S	○	31.5	63	52	40	200	100	ZPNT2204CY(R31)	4	SPMT120408	2	3.0
	-063-XP40-M	○	31.5	63	52	40	300	100	ZPNT2204CY(R31)	4	SPMT120408	2	3.5

Spare parts · Ersatzteile

Diameter Durchmesser Ø D	Screw Schraube	Wrench Schlüssel	
			
Ø20-Ø25	I43M2.5×5.7	WT07IP	--
Ø32	I43M4×8	--	WT15IS
Ø40-Ø63	I43M5×11	--	WT20IS



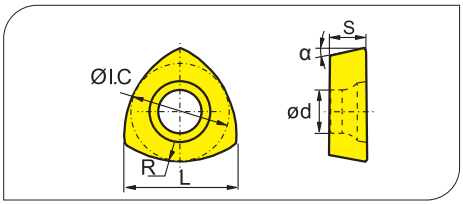
Applicable tool B9-B15 Werkzeug
Tools code key B22-B23 Werkzeug ISO
Grade selection guide B16-B20 Sortenauswahl
Technical data B183-B188 Technische Daten

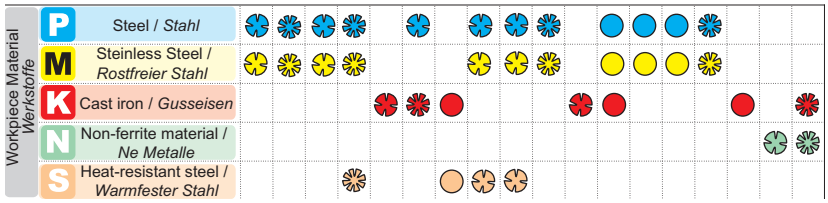
Applicable inserts · Wendeschneidplatten

Ideal Machining Condition
Gute Bearbeitungsbedingungen

Normal Machining Condition
Normale Bearbeitungsbedingungen

Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen





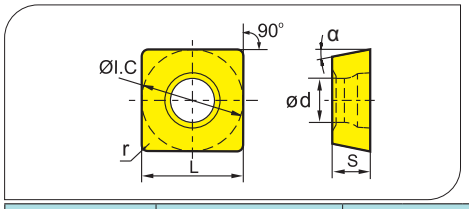
Insert WSP	Type · Typ	Dimensions (mm) · Abmessungen						CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall			
		R	L	I.C	S	d	α	YBC301	YBC401	YBM251	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**ZDET08T2CYR10**	10	8.4	6.75	2.78	2.8	14°			●															
	ZDET1103CYR12.5	12.5	10.6	8.5	3.18	2.8	14°			●															
	ZDET13T3CYR16	16	13.2	10.5	3.97	4.4	14°			○															
	**ZPNT2204CY(R20)**	20	16.1	12.7	4.76	5.56	11°			○															
	ZPNT2204CY(R25)	25	16.9	12.7	4.76	5.56	11°			○															
	ZPNT2204CY(R31)	31.5	17.6	12.7	4.76	5.56	11°			○															

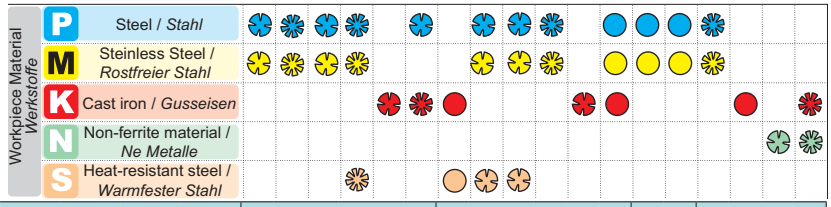
Applicable inserts · Wendeschneidplatten

Ideal Machining Condition
Gute Bearbeitungsbedingungen

Normal Machining Condition
Normale Bearbeitungsbedingungen

Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen



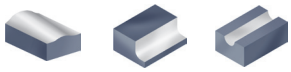


Insert WSP	Type · Typ	Dimensions (mm) · Abmessungen						CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall			
		r	L	I.C	S	d	α	YBC301	YBC401	YBM251	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**SPMT060304**	0.4	6.35	6.35	3.18	2.8	11°	○		●															
	SDMT090308	0.8	9.525	9.525	3.18	4.4	15°			●															
	SPMT120408	0.8	12.7	12.70	4.76	5.5	11°	●	○	●							○								

Recommended Cutting data · Schnittdaten

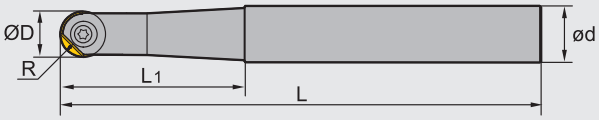
Workpiece material Werkstück-stoff		Hardness HB Härte	Grade Sorte	Cutting data · Schnittdaten	
				V(m/min)	f(mm/z)
P	Low-carbon steel Soft steel Niedrig legierter Kohlenstoffstahl Baustahl	≤180	YBM251 YBC301	180(120-220)	0.25(0.1-0.4)
			YBG302 YBC401	160(120-220)	0.25(0.1-0.4)
	High-carbon steel Alloy steel Hoch Leg. Kohlenstoffstahl Leg. Stahl	180-280	YBM251 YBC301	150(100-200)	0.2(0.1-0.4)
			YBG302 YBC401	120(100-200)	0.2(0.1-0.4)
	Alloy tool steel Leg. Werkzeugstahl	280-350	YBM251 YBC301	100(80-150)	0.2(0.1-0.3)
			YBG302	100(80-150)	0.2(0.1-0.3)
M	Stainless steel Rostfreier Stahl	≤270	YBM251	100(80-150)	0.2(0.1-0.3)
			YBG302 YBC401	100(80-150)	0.2(0.1-0.3)
K	Cast iron Gusseisen	180-250	YBM251	150(100-180)	0.3(0.2-0.5)

Profile milling tools · Profilfräser



BMR02 P M K





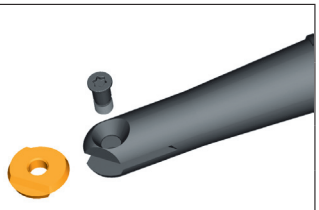
Specification of tools · Werkzeug Beschreibung

Type · Typ		Stock Lager	Dimensions (mm) · Abmessungen					Weight Gewicht (kg)
			R	Ø D	ø d	L	L_1	
BMR02	**-012-G16-S**	●	6	12	16	110	40	0.1
	-012-G16-M	●	6	12	16	130	50	0.2
	-012-G16-L	●	6	12	16	160	50	0.2
	-016-G20-S	●	8	16	20	140	45	0.3
	-016-G20-M	●	8	16	20	170	65	0.3
	-016-G20-L	●	8	16	20	200	65	0.4
	-020-G25-S	●	10	20	25	160	60	0.5
	-020-G25-M	●	10	20	25	200	80	0.6
	-020-G25-L	●	10	20	25	240	80	0.8

● Ex Stock / ab Lager ○ On demand / auf Anfrage

Spare parts · Ersatzteile

Diameter Durchmesser Ø D	Screw Schraube	Wrench Schlüssel
Ø12	I90M4×09TT	WT10S
Ø16	I90M5×11TT	WT15S
Ø20	I90M5×13.5TT	WT15S



Applicable tool B9-B15 Werkzeug
Tools code key B22-B23 Werkzeug ISO
Grade selection guide B16-B20 Sortenauswahl
Technical data B183-B188 Technische Daten

B

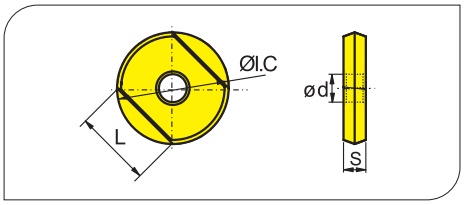
Milling Tools · Fräser

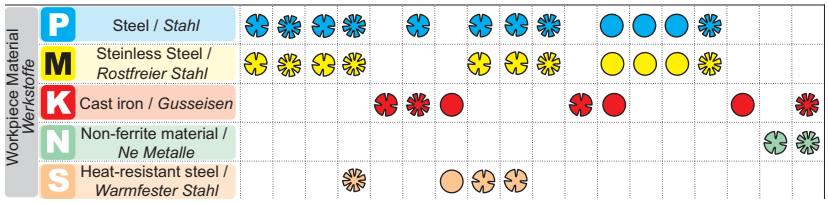
Applicable inserts · Wendeschneidplatten

Ideal Machining Condition
Gute Bearbeitungsbedingungen

Normal Machining Condition
Normale Bearbeitungsbedingungen

Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen





Insert WSP	Type · Typ	Dimensions (mm) · Abmessungen				CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall			
		I.C	L	S	d	YBC301	YBC401	YBM251	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**ROHX1203**	12	8.5	3	4				○			○	●				○						
	ROHX1604	16	11.3	4	5				○				●				●						
	ROHX2005	20	14.1	5	5								●				○						

Recommended Cutting data · Schnittdaten

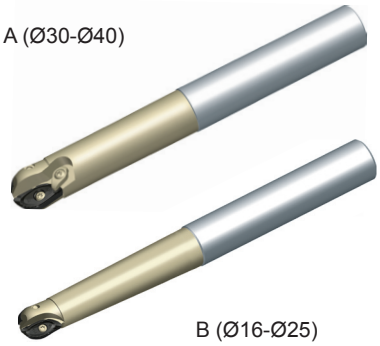
Workpiece material Werkstück-stoff		Hardness HB Härte	Grade Sorte	Cutting data · Schnittdaten	Diameter · Durchmesser Ø D		
					Ø12	Ø16	Ø20
P	carbon steel leg. Kohlenstoff-stahl	HB≤180	YBG202 YBG252	V(m/min)	100~200	100~200	100~200
				f_z(mm/z)	0.15~0.25	0.2~0.3	0.2~0.3
				a_{pmax}(mm)	0.8	1	1.25
				a_{emax}(mm)	0.8	1	1.25
	Alloy steel Leg. Stahl	HB180~280		V(m/min)	80~180	80~180	80~180
				f_z(mm/z)	0.15~0.25	0.2~0.3	0.2~0.3
				a_{pmax}(mm)	0.8	1	1.25
				a_{emax}(mm)	0.8	1	1.25
	Hardened steel gehärteter Stahl	HRC55~65		V(m/min)	60~100	60~100	60~100
				f_z(mm/z)	0.15~0.25	0.2~0.3	0.2~0.3
				a_{pmax}(mm)	0.4	0.5	0.6
				a_{emax}(mm)	0.4	0.5	0.6
M	Stainless steel Rostfreier Stahl	HB≤270		V(m/min)	70~150	70~150	70~150
				f_z(mm/z)	0.1~0.2	0.1~0.25	0.1~0.25
				a_{pmax}(mm)	0.6	0.8	1
				a_{emax}(mm)	0.6	0.8	1
K	Cast iron Gusseisen	HB180-250		V(m/min)	160~300	160~300	160~300
				f_z(mm/z)	0.2~0.3	0.25~0.35	0.25~0.35
				a_{pmax}(mm)	1	1.5	1.8
				a_{emax}(mm)	1	1.5	1.8

● Ex Stock / ab Lager ○ On demand / auf Anfrage

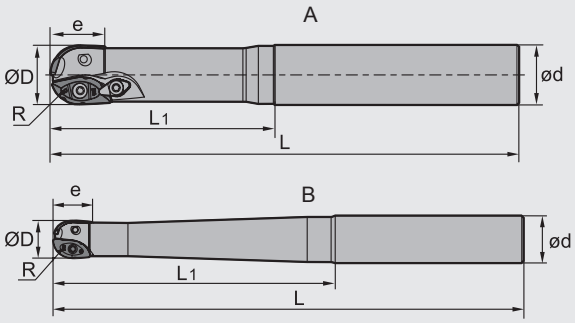
Profile milling tools · Profilfräser



BMR03 P M K



Straigth shank
Zylinder Schaft



Specification of tools · Werkzeug Beschreibung

Type · Typ		Stock Lager	Dimensions (mm) · Abmessungen						No. of teeth Zähne	Weight Gewicht (kg)	Type · Typ	Clamp Pratze
			R	Ø D	ø d	L	L_1	e				
BMR03	**-016-G20-S**	●	8	16	20	150	70	16	2	0.3	B	
	-016-G20-M	●	8	16	20	180	80	16	2	0.4	B	
	-020-G25-S	●	10	20	25	180	80	20	2	0.5	B	
	-020-G25-M	●	10	20	25	200	100	20	2	0.6	B	
	-020-G25-L	●	10	20	25	250	150	20	2	0.7	B	
	-020-G25-XL	○	10	20	25	300	110	20	2	1.0	B	
	-025-G25-S	●	12.5	25	25	180	80	25	2	0.6	B	
	-025-G25-M	●	12.5	25	25	200	100	25	2	0.7	B	
	-025-G25-L	○	12.5	25	25	250	110	25	2	0.8	B	
	-025-G25-XL	○	12.5	25	25	300	120	25	2	1.0	B	
	-030-G32-S	●	15	30	32	200	120	30	2	1.0	A	WD-208
	-030-G32-M	●	15	30	32	250	150	30	2	1.3	A	
	-030-G32-L	●	15	30	32	300	200	30	2	1.6	A	
	-030-G32-XL	○	15	30	32	350	200	30	2	1.9	A	
	-032-G32-S	●	16	32	32	200	120	32	2	1.1	A	
	-032-G32-M	●	16	32	32	250	150	32	2	1.4	A	
	-032-G32-L	●	16	32	32	300	200	32	2	1.6	A	
	-032-G32-XL	○	16	32	32	350	200	32	2	2.0	A	
	-040-G40-S	○	20	40	40	200	120	40	2	1.6	A	CBH5R1
	-040-G40-M	○	20	40	40	250	150	40	2	2.0	A	
	-040-G40-L	●	20	40	40	300	200	40	2	2.5	A	
	-040-G40-XL	○	20	40	40	350	200	40	2	3.0	A	

● Ex Stock / ab Lager ○ On demand / auf Anfrage

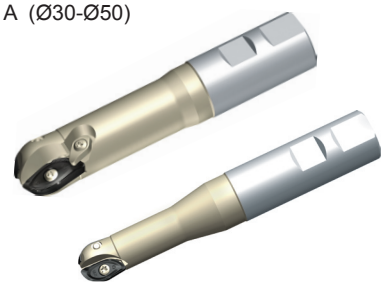
Applicable tool B9-B15
Werkzeug
Tools code key B22-B23
Werkzeug ISO
Grade selection guide B16-B20
Sortenauswahl
Technical data B183-B188
Technische Daten

Profile milling tools · Profilfräser



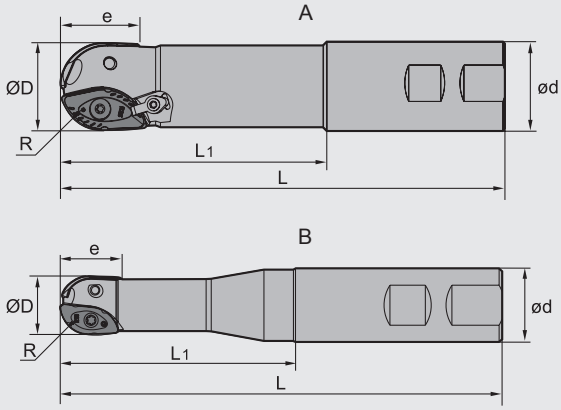
BMR03 P M K

A (Ø30-Ø50)



B (Ø16-Ø25)

Weldon shank
Weldon Schaft



Specification of tools · Werkzeug Beschreibung

Type · Typ		Stock Lager	Dimensions (mm) · Abmessungen						No. of teeth Zähne	Weight Gewicht (kg)	Type · Typ	Clamp Pratze
			R	Ø D	ø d	L	L1	e				
BMR03	**-016-XP20-M**	●	8	16	20	111	60	16	2	0.2	B	
	-020-XP25-M	●	10	20	25	127	70	20	2	0.3	B	
	-020-XP25-L	●	10	20	25	150	80	20	2	0.4	B	
	-025-XP25-M	●	12.5	25	25	137	80	25	2	0.4	B	
	-025-XP25-L	●	12.5	25	25	200	100	25	2	0.6	B	
	-030-XP32-M	●	15	30	32	161	100	30	2	0.8	A	WD-208
	-030-XP32-L	●	15	30	32	250	150	30	2	1.3	A	
	-032-XP32-M	●	16	32	32	161	100	32	2	0.8	A	
	-032-XP32-L	●	16	32	32	250	120	32	2	1.3	A	
	-040-XP40-M	○	20	40	40	175	100	40	2	1.3	A	CBH5R1
	-040-XP40-L	●	20	40	40	250	120	40	2	2.0	A	
	-050-XP50-M	○	25	50	50	200	100	50	2	2.5	A	
	-050-XP50-L	○	25	50	50	250	150	50	2	3.1	A	

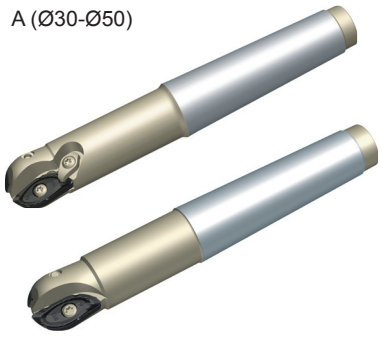
● Ex Stock / ab Lager ○ On demand / auf Anfrage

Profile milling tools · Profilfräser



BMR03 P M K

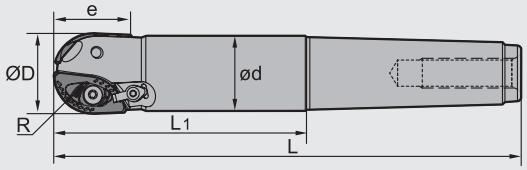
A (Ø30-Ø50)



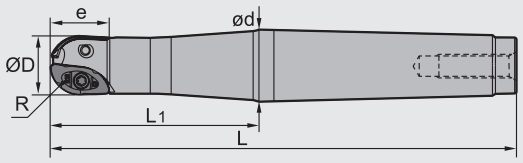
B (Ø20-Ø25)

Morse taper shank
Morsekegel Schaft

A



B



Specification of tools · Werkzeug Beschreibung

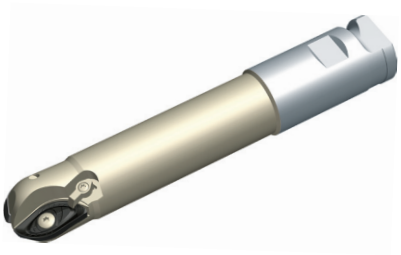
Type · Typ		Stock Lager	Dimensions (mm) · Abmessungen						No. of teeth Zähne	Weight Gewicht (kg)	type	Clamp Pratze
			R	Ø D	ø d	L	L_1	e				
BMR03	**-020-MT3-M**	○	10	20	18.7	156	70	20	2	0.4	B	
	-020-MT3-L	○	10	20	18.7	186	100	20	2	0.4	B	
	-025-MT3-M	○	12.5	25	23.5	156	70	25	2	0.4	B	
	-025-MT3-L	○	12.5	25	23.5	186	100	25	2	0.4	B	
	-030-MT4-M	●	15	30	28.2	189	70	30	2	0.8	A	
	-030-MT4-L	○	15	30	28.2	229	120	30	2	1.0	A	WD-208
	-032-MT4-M	○	16	32	29.2	179	70	32	2	0.9	A	
	-032-MT4-L	●	16	32	29.2	209	100	32	2	0.9	A	
	-040-MT4-M	○	20	40	36.9	199	100	40	2	1.0	A	
	-040-MT5-L	●	20	40	36.9	226	90	40	2	1.8	A	
	-040-MT5-XL	○	20	40	36.9	256	120	40	2	2.0	A	CBH5R1
	-050-MT5-M	●	25	50	46.8	236	100	50	2	2.2	A	
	-050-MT5-L	●	25	50	46.8	286	150	50	2	2.9	A	

Applicable tool B9-B15
Werkzeug
Tools code key B22-B23
Werkzeug ISO
Grade selection guide B16-B20
Sortenauswahl
Technical data B183-B188
Technische Daten

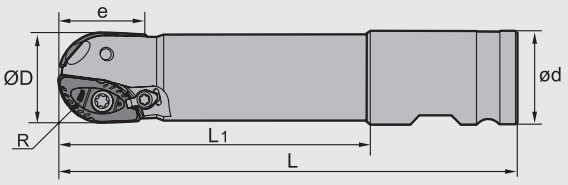
Profile milling tools · Profilfräser



BMR03 P M K



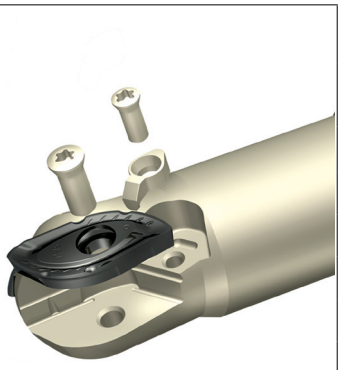
Compound shank



Specification of tools · Werkzeug Beschreibung

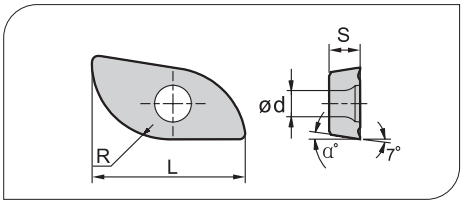
Type · Typ		Stock Lager	Dimensions (mm) · Abmessungen						No. of teeth Zähne	Weight Gewicht (kg)	Clamp Pratze
			R	Ø D	ø d	L	L1	e			
BMR03	**-040-XPX-M**	○	20	40	50.8	250	170	40	2	1.3	CBH5R1
	-040-XPX-L	○	20	40	50.8	300	220	40	2	3.1	
	-040-XPX-XL	○	20	40	50.8	350	270	40	2	3.5	
	-050-XPX-M	○	25	50	50.8	250	170	50	2	3.1	
	-050-XPX-L	○	25	50	50.8	300	200	50	2	3.8	
	-050-XPX-XL	○	25	50	50.8	350	270	50	2	4.4	

Spare parts · Ersatzteile

Diameter Durchmesser Ø D	Clamp Pratze	Screw Schraube	Wrench Schlüssel		
					
Φ16	--	I60M2.5×6.5	--	WT07P	
Φ20	--	I60M3.5×08TT		WT10IP	
Φ25	--	I60M4×10		WT15S	
Φ30	WD-208	I60M5×13	WT20IT	--	
Φ32	WD-208	I60M5×13			
Φ40	CBH5R1	I43M6×16	WT25IT		
Φ50	CBH5R1	I43M8×21 I43M6×16	WT25IT WT30IT		

● Ex Stock / ab Lager ○ On demand / auf Anfrage

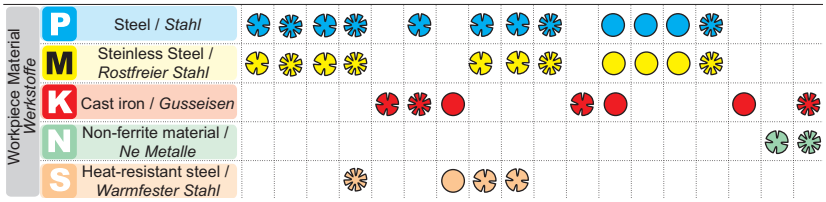
Applicable inserts · Wendeschneidplatten



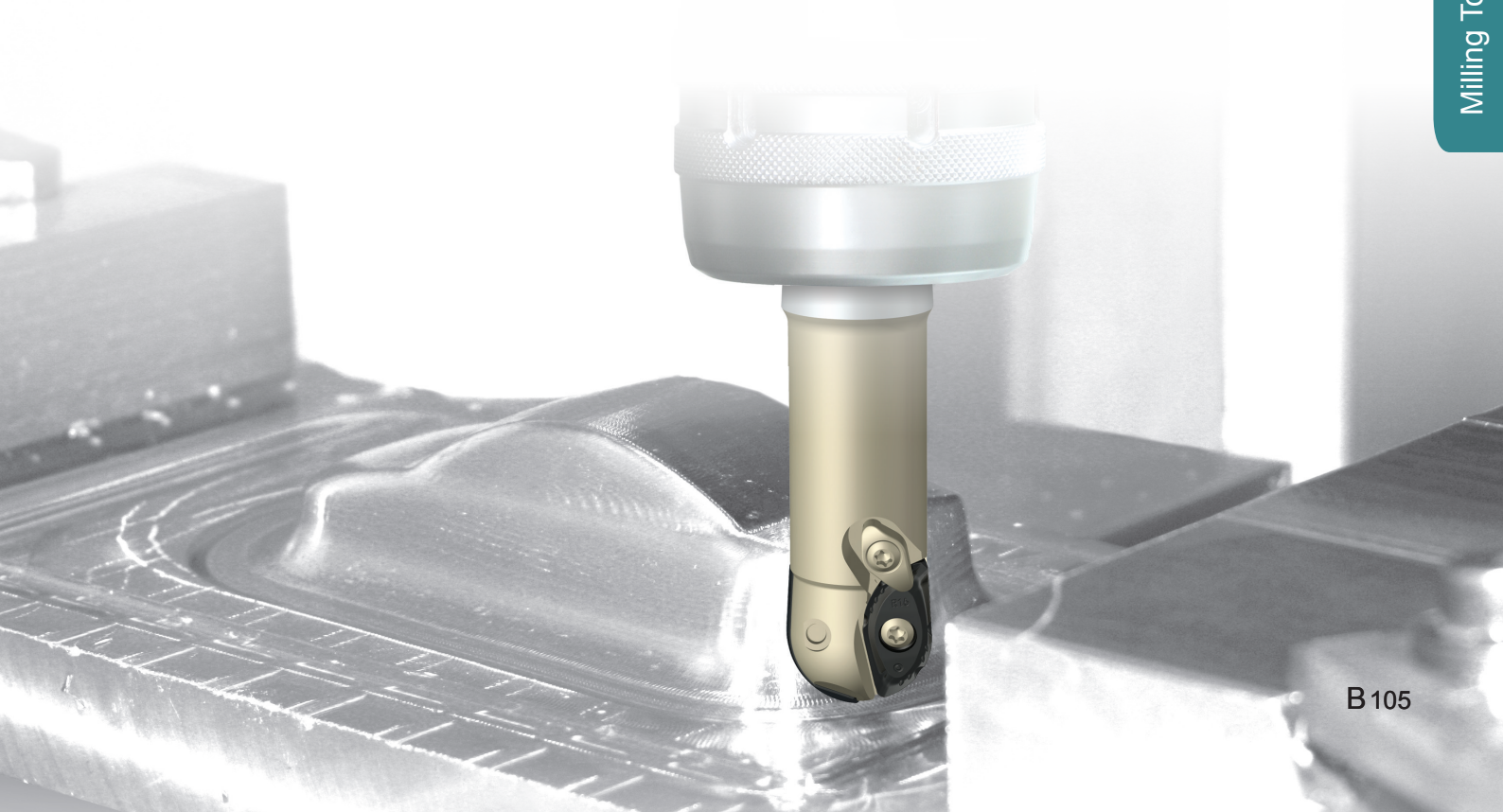
Ideal Machining Condition
Gute Bearbeitungsbedingungen

Normal Machining Condition
Normale Bearbeitungsbedingungen

Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen



Insert WSP	Type · Typ	Dimensions (mm) · Abmessungen						CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall			
		R	d	S	α°	L	Applicable tools	YBC301	YBC401	YBM251	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**XPHT16R0803-GM**	8	3.1	3.18	9	16	Φ16										●								
	XPHT20R10T3-GM	10	4.0	3.97	9	20	Φ20										●								
	XPHT25R1204-GM	12.5	4.7	4.76	9	25	Φ25										●								
	XPHT30R1506-GM	15	5.8	6.35	11	30	Φ30										●								
	XPHT32R1606-GM	16	5.8	6.35	9	32	Φ32										●								
	XPHT40R2007-GM	20	6.8	7.94	9	40	Φ40										○								
	XPHT50R2507-GM	25	9.2	7.94	9	50	Φ50										○								



BMR03



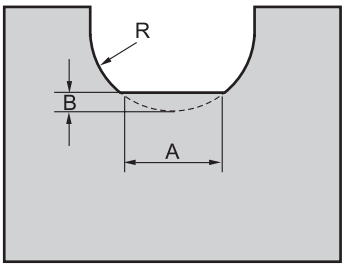
Ball nose end mills
- Serie -
Kugelschaftfräser



- The unique chipbreaker design and big rake angle can effectively control the curling and flow direction of chippings and reduce the cutting force, improve workpiece surface quality and tool life.
- The insert after precisely grinding periphery and locating surface can sufficiently ensure the shape accuracy of cutting edge and the precision of location and installation, improve the reliability of installation and the workpiece precision after machining.
- The concave structure design of flank can effectively enhance the strength of cutting edge, and prevent the scraping between the clearance face and workpiece surface. Therefore it improves the workpiece surface quality and prolongs the life of insert.
- The design of cutting edge over center and a big negative rake angle make it possible to cut vertically, thus the capability of anti-breakage is enhanced.
- The rough ball nose milling cutters with big diameter adopt the top and hole clamping style, insert clamping becomes more firm and stable. The machining also is high efficiency even at the poor condition such as long overhang and large vibration etc.
- The adapter types include straight shank, Weldon shank, Morse taper shank and compound shank.

- Das einzigartige Spanbrecherdesign mit großem Spanwinkel, kontrolliert die Spanbildung und, Spanabfuhr, reduziert die Schnittkräfte und erhöht die Werkzeuglebensdauer.
- Die unfangsgeschliffene Schneidplatte und die Präzision des Plattensitzes sind ein Garant für die Erzielung einer hohen Werkstückqualität.
- Die konkave Schneidengeometrie erhöht die Schneidkantenstabilität und schützt die Schneide vor Ausbrüchen.
- Die Ausführung der Zentrumsschneide und ein großer negativer Spanwinkel ermöglicht eine vertikale Bearbeitung (Zustellung) und stabilisiert das Werkzeug.
- Der Schruppradiusfräser für größere Durchmesser ist neben der Schrauben- mit einer zusätzlichen Pratzenklemmung versehen. Dadurch wird die Schneidplattenklemmung deutlich erhöht. Dies ermöglicht eine effizientere Bearbeitung auch unter ungünstigen Bedingungen, wie langer Auskragung oder bei Vibrationen.
- Durch verschiedene Schaftausführungen kann das Werkzeugsystem auf unterschiedliche Maschinen eingesetzt werden.

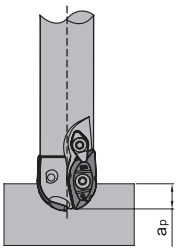
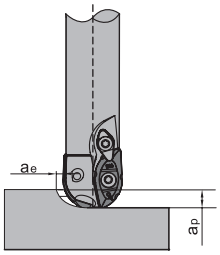
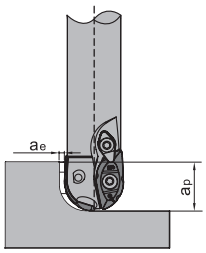
Slot shape after machining
Nut nach der Bearbeitung



R	A	B
08	1.7	0.09
10	2.2	0.12
12.5	3.0	0.18
15	3.9	0.20
16	3.5	0.22
20	3.6	0.24
25	3.8	0.26

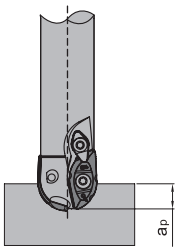
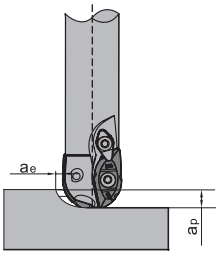
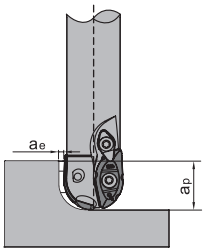
Recommended Cutting data · Schnittdaten

Diameter range
Durchmesser Bereich Ø16

Operations Anwendung					
Workpiece material Werkstück-stoff	Cutting data · Schnittdaten	Machining of slot Nuten Fräsen	Side milling (slight) Schulterfräsen		Side milling (deep) Schulterfräsen	Grade Sorte
Medium carbon steel Kohlenstoff-stahl Hardness Härte 150~250HB	V(m/min)	150~220	150~220	150~220	150~220	YBG302
	Fz(mm/z)	0.1~0.4	0.1~0.4	0.1~0.4	0.1~0.4	
	a_p(mm)	4	4	8	16	
	a_e(mm)	--	3	4	1.5	
Alloy steel leg. Stahl Hardness Härte 150~280HB	V(m/min)	100~150	100~150	100~150	100~150	
	Fz(mm/z)	0.1~0.4	0.1~0.4	0.1~0.4	0.1~0.4	
	a_p(mm)	4	4	8	16	
	a_e(mm)	--	3	4	1.5	
Die steel Gesenkstahl Hardness Härte 150~255HB	V(m/min)	80~120	80~120	80~120	80~120	
	Fz(mm/z)	0.1~0.3	0.1~0.3	0.1~0.3	0.1~0.3	
	a_p(mm)	4	4	8	16	
	a_e(mm)	--	3	4	1.5	
Hardened steel gehärteter Stahl Hardness Härte 40~50HRC	V(m/min)	80~100	80~100	80~100	--	
	Fz(mm/z)	0.08~0.15	0.08~0.15	0.08~0.15	--	
	a_p(mm)	4	4	8	--	
	a_e(mm)	--	2	3	--	
Grey Cast iron Grausguss Hardness Härte 160~260HB	V(m/min)	250~300	250~300	250~300	250~300	
	Fz(mm/z)	0.08~0.15	0.08~0.15	0.08~0.15	0.08~0.15	
	a_p(mm)	4	4	8	16	
	a_e(mm)	--	3	4	1.5	
Nodular Cast iron Kugelgrafitguss Hardness Härte 170~300HB	V(m/min)	200~250	200~250	200~250	200~250	
	Fz(mm/z)	0.08~0.15	0.08~0.15	0.08~0.15	0.08~0.15	
	a_p(mm)	4	4	8	16	
	a_e(mm)	--	3	4	1.5	

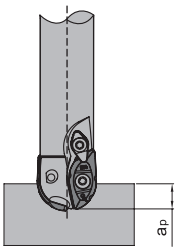
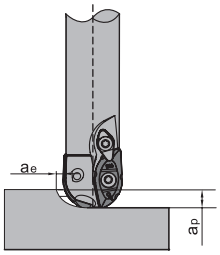
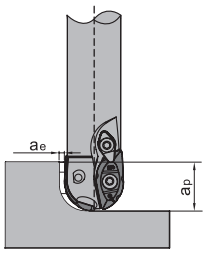
Recommended Cutting data · Schnittdaten

Diameter range Ø20

Operations Anwendung						
Workpiece material Werkstück-stoff	Cutting data · Schnittdaten	Machining of slot Nuten Fräsen	Side milling (slight) Schulterfräsen		Side milling (deep) Schulterfräsen	Grade Sorte
Medium carbon steel Kohlenstoff-stahl Hardness Härte 150~250HB	V(m/min)	150~220	150~220	150~220	150~220	YBG302
	Fz(mm/z)	0.1~0.4	0.1~0.4	0.1~0.4	0.1~0.4	
	a_p(mm)	5	5	10	20	
	a_e(mm)	--	4	5	2	
Alloy steel leg. Stahl Hardness Härte 150~280HB	V(m/min)	100~150	100~150	100~150	100~150	
	Fz(mm/z)	0.1~0.4	0.1~0.4	0.1~0.4	0.1~0.4	
	a_p(mm)	5	5	10	20	
	a_e(mm)	--	4	5	2	
Die steel Gesenkstahl Hardness Härte 150~255HB	V(m/min)	80~120	80~120	80~120	80~120	
	Fz(mm/z)	0.1~0.3	0.1~0.3	0.1~0.3	0.1~0.3	
	a_p(mm)	5	5	10	20	
	a_e(mm)	--	4	5	2	
Hardened steel gehärteter Stahl Hardness Härte 40~50HRC	V(m/min)	80~100	80~100	80~100	--	
	Fz(mm/z)	0.08~0.15	0.08~0.15	0.08~0.15	--	
	a_p(mm)	5	5	10	--	
	a_e(mm)	--	4	5	--	
Grey Cast iron Grausguss Hardness Härte 160~260HB	V(m/min)	250~300	250~300	250~300	250~300	
	Fz(mm/z)	0.08~0.15	0.08~0.15	0.08~0.15	0.08~0.15	
	a_p(mm)	5	5	10	20	
	a_e(mm)	--	4	5	2	
Nodular Cast iron Kugelgrafitguss Hardness Härte 170~300HB	V(m/min)	200~250	200~250	200~250	200~250	
	Fz(mm/z)	0.08~0.15	0.08~0.15	0.08~0.15	0.08~0.15	
	a_p(mm)	5	5	10	20	
	a_e(mm)	--	4	5	2	

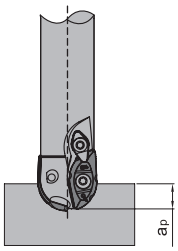
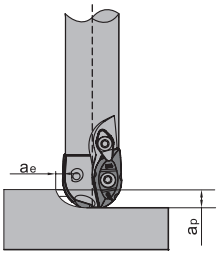
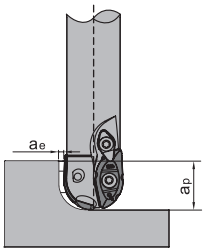
Recommended Cutting data · Schnittdaten

Diameter range
Durchmesser Bereich Ø25

Operations Anwendung						
Workpiece material Werkstück-stoff	Cutting data · Schnittdaten	Machining of slot Nuten Fräsen	Side milling (slight) Schulterfräsen		Side milling (deep) Schulterfräsen	Grade Sorte
Medium carbon steel Kohlenstoff-stahl Hardness Härte 150~250HB	V(m/min)	150~220	150~220	150~220	150~220	YBG302
	Fz(mm/z)	0.1~0.4	0.1~0.4	0.1~0.4	0.1~0.4	
	a_p(mm)	6	6	12.5	25	
	a_e(mm)	--	5	6.5	3	
Alloy steel leg. Stahl Hardness Härte 150~280HB	V(m/min)	100~150	100~150	100~150	100~150	
	Fz(mm/z)	0.1~0.4	0.1~0.4	0.1~0.4	0.1~0.4	
	a_p(mm)	6	6	12.5	25	
	a_e(mm)	--	5	6.5	3	
Die steel Gesenkstahl Hardness Härte 150~255HB	V(m/min)	80~120	80~120	80~120	80~120	
	Fz(mm/z)	0.1~0.3	0.1~0.3	0.1~0.3	0.1~0.3	
	a_p(mm)	6	6	12.5	25	
	a_e(mm)	--	5	6.5	3	
Hardened steel gehärteter Stahl Hardness Härte 40~50HRC	V(m/min)	80~100	80~100	80~100	--	
	Fz(mm/z)	0.08~0.15	0.08~0.15	0.08~0.15	--	
	a_p(mm)	6	6	12.5	--	
	a_e(mm)	--	5	6.5	--	
Grey Cast iron Grausguss Hardness Härte 160~260HB	V(m/min)	250~300	250~300	250~300	250~300	
	Fz(mm/z)	0.08~0.15	0.08~0.15	0.08~0.15	0.08~0.15	
	a_p(mm)	6	6	12.5	25	
	a_e(mm)	--	5	6.5	3	
Nodular Cast iron Kugelgrafitguss Hardness Härte 170~300HB	V(m/min)	200~250	200~250	200~250	200~250	
	Fz(mm/z)	0.08~0.15	0.08~0.15	0.08~0.15	0.08~0.15	
	a_p(mm)	6	6	12.5	25	
	a_e(mm)	--	5	6.5	3	

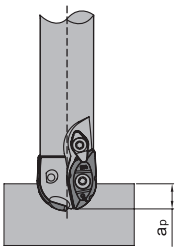
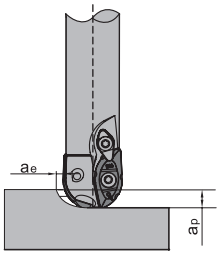
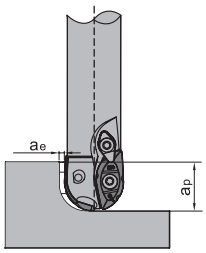
Recommended Cutting data · Schnittdaten

Diameter range
Durchmesser Bereich Ø30, Ø32

Operations Anwendung						
Workpiece material Werkstück-stoff	Cutting data · Schnittdaten	Machining of slot Nuten Fräsen	Side milling (slight) Schulterfräsen		Side milling (deep) Schulterfräsen	Grade Sorte
Medium carbon steel Kohlenstoff-stahl Hardness Härte 150~250HB	V(m/min)	150~220	150~220	150~220	150~220	YBG302
	Fz(mm/z)	0.1~0.4	0.1~0.4	0.1~0.4	0.1~0.4	
	a_p(mm)	10	10	16	28	
	a_e(mm)	--	6	9	6	
Alloy steel leg. Stahl Hardness Härte 150~280HB	V(m/min)	100~150	100~150	100~150	100~150	
	Fz(mm/z)	0.1~0.4	0.1~0.4	0.1~0.4	0.1~0.4	
	a_p(mm)	10	10	16	28	
	a_e(mm)	--	6	9	6	
Die steel Gesenkstahl Hardness Härte 150~255HB	V(m/min)	80~120	80~120	80~120	80~120	
	Fz(mm/z)	0.1~0.3	0.1~0.3	0.1~0.3	0.1~0.3	
	a_p(mm)	10	10	16	28	
	a_e(mm)	--	6	9	6	
Hardened steel gehärteter Stahl Hardness Härte 40~50HRC	V(m/min)	80~100	80~100	80~100	--	
	Fz(mm/z)	0.08~0.15	0.08~0.15	0.08~0.15	--	
	a_p(mm)	10	10	16	--	
	a_e(mm)	--	6	9	--	
Grey Cast iron Grausguss Hardness Härte 160~260HB	V(m/min)	250~300	250~300	250~300	250~300	
	Fz(mm/z)	0.08~0.15	0.08~0.15	0.08~0.15	0.08~0.15	
	a_p(mm)	10	10	16	28	
	a_e(mm)	--	6	9	6	
Nodular Cast iron Kugelgrafitguss Hardness Härte 170~300HB	V(m/min)	200~250	200~250	200~250	200~250	
	Fz(mm/z)	0.08~0.15	0.08~0.15	0.08~0.15	0.08~0.15	
	a_p(mm)	10	10	16	28	
	a_e(mm)	--	6	9	6	

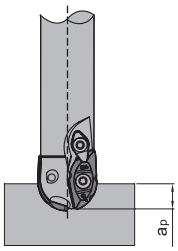
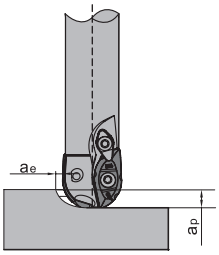
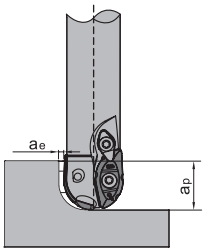
Recommended Cutting data · Schnittdaten

Diameter range
Durchmesser Bereich Ø40

Operations Anwendung						
Workpiece material Werkstück-stoff	Cutting data · Schnittdaten	Machining of slot Nuten Fräsen	Side milling (slight) Schulterfräsen		Side milling (deep) Schulterfräsen	Grade Sorte
Medium carbon steel	V(m/min)	150~220	150~220	150~220	150~220	YBG302
Kohlenstoff-stahl	Fz(mm/z)	0.1~0.4	0.1~0.4	0.1~0.4	0.1~0.4	
Hardness Härte	a_p(mm)	12	10	20	35	
150~250HB	a_e(mm)	--	8	12	8	
Alloy steel leg. Stahl	V(m/min)	100~150	100~150	100~150	100~150	
	Fz(mm/z)	0.1~0.4	0.1~0.4	0.1~0.4	0.1~0.4	
Hardness Härte	a_p(mm)	12	10	20	35	
150~280HB	a_e(mm)	--	8	12	8	
Die steel Gesenkstahl	V(m/min)	80~120	80~120	80~120	80~120	
	Fz(mm/z)	0.1~0.3	0.1~0.3	0.1~0.3	0.1~0.3	
Hardness Härte	a_p(mm)	12	10	20	35	
150~255HB	a_e(mm)	--	8	12	8	
Hardened steel gehärteter Stahl	V(m/min)	80~100	80~100	80~100	--	
	Fz(mm/z)	0.08~0.15	0.08~0.15	0.08~0.15	--	
Hardness Härte	a_p(mm)	12	10	20	--	
40~50HRC	a_e(mm)	--	8	12	--	
Grey Cast iron Grausguss	V(m/min)	250~300	250~300	250~300	250~300	
	Fz(mm/z)	0.08~0.15	0.08~0.15	0.08~0.15	0.08~0.15	
Hardness Härte	a_p(mm)	12	10	20	35	
160~260HB	a_e(mm)	--	8	12	8	
Nodular Cast iron Kugelgrafitguss	V(m/min)	200~250	200~250	200~250	200~250	
	Fz(mm/z)	0.08~0.15	0.08~0.15	0.08~0.15	0.08~0.15	
Hardness Härte	a_p(mm)	12	10	20	35	
170~300HB	a_e(mm)	--	8	12	8	

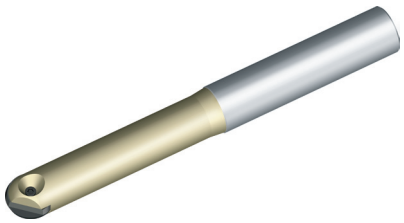
Recommended Cutting data · Schnittdaten

Diameter range
Durchmesser Bereich Ø50

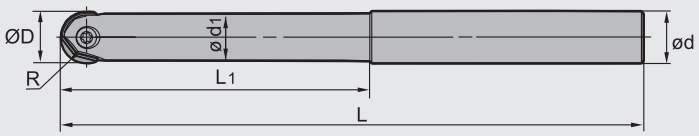
Operations Anwendung						
Workpiece material Werkstück-stoff	Cutting data · Schnittdaten	Machining of slot Nuten Fräsen	Side milling (slight) Schulterfräsen		Side milling (deep) Schulterfräsen	Grade Sorte
Medium carbon steel Kohlenstoff-stahl Hardness Härte 150~250HB	V(m/min)	150~220	150~220	150~220	150~220	YBG302
	Fz(mm/z)	0.1~0.4	0.1~0.4	0.1~0.4	0.1~0.4	
	a_p(mm)	15	10	25	40	
	a_e(mm)	--	10	15	10	
Alloy steel leg. Stahl Hardness Härte 150~280HB	V(m/min)	100~150	100~150	100~150	100~150	
	Fz(mm/z)	0.1~0.4	0.1~0.4	0.1~0.4	0.1~0.4	
	a_p(mm)	15	10	25	40	
	a_e(mm)	--	10	15	10	
Die steel Gesenkstahl Hardness Härte 150~255HB	V(m/min)	80~120	80~120	80~120	80~120	
	Fz(mm/z)	0.1~0.3	0.1~0.3	0.1~0.3	0.1~0.3	
	a_p(mm)	15	10	25	40	
	a_e(mm)	--	10	15	10	
Hardened steel gehärteter Stahl Hardness Härte 40~50HRC	V(m/min)	80~100	80~100	80~100	--	
	Fz(mm/z)	0.08~0.15	0.08~0.15	0.08~0.15	--	
	a_p(mm)	15	10	25	--	
	a_e(mm)	--	10	15	--	
Grey Cast iron Grausguss Hardness Härte 160~260HB	V(m/min)	250~300	250~300	250~300	250~300	
	Fz(mm/z)	0.08~0.15	0.08~0.15	0.08~0.15	0.08~0.15	
	a_p(mm)	15	10	25	40	
	a_e(mm)	--	10	15	10	
Nodular Cast iron Kugelgrafitguss Hardness Härte 170~300HB	V(m/min)	200~250	200~250	200~250	200~250	
	Fz(mm/z)	0.08~0.15	0.08~0.15	0.08~0.15	0.08~0.15	
	a_p(mm)	15	10	25	40	
	a_e(mm)	--	10	15	10	

Profile milling tools · Profilfräser

BMR04 P M K



Straigth shank
Zylinder Schaft



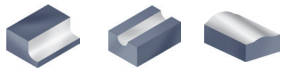
Specification of tools · Werkzeug Beschreibung

Type · Typ		Stock Lager	Dimensions (mm) · Abmessungen						Weight Gewicht (kg)
			R	Ø D	ø d	ø d_1	L_1	L	
BMR04	**-012-G12-M**	●	6	12	12	11	35	125	0.1
	-012-G12-L	●	6	12	12	11	45	150	0.1
	-016-G16-M	●	8	16	16	14	40	150	0.2
	-016-G16-L	●	8	16	16	14	55	180	0.3
	-020-G20-M	●	10	20	20	18	65	180	0.4
	-020-G20-L	●	10	20	20	18	100	250	0.6
	-025-G25-M	●	12.5	25	25	23	70	200	0.7
	-025-G25-L	●	12.5	25	25	23	100	250	0.9
	-030-G32-M	●	15	30	32	27	80	250	1.2
	-030-G32-L	●	15	30	32	27	110	300	1.5
	-032-G32-M	●	16	32	32	29	80	250	1.4
	-032-G32-L	●	16	32	32	29	110	300	1.7

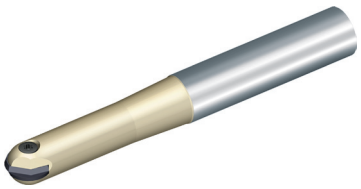
● Ex Stock / ab Lager ○ On demand / auf Anfrage

Applicable tool B9-B15
Werkzeug
Tools code key B22-B23
Werkzeug ISO
Grade selection guide B16-B20
Sortenauswahl
Technical data B183-B188
Technische Daten

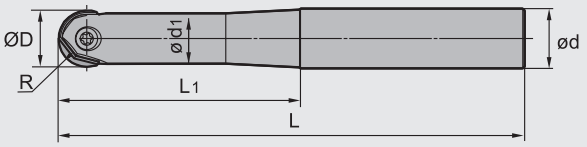
Profile milling tools · Profilfräser



BMR04 P M K



Straight shank
Zylinderschaft



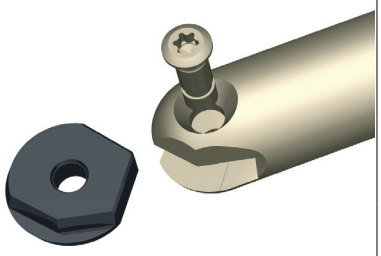
Specification of tools · Werkzeug Beschreibung

Type · Typ		Stock Lager	Dimensions (mm) · Abmessungen						Weight Gewicht (kg)
			R	Ø D	ø d	ø d_1	L_1	L	
BMR04	**-012-G16-M**	●	6	12	16	11	50	125	0.2
	-012-G16-L	●	6	12	16	11	70	150	0.2
	-016-G20-M	●	8	16	20	14	60	150	0.3
	-016-G20-L	●	8	16	20	14	80	180	0.3
	-020-G25-M	●	10	20	25	18	75	180	0.6
	-020-G25-L	●	10	20	25	18	95	200	0.6
	-025-G32-M	●	12.5	25	32	23	90	200	1.0
	-025-G32-L	●	12.5	25	32	23	110	250	1.3
	-030-G40-M	●	15	30	40	27	110	250	2.0
	-030-G40-L	●	15	30	40	27	125	300	2.4
	-032-G40-M	●	16	32	40	29	110	250	2.0
	-032-G40-L	●	16	32	40	29	125	300	2.4

● Ex Stock / ab Lager ○ On demand / auf Anfrage

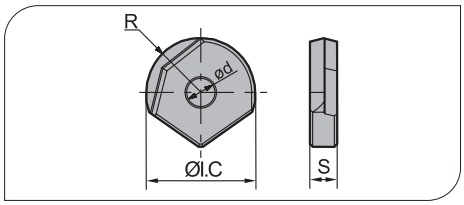
Spare parts · Ersatzteile

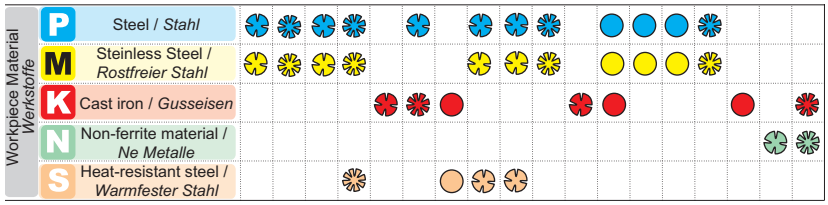
Diameter Durchmesser Ø D	Screw Schraube	Wrench Schlüssel	
Ø12	I90M4×10TT	WT15P	--
Ø16	I90M5×11TT	WT20P	--
Ø20	I90M5×13.5TT	WT20P	--
Ø25	I70M6×20TT	WT20P	--
Ø30	I70M8×25TT	--	WT30IT
Ø32	I70M8×25TT	--	WT30IT

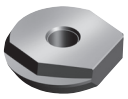
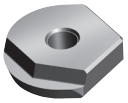


Applicable inserts · Wendeschneidplatten

Ideal Machining Condition
Gute Bearbeitungsbedingungen
Normal Machining Condition
Normale Bearbeitungsbedingungen
Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen



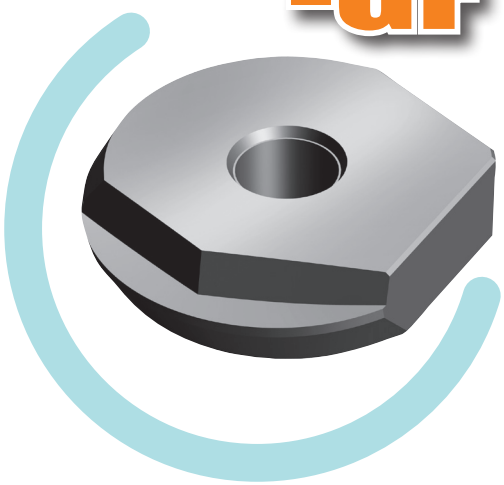


Insert WSP	Type · Typ	Dimensions (mm) · Abmessungen					CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall			
		R	I.C	S	d	Applicable insert Ø D	YBC301	YBC401	YBM251	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**ZOHX1203-GF**	6	12	3	4	Φ12												●						
	ZOHX1604-GF	8	16	4	5	Φ16												●						
	ZOHX2005-GF	10	20	5	5	Φ20												●						
	ZOHX2506-GF	12.5	25	6	6	Φ25												●						
	ZOHX3007-GF	15	30	7	8	Φ30												●						
	ZOHX3207-GF	16	32	7	8	Φ32												●						
	**ZOHX1203-GM**	6	12	3	4	Φ12												●						
	ZOHX1604-GM	8	16	4	5	Φ16												●						
	ZOHX2005-GM	10	20	5	5	Φ20												●						
	ZOHX2506-GM	12.5	25	6	6	Φ25												●						
	ZOHX3007-GM	15	30	7	8	Φ30												●						
	ZOHX3207-GM	16	32	7	8	Φ32												●						

Applicable tool B9-B15
Werkzeug
Tools code key B22-B23
Werkzeug ISO
Grade selection guide B16-B20
Sortenauswahl
Technical data B183-B188
Technische Daten

BMR04

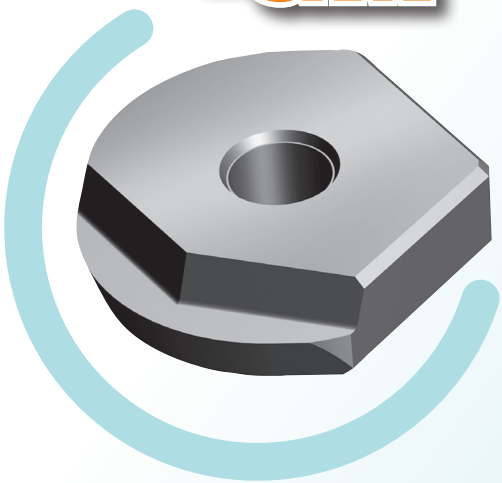
-GF



Positive rake angle and double clearance angle, the design of curved cutting edge take both sharpness and strength into consideration. The edge with high precision is applicable in the stable machining condition and the condition with high precision demand for workpiece profile.

Das spezielle Design aus positivem Spanwinkel und doppeltem Freiwinkel ermöglicht sowohl eine scharfe wie auch stabile Schneidkantenausführung. Die GF-Geometrie eignet sich besonders für Hochpräzisions- und Schlichtbearbeitung unter stabilen Maschinenbedingungen.

-GM



0° rake angle, only one clearance angle, high edge strength. Suitable for the machining condition requiring high cutting efficiency.

0° Grad Spanwinkel mit definiertem Freiwinkel ergeben eine sehr stabile Schneidkante. Für mittlere Bearbeitung mit hoher Effizienz.

The grade YBG 252 is a perfect combination of ultra fine grain carbide substrate and nano PVD-Coating.

Die Sorte YBG 252 ist die ideale Kombination von ultra Feinkorn-Hartmetallsubstrat und einer nano PVD-Beschichtung.

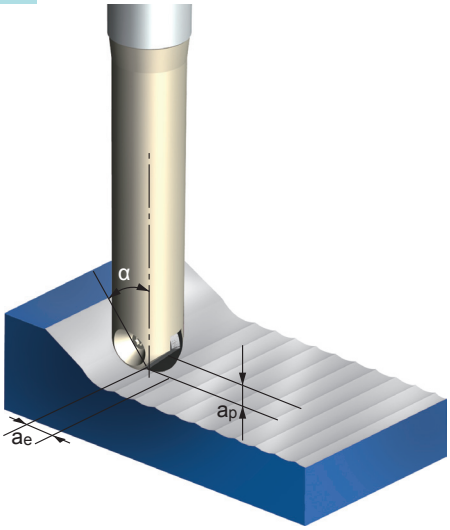
Calculation of cutting data for ball nose endmills (BMR02/04 series)
Kalkulation der Schnittdaten für Kugelkopffräser (BMR02/04)

1.when tool axial line is vertical to the machined surface

axiale Werkzeugachse zur vertikalen Fräsfläche:

$$N = \frac{1000Vc}{\pi Dc}(r/min)$$

$$Dc = 2\sqrt{a_p(D-a_p)}$$



N: revolution/min · Umdrehung/min

Vc: real cutting speed · effektive Schnittgeschwindigkeit

Dc: effective cutting diameter · effektive Ø

D: tool nominal diameter · nominale Ø

a_p: axial cutting depth · axiale Schnitttiefe

2. When there is a inclined angle between the tool axial line and the machined surface, the recommended cutting speed should be multiplied by a factor in the follow table to obtain the cutting speed used for programming

2. Unter Berücksichtigung des Neigungswinkel, (Werkzeugachse/ bearbeitenden Oberfläche) erhalten Sie die empfohlene Schnittgeschwindigkeit, durch in der Tabelle angegeben Multiplikator.

Diameter (mm) Ø		Ø12		Ø16		Ø20		Ø25		Ø30		Ø32	
depth of cut Schnitttiefe a_p(mm)		0.2	0.5	0.2	0.5	0.5	1	0.5	1	0.5	1.5	0.5	1.5
Inclined angle Neigungs-winkel α	15°	1.00	1.00	1.00	1.00	1.00	1.02	1.00	1.01	1.00	1.00	1.00	1.00
	30°	1.04	1.01	1.05	1.01	1.02	1.04	1.03	1.04	1.04	1.01	1.04	1.00
	45°	1.16	1.07	1.18	1.10	1.12	1.06	1.14	1.08	1.16	1.06	1.16	1.06
	60°	1.42	1.24	1.47	1.30	1.34	1.21	1.38	1.25	1.42	1.21	1.43	1.22
	75°	2.02	1.60	2.14	1.73	1.83	1.53	1.93	1.62	2.01	1.53	2.04	1.55
	90°	3.92	2.50	4.48	2.87	3.20	2.29	3.57	2.55	3.9	2.29	4.03	2.37

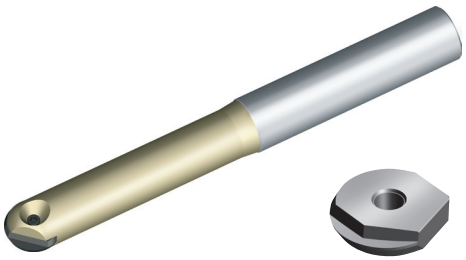
Applicable tool B9-B15
Werkzeug
Tools code key B22-B23
Werkzeug ISO
Grade selection guide B16-B20
Sortenauswahl
Technical data B183-B188
Technische Daten

Recommended Cutting data · Schnittdaten

Workpiece material Werkstück-stoff		Hardness HB	Grade Sorte	Cutting data · Schnittdaten	Tool specification					
					Ø12	Ø16	Ø20	Ø25	Ø30	Ø32
P	carbon steel leg. Kohlenstoff-stahl	HB≤180	YBG252	V(m/min)	100~200	100~200	100~200	100~200	100~200	100~200
				fz(mm/z)	0.15~0.25	0.2~0.3	0.2~0.3	0.25~0.35	0.25~0.35	0.25~0.35
				a_{pmax}(mm)	0.8	1	1.25	1.5	2	2
				a_{emax}(mm)	0.8	1	1.25	1.5	2	2
	Alloy steel Leg. Stahl	HB180~280		V(m/min)	80~180	80~180	80~180	80~180	80~180	80~180
				fz(mm/z)	0.15~0.25	0.2~0.3	0.2~0.3	0.25~0.35	0.25~0.35	0.25~0.35
				a_{pmax}(mm)	0.8	1	1.25	1.5	2	2
				a_{emax}(mm)	0.8	1	1.25	1.5	2	2
	Hardened steel gehärteter Stahl	HRC55~65		V(m/min)	60~100	60~100	60~100	60~100	60~100	60~100
				fz(mm/z)	0.15~0.25	0.2~0.3	0.2~0.3	0.25~0.35	0.25~0.35	0.25~0.35
				a_{pmax}(mm)	0.4	0.5	0.6	0.8	1	1
				a_{emax}(mm)	0.4	0.5	0.6	0.8	1	1
M	Stainless steel Rostfreier Stahl	HB≤270		V(m/min)	70~150	70~150	70~150	70~150	70~150	70~150
				fz(mm/z)	0.1~0.2	0.1~0.25	0.1~0.25	0.2~0.3	0.2~0.3	0.2~0.3
				a_{pmax}(mm)	0.6	0.8	1	1.25	1.5	1.5
				a_{emax}(mm)	0.6	0.8	1	1.25	1.5	1.5
K	Cast iron Gusseisen	HB180-250		V(m/min)	160~300	160~300	160~300	160~300	160~300	160~300
				fz(mm/z)	0.2~0.3	0.25~0.35	0.25~0.35	0.3~0.4	0.3~0.4	0.3~0.4
				a_{pmax}(mm)	1	1.5	1.8	2	2.5	2.5
				a_{emax}(mm)	1	1.5	1.8	2	2.5	2.5

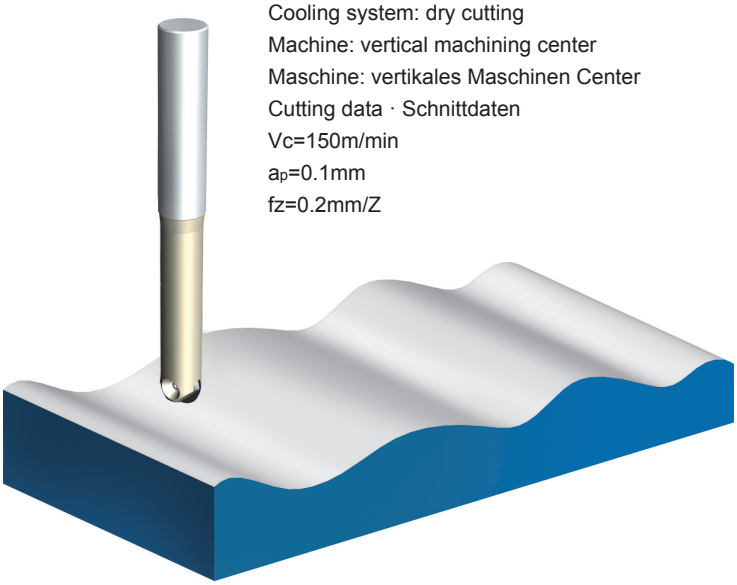
● Ex Stock / ab Lager ○ On demand / auf Anfrage

Case study for BMR04
Bearbeitungsbeispiel für BMR04

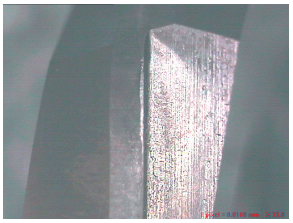
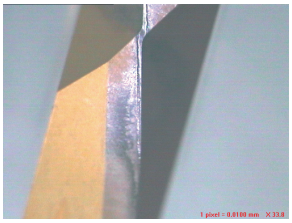
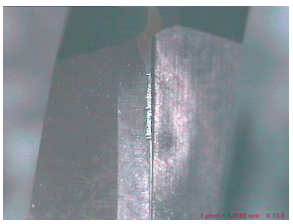
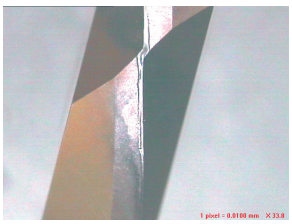


■ToolWerkzeug: BMR04-020-G25-M
■Insert type/grade: ZOHX2005-GM/YBG252

Workpiece material
Werkstück-
stoff: 42CrMo (HRC35)
Cooling system: dry cutting
Machine: vertical machining center
Maschine: vertikales Maschinen Center
Cutting data · Schnittdaten
Vc=150m/min
a_p=0.1mm
fz=0.2mm/Z



●Abrasion comparison of inserts after milling curved face

	ZCC-CT	Other company product
60minutes later	 Flank abrasion0.08	 Flank abrasion0.10
120minutes later	 Flank abrasion0.12	 Flank abrasion0.16

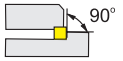
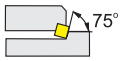
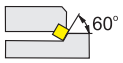
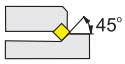
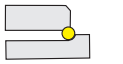
Applicable tool B9-B15
Werkzeug
Tools code key B22-B23
Werkzeug ISO
Grade selection guide B16-B20
Sortenauswahl
Technical data B183-B188
Technische Daten

B

Milling Tools · Fräser

Side and face milling tools · Scheiben- und Planfräser code key

Milling tool type Fräsertyp	
FM	Face milling Planfräsen
EM	Square shoulder milling /Eckfräsen
HM	Helical end milling Spiralfräsen
SM	Side and face milling Eck- und Planfräsen
BM	Profile milling Profilfräsen
CM	Chamfer milling Fasfräsen
XM	Special milling Spezialfräsen

Approach angle Anstellwinkel		
P	90°	
E	75°	
D	60°	
A	45°	
R		

Sequence number of series
Serien Nummer

Cutting diameter ØD (mm)
Fräserdurchmesser

Cutting width of milling tools
Schnittbreite

Coupling structure and demension Aufnahmetyp			
A	A type	D	D type
B	B type	K	Mounting by keyway
C	C type		

SM P 03 - 160 × 16 - K40 - M P 12 - 12 L

Insert · WSP	
C	Diamond with 80° Raute mit 80°
D	Diamond with 55° Raute mit 55°
R	Round Rounde
S	Square Viereck
T	Regular triangle Regular triangle
V	Diamond with 35° Raute mit 35°
M	Diamond with 86° Raute mit 86°

Insert clearance angle Freiwinkel	
N	0°
B	5°
C	7°
P	11°
D	15°
E	20°

Length of cutting edge Schneidkantenlänge						
Diameter of IC Durchmesse von IC	Insert · WSP					
	C	D	R	S	T	V
5.556	—	—	—	—	09	—
6.350	06	07	—	—	11	—
9.525	09	11	09	09	16	16
12.700	12	15	12	12	22	22
15.875	16	19	15	15	27	—
19.050	19	—	19	19	33	—
25.400	25	—	25	25	44	—

Cutting direction
Schnittrichtung

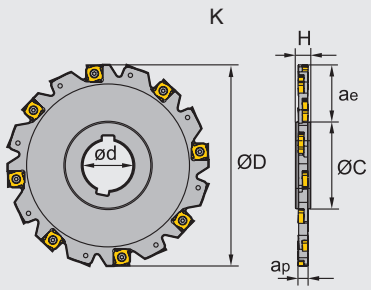
(R: right L: left)
(R: rechts L: links)

Number of teeth
Zähnezahl

Side and face milling tools · Scheibenfräser

SMP01 P M K





Specification of tools · Werkzeug Beschreibung

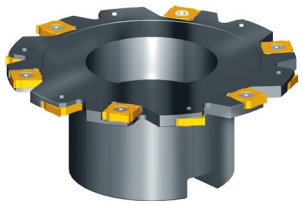
Type · Typ		Stock Lager R	Stock Lager L	Dimensions (mm) · Abmessungen Ø D	ø d	ø c	H	a_p	a_{emax}	Inserts WSP	No. of teeth Zähne	Coupling Aufnahme	Weight Gewicht (kg)
SMP01 Mounting by keyway	**-100×4-K27-SN12-10**	○	○	100	27	45	12	4	25		10	K	0.2
	-125×4-K40-SN12-12	○	○	125	40	56	12	4	32	XSEQ1202	12	K	0.3
	-160×4-K40-SN12-16	○	○	160	40	67	12	4	44		16	K	0.5
	-100×5-K27-SN12-10	○	○	100	27	45	12	5	25		10	K	0.2
	-125×5-K40-SN12-12	○	○	125	40	56	12	5	32	XSEQ1203	12	K	0.3
	-160×5-K40-SN12-16	●	○	160	40	67	12	5	44		16	K	0.6
	-100×6-K27-SN12-10	○	○	100	27	45	12	6	25		10	K	0.3
	-125×6-K40-SN12-12	○	○	125	40	56	12	6	32		12	K	0.4
	-160×6-K40-SN12-16	○	○	160	40	67	12	6	44	XSEQ12T3	16	K	0.7
	-200×6-K50-SN12-18	○	○	200	50	71	12	6	62		18	K	1.1
	-250×6-K50-SN12-24	○	○	250	50	71	12	6	87		24	K	1.7
	-100×7-K27-SN12-10	●	○	100	27	45	12	7	25		10	K	0.3
	-125×7-K40-SN12-12	○	○	125	40	56	12	7	32		12	K	0.4
	-160×7-K40-SN12-16	○	○	160	40	67	12	7	44	XSEQ1204	16	K	0.8
	-200×7-K50-SN12-18	○	○	200	50	71	12	7	62		18	K	1.2
	-250×7-K50-SN12-24	○	○	250	50	71	12	7	87		24	K	1.9
	-100×8-K27-SN12-10	●	○	100	27	45	12	8	25		10	K	0.3
	-125×8-K40-SN12-12	●	○	125	40	56	12	8	32		12	K	0.5
	-160×8-K40-SN12-16	○	○	160	40	67	12	8	44	XSEQ12T4	16	K	0.9
	-200×8-K50-SN12-18	○	○	200	50	71	12	8	62		18	K	1.4
	-250×8-K50-SN12-24	○	○	250	50	71	12	8	87		24	K	2.2

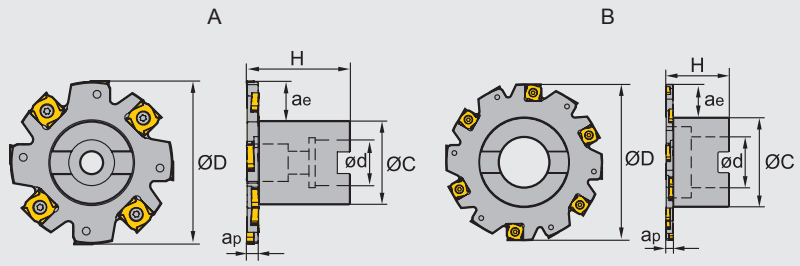
● Ex Stock / ab Lager ○ On demand / auf Anfrage

Applicable tool B9-B15
Werkzeug
Tools code key B22-B23
Werkzeug ISO
Grade selection guide B16-B20
Sortenauswahl
Technical data B183-B188
Technische Daten

Side and face milling tools · Scheibenfräser

SMP01 P M K





Specification of tools · Werkzeug Beschreibung

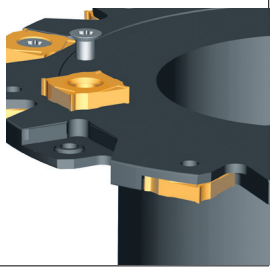
Type · Typ		Stock Lager R	Stock Lager L	Dimensions (mm) · Abmessungen Ø D	ø d	ø c	H	ap	aemax	Inserts WSP	No. of teeth Zähne	Coupling Aufnahme	Weight Gewicht (kg)
SMP01 Arbor mounting	**-063×4-A22-SN12-06**	●	○	63	22	32	40	4	14		6	A	0.2
	-080×4-A22-SN12-08	●	○	80	22	40	40	4	18	XSEQ1202	8	A	0.4
	-100×4-A27-SN12-10	○	○	100	27	48	50	4	23		10	A	0.6
	-063×5-A22-SN12-06	○	○	63	22	32	40	5	14		6	A	0.2
	-080×5-A22-SN12-08	●	○	80	22	40	40	5	18	XSEQ1203	8	A	0.4
	-100×5-A27-SN12-10	○	○	100	27	48	50	5	23		10	A	0.7
	-063×6-A22-SN12-06	○	○	63	22	32	40	6	14		6	A	0.2
	-080×6-A22-SN12-08	●	○	80	22	40	40	6	18		8	A	0.5
	-100×6-A27-SN12-10	●	○	100	27	48	50	6	23	XSEQ12T3	10	A	0.7
	-125×6-B40-SN12-12	○	○	125	40	70	50	6	30		12	B	1.0
	-160×6-B40-SN12-16	○	○	160	40	70	60	6	41		16	B	1.3
	-063×7-A22-SN12-06	○	○	63	22	32	40	7	14		6	A	0.2
	-080×7-A22-SN12-08	○	○	80	22	40	40	7	18		8	A	0.5
	-100×7-A27-SN12-10	●	○	100	27	48	50	7	23	XSEQ1204	10	A	0.7
	-125×7-B40-SN12-12	○	○	125	40	70	50	7	30		12	B	1.1
	-160×7-B40-SN12-16	○	○	160	40	70	60	7	41		16	B	1.4
	-063×8-A22-SN12-06	○	○	63	22	32	40	8	14		6	A	0.2
	-080×8-A22-SN12-08	○	○	80	22	40	40	8	18		8	A	0.5
	-100×8-A27-SN12-10	○	○	100	27	48	50	8	23	XSEQ12T4	10	A	0.8
	-125×8-B40-SN12-12	○	○	125	40	70	50	8	30		12	B	1.1
	-160×8-B40-SN12-16	○	○	160	40	70	60	8	41		16	B	1.5

● Ex Stock / ab Lager ○ On demand / auf Anfrage

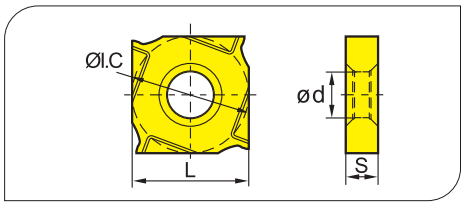
Spare parts · Ersatzteile

Diameter Durchmesser Ø D	Cutting width a_p	Screw Schraube	Wrench Schlüssel
Ø63-Ø160	4	I91M4×3.2X	WT10S
Ø63-Ø160	5	I91M4×4.2X	
Ø63-Ø250	6	I91M4×5.1X	
Ø63-Ø250	7	I91M4×6.1X	
Ø63-Ø250	8	I91M4×7.1X	

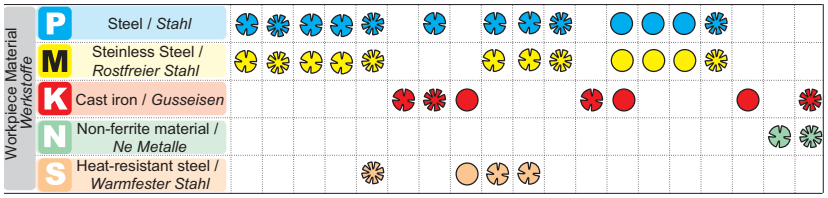
SMP01 P M K



Applicable inserts · Wendeschneidplatten



Ideal Machining Condition
Gute Bearbeitungsbedingungen
Normal Machining Condition
Normale Bearbeitungsbedingungen
Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen



Insert WSP	Type · Typ	Dimensions (mm) · Abmessungen				CVD Coating CVD Beschicht.							PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall			
		I.C	L	S	d	YBC301	YBC401	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**XSEQ1202**	12.7	12.7	2.3	5.0											●								
	XSEQ1203	12.7	12.7	3.0	5.0				○							●								
	XSEQ12T3	12.7	12.7	3.5	5.0	○										●								
	XSEQ1204	12.7	12.7	4.0	5.0											●								
	XSEQ12T4	12.7	12.7	4.5	5.0											●								

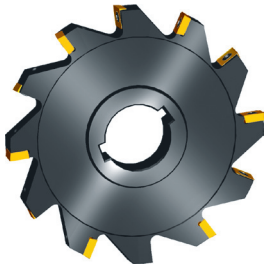
Recommended Cutting data · Schnittdaten

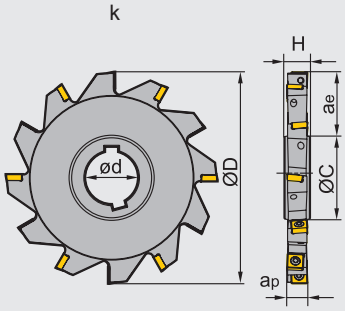
	Workpiece material Werkstück-stoff	Hardness HB Härte	Grade Sorte	Cutting data · Schnittdaten	
				V(m/min)	f(mm/z)
P	Low-carbon steel Soft steel Niedrig legierter Kohlenstoffstahl Baustahl	≤180	YBG202	180 (100-250)	0.1(0.08-0.25)
			YBG302	150 (100-200)	0.15(0.1-0.3)
	High-carbon steel Alloy steel Hoch Leg. Kohlenstoffstahl Leg. Stahl	180-280	YBG202	150 (80-250)	0.1(0.08-0.25)
			YBG302	120 (80-200)	0.15(0.1-0.3)
	Alloy tool steel Leg. Werkzeugstahl	280-350	YBG202	120 (80-250)	0.1(0.08-0.25)
			YBG302	100 (80-200)	0.15(0.1-0.3)
M	Stainless steel Rostfreier Stahl	≤270	YBG202	120 (80-250)	0.1(0.05-0.15)
			YBG302	100 (80-200)	0.08(0.05-0.15)
K	Cast iron Gusseisen	180-250	YBG152	120 (80-250)	0.1(0.05-0.15)
			YBG302	150 (100-250)	0.08(0.05-0.15)

Applicable tool B9-B15
Werkzeug
Tools code key B22-B23
Werkzeug ISO
Grade selection guide B16-B20
Sortenauswahl
Technical data B183-B188
Technische Daten

Side and face milling tools · Scheibenfräser

SMP03 P M K



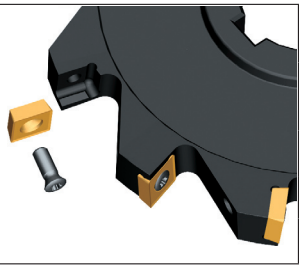


Specification of tools · Werkzeug Beschreibung

Type · Typ		Stock Lager	Dimensions (mm) · Abmessungen						Inserts WSP	No. of teeth Zähne	Applicable inserts	Weight Gewicht (kg)
			ØD	øc	ød	a_{emax}	a_p	H				
SMP03 Arbor mounting	**-080×8-K27-MP06-10**	○	80	44.0	27	17.6	8	12	MPHT060304-DM	10	K	0.2
	-100×8-K32-MP06-14	○	100	49.0	32	25.1	8	12		14	K	0.3
	-100×10-K32-MP06-14	●	100	49.0	32	25.1	10	14		14	K	0.4
	-125×10-K40-MP06-16	○	125	57.0	40	33.6	10	14		16	K	0.6
	-125×12-K40-MP08-12	●	125	58.3	40	32.6	12	16	MPHT080305-DM	12	K	0.7
	-160×12-K40-MP08-14	●	160	64.3	40	31.5	12	16		14	K	1.3
	-160×16-K40-MP12-12	○	160	64.6	40	47.6	16	20	MPHT120408-DM	12	K	1.6
	-160×18-K40-MP12-12	○	160	65.3	40	47.3	18	24		12	K	1.9
	-160×20-K40-MP12-12	○	160	65.3	40	47.3	20	26		12	K	2.1
	-200×16-K50-MP12-14	○	200	74.6	50	62.6	16	20		14	K	2.5
	-200×18-K50-MP12-14	○	200	75.3	50	62.3	18	24		14	K	2.9
	-200×20-K50-MP12-14	○	200	75.3	50	62.3	20	26		14	K	3.3

Spare parts · Ersatzteile

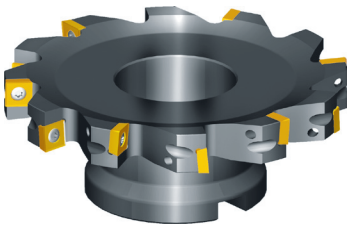
Diameter Durchmesser Ø D	Insert	Screw Schraube	Wrench Schlüssel	
				
Ø80-Ø125	MP06	I60M2.5x6.5	WT07IP	--
Ø125-Ø160	MP08	I60M3x7	WT09IP	--
Ø160-Ø200	MP12	I60M5x13	--	WT20IS

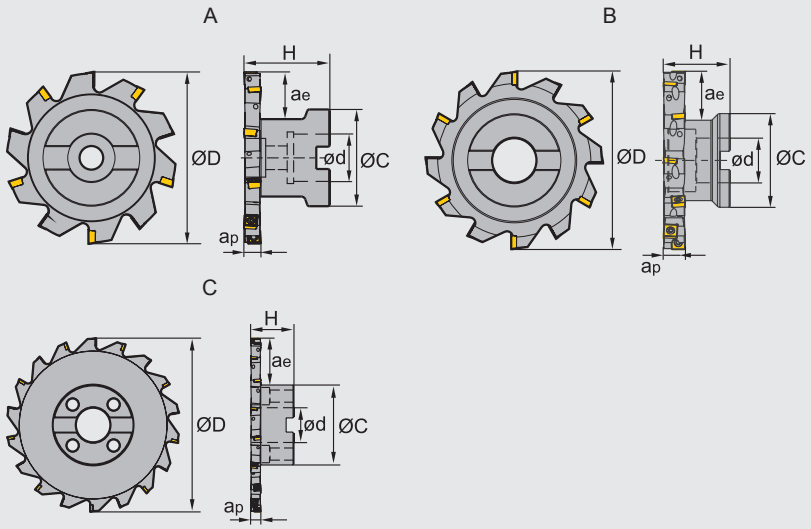


● Ex Stock / ab Lager ○ On demand / auf Anfrage

Side and face milling tools · Scheibenfräser

SMP03 P M K



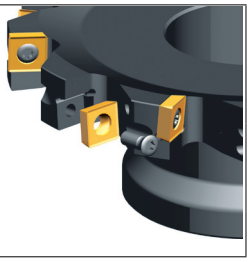


Specification of tools · Werkzeug Beschreibung

Type · Typ		Stock Lager R	Stock Lager L	Dimensions (mm) · Abmessungen Ø D	ø c	ø d	a_{emax}	a_p	H	Inserts WSP	No. of teeth Zähne	Applicable inserts	Weight Gewicht (kg)
SMP03 Arbor mounting	**-080×8-A22-MP06-10**	●	○	80	45	22	21	8	40	MPHT060304-DM	10	A	0.4
	-100×8-B27-MP06-14	○	○	100	55	27	24.5	8	40		14	B	0.6
	-100×10-B27-MP06-14	●	○	100	55	27	24.5	10	40		14	B	0.7
	-125×10-B32-MP06-16	○	○	125	65	32	33.3	10	45		16	B	1.1
	-125×12-B32-MP08-12	○	○	125	65	32	33	12	45	MPHT080305-DM	12	B	1.4
	-160×12-B40-MP08-14	○	○	160	80	40	44	12	50		14	B	1.9
	-200×12-C40-MP08-18	○	○	200	92	40	52	12	50		18	C	3.2
	-125×16-B32-MP12-10	○	○	125	65	32	33	16	50	MPHT120408-DM	10	B	2.3
	-160×16-B40-MP12-12	○	○	160	80	40	45	16	60		12	B	2.3
	-160×18-B40-MP12-12	○	○	160	80	40	45	18	60		12	B	2.4
	-200×16-C40-MP12-14	○	○	200	92	40	52	16	50		14	C	3.6
	-200×18-C40-MP12-14	○	○	200	92	40	52	18	50		14	C	3.9
	-200×20-C40-MP12-14	○	○	200	92	40	52	20	50		14	C	4.2

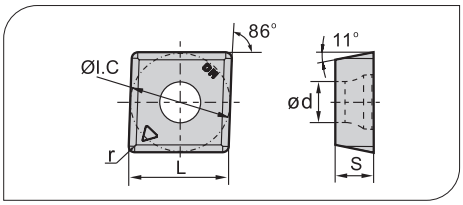
Spare parts · Ersatzteile

Diameter Durchmesser Ø D	Insert	Screw Schraube	Wrench Schlüssel	
Ø80-Ø125	MP06	I60M2.5×6.5	WT07IP	
Ø125-Ø200	MP08	I60M3×7	WT09P	
Ø125-Ø200	MP12	I60M5×13		WT20IS



Applicable tool B9-B15 Werkzeug
Tools code key B22-B23 Werkzeug ISO
Grade selection guide B16-B20 Sortenauswahl
Technical data B183-B188 Technische Daten

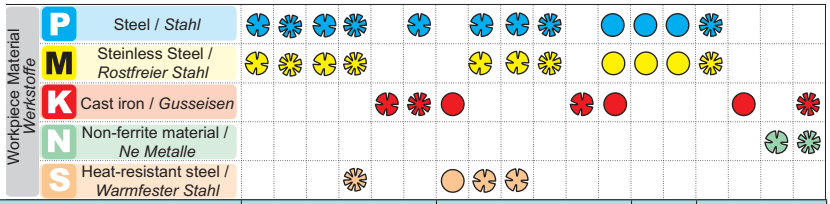
Applicable inserts · Wendeschneidplatten



Ideal Machining Condition
Gute Bearbeitungsbedingungen

Normal Machining Condition
Normale Bearbeitungsbedingungen

Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen



Insert WSP	Type · Typ	Dimensions (mm) · Abmessungen					CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall			
		I.C	L	S	d	r	YBC301	YBC401	YBM251	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**MPHT060304-DM**	6.35	6.35	3.18	2.8	0.4			●							●								
	MPHT080305-DM	8.3	8.3	3.18	5.56	0.5			●							●								
	MPHT120408-DM	12.7	12.7	4.76	5.56	0.8			●							●								

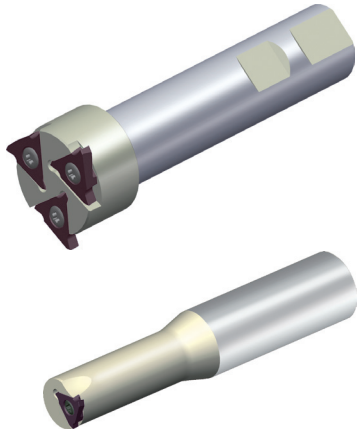
Recommended Cutting data · Schnittdaten

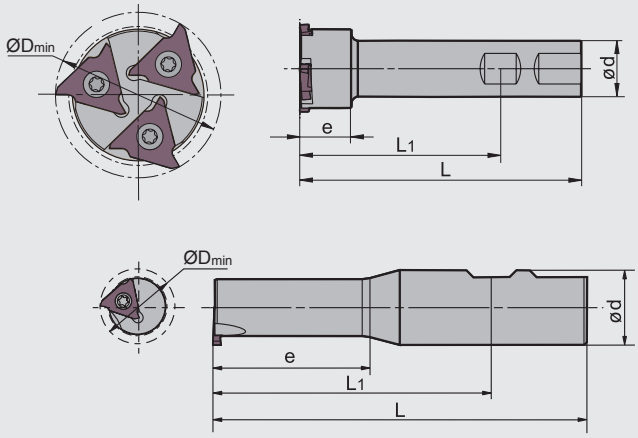
Workpiece material Werkstück-stoff		Hardness HB Härte	Grade Sorte	Cutting data · Schnittdaten	
				V(m/min)	f(mm/z)
P	Low-carbon steel Soft steel Niedrig legierter Kohlenstoffstahl Baustahl	≤180	YBM251 YBG202	180 (100-250)	0.1(0.08-0.25)
			YBG302	150 (100-200)	0.15(0.1-0.3)
	High-carbon steel Alloy steel Hoch Leg. Kohlenstoffstahl Leg. Stahl	180-280	YBM251 YBG202	150 (80-250)	0.1(0.08-0.25)
			YBG302	120 (80-200)	0.15(0.1-0.3)
	Alloy tool steel Leg. Werkzeugstahl	280-350	YBM251 YBG202	120 (80-250)	0.1(0.08-0.25)
			YBG302	100 (80-200)	0.15(0.1-0.3)
M	Stainless steel Rostfreier Stahl	≤270	YBM251 YBG202	120 (80-250)	0.1(0.05-0.15)
			YBG302	100 (80-200)	0.08(0.05-0.15)
K	Cast iron Gusseisen	180-250	YBG152	120 (80-250)	0.1(0.05-0.15)
			YBG302	150 (100-250)	0.08(0.05-0.15)

● Ex Stock / ab Lager ○ On demand / auf Anfrage

Groove milling tools · Nutenfräser

SMP05 P M K



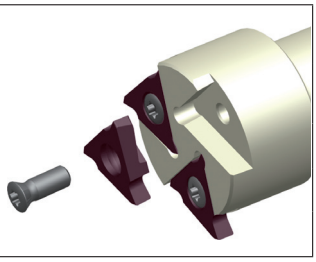


Specification of tools · Werkzeug Beschreibung

Type · Typ		Stock Lager	Dimensions (mm) · Abmessungen					No. of teeth Zähne	Applicable inserts	W(mm)
			ØDmin	ød	e	L1	L			
SMP05	-025×3.0-XP25-QC16-01	○	25	25	40	89	125	1	QC16L 050~300	0.50-3.00
	-039×3.0-XP25-QC16-03	○	39	25	23	89	125	3	QC16L 050~300	0.50-3.00
	-044×4.8-XP25-QC22-03	○	44	25	23	89	125	3	QC22L 100~480	1.0-4.8

Spare parts · Ersatzteile

Diameter Durchmesser Ø D	Screw Schraube	Wrench Schlüssel
Ø25	I60M3.5×10	WT15IP
Ø39	I60M3.5×10	WT15IP
Ø44	I60M5×13	WT20IP



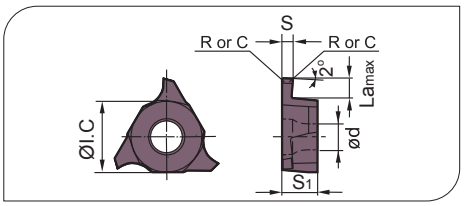
Applicable tool B9-B15 Werkzeug
Tools code key B22-B23 Werkzeug ISO
Grade selection guide B16-B20 Sortenauswahl
Technical data B183-B188 Technische Daten

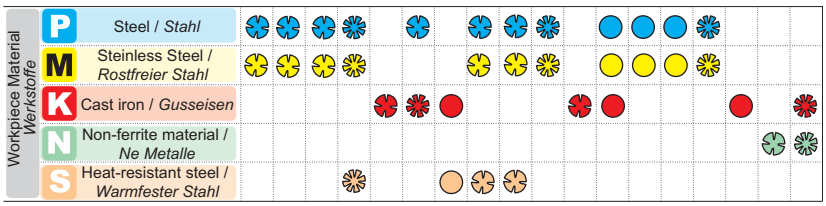
Ideal Machining Condition
Gute Bearbeitungsbedingungen

Normal Machining Condition
Normale Bearbeitungsbedingungen

Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen

Applicable inserts · Wendeschneidplatten

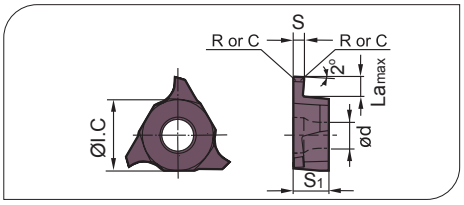




Insert WSP	Type · Typ	Dimensions (mm) · Abmessungen						CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall			
		$S_{\pm 0.025}$	La_{max}	R/C	ØI.C	S_1	ød	YBC301	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**QC16L050-R005**	0.50	1.00	R0.05	9.525	3.18	4.4																		
	QC16L100-R005	1.00	2.00	R0.05	9.525	3.18	4.4																		
	QC16L110-R005	1.10	2.00	R0.05	9.525	3.18	4.4																		
	QC16L110-R01	1.10	2.00	R0.1	9.525	3.18	4.4								○	○									
	QC16L120-R005	1.20	2.00	R0.05	9.525	3.18	4.4																		
	QC16L125-R02	1.25	2.00	R0.2	9.525	3.18	4.4								○	○									
	QC16L145-R02	1.45	2.00	R0.2	9.525	3.18	4.4								○	○									
	QC16L150-R02	1.50	2.00	R0.2	9.525	3.18	4.4								○	○									
	QC16L175-R02	1.75	2.00	R0.2	9.525	3.18	4.4								○	○									
	QC16L185-R02	1.85	2.50	R0.2	9.525	3.18	4.4								○	○									
	QC16L200-R02	2.00	2.50	R0.2	9.525	3.18	4.4								○	○									
	QC16L250-R02	2.50	2.50	R0.2	9.525	3.18	4.4								○	○									
	QC16L300-R02	3.00	3.00	R0.2	9.525	3.18	4.4								○	○									

● Ex Stock / ab Lager ○ On demand / auf Anfrage

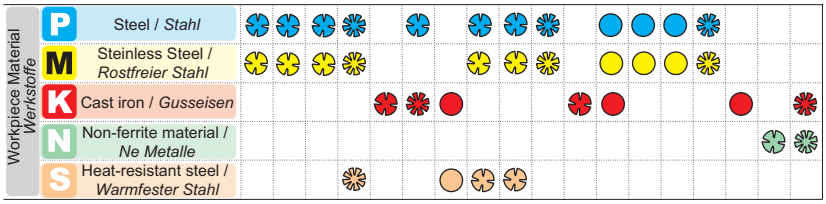
Applicable inserts · Wendeschneidplatten



Ideal Machining Condition
Gute Bearbeitungsbedingungen

Normal Machining Condition
Normale Bearbeitungsbedingungen

Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen



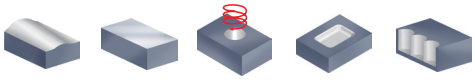
Insert WSP	Type · Typ	Dimensions (mm) · Abmessungen						CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall			
		$S_{\pm 0.025}$	La_{max}	R/C	ØI.C	S_1	ød	YBC301	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**QC22L125-R02**	1.25	2.00	R0.2	12.70	4.76	5.5								○	○									
	QC22L145-R02	1.45	2.00	R0.2	12.70	4.76	5.5								○	○									
	QC22L150-R02	1.50	3.50	R0.2	12.70	4.76	5.5								○	○									
	QC22L175-R02	1.75	3.50	R0.2	12.70	4.76	5.5								○	○									
	QC22L185-R02	1.85	3.50	R0.2	12.70	4.76	5.5								○	○									
	QC22L200-R02	2.00	3.50	R0.2	12.70	4.76	5.5								○	○									
	QC22L230-R02	2.30	3.50	R0.2	12.70	4.76	5.5								○	○									
	QC22L250-R03	2.50	4.00	R0.3	12.70	4.76	5.5								○	○									
	QC22L265-R03	2.65	4.00	R0.3	12.70	4.76	5.5								○	○									
	QC22L280-R03	2.80	4.00	R0.3	12.70	4.76	5.5								○	○									
	QC22L300-R03	3.00	4.00	R0.3	12.70	4.76	5.5								○	○									
	QC22L320-R03	3.20	4.00	R0.3	12.70	4.76	5.5								○	○									
	QC22L330-R03	3.30	4.00	R0.3	12.70	4.76	5.5								○	○									
	QC22L350-R03	3.50	5.00	R0.3	12.70	4.76	5.5								○	○									
	QC22L400-R04	4.00	5.00	R0.4	12.70	4.76	5.5								○	○									
	QC22L430-R04	4.30	5.00	R0.4	12.70	4.76	5.5								○	○									
	QC22L450-R04	4.50	5.00	R0.4	12.70	4.76	5.5								○	○									
	QC22L480-R04	4.80	5.00	R0.4	12.70	5.06	5.5								○	○									

Applicable tool B9-B15
Werkzeug

Tools code key B22-B23
Werkzeug ISO

Grade selection guide B16-B20
Sortenauswahl

Technical data B183-B188
Technische Daten

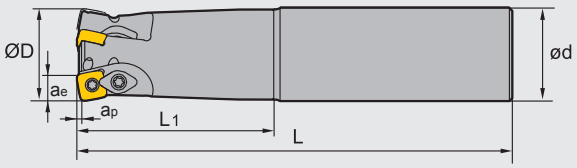


High feed milling cutters · Hochvorschubfräser

XMR01 P M K



S type insert, straight shank
S Typ WSP, Zylinder Schaft



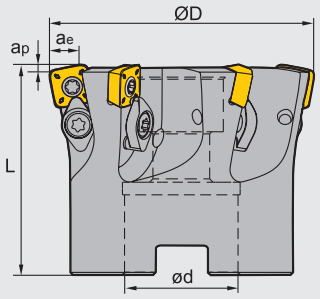
Specification of tools · Werkzeug Beschreibung with Internal Cooling · Mit Innenkühlung

Type · Typ		Stock Lager	Dimensions (mm) · Abmessungen						No. of teeth Zähne	Weight Gewicht (kg)
			Ø D	a_p	a_e	L_1	L	Ø d		
XMR01	**-025-G25-SD09-02**	●	25	1.4	8.8	60	140	25	2	0.5
	-032-G32-SD09-03	●	32	1.4	8.8	70	150	32	3	0.8
	-035-G32-SD09-03	○	35	1.4	8.8	70	150	32	3	0.8
	-032-G32-SD12-02	●	32	1.8	11.7	70	150	32	2	0.8
	-040-G40-SD12-03	●	40	1.8	11.7	70	150	40	3	1.3

XMR01 P M K



S



Specification of tools · Werkzeug Beschreibung with Internal Cooling · mit Innenkühlung

Type · Typ		Stock Lager	Dimensions (mm) · Abmessungen					No.of teeth Zähne	Coupling Aufnahme	Weight Gewicht (kg)
			Ø D	a_p	a_e	L	ø d			
XMR01	**-050-A22-SD09-04**	●	50	1.4	8.8	40	22	4	A	0.3
	-063-A22-SD09-06	●	63	1.4	8.8	40	22	6	A	0.5
	-063-A27-SD09-06	○	63	1.4	8.8	50	27	6	A	0.6
	-063-A22-SD12-05	●	63	1.8	11.7	40	22	5	A	0.5
	-063-A27-SD12-05	○	63	1.8	11.7	50	27	5	A	0.6
	-080-A27-SD12-05	●	80	1.8	11.7	63	27	5	A	0.9
	-100-B32-SD12-06	●	100	1.8	11.7	50	32	6	B	1.8

● Ex Stock / ab Lager ○ On demand / auf Anfrage

Spare parts · Ersatzteile

Tool Werkzeug	Insert Screw Schraube	Clamp Screw Schraube	Clamp Pratze	Wrench Schlüssel	
XMR01**-SD09**	I60M3.5×08TT	I60M4×8.4	WD-204	WT10IP	WT15IP
XMR01**-SD12**	I60M4×8.4			WT15IP	

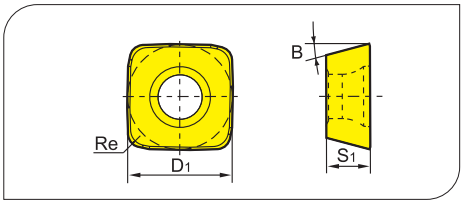


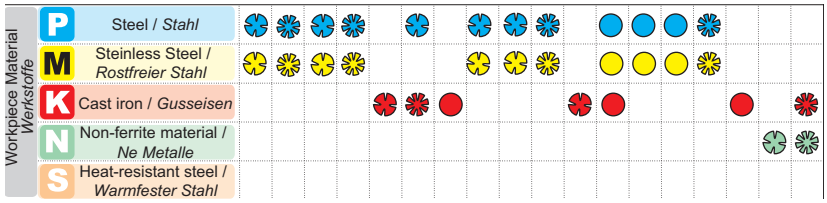
Applicable inserts · Wendeschneidplatten

Ideal Machining Condition
Gute Bearbeitungsbedingungen

Normal Machining Condition
Normale Bearbeitungsbedingungen

Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen





Insert WSP	Type · Typ	Dimensions (mm) · Abmessungen				CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall			
		B	Re	S_1	D_1	YBC301	YBC401	YBM251	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**SDMT09T312-DM**	15°	1.2	3.97	9.525				●		○		●		○								
	SDMT120412-DM	15°	2.0	4.76	12.7				●		○		●		○								

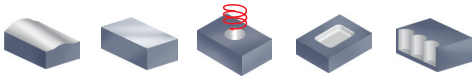
Applicable tool B9-B15
Werkzeug

Tools code key B22-B23
Werkzeug ISO

Grade selection guide B16-B20
Sortenauswahl

Technical data B183-B188
Technische Daten

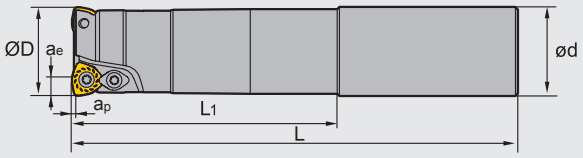
High feed milling cutters · Hochvorschubschaftfräser



XMR01 P M K



W type insert, straight shank
W Typ WSP, Zylinder Schaft



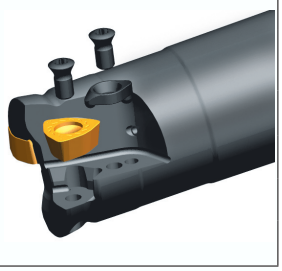
Specification of tools · Werkzeug Beschreibung

Type · Typ		Stock Lager	Dimensions (mm) · Abmessungen						No. of teeth Zähne	Weight Gewicht (kg)
			Ø D	a_p	a_e	L_1	L	ø d		
XMR01	**-020-G20-WP05-02-M**	●	20	1.5	3.8	50	130	20	2	0.2
	-020-G20-WP05-02-L	●	20	1.5	3.8	100	180	20	2	0.3
	-020-G20-WP05-02-XL	○	20	1.5	3.8	130	250	20	2	0.8
	-025-G25-WP06-02-M	●	25	1.5	4.35	60	140	25	2	0.4
	-025-G25-WP06-02-L	●	25	1.5	4.35	120	200	25	2	0.6
	-025-G25-WP06-02-XL	○	25	1.5	4.35	180	300	25	2	1.0
	-032-G32-WP06-03-M	●	32	1.5	4.35	70	150	32	3	0.8
	-032-G32-WP06-03-L	●	32	1.5	4.35	120	200	32	3	1.0
	-032-G32-WP06-03-XL	○	32	1.5	4.35	180	300	32	3	1.6
	-040-G32-WP06-03-M	○	40	1.5	4.35	50	150	32	3	0.9
	-040-G32-WP06-03-L	○	40	1.5	4.35	50	250	32	3	1.5
	-040-G32-WP06-03-XL	○	40	1.5	4.35	50	300	32	3	1.8
	-040-G32-WP08-02-M	○	40	1.5	5.66	50	150	32	2	0.9
	-040-G32-WP08-02-L	○	40	1.5	5.66	50	250	32	2	1.5
	-040-G32-WP08-02-XL	○	40	1.5	5.66	50	300	32	2	1.9
	-050-G32-WP09-02-M	○	50	3.0	6.8	50	150	32	2	1.9
	-050-G32-WP09-02-L	○	50	3.0	6.8	50	250	32	2	2.5

● Ex Stock / ab Lager ○ On demand / auf Anfrage

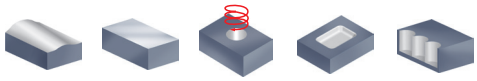
Spare parts · Ersatzteile

Tool Werkzeug	Clamp/Insert Screw Schraube	Clamp Pratze	Wrench Schlüssel	
				
XMR01**-WP05**	I60M3.5×08TT	--	WT10P	--
XMR01**-WP06**	I60M4×8.4		WT15P	
XMR01**-WP08**	I60M5×13	WD-208	--	WT20IT
XMR01**-WP09**				



● Ex Stock / ab Lager ○ On demand / auf Anfrage

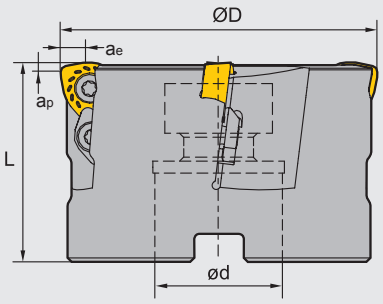
High feed milling cutters · Hochvorschubfräser



XMR01 P M K



W type insert, Arbor mounting
W Typ WSP, Aufsteckfräser

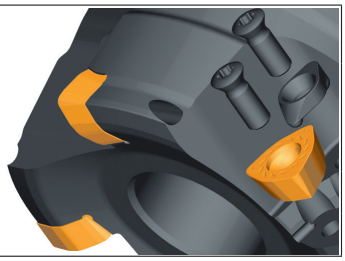


Specification of tools · Werkzeug Beschreibung

Type · Typ		Stock Lager	Dimensions (mm) · Abmessungen					No. of teeth Zähne	Inserts WSP	Weight Gewicht (kg)
			Ø D	a_p	a_e	L	ø d			
XMR01	**-050-A22-WP06-04**	●	50	1.5	4.35	50	22	4	A	0.4
	-050-A22-WP08-03	○	50	1.5	5.66	50	22	3	A	0.4
	-063-A22-WP08-04	●	63	1.5	5.66	50	22	4	A	0.7
	-063-A27-WP08-04	●	63	1.5	5.66	50	27	4	A	0.7
	-080-A27-WP08-05	●	80	1.5	5.66	63	27	5	A	1.5
	-100-B32-WP08-06	○	100	1.5	5.66	63	32	6	B	2.2
	-125-B40-WP08-07	●	125	1.5	5.66	63	40	7	B	3.5
	-160-B40-WP08-08	○	160	1.5	5.66	63	40	8	B	6.0
	-063-A22-WP09-03	○	63	3.0	6.8	50	22	3	A	0.7
	-080-A27-WP09-04	○	80	3.0	6.8	63	27	4	A	1.4
	-100-B32-WP09-05	○	100	3.0	6.8	63	32	5	B	2.1
	-125-B40-WP09-06	○	125	3.0	6.8	63	40	6	B	3.7
	-160-B40-WP09-07	●	160	3.0	6.8	63	40	7	B	6.3

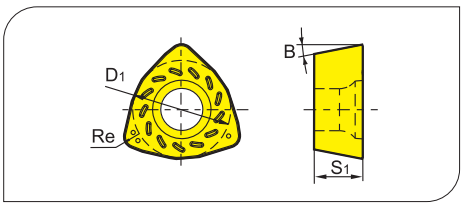
Spare parts · Ersatzteile

Tool Werkzeug	Clamp / Insert Screw Pratze / WSP Schraube	Clamp Pratze	Wrench Schlüssel	
				
XMR01**-WP06**	I60M4×8.4	--	WT15S	--
XMR01**-WP08**	I60M5×13	WD-208	--	WT20IT
XMR01**-WP09**	I60M5×13	WD-208	--	



Applicable tool B9-B15
Werkzeug
Tools code key B22-B23
Werkzeug ISO
Grade selection guide B16-B20
Sortenauswahl
Technical data B183-B188
Technische Daten

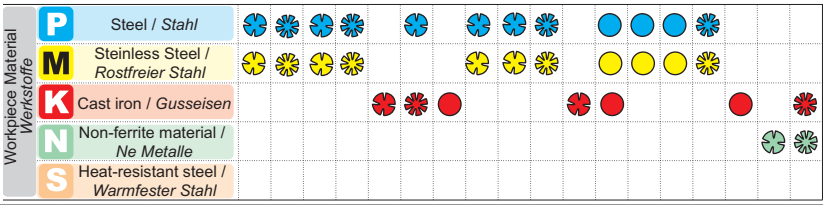
Applicable inserts · Wendeschneidplatten



Ideal Machining Condition
Gute Bearbeitungsbedingungen

Normal Machining Condition
Normale Bearbeitungsbedingungen

Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen

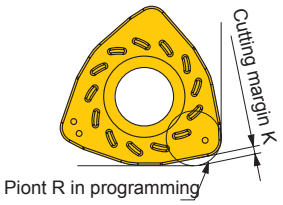


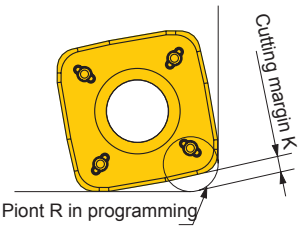
Insert WSP	Type · Typ	Dimensions (mm) · Abmessungen				CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall			
		B	Re	S_1	D_1	YBC301	YBC401	YBM251	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG212	YBG152	YBG252	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**WPGT050315ZSR**	11°	1.5	3.5	7.94				●						○								
	WPGT060415ZSR	11°	1.5	4.2	9.525				●						○								
	WPGT080615ZSR	11°	1.5	6.35	12.85				●					○	○								
	WPGT090725ZSR	11°	2.5	7	15				●						○								

● Ex Stock / ab Lager ○ On demand / auf Anfrage

Approximate R in machining program
Ungefährer Programmierradius

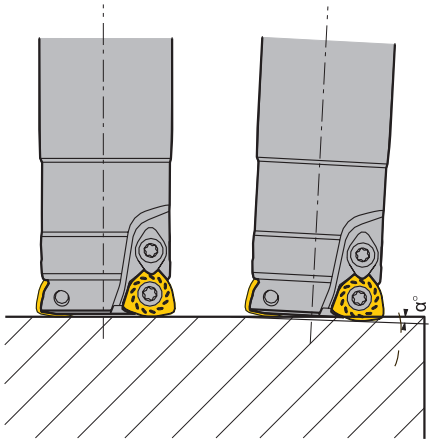
Insert · WSP	approx./ca. R(mm)	Cutting margin K(mm)
WPGT050315ZSR	2	0.5
WPGT060415ZSR	2.5	0.7
WPGT080615ZSR	2.0	0.7
WPGT090725ZSR	4.0	1.2
SDMT09T312-DM	2.5	0.87
SDMT120412-DM	4.0	0.93



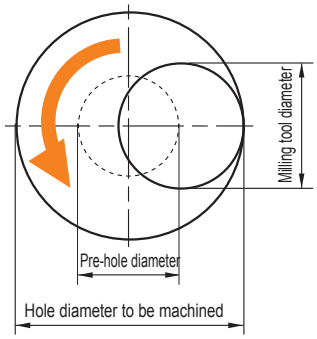


Different machining styles

■ Ramp machining
Tauchfräsen



■ Helical interpolation milling
Zirkularfräsen



- Reduce the feed rate in ramp and helical machining operations.
- Set the axial feed rate below 0.2mm/rev in drilling operation.
- Be careful ! Long chippings may fly out in drilling operation.
- The cutting depth of each rotation can't exceed the maximum cutting depth (a_p)
- The S type insert not only is applied in the machining operations mentioned above, but also able to be used for plunge milling.

- Beim Tauch- und Zirkularfräsen den Vorschub reduzieren.
- Vorschub bei Bohroperationen (achsial) unter 0,2 mm einstellen.
- "Vorsicht“ – Beim Bohren können lange Späne entstehen.
- Die Schnitttiefe pro Rotation kann die maximale Schnitttiefe ap nicht erreichen.
- Die S-Type Wendeschneidplatten können auch für andere Bearbeitungsoperationen eingesetzt werden.

XMR01-Serie

XMR01 series tools (install SD**inserts) possess perfect edge strength and excellent economical efficiency, have more advantages in face milling.
XMR01 series tools (install WP**inserts) possess good capability of chip removal, have more advantages in cavity milling.

Werkzeuge mit Schneidplatten (SD**) besitzen ausgezeichnete Schneidkantenstabilität. Sie haben besondere Vorteile beim Planfräsen mit hoher Wirtschaftlichkeit.

Werkzeuge mit Schneidplatten (WP..) haben besondere Vorteile bei der Spanabfuhr und werden vorteilhaft beim Auskoffern eingesetzt.

Recommended Cutting data · Schnittdaten

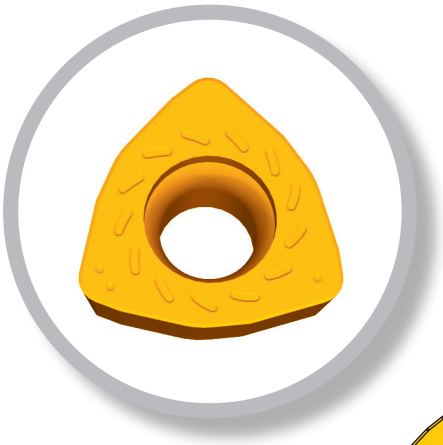
Workpiece material Werkstück-stoff		Hardness HB Härte	Grade Sorte	Cutting speed Schnitt-geschw. (m/min)	Ø25		Ø30/32/35	
					Axial cutting depth	Feed rate per tooth	Axial cutting depth	Feed rate per tooth
P	carbon steel Soft steel legierter Kohlenstoffstahl Baustahl	≤HB180 HB180-280	YBG202	170(120-220)	0.6~1.0	0.8~1.2	0.8~1.2	1.0~1.4
			YBM351	150(100-200)				
	Alloy steel Leg. Stahl Alloy tool steel Leg. Werkzeugstahl	HB280-350 ≤HB350	YBG202	150(100-200)	0.4~0.8	0.8~1.2	0.6~1.0	1.0~1.4
			YBM351	130(80-180)				
	hardened steel gehärteter Stahl	≤HRC35	YBG202	150(100-200)	0.4~0.8	0.6~1.0	0.6~1.0	0.8~1.2
			YBM351	120(80-160)				
M	Stainless steel Rostfreier Stahl	≤HB270	YBG202	150(100-200)	0.6~1.0	0.6~1.0	0.8~1.2	0.8~1.2
			YBM351	120(80-160)				
K	cast Iron Gusseisen	Tensile strength ≤350MPa	YBG202	170(120-220)	0.6~1.0	1.0~1.4	0.8~1.2	1.2~1.6
			YBM351	150(100-200)				
	Nodular Cast iron Kugelgrafitguss Temperguss	Tensile strength ≤800MPa	YBG202	150(100-200)	0.4~0.8	0.8~1.2	0.6~1.0	1.0~1.4
			YBM351	120(80-160)				

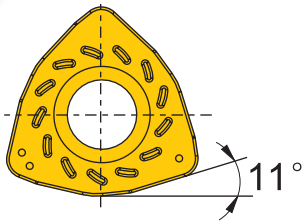
Recommended Cutting data · Schnittdaten

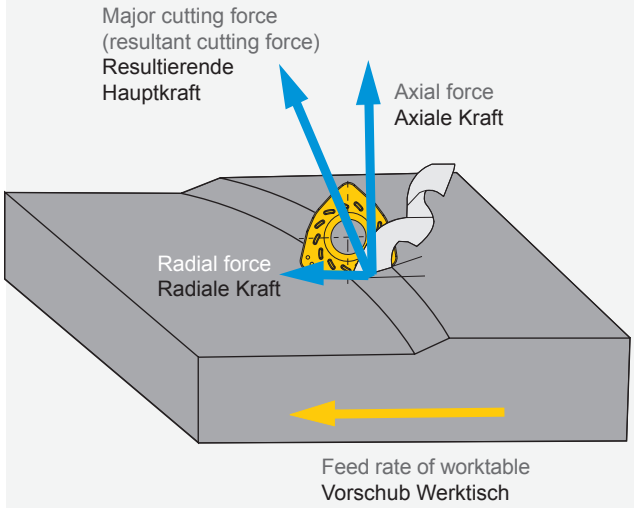
Workpiece material Werkstück-stoff		Hardness HB Härte	Grade Sorte	Cutting speed Schnitt-geschw. (m/min)	Ø40		Ø50/63		Ø80/100	
					Axial cutting depth	Feed rate per tooth	Axial cutting depth	Feed rate per tooth	Axial cutting depth	Feed rate per tooth
P	carbon steel Soft steel legierter Kohlenstoffstahl Baustahl	≤HB180 HB180-280	YBG202	170(120-220)	0.8~1.2	1.0~1.4	1.1~1.5	1.1~1.5	1.0~1.5	1.0~1.5
			YBM351	150(100-200)						
	Alloy steel Leg. Stahl Alloy tool steel Leg. Werkzeugstahl	HB280-350 ≤HB350	YBG202	150(100-200)	0.6~1.0	1.0~1.4	0.9~1.3	1.1~1.5	0.8~1.3	1.0~1.5
			YBM351	130(80-180)						
	hardened steel gehärteter Stahl	≤HRC35	YBG202	150(100-200)	0.6~1.0	0.8~1.2	0.9~1.3	0.9~1.3	0.8~1.3	0.8~1.3
			YBM351	120(80-160)						
M	Stainless steel Rostfreier Stahl	≤HB270	YBG202	150(100-200)	0.8~1.2	0.8~1.2	1.1~1.5	0.9~1.3	1.0~1.5	0.8~1.3
			YBM351	120(80-160)						
K	cast Iron Gusseisen	Tensile strength ≤350MPa	YBG202	170(120-220)	0.8~1.2	1.2~1.6	1.1~1.5	1.3~1.7	1.0~1.5	1.2~1.7
			YBM351	150(100-200)						
	Nodular Cast iron Kugelgrafitguss Temperguss	Tensile strength ≤800MPa	YBG202	150(100-200)	0.6~1.0	1.0~1.4	0.9~1.3	1.1~1.5	0.8~1.3	1.0~1.5
			YBM351	120(80-160)						

● Ex Stock / ab Lager ○ On demand / auf Anfrage

XMR01 series high feed milling tools
Hochvorschubfräser







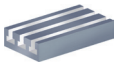
The feature of high feed tool is to resolve the major cutting force into the axial direction, greatly reduce the radial cutting force, thus improve tool's capability of shock resistance. In addition, this structure can effectively reduce the vibration in long overhang milling application.



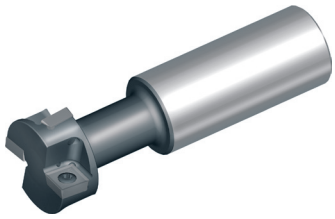
Die Merkmale dieses Hochvorschubfräsers sind die Ablenkung der Hauptkraft in axiale Richtung. Dadurch wird die radiale Kraft deutlich verringert, was eine Reduzierung oder Vibration ermöglicht und somit lange Standzeiten auch bei größeren Auskraglängen zur Folge hat.

T-slot milling tools · T-Nuten Fräser

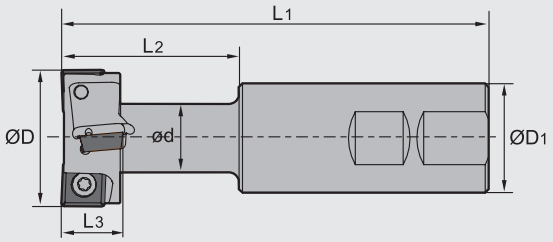
Kr:90°



TMP01 K



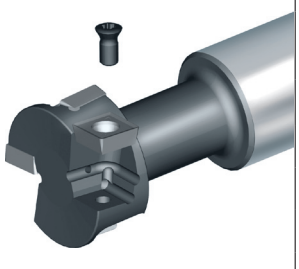
Weldon shank
Weldon Schaft



Specification of tools · Werkzeug Beschreibung

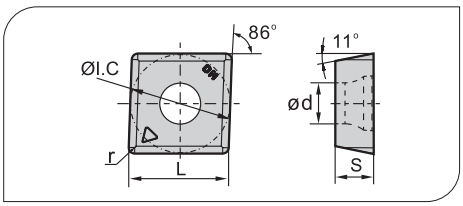
Type · Typ		Stock Lager	Dimensions (mm) · Abmessungen						No. of teeth Zähne	Number of insert Anzahl WSP	T-slot specification
			Ø D	Ø D_1	ø d	L_1	L_2	L_3			
TMP01	**-021-XP25-MP06-01**	●	21	25	10	100	32	9	1	2	12
	-025-XP25-MP06-01	●	25	25	12	100	35	11	1	2	14
	-032-XP32-MP08-02	●	32	32	15	110	45	14	2	4	18
	-040-XP32-MP12-02	●	40	32	19	125	55	18	2	4	22
	-050-XP40-MP12-02	●	50	40	25	140	65	22	2	4	28
	-060-XP50-MP12-02	●	60	50	32	160	80	28	2	6	36

Spare parts · Ersatzteile

Tool Werkzeug	Screw Schraube	Wrench Schlüssel		
				
TMP01-021-XP25-MP06-01	I60M2.5×5.5	WT07IP	--	
TMP01-025-XP25-MP06-01	I60M2.5×5.5			
TMP01-032-XP32-MP08-02	I60M3×7	WT10IP	--	
TMP01-040-XP32-MP12-02	I60M5×10	--	WT20IT	
TMP01-050-XP40-MP12-02	I60M5×10			
TMP01-060-XP50-MP12-02	I60M5×10			

● Ex Stock / ab Lager ○ On demand / auf Anfrage

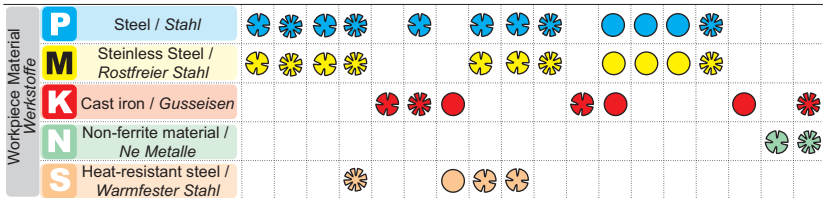
Applicable inserts · Wendeschneidplatten



Ideal Machining Condition
Gute Bearbeitungsbedingungen

Normal Machining Condition
Normale Bearbeitungsbedingungen

Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen

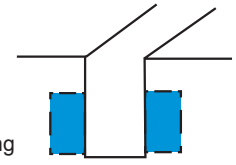


Insert WSP	Type · Typ	Dimensions (mm) · Abmessungen					CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall			
		I.C	L	s	d	r	YBC301	YBC401	YBM251	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**MPHT060304-DM**	6.35	6.35	3.18	2.8	0.4			●							●								
	MPHT080305-DM	8.3	8.3	3.18	3.4	0.5			●							○								
	MPHT120408-DM	12.7	12.7	4.76	5.56	0.8			●							●								

Recommended Cutting data · Schnittdaten

Workpiece material Werkstückstoff	Grade Sorte	Cutting data · Schnittdaten		
		V(m/min)	f(mm/z)	Cooling
K	YBG302	80~160	0.05~0.2	Wet / Dry Nass/ Trocken

Workpiece before machining
Werktisch vor der Bearbeitung

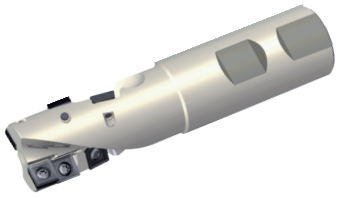


Applicable tool B9-B15 Werkzeug
Tools code key B22-B23 Werkzeug ISO
Grade selection guide B16-B20 Sortenauswahl
Technical data B183-B188 Technische Daten

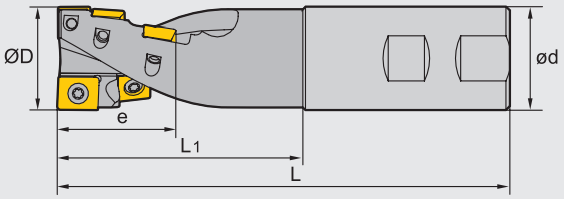
Helical end mill · Walzenstirnfräser

Kr:90°

HMP01 P K



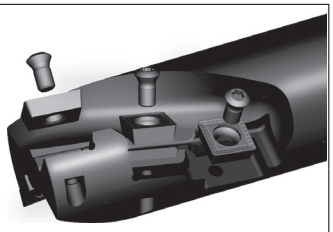
Weldon shank
Weldon Schaft



Specification of tools · Werkzeug Beschreibung

Type · Typ		Stock Lager		Dimensions (mm) · Abmessungen					Number of flute	Number of insert Anzahl WSP		Shank type Schaft
		R	L	Ø D	ø d	e	L_1	L	Z	APKT 150412-**	SPMT 120408-**	
HMP01	**-040×55-XP40-SP12-02**	○	○	40	40	55	95	175	2	1	5	Weldon
	-050×55-XP40-SP12-04	○	○	50	40	55	95	175	4	2	10	Weldon

Spare parts · Ersatzteile

Diameter Durchmesser Ø D	Screw Schraube	Wrench Schlüssel	
			
Ø40	I60M5×10	WT20IS	
Ø50	I60M5×13	WT20IS	

● Ex Stock / ab Lager ○ On demand / auf Anfrage

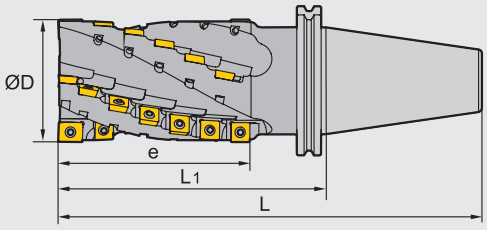
Helical end mill · Walzenstirnfräser

Kr:90°

HMP01 P K



JT shank/BT shank (figure is JT shank)
JT Schaft/BT Schaft (Abb. is JT shank)

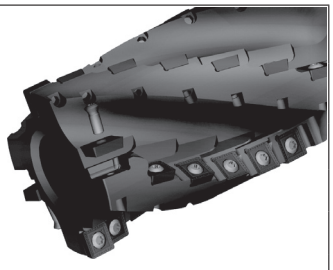


Specification of tools · Werkzeug Beschreibung

Type · Typ		Stock Lager		Dimensions (mm) · Abmessungen				Number of flute Zähne Z	Number of insert Anzahl WSP		Shank type Schaft
		R	L	Ø D	e	L_1	L		APKT 150412-**	SPMT 120408-**	
HMP01	**-050×84-JT50-SP12-04**	○	○	50	84	145	246.75	4	2	16	JT
	-063×74-JT50-SP12-04	○	○	63	74	135	236.75	4	2	14	JT
	-063×104-JT50-SP12-04	○	○	63	104	165	266.75	4	2	20	JT
	-063×134-JT50-SP12-04	○	○	63	134	195	296.75	4	2	26	JT
	-080×104-JT50-SP12-04	○	○	80	104	165	266.75	4	2	20	JT
	-080×144-JT50-SP12-04	○	○	80	144	205	306.75	4	2	28	JT
	-050×84-BT50-SP12-04	○	○	50	84	145	246.8	4	2	16	BT
	-063×74-BT50-SP12-04	○	○	63	74	135	236.8	4	2	14	BT
	-063×104-BT50-SP12-04	○	○	63	104	165	266.8	4	2	20	BT
	-063×134-BT50-SP12-04	○	○	63	134	195	296.8	4	2	26	BT
	-080×104-BT50-SP12-04	○	○	80	104	165	266.8	4	2	20	BT
	-080×144-BT50-SP12-04	○	○	80	144	205	306.8	4	2	28	BT

Spare parts · Ersatzteile

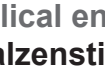
Diameter Durchmesser Ø D	Screw Schraube	Wrench Schlüssel
Ø50	I60M5×13	WT20IS
Ø63	I60M5×13	WT20IS
Ø80	I60M5×13	WT20IS



Applicable tool B9-B15
Werkzeug
Tools code key B22-B23
Werkzeug ISO
Grade selection guide B16-B20
Sortenauswahl
Technical data B183-B188
Technische Daten

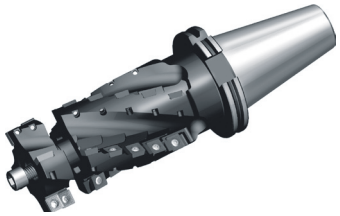
Helical endmills with interchangeable heads
Walzenstirnfräser mit austauschbarem Kopf

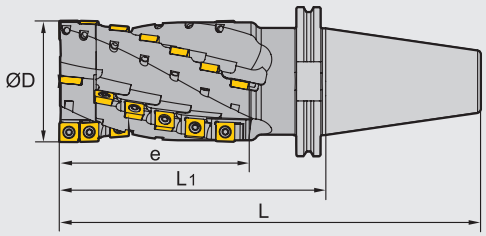
Kr:90°





HMP01 EC P K



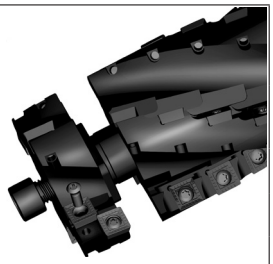


Specification of tools · Werkzeug Beschreibung

Type · Typ		Stock Lager		Dimensions (mm) · Abmessungen				Number of flute Zähne Z	Number of insert Anzahl WSP		Shank type Schaft
		R	L	Ø D	e	L_1	L		APKT 150412-**	SPMT 120408-**	
HMP01	**-050×84EC-JT50-SP12-04**	○	○	50	84	145	246.75	4	2	16	JT
	-063×74EC-JT50-SP12-04	○	○	63	74	135	236.75	4	2	14	JT
	-063×104EC-JT50-SP12-04	○	○	63	104	165	266.75	4	2	20	JT
	-063×134EC-JT50-SP12-04	○	○	63	134	195	296.75	4	2	26	JT
	-080×104EC-JT50-SP12-04	○	○	80	104	165	266.75	4	2	20	JT
	-080×144EC-JT50-SP12-04	○	○	80	144	205	306.75	4	2	28	JT
	-050×84EC-BT50-SP12-04	○	○	50	84	145	246.8	4	2	16	BT
	-063×74EC-BT50-SP12-04	○	○	63	74	135	236.8	4	2	14	BT
	-063×104EC-BT50-SP12-04	○	○	63	104	165	266.8	4	2	20	BT
	-063×134EC-BT50-SP12-04	○	○	63	134	195	296.8	4	2	26	BT
	-080×104EC-BT50-SP12-04	○	○	80	104	165	266.8	4	2	20	BT
	-080×144EC-BT50-SP12-04	○	○	80	144	205	306.8	4	2	28	BT

Spare parts · Ersatzteile

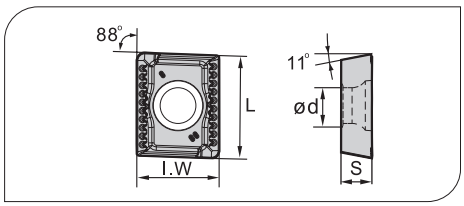
Diameter Durchmesser Ø D	Insert Screw WSP Schraube	Screw of head Schraube für Kopf	Wrench of insert Screw Schlüssel f. WSP	Wrench of head Schlüssel für Kopf	Interchangeable head Austauschbarer Kopf
					
Ø50	I60M5×13	M10×50	WT20IS	WH80L	050EC
Ø63	I60M5×13	M10×50	WT20IS	WH80L	063EC
Ø80	I60M5×13	M12×55	WT20IS	WH100L	080EC

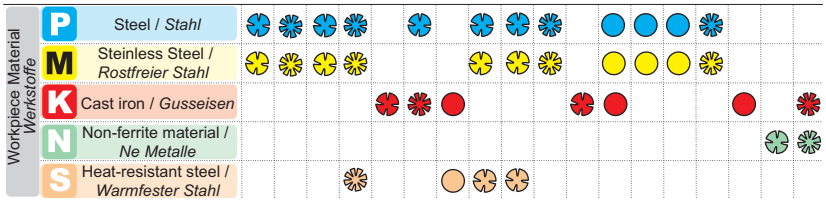


● Ex Stock / ab Lager ○ On demand / auf Anfrage

Applicable inserts · Wendeschneidplatten

Ideal Machining Condition
Gute Bearbeitungsbedingungen
Normal Machining Condition
Normale Bearbeitungsbedingungen
Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen

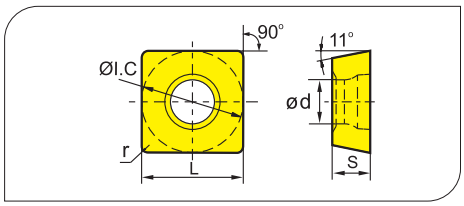


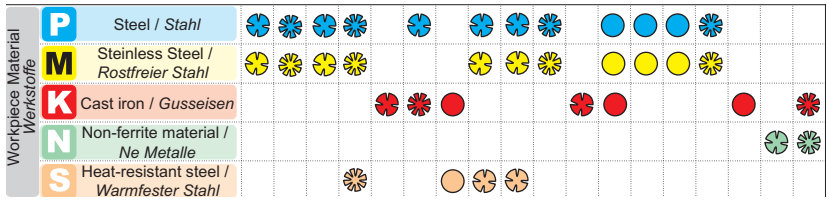


Insert WSP	Type · Typ	Dimensions (mm) · Abmessungen					CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall			
		L	I.W	S	d	r	YBC301	YBC401	YBM251	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**APKT150412-PM**	16.33	12.7	4.76	5.4	1.2										●	○							
	APKT150412-KM	16.33	12.7	4.76	5.4	1.2										○	●							

Applicable inserts · Wendeschneidplatten

Ideal Machining Condition
Gute Bearbeitungsbedingungen
Normal Machining Condition
Normale Bearbeitungsbedingungen
Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen

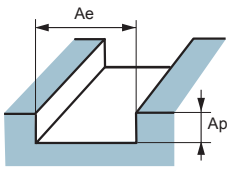




Insert WSP	Type · Typ	Dimensions (mm) · Abmessungen					CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall			
		L	I.C	S	d	r	YBC301	YBC401	YBM251	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**SPMT120408-PM**	12.7	12.7	4.76	5.5	0.8										●	○							
	SPMT120408-KM	12.7	12.7	4.76	5.5	0.8										○	●							

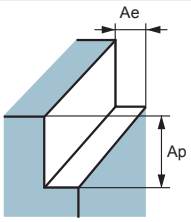
Applicable tool B9-B15
Werkzeug
Tools code key B22-B23
Werkzeug ISO
Grade selection guide B16-B20
Sortenauswahl
Technical data B183-B188
Technische Daten

A Slot milling
Nutenfräsen



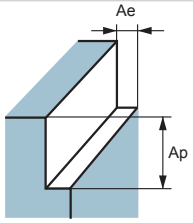
Ae=D
Ap=0.5D (cast iron/Guss)
Maximum 12mm (steel/Stahl)

B Square shoulder milling
breites Eckfräsen



Ae=0.5D
Ap=1.5D (cast iron/Guss)
1.0D (steel/Stahl)

C Narrow shoulder milling
schmales Eckfräsen



Ae=0.1D
Ap≤Maximum cutting length

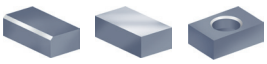
Recommended Cutting data · Schnittdaten

Workpiece material Werkstück-stoff		Hardness HB Härte	Grade Sorte	Cutting data · Schnittdaten		Operation (figure/Abb.)
				Cutting speed Schnittgeschw. (m/min)	Feed speed Vorschub (mm/z)	
P	Low-carbon steel Soft steel niedrig legierter Kohlenstoffstahl Baustahl	≤180	YBG302	80(60-90)	0.25(0.1-0.35)	A
				90(70-120)	0.3(0.15-0.4)	B
				90(70-120)	0.3(0.15-0.4)	C
	High-carbon steel hoch legierter Kohlenstoffstahl Alloy steel Leg. Stahl	180-280	YBG302	70(60-100)	0.2(0.1-0.35)	A
				80(60-120)	0.25(0.15-0.35)	B
				90(70-120)	0.25(0.15-0.35)	C
	Alloy tool steel Leg. Werkzeugstahl	280-350	YBG302	50(40-80)	0.15(0.08-0.25)	A
				60(50-100)	0.2(0.1-0.35)	B
				70(50-100)	0.2(0.1-0.35)	C
K	cast Iron Gusseisen	180-250	YBG152 YBG302	70(50-100)	0.2(0.1-0.35)	A
				80(60-120)	0.25(0.15-0.35)	B
				90(80-120)	0.25(0.15-0.35)	C

● Ex Stock / ab Lager ○ On demand / auf Anfrage

Chamfer milling tools · Fasfräser

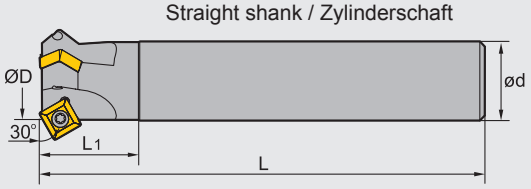
Kr:30°



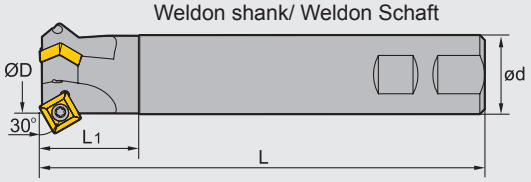
CMZ01 P M K



Straight shank / Zylinderschaft



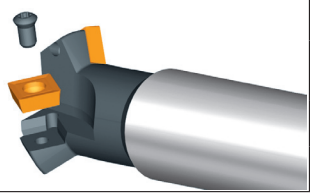
Weldon shank/ Weldon Schaft



Specification of tools · Werkzeug Beschreibung

Type · Typ		Stock Lager	Dimensions (mm) · Abmessungen				No. of teeth Zähne	Weight Gewicht (kg)
			Ø D	ø d	L	L1		
CMZ01 Straight shank Zylinder-schaft	**-012-G20-SP12-01**	●	12	20	100	40	1	0.2
	-025-G25-SP12-02	●	25	25	120	40	2	0.8
	-032-G32-SP12-03	●	32	32	180	40	3	1.1
Weldon shank Weldon Schaft	**-012-XP20-SP12-01**	●	12	20	100	40	1	0.2
	-025-XP25-SP12-02	●	25	25	120	40	2	0.6
	-032-XP32-SP12-03	●	32	32	180	40	3	1.0

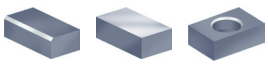
Spare parts · Ersatzteile

Diameter Durchmesser Ø D	Screw Schraube	Wrench Schlüssel	
			
Ø12-Ø32	I43M5×11	WT20IS	

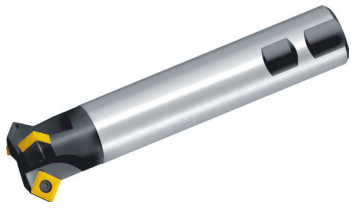
Applicable tool B9-B15 Werkzeug
Tools code key B22-B23 Werkzeug ISO
Grade selection guide B16-B20 Sortenauswahl
Technical data B183-B188 Technische Daten

Chamfer milling tools · Fasfräser

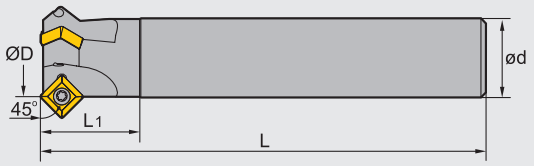
Kr:45°



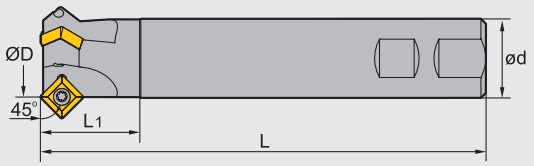
CMA01 P M K



Straight shank / Zylinderschaft



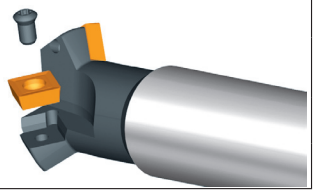
Weldon shank/ Weldon Schaft



Specification of tools · Werkzeug Beschreibung

Type · Typ		Stock Lager	Dimensions (mm) · Abmessungen				No. of teeth Zähne	Weight Gewicht (kg)
			Ø D	ø d	L	L_1		
CMA01 Straight shank	**-012-G20-SP12-01**	●	12	20	100	40	1	0.2
	-025-G25-SP12-02	●	25	25	120	40	2	0.8
Zylinder Schaft	**-032-G32-SP12-03**	●	32	32	180	40	3	1.1
Weldon shank	**-012-XP20-SP12-01**	●	12	20	100	40	1	0.2
	-025-XP25-SP12-02	●	25	25	120	40	2	0.6
Weldon Schaft	**-032-XP32-SP12-03**	●	32	32	100	40	3	1.0

Spare parts · Ersatzteile

Diameter Durchmesser Ø D	Screw Schraube	Wrench Schlüssel	
			
Ø12-Ø32	I43M5×11	WT20IS	

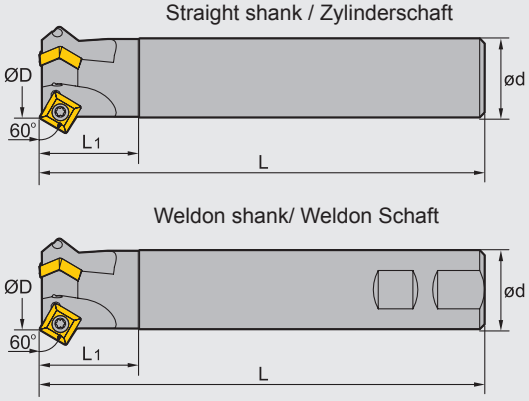
● Ex Stock / ab Lager ○ On demand / auf Anfrage

Chamfer milling tools · Fasfräser

Kr:60°

CMD01 P M K

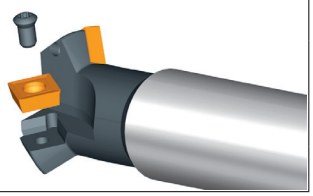




Specification of tools · Werkzeug Beschreibung

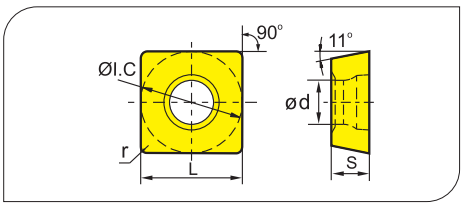
Type · Typ		Stock Lager	Dimensions (mm) · Abmessungen				No. of teeth Zähne	Weight Gewicht (kg)
			Ø D	ø d	L	L1		
CMD01 Straight shank Zylinder Schaft	**-012-G20-SP12-01**	●	12	20	100	40	1	0.2
	-025-G25-SP12-02	●	25	25	120	40	2	0.8
	-036-G32-SP12-03	●	36	32	180	40	3	1.0
Weldon shank Weldon Schaft	**-012-XP20-SP12-01**	●	12	20	100	40	1	0.2
	-025-XP25-SP12-02	●	25	25	120	40	2	0.6
	-036-XP32-SP12-03	●	36	32	180	40	3	1.0

Spare parts · Ersatzteile · Ersatzteile

Diameter Durchmesser Ø D	Screw Schraube	Wrench Schlüssel	
			
Ø12-Ø32	I43M5×11	WT20IS	

Applicable tool B9-B15 Werkzeug
Tools code key B22-B23 Werkzeug ISO
Grade selection guide B16-B20 Sortenauswahl
Technical data B183-B188 Technische Daten

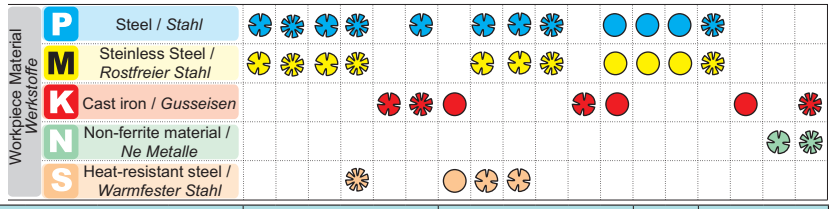
Applicable inserts · Wendeschneidplatten



Ideal Machining Condition
Gute Bearbeitungsbedingungen

Normal Machining Condition
Normale Bearbeitungsbedingungen

Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen



Insert WSP	Type · Typ	Dimensions (mm) · Abmessungen					CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall			
		I.C	L	r	S	d	YBC301	YBC401	YBM251	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**SPMT120408**	12.7	12.7	0.8	4.76	5.5	●	●	●							○								

Recommended Cutting data · Schnittdaten

Workpiece material Werkstück-stoff		Hardness HB Härte	Grade Sorte	Cutting data · Schnittdaten	
				Cutting speed Schnittgeschw. (m/min)	Feed speed Vorschub (mm/z)
P	Low-carbon steel Soft steel niedrig legierter Kohlenstoffstahl Baustahl	≤180	YBM251 YBC301	180(100—250)	0.25 (0.1-0.4)
			YBM351 YBG302 YBC401	150(100—200)	0.3 (0.1-0.5)
			YC30S	120(80—150)	0.4 (0.1-0.5)
	High-carbon steel hoch legierter Kohlenstoffstahl Alloy steel Leg. Stahl	180—280	YBM251 YBC301	160(100—220)	0.3 (0.1-0.4)
			YBM351 YBG302 YBC401	130(100—180)	0.3 (0.1-0.5)
			YC30S	100(60—150)	0.4 (0.1-0.5)
	Alloy tool steel Leg. Werkzeugstahl	280—350	YBM251 YBC301	120(80—180)	0.3 (0.1-0.4)
			YBM351 YBG302	100(80—150)	0.3 (0.1-0.5)
			YC30S	80(60—120)	0.4 (0.1-0.5)
M	Stainless steel Rostfreier Stahl	≤270	YBM251 YBC301	120(80—180)	0.3 (0.1-0.4)
			YBM351 YBG302 YBC401	100(80—150)	0.3 (0.1-0.5)
			YC30S	80(60—120)	0.4 (0.1-0.5)
K	Cast iron Gusseisen	180-250	YBG302	130(100—180)	0.4 (0.1-0.5)

● Ex Stock / ab Lager ○ On demand / auf Anfrage

NOTIZEN:

Applicable tool B9-B15
Werkzeug

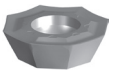
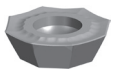
Tools code key B22-B23
Werkzeug ISO

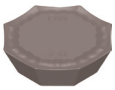
Grade selection guide B16-B20
Sortenauswahl

Technical data B183-B188
Technische Daten

Inserts - face milling · WSP - Planfräsen

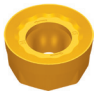
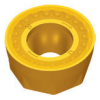
								
	SEET-CF	SEET-CM	SEET-CR	SEET-DF	SEET-DM	SEET-DR	SEET-EF	SEET-EM
Page Seite	B167	B167	B167	B167	B167	B167	B167	B167

								
	SEET-LH	SEET-W	SEK(E)N	SEKR	OFKT-DF	OFKT-DM	OFKT-LH	OFKR-DF / DM
Page Seite	B167	B167	B169	B169	B160	B160	B160	B160

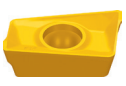
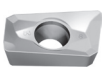
								
	OFKR-LH	ONHU-PF	ONHU-PM	ONHU-W	SNKN	HNEX-DF	HNEX-DM	HNEX-DR
Page Seite	B160	B161	B161	B161	B170	B157	B157	B157

								
	PNEG	LNKT-ZR	LNE32.534 / 32.302	LNCX	SPKW	SPKT	SPAN/SPCN	SPKN
Page Seite	B162	B158	B158	B159	B173	B175	B171	B172

								
	SPKR-GM	SPEX	SPMR	SP*N	TPAN/TPCN/TPKN	TPKN	TPUN	TPMR
Page Seite	B173	B174	B175	B176	B177	B178	B179	B179

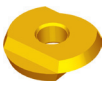
								
	SEET*PER-PF	SEET*PER-PM	SEET*PER-PR	SEET-LH	RCKT-DM	RCKT-DR	RCKT-ER	RDKW
Page Seite	B168	B168	B168	B168	B165	B165	B165	B165

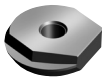
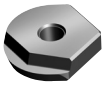
Inserts - square shoulder milling · WSP - Eckfräsen

						
	APKT-PF	APKT-PM	APKT-PR	APKT-LH	APMT-PDR	APMT-PDER
Page Seite	B154	B154	B154	B154	B155	B155

Inserts for profile milling · WSP - Formfräsen



	ZDET	ZPNT	SPMT	ROHX	XPHT-GM	ZOHX-GF	ZOHX-GM
Page / Seite	B181	B182	B175	B166	B180	B182	B182

Inserts - side and face milling WSP - Seiten und Stirnfräsen





	XSEQ	MPHT	QC**L
Page / Seite	B181	B159	B163 / 164

Inserts - high feed milling WSP - Hochvorschubfräsen




	SDMT-DM	WPGT
Page / Seite	B166	B180

Inserts - T-slot milling WSP - T-Nuten Fräsen



	MPHT
Page / Seite	B159

Inserts - helical milling WSP - Zirkular Fräsen




	APKT-PM/KM	SPMT-PM/KM
Page / Seite	B156	B175

Inserts - chamfer milling WSP - Fasfräsen



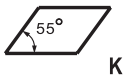
	SPMT
Page / Seite	B175

B

Milling Tools · Fräser

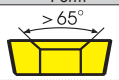
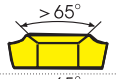
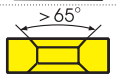
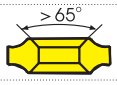
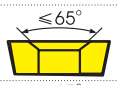
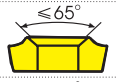
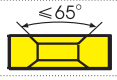
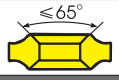
Indexable milling inserts code key · Wendeplattenfräser ISO Kode

Insert Code · WSP Code

 A	 B	 C
 D	 E	 H
 K	 L	 M
 O	 P	 R
 S	 T	 V
 W	Others Ander Z	

Insert · WSP

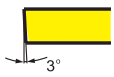
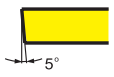
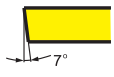
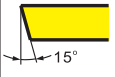
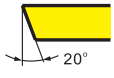
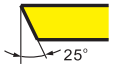
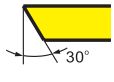
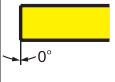
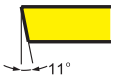
Metric System · Metrisches System

Code	Hole Loch	Chipbreaker Spanbrecher	Section Form	Code	Hole Loch	Chipbreaker Spanbrecher	Section Form
B	✔	-		N	-	-	
H	✔	Single-side Einseitig		R	-	Single-side Einseitig	
C	✔	-		F	-	Double-side Doppelseitig	
J	✔	Double-side Doppelseitig		A	✔	-	
W	✔	-		M	✔	Single-side Einseitig	
T	✔	Single-side Einseitig		G	✔	Double-side Doppelseitig	
Q	✔	-		X	---	---	Special
U	✔	Double-side Doppelseitig					

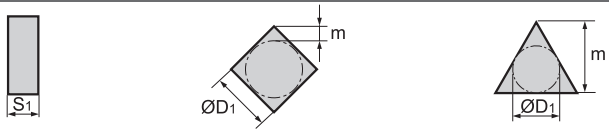
Chipbreaker and clamping system

S P K N

Clearance angle of main cutting edge Freiwinkel der Hauptschneidl

Code	Clearance angle Freiwinkel	Code	Clearance angle Freiwinkel
A		B	
C		D	
E		F	
G		N	
P		O	Other clearance angle Andere Freiwinkel

Tolerance



Code	Nose height M Tolerance Höhetoleranz M (mm)	Inscribed circle Ø D1 Tolerance Innenkreistoleranz Ø D1 (mm)	Thickness S Tolerance Dicketoleranz S (mm)
A	±0.005	±0.025	±0.025
F	±0.005	±0.013	±0.025
C	±0.013	±0.025	±0.025
H	±0.013	±0.013	±0.025
E	±0.025	±0.025	±0.025
G	±0.025	±0.025	±0.13
J	±0.005	±0.05 - ±0.13	±0.025
K	±0.013	±0.05 - ±0.13	±0.025
L	±0.025	±0.05 - ±0.13	±0.025
M	±0.08 - ±0.18	±0.05 - ±0.13	±0.13
N	±0.08 - ±0.18	±0.05 - ±0.13	±0.025
U	±0.13 - ±0.38	±0.08 - ±0.25	±0.13

(Reference) details of M-class tolerance (identified by shape and size)

● Nose height tolerance(mm)

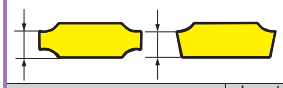
Inscribed circle Innenkreis	Regular triangle	Square Viereck	Diamond with 80° Raute mit 80°	Diamond with 55° Raute mit 55°	Diamond with 35° Raute mit 35°	Round Rounde
6.35	±0.08	±0.08	±0.08	±0.11	±0.16	---
9.525	±0.08	±0.08	±0.08	±0.11	±0.16	---
12.7	±0.13	±0.13	±0.13	±0.15	---	---
15.875	±0.15	±0.15	±0.15	±0.18	---	---
19.05	±0.15	±0.15	±0.15	±0.18	---	---
25.4	---	±0.18	---	---	---	---

● Tolerance of Inscribed Circle ØD1(mm)

Inscribed circle Innenkreis	Regular triangle	Square Viereck	Diamond with 80° Raute mit 80°	Diamond with 55° Raute mit 55°	Diamond with 35° Raute mit 35°	Round Rounde
6.35	±0.05	±0.05	±0.05	±0.05	±0.05	---
9.525	±0.05	±0.05	±0.05	±0.05	±0.05	±0.05
12.7	±0.08	±0.08	±0.08	±0.08	---	±0.58
15.875	±0.10	±0.10	±0.10	±0.10	---	±0.10
19.05	±0.10	±0.10	±0.10	±0.10	---	±0.10
25.4	---	±0.13	---	---	---	±0.13

Diameter of IC Durchmesse von IC	Insert/ WSP C	D	R	S	T	V	W
3.97					06		
5.0			05				
5.56					09		
6.0			06				
6.35	06	07			11	11	
8.0			08				
9.525	09	11	09	09	16	16	06
10.0			10				
12.0			12				
12.7	12	15	12	12	22	22	08
15.875	16		15	15	27		
16.0		19	16				
19.05	19		19	19	33		
20.0			20				
25.0	25	25	25				
25.4			25	25			
31.75			31				
32			32				

Length of cutting edge · Schneidkantenlänge



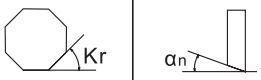
Definition thickness
Definition dicke

Code	Insert thickness (mm) Plattendicke
00	0.79
T0	0.99
01	1.59
T1	1.98
02	2.38
T2	2.58
03	3.18
T3	3.97
04	4.76
T4	4.96
05	5.96
T5	5.95
06	6.35
T6	6.75
07	7.94
09	9.52
T9	9.72
11	11.11
12	12.70

Insert thickness · WSP dicke

12 04 ED T21K R -DM

Angel · Winkel



A	45°	**A**	3°
D	60°	**B**	5°
E	75°	**C**	7°
F	85°	**D**	15°
P	90°	**E**	20°
Z	Others Andere	**F**	25°
		G	30°
		N	0°
		P	11°
		Z	Others Andere

Chamfer · Fase (mm)

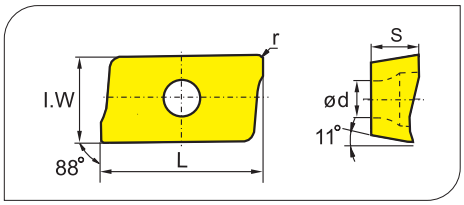
F	0-5°	0-0.10	K
	1-10°	1-0.15	
E	2-15°	2-0.20	P
	3-20°	3-0.25	
T	4-25°	4-0.30	W
	5-30°	5-0.35	
		6-0.40	
S		7-0.45	No mark

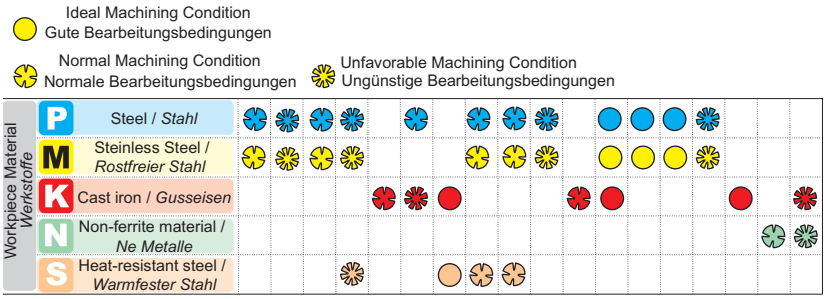
Chipbreaker code Spanbrecher

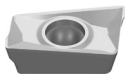
Cutting direction Schnittrichtung

R	Right hand Rechts
L	Left hand Links
N	Neutral Neutral

AP**

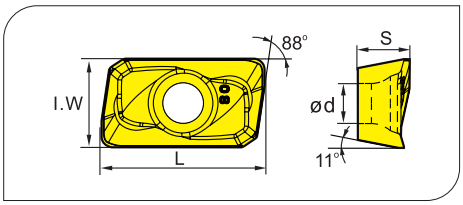




Insert shape Plattenform	Type · Typ	Dimensions (mm) · Abmessungen					CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall			
		L	l.W	S	d	r	YBC301	YBC401	YBM251	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	APKT11T304-PF	12.24	6.5	3.6	2.8	0.4	○		●					●		●								
	APKT11T308-PF	12.24	6.5	3.6	2.8	0.8			●					●										
	APKT11T312-PF	12.24	6.5	3.6	2.8	1.2								○										
	APKT11T316-PF	12.24	6.5	3.6	2.8	1.6								●										
	APKT160408-PF	17.877	9.33	5.76	4.4	0.8	●		●	●				●										
	APKT11T304-PM	12.24	6.5	3.6	2.8	0.4	●	●	●	●			●	●		●								
	APKT11T308-PM	12.24	6.5	3.6	2.8	0.8	●		●	●	●	●	●	●	●	●								
	APKT11T312-PM	12.24	6.5	3.6	2.8	1.2			●				○	●										
	APKT11T316-PM	12.24	6.5	3.6	2.8	1.6			●				○	●										
	APKT160408-PM	17.877	9.33	5.76	4.4	0.8	●	●	●	●	●	●	●	●	●	●								
	APKT11T304-PR	12.24	6.5	3.6	2.8	0.4		●		●						●								
	APKT11T308-PR	12.24	6.5	3.6	2.8	0.8										○								
	APKT11T312-PR	12.24	6.5	3.6	2.8	1.2										○								
	APKT11T316-PR	12.24	6.5	3.6	2.8	1.6										○								
	APKT160408-PR	17.877	9.33	5.76	4.4	0.8										○								
	APKT11T304-LH	12.24	6.5	3.6	2.8	0.4																	●	●
	APKT11T308-LH	12.24	6.5	3.6	2.8	0.8																	●	●
	APKT160408-LH	17.877	9.33	5.76	4.4	0.8																	●	●

● Ex Stock / ab Lager ○ On demand / auf Anfrage

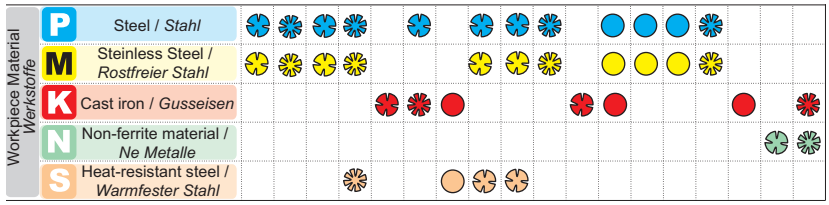
AP**

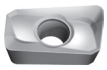
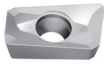
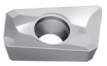


Ideal Machining Condition
Gute Bearbeitungsbedingungen

Normal Machining Condition
Normale Bearbeitungsbedingungen

Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen



Insert WSP	Type · Typ	Dimensions (mm) · Abmessungen					CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall			
		L	I.W	S	d	r	YBC301	YBC401	YBM251	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**APMT1135PDR**	11.25	6.2	3.5	2.8	0.8			●				○	○	●									
	**APMT160408PDER**	17.25	9.25	4.76	4.4	0.8							○		●									
	**APMT160432PDER**	17.25	9.25	4.76	4.4	3.2				○				●										

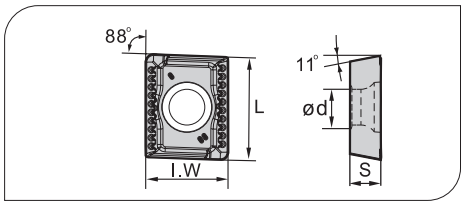
Applicable tool B9-B15
Werkzeug

Tools code key B152-B153
WSP ISO

Grade selection guide B16-B20
Sortenauswahl

Technical data B183-B188
Technische Daten

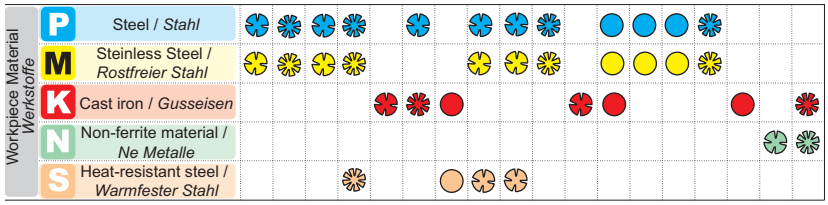
AP**



Ideal Machining Condition
Gute Bearbeitungsbedingungen

Normal Machining Condition
Normale Bearbeitungsbedingungen

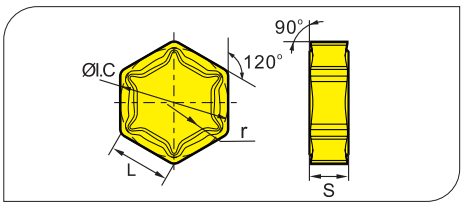
Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen



Insert WSP	Type · Typ	Dimensions (mm) · Abmessungen					CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall			
		L	I.W	S	d	r	YBC301	YBC401	YBM251	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**APKT150412-PM**	16.33	12.7	4.76	5.4	1.2										●	○							
	APKT150412-KM	16.33	12.7	4.76	5.4	1.2										○	●							

● Ex Stock / ab Lager ○ On demand / auf Anfrage

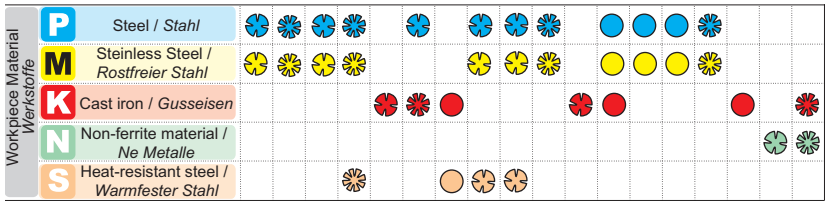
HN**



Ideal Machining Condition
Gute Bearbeitungsbedingungen

Normal Machining Condition
Normale Bearbeitungsbedingungen

Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen



Insert WSP	Type · Typ	Dimensions (mm) · Abmessungen				CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall			
		L	I.C	S	R	YBC301	YBC401	YBM251	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**HNEX090512-DF**	9.16	15.875	5.56	1.2					○													
	**HNEX090512-DM**	9.16	15.875	5.56	1.2					○													
	**HNEX090512-DR**	9.16	15.875	5.56	1.2					●	●												
	**HNGX090516-MR**	9.16	15.875	5.56	1.6					●													
	HNGX090520-MR	9.16	15.875	5.56	2.0					●													

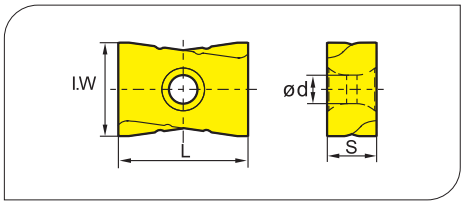
Applicable tool B9-B15
Werkzeug

Tools code key B152-B153
WSP ISO

Grade selection guide B16-B20
Sortenauswahl

Technical data B183-B188
Technische Daten

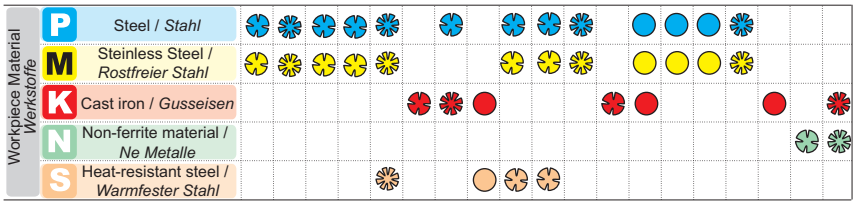
LN**



Ideal Machining Condition
Gute Bearbeitungsbedingungen

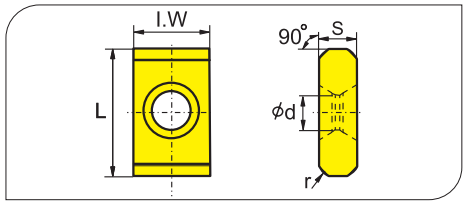
Normal Machining Condition
Normale Bearbeitungsbedingungen

Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen



Insert WSP	Type · Typ	Dimensions (mm) · Abmessungen				CVD Coating CVD Beschicht.							PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall			
		L	l.W	S	d	YBC301	YBC401	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**LNKT1506EN-ZR**	15.875	14	6.35	4.6	●		●		●	●	●				●								
	LNKT2007DN-ZR	20	17	7.94	4.6					●		●				●								
	LNKT2510-ZR	25	18	9.525	5.5					●		○				○								

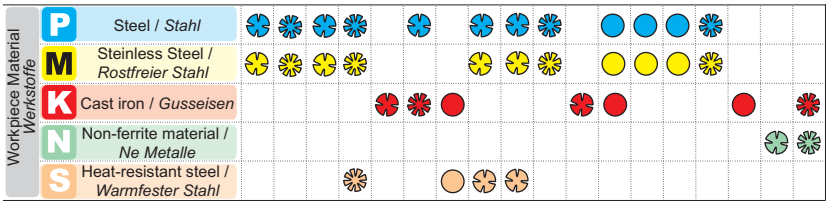
LN**



Ideal Machining Condition
Gute Bearbeitungsbedingungen

Normal Machining Condition
Normale Bearbeitungsbedingungen

Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen



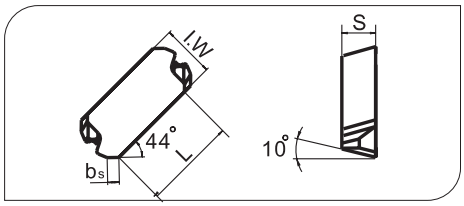
Insert WSP	Type · Typ	Dimensions (mm) · Abmessungen					CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall			
		L	l.W	S	d	r	YBC301	YBC401	YBM251	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**LNE32.534**	15.875	9.525	4.76	4.4	1.6				○	○													
	LNE32.302	15.875	9.525	4.76	4.2	45 Fase			○			○												

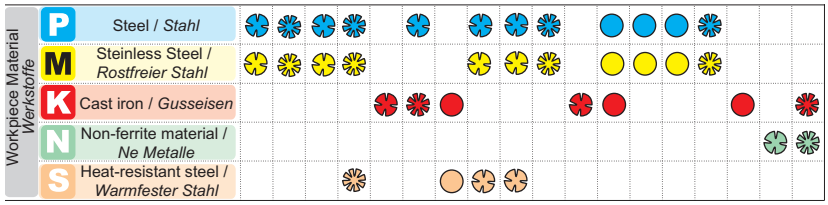
LNCX

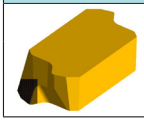
Ideal Machining Condition
Gute Bearbeitungsbedingungen

Normal Machining Condition
Normale Bearbeitungsbedingungen

Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen





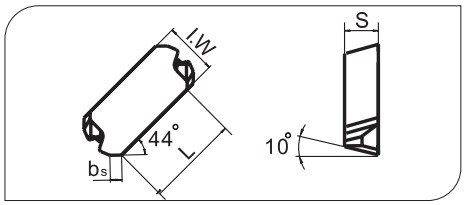
Insert WSP	Type · Typ	Dimensions (mm) · Abmessungen					CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall			
		L	l.W	S	bs		YBC301	YBC401	YBM251	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**LNCX1806AZR**	18.77	10.0	6.4	2.0		○																	○
	LNCX1806AZL	18.77	10.0	6.4	2.0																			

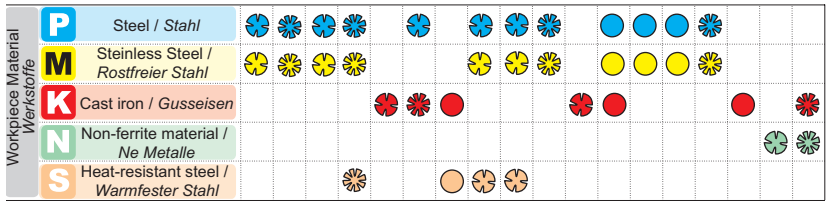
LNCX

Ideal Machining Condition
Gute Bearbeitungsbedingungen

Normal Machining Condition
Normale Bearbeitungsbedingungen

Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen





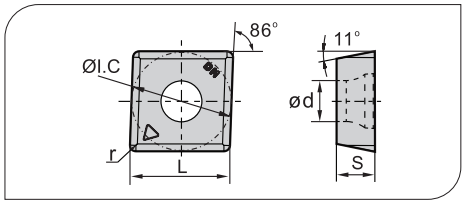
Insert WSP	Type · Typ	Dimensions (mm) · Abmessungen					CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall			
		L	l.W	S	bs	T-land	YBC301	YBC401	YBM251	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**LNCX1806AZT11R**	18.77	10.0	6.4	2.0	0.1						○												
	LNCX1806AZT11L	18.77	10.0	6.4	2.0	0.1						○												

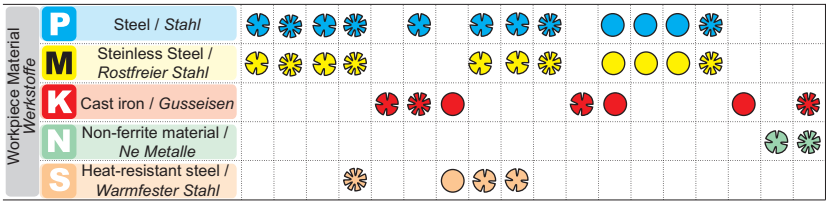
MP**

Ideal Machining Condition
Gute Bearbeitungsbedingungen

Normal Machining Condition
Normale Bearbeitungsbedingungen

Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen





Insert WSP	Type · Typ	Dimensions (mm) · Abmessungen					CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall			
		I.C	L	S	d	r	YBC301	YBC401	YBM251	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**MPHT060304-DM**	6.35	6.35	3.18	2.8	0.4			●							●								
	MPHT080305-DM	8.3	8.3	3.18	3.4	0.5			●							●								
	MPHT120408-DM	12.7	12.7	4.76	5.56	0.8			●							●								

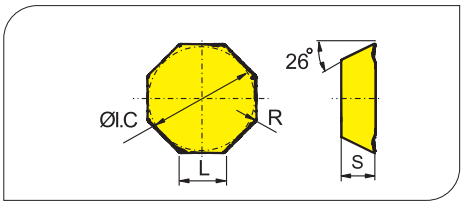
Applicable tool B9-B15
Werkzeug

Tools code key B152-B153
WSP ISO

Grade selection guide B16-B20
Sortenauswahl

Technical data B183-B188
Technische Daten

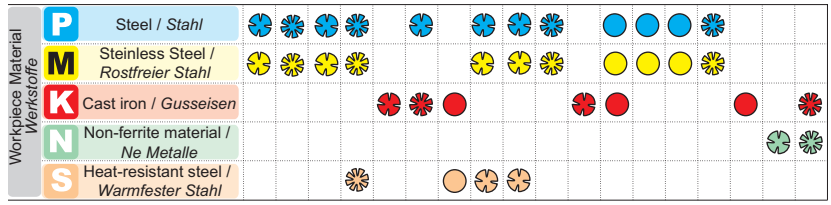
OF**



Ideal Machining Condition
Gute Bearbeitungsbedingungen

Normal Machining Condition
Normale Bearbeitungsbedingungen

Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen



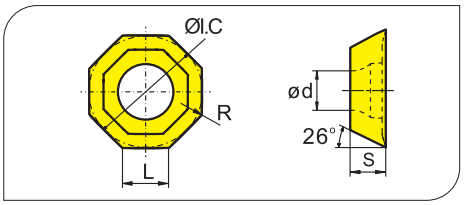
Insert WSP	Type · Typ	Dimensions (mm) · Abmessungen				CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall			
		L	I.C	S	R	YBC301	YBC401	YBM251	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**OFKR0704-DF**	7.45	17.94	4.76	0.8			●					●										
	**OFKR0704-DM**	7.45	17.94	4.76	0.8	●	●	●	●	●	●	●	●		●								
	OFKR0704W-DM wiper	7.45	17.94	4.76		●					●		●	●									
	**OFKR0704-LH**	7.45	17.94	4.76																			○

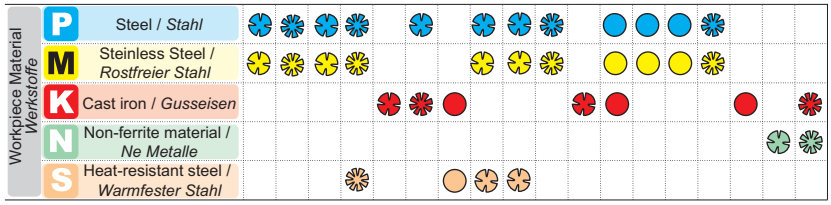
Ideal Machining Condition
Gute Bearbeitungsbedingungen

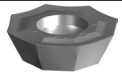
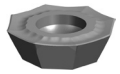
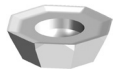
Normal Machining Condition
Normale Bearbeitungsbedingungen

Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen

OF**

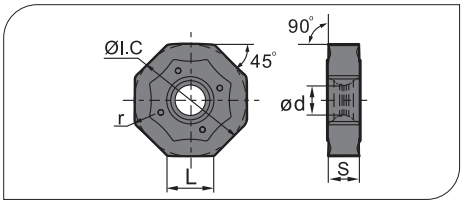




Insert WSP	Type · Typ	Dimensions (mm) · Abmessungen					CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall			
		L	I.C	S	d	R	YBC301	YBC401	YBM251	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**OFKT05T3-DF**	5.26	12.7	3.97	4.4	0.5							●	●		○								
	**OFKT05T3-DM**	5.26	12.7	3.97	4.4	0.5			○		●		●	●		●								
	**OFKT05T3-LH**	5.26	12.7	3.97	4.4	0.5																	●	

● Ex Stock / ab Lager ○ On demand / auf Anfrage

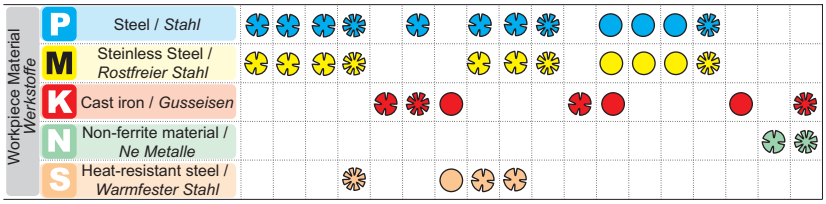
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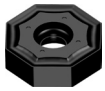
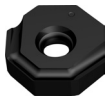


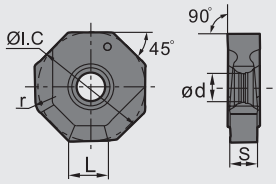
Ideal Machining Condition
Gute Bearbeitungsbedingungen

Normal Machining Condition
Normale Bearbeitungsbedingungen

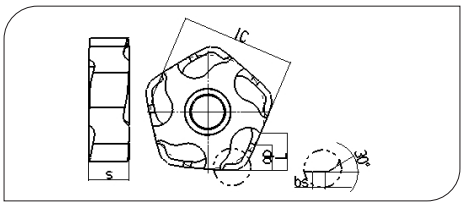
Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen



Insert WSP	Type · Typ	Dimensions (mm) · Abmessungen					CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall			
		L	ØI.C	S	ød	r	YBC301	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	ONHU060408-PF	6.58	15.875	4.76	4.4	0.83					●			●										
	ONHU08T508-PF	8.37	20.2	5.77	5.3	0.83					●			●										
	ONHU060408-PM	6.58	15.875	4.76	4.4	0.83			●	●	●													
	ONHU08T508-PM	8.37	20.2	5.79	5.3	0.83			●	●	●													
	ONHU08T508-W	6.9	20.5	6.00	5.3	0.80					●		○											



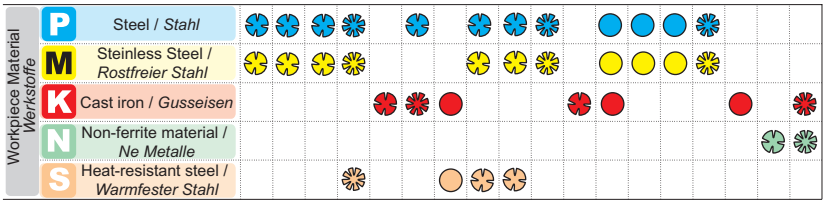
PN**



Ideal Machining Condition
Gute Bearbeitungsbedingungen

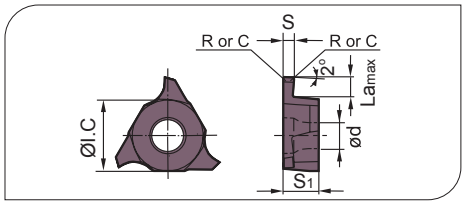
Normal Machining Condition
Normale Bearbeitungsbedingungen

Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen



Insert WSP	Type · Typ	Dimension (mm) Abmessung					CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall			
		L	I.C	S	bs	ap	YBC301	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**PNEG110512R-CR**	5	15.875	5.56	1.6	4.0					●	●												
	**PNEG110512R-CM**	5	15.875	5.56	1.6	4.0					●													

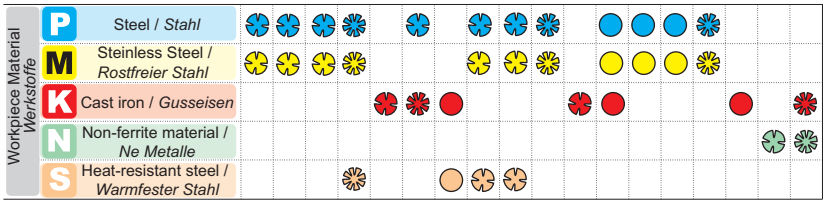
QC**L



Ideal Machining Condition
Gute Bearbeitungsbedingungen

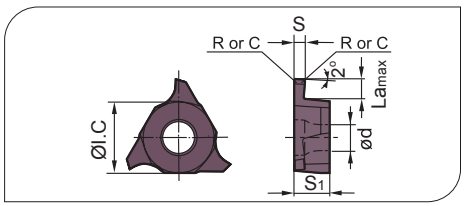
Normal Machining Condition
Normale Bearbeitungsbedingungen

Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen



Insert WSP	Type · Typ	Dimensions (mm) · Abmessungen						CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall			
		$S_{\pm 0.025}$	La_{max}	R/C	ØI.C	S_1	ød	YBC301	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**QC16L050-R005**	0.50	1.00	R0.05	9.525	3.18	4.4																		
	QC16L100-R005	1.00	2.00	R0.05	9.525	3.18	4.4																		
	QC16L110-R005	1.10	2.00	R0.05	9.525	3.18	4.4																		
	QC16L110-R01	1.10	2.00	R0.1	9.525	3.18	4.4								○	○									
	QC16L120-R005	1.20	2.00	R0.05	9.525	3.18	4.4																		
	QC16L125-R02	1.25	2.00	R0.2	9.525	3.18	4.4								○	○									
	QC16L145-R02	1.45	2.00	R0.2	9.525	3.18	4.4								○	○									
	QC16L150-R02	1.50	2.00	R0.2	9.525	3.18	4.4								○	○									
	QC16L175-R02	1.75	2.00	R0.2	9.525	3.18	4.4								○	○									
	QC16L185-R02	1.85	2.50	R0.2	9.525	3.18	4.4								○	○									
	QC16L200-R02	2.00	2.50	R0.2	9.525	3.18	4.4								○	○									
	QC16L250-R02	2.50	2.50	R0.2	9.525	3.18	4.4								○	○									
	QC16L300-R02	3.00	3.00	R0.2	9.525	3.18	4.4								○	○									

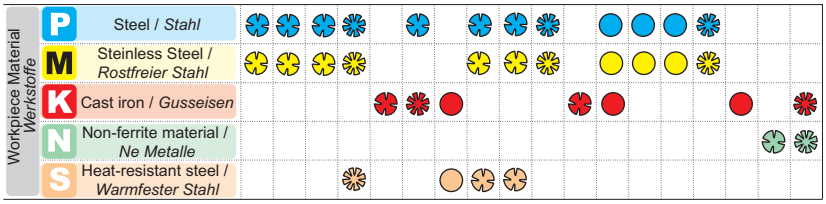
QC**L



Ideal Machining Condition
Gute Bearbeitungsbedingungen

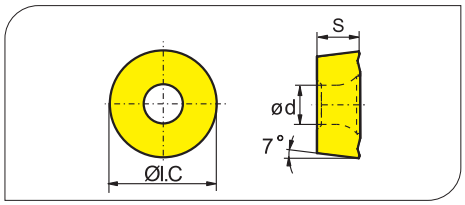
Normal Machining Condition
Normale Bearbeitungsbedingungen

Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen



Insert WSP	Type · Typ	Dimensions (mm) · Abmessungen						CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall			
		$S^{\pm 0.025}$	La_{max}	R/C	ØI.C	S_1	ød	YBC301	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**QC22L125-R02**	1.25	2.00	R0.2	12.70	4.76	5.5								○	○									
	QC22L145-R02	1.45	2.00	R0.2	12.70	4.76	5.5								○	○									
	QC22L150-R02	1.50	3.50	R0.2	12.70	4.76	5.5								○	○									
	QC22L175-R02	1.75	3.50	R0.2	12.70	4.76	5.5								○	○									
	QC22L185-R02	1.85	3.50	R0.2	12.70	4.76	5.5								○	○									
	QC22L200-R02	2.00	3.50	R0.2	12.70	4.76	5.5								○	○									
	QC22L230-R02	2.30	3.50	R0.2	12.70	4.76	5.5								○	○									
	QC22L250-R03	2.50	4.00	R0.3	12.70	4.76	5.5								○	○									
	QC22L265-R03	2.65	4.00	R0.3	12.70	4.76	5.5								○	○									
	QC22L280-R03	2.80	4.00	R0.3	12.70	4.76	5.5								○	○									
	QC22L300-R03	3.00	4.00	R0.3	12.70	4.76	5.5								○	○									
	QC22L320-R03	3.20	4.00	R0.3	12.70	4.76	5.5								○	○									
	QC22L330-R03	3.30	4.00	R0.3	12.70	4.76	5.5								○	○									
	QC22L350-R03	3.50	5.00	R0.3	12.70	4.76	5.5								○	○									
	QC22L400-R04	4.00	5.00	R0.4	12.70	4.76	5.5								○	○									
	QC22L430-R04	4.30	5.00	R0.4	12.70	4.76	5.5								○	○									
	QC22L450-R04	4.50	5.00	R0.4	12.70	4.76	5.5								○	○									
	QC22L480-R04	4.80	5.00	R0.4	12.70	5.06	5.5								○	○									

RC**



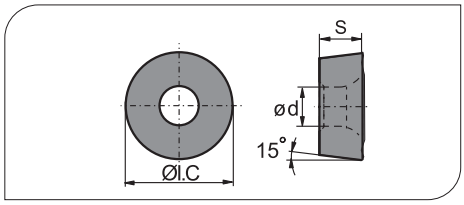
Ideal Machining Condition
Gute Bearbeitungsbedingungen
Normal Machining Condition
Normale Bearbeitungsbedingungen
Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen

Workpiece Material / Werkstoffe

P	Steel / *Stahl*
M	Steinless Steel / *Rostfreier Stahl*
K	Cast iron / *Gusseisen*
N	Non-ferrite material / *Ne Metalle*
S	Heat-resistant steel / *Warmfester Stahl*

Insert WSP	Type · Typ	Dimension (mm) Abmessung			CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall			
		I.C	S	d	YBC301	YBC401	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD101	YD201
	RCKT10T3MO-DM	10.0	3.97	4.4	●	●									○							
	RCKT1204MO-DM	12.0	4.76	4.0	●	●	●		●	○			○									
	RCKT1204MO-DR	12.0	4.76	4.0	●	●	●		●													
	RCKT1204MO-ER	12.0	4.76	4.0				○	○													
	RCKT1606MO-DM	16	6.35	5.56	●	●	○								○							
	RCKT1606MO-DR	16	6.35	5.56	●	●			●		●											
	RCKT1606MO-ER	16	6.35	5.56				○	○													
	RCKT2006MO-DM	16	6.35	5.56	●	●																
	RCKT2006MO-DR	20	6.35	6.55	●	●			●		●											
	RCKT2006MO-ER	20	6.35	6.55				○	○													

RD**



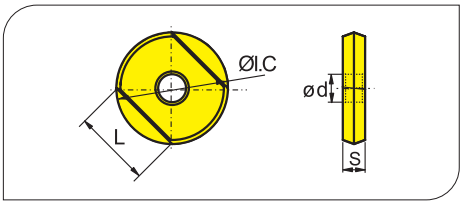
Ideal Machining Condition
Gute Bearbeitungsbedingungen
Normal Machining Condition
Normale Bearbeitungsbedingungen
Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen

Workpiece Material / Werkstoffe

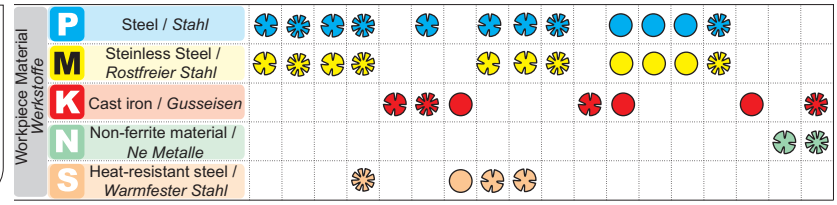
P	Steel / *Stahl*
M	Steinless Steel / *Rostfreier Stahl*
K	Cast iron / *Gusseisen*
N	Non-ferrite material / *Ne Metalle*
S	Heat-resistant steel / *Warmfester Stahl*

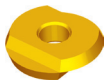
Insert shape Plattenform	Type · Typ	Dimension (mm) Abmessung			CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall		
		I.C	S	d	YBC301	YBC401	YBM251	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD101	YD201
	RDKW0702MO	7.0	2.38	2.7				●			●	●									
	RDKW0803MO	8.0	3.18	3.4				●				●									
	RDKW1003MO	10.0	3.18	3.9			●	●			●	●									
	RDKW10T3MO	10.0	3.97	4.4	○			●			●	●									
	RDKW1204MO	12.0	4.76	4.4			○	●			●	●									
	RDKW12T3MO	12.0	3.97	3.9		○	●	●			●	●								○	
	RDKW1604MO	16.0	4.76	5.2				●			●	●									
	RDKW1605MO	16.0	5.56	5.5				●				●		○							
	RDKW2006MO	20.0	6.35	6.5				●		○											

RO**

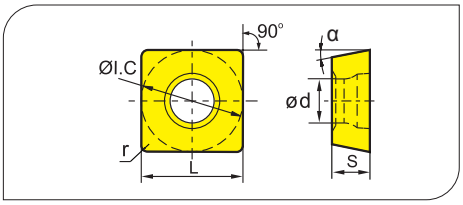


Ideal Machining Condition
Gute Bearbeitungsbedingungen
Normal Machining Condition
Normale Bearbeitungsbedingungen
Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen

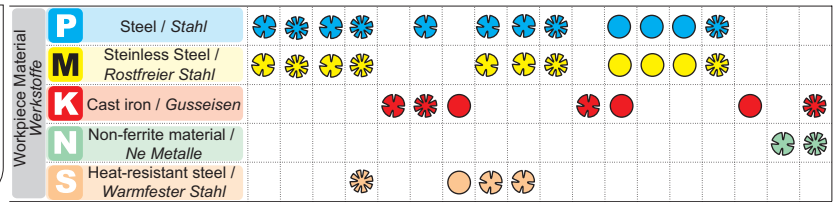


Insert WSP	Type · Typ	Dimensions (mm) · Abmessungen				CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall			
		I.C	L	S	d	YBC301	YBC401	YBM251	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**ROHX1203**	12	8.5	3	4				○			○	●				○						
	ROHX1604	16	11.3	4	5				○				●				●						
	ROHX2005	20	14.1	5	5								●				○						

SD**

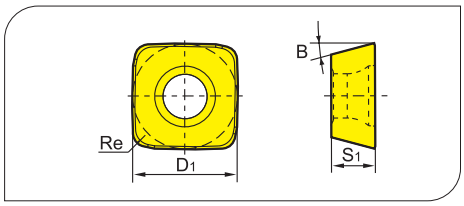


Ideal Machining Condition
Gute Bearbeitungsbedingungen
Normal Machining Condition
Normale Bearbeitungsbedingungen
Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen

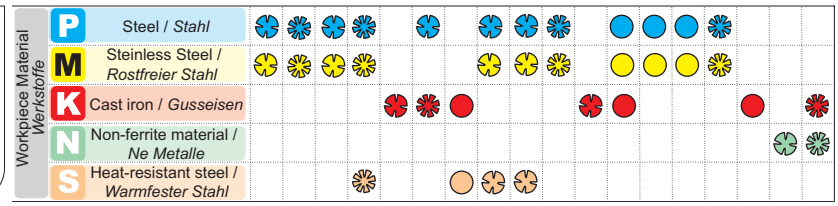


Insert WSP	Type · Typ	Dimensions (mm) · Abmessungen						CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall			
		r	L	I.C	S	d	α	YBC301	YBC401	YBM251	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**SDMT090308**	0.8	9.525	9.525	3.18	4.4	15°			●	○														

SD**



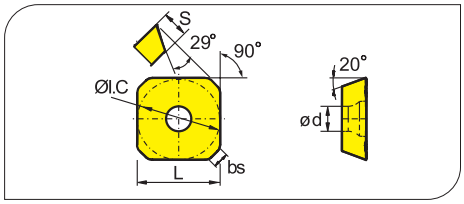
Ideal Machining Condition
Gute Bearbeitungsbedingungen
Normal Machining Condition
Normale Bearbeitungsbedingungen
Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen



Insert WSP	Type · Typ	Dimensions (mm) · Abmessungen				CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall			
		B	Re	S_1	D_1	YBC301	YBC401	YBM251	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**SDMT09T312-DM**	15°	1.2	3.97	9.525				●		●		●		●								
	SDMT120412-DM	15°	1.2	4.76	12.7				●		●		●		○								

● Ex Stock / ab Lager ○ On demand / auf Anfrage

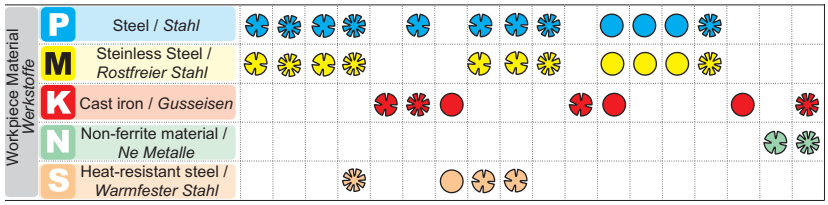
SE**



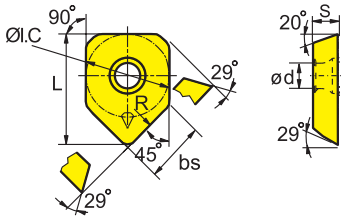
Ideal Machining Condition
Gute Bearbeitungsbedingungen

Normal Machining Condition
Normale Bearbeitungsbedingungen

Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen



Insert WSP	Type · Typ	Dimensions (mm) · Abmessungen						CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall			
		L	I.C	S	d	bs	R	YBC301	YBC401	YBM251	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**SEET12T3-DF**	13.40	13.40	3.97	4.1	2.55		●		●	●				●					○					
	SEET12T3-CF	13.40	13.40	3.97	4.1	2.55						●		●											
	SEET12T3-EF	13.40	13.40	3.97	4.1	2.55											●								
	**SEET12T3-DM**	13.40	13.40	3.97	4.1	2.55		●	●	●	●				●		●								
	SEET12T3-CM	13.40	13.40	3.97	4.1	2.55						●		○											
	SEET12T3-EM	13.40	13.40	3.97	4.1	2.55				●	●				○		●								
	**SEET12T3-DR**	13.40	13.40	3.97	4.1	2.55		●	●		●		●		○		○								
	SEET12T3-CR	13.40	13.40	3.97	4.1	2.55						●	○												
	**SEET12T3-LH**	13.40	13.40	3.97	4.1	2.55																		●	●
	**SEET12T3-W**	17.82	13.40	3.97	4.1	9.46	500			○		○			●		○								



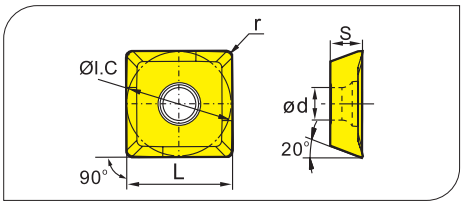
Applicable tool B9-B15
Werkzeug

Tools code key B152-B153
WSP ISO

Grade selection guide B16-B20
Sortenauswahl

Technical data B183-B188
Technische Daten

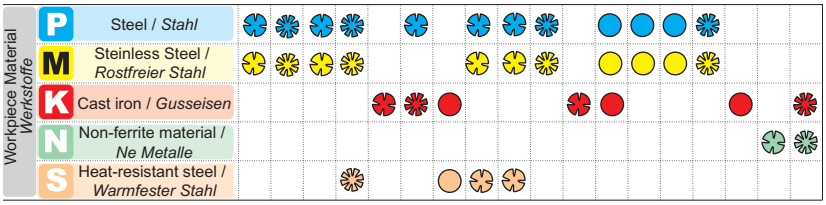
SE**



Ideal Machining Condition
Gute Bearbeitungsbedingungen

Normal Machining Condition
Normale Bearbeitungsbedingungen

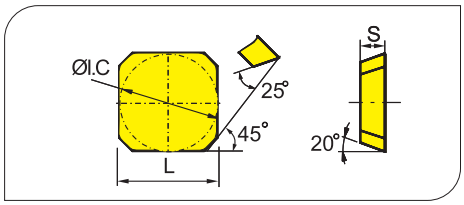
Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen



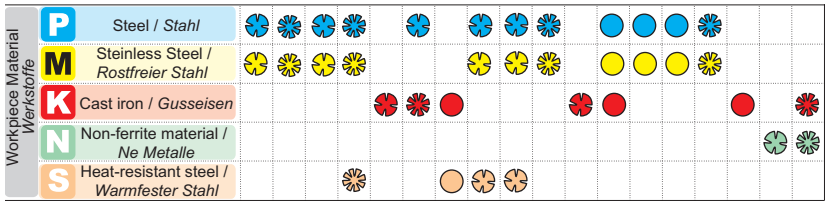
Insert WSP	Type · Typ	Dimensions (mm) · Abmessungen					CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall			
		L	I.C	S	d	r	YBC301	YBC401	YBM251	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**SEET09T308PER-PF**	9.525	9.525	4.01	3.3	0.8								●										
	**SEET09T308PER-PM**	9.525	9.525	4.01	3.3	0.8								●										
	**SEET09T308PER-PR**	9.525	9.525	4.01	3.3	0.8					●													
	**SEET120308PER-PF**	13.308	13.308	4.04	4.1	0.8	●			●				●										
	**SEET120308PER-PM**	13.308	13.308	4.04	4.1	0.8			●	●	●	●	●	●		●								
	**SEET120308PER-PR**	13.308	13.308	4.04	4.1	0.8			●	●		●	○	○										
	**SEET120308-LH**	13.308	13.308	4.04	4.1	0.8							●										●	

● Ex Stock / ab Lager ○ On demand / auf Anfrage

SE**

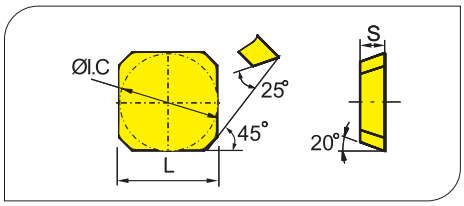


Ideal Machining Condition
Gute Bearbeitungsbedingungen
Normal Machining Condition
Normale Bearbeitungsbedingungen
Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen

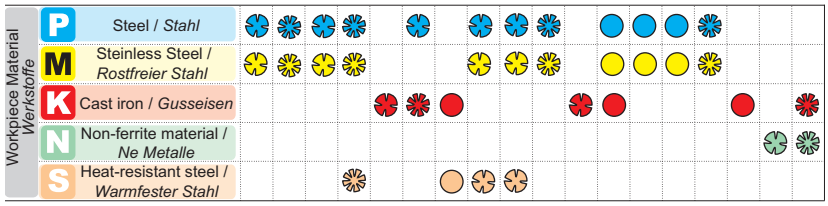


Insert WSP	Type · Typ	Dimensions (mm) · Abmessungen			CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall			
		L	I.C	S	YBC301	YBC401	YBM251	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**SEEN1203AFTN**	12.7	12.7	3.18																		
	SEKN1203AFFN	12.7	12.7	3.18																		
	SEKN1203AFN	12.7	12.7	3.18	●														○		○	
	SEKN1203AFTN	12.7	12.7	3.18	●		●										●		●			○
	SEKN1203AFS13N	12.7	12.7	3.18	○																	
	SEKN1204AFN	12.7	12.7	4.76	●																	
	SEKN1204AFTN	12.7	12.7	4.76	●																	○
	SEKN1204AFS13N	12.7	12.7	4.76	○																	
	SEKN1504AFN	15.875	15.875	4.76	○																○	○
	SEKN1504AFTN	15.875	15.875	4.76	●	●	●												●			
	SEKN1504AFZN	15.875	15.875	4.76																		
	SEKN1204AZ	15.875	15.875	4.76	●	○																○
	SEKN1504AZ	15.875	15.875	4.76	●	●																○

SE**



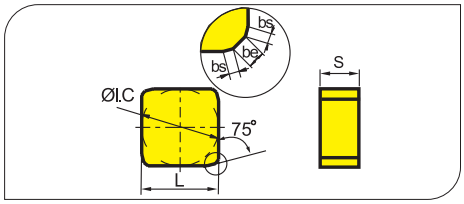
Ideal Machining Condition
Gute Bearbeitungsbedingungen
Normal Machining Condition
Normale Bearbeitungsbedingungen
Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen



Insert WSP	Type · Typ	Dimensions (mm) · Abmessungen			CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall			
		L	I.C	S	YBC301	YBC401	YBM251	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**SEKR1203AFN**	12.7	12.7	3.18	●	○						●										
	SEKR1504AFN	15.875	15.875	4.76																		

Applicable tool B9-B15
Werkzeug
Tools code key B152-B153
WSP ISO
Grade selection guide B16-B20
Sortenauswahl
Technical data B183-B188
Technische Daten

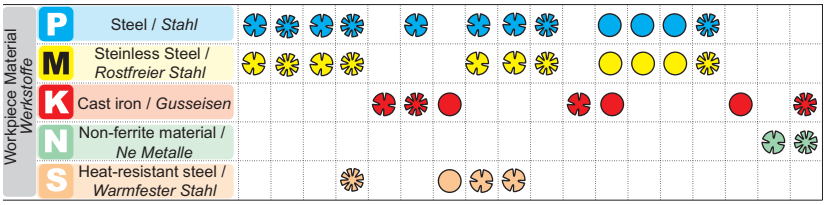
SN**



Ideal Machining Condition
Gute Bearbeitungsbedingungen

Normal Machining Condition
Normale Bearbeitungsbedingungen

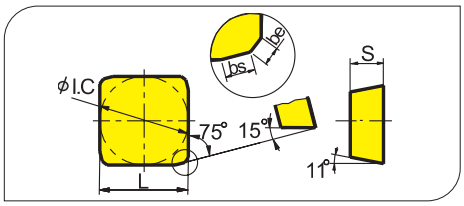
Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen



Insert WSP	Type · Typ	Dimensions (mm) · Abmessungen					CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall			
		L	I.C	S	be	bs	YBC301	YBC401	YBM251	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**SNKN1204ENN**	12.7	12.7	4.76	0.9	1.5	●			●	●										●			○
	SNKN1504ENN	15.875	15.875	4.76	0.9	1.5	●			○											●			
	SNKN1904ENN	19.05	19.05	4.76	1.0	1.5																		

● Ex Stock / ab Lager ○ On demand / auf Anfrage

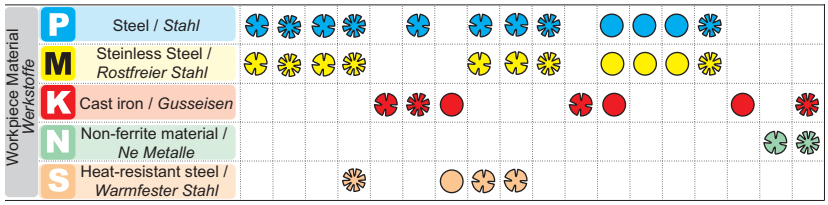
SP*N



Ideal Machining Condition
Gute Bearbeitungsbedingungen

Normal Machining Condition
Normale Bearbeitungsbedingungen

Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen



Insert WSP	Type · Typ	Dimensions (mm) · Abmessungen					CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall			
		L	I.C	S	be	bs	YBC301	YBC401	YBM251	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	SPAN1203EDEL	12.7	12.7	1.4	1	3.18	○																	
	SPAN1203EDER	12.7	12.7	1.4	1	3.18	○																	
	SPAN1203EDFL	12.7	12.7	1.4	1	3.18																		○
	SPAN1203EDFR	12.7	12.7	1.4	1	3.18																		●
	SPAN1203EDL	12.7	12.7	1.4	1	3.18																		
	SPAN1203EDR	12.7	12.7	1.4	1	3.18																		○
	SPAN1504EDFR	15.875	15.875	1.4	1	4.76																		○
	SPAN1504EDFL	15.875	15.875	1.4	1	4.76																		○
	SPCN1203EDSKR	12.7	12.7	1.4	1	3.18	●														○			
	SPCN1504EDSKR	15.875	15.875	1.4	1	4.76	●														○			

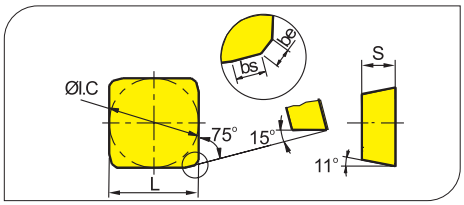
Applicable tool B9-B15
Werkzeug

Tools code key B152-B153
WSP ISO

Grade selection guide B16-B20
Sortenauswahl

Technical data B183-B188
Technische Daten

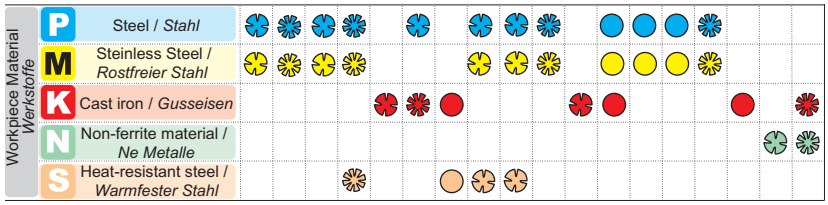
SP*N



Ideal Machining Condition
Gute Bearbeitungsbedingungen

Normal Machining Condition
Normale Bearbeitungsbedingungen

Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen



Insert WSP	Type · Typ	Dimensions (mm) · Abmessungen					CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall			
		L	I.C	S	be	bs	YBC301	YBC401	YBM251	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	SPKN1203EDER	12.7	12.7	3.18	1	1.4																		
	SPKN1203EDEL	12.7	12.7	3.18	1	1.4																		
	SPKN1203EDFR	12.7	12.7	3.18	1	1.4																	○	●
	SPKN1203EDFL (SPKN1203EDL)	12.7	12.7	3.18	1	1.4																		●
	SPKN1203EDSKR (SPKN1203EDR)	12.7	12.7	3.18	1	1.4	●						●	●		○					●			
	SPKN1203EDSKL (SPKN1203EDL)	12.7	12.7	3.18	1	1.4								●							●			
	SPKN1203EDTKR	12.7	12.7	3.18	1	1.4																		
	SPKN1203EDTKL	12.7	12.7	3.18	1	1.4																		
	SPKN1203EDS31PR (SPKN1203EDT31R)	12.7	12.7	3.18	1	1.4								○										
	SPKN1203EDS31PL (SPKN1203EDT31L)	12.7	12.7	3.18	1	1.4																		
	SPKN1203EDT31R	12.7	12.7	3.18	1	1.4																		
	SPKN1203EDT31L	12.7	12.7	3.18	1	1.4																		
	SPKR1203EDR-GM	12.7	12.7	3.18	1	1.4			●					○										
	SPKR1203EDI-GM	12.7	12.7	3.18	1	1.4			●					○										
	SPKN1204EDFL (SPKN1204EDL)	12.7	12.7	4.76	1	1.4																		
	SPKN1204EDER (SPKN1204EDR)	12.7	12.7	4.76	1	1.4	○																	
	SPKN1204EDFR	12.7	12.7	4.76	1	1.4																		
	SPKN1204EDSKR	12.7	12.7	4.76	1	1.4						○												
	SPKN1504EDER	15.875	15.875	4.76	1	1.4																		
	SPKN1504EDEL	15.875	15.875	4.76	1	1.4																		
	SPKN1504EDFR	15.875	15.875	4.76	1	1.4																		●
	SPKN1504EDFL (SPKN1504EDL)	15.875	15.875	4.76	1	1.4																		●
	SPKN1504EDSKR (SPKN1504EDR)	15.875	15.875	4.76	1	1.4	●							●		●					●			
	SPKN1504EDSKL (SPKN1504EDL)	15.875	15.875	4.76	1	1.4															●			
	SPKN1504EDTKR (SPKN1504EDR)	15.875	15.875	4.76	1	1.4							●											
	SPKN1504EDTKL	15.875	15.875	4.76	1	1.4																		
	SPKN1504EDS32PR (SPKN1504EDT32R)	15.875	15.875	4.76	1	1.4								●										
	SPKN1504EDS32PL (SPKN1504EDTL)	15.875	15.875	4.76	1	1.4																		
	SPKN1504EDT32PR (SPKN1504EDTR)	15.875	15.875	4.76	1	1.4	●																	
	SPKN1504EDT32PL (SPKN1504EDTL)	15.875	15.875	4.76	1	1.4																		
	SPKR1904EDFL	19.05	19.05	4.76	1	1.4																		
	SPKR1904EDFR	19.05	19.05	4.76	1	1.4																		
	SPKR1504EDR-GM	19.05	19.05	4.76	1	1.4			●					●										
	SPKR1504EDL-GM	19.05	19.05	4.76	1	1.4			●					●										

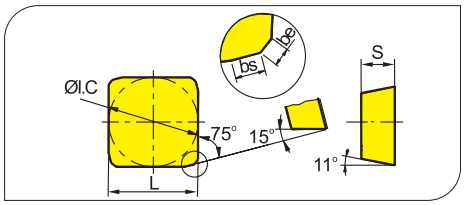
SPKN1203EDT31R **chamfer** · Fase 20° X 0.15 mm

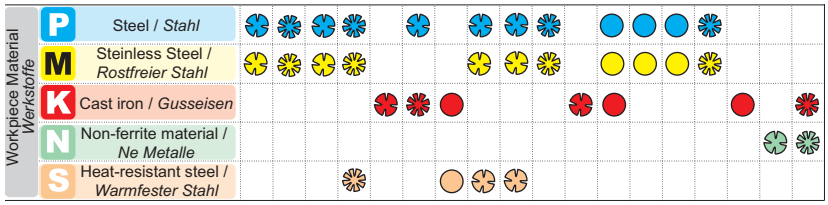
SP*R

Ideal Machining Condition
Gute Bearbeitungsbedingungen

Normal Machining Condition
Normale Bearbeitungsbedingungen

Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen





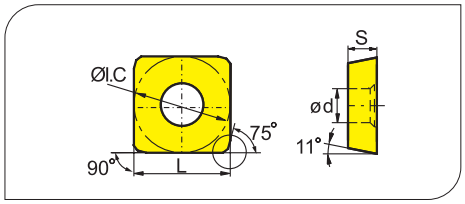
Insert WSP	Type · Typ	Dimensions (mm) · Abmessungen					CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall			
		L	I.C	S	be	bs	YBC301	YBC401	YBM251	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**SPKR1203EDR-GM**	12.7	12.7	3.18	1	1.4			●					○										
	SPKR1203EDL-GM	12.7	12.7	3.18	1	1.4			●					○										
	SPKR1504EDR-GM	15.875	15.875	4.76	1	1.4			○					○										
	SPKR1504EDL-GM	15.875	15.875	4.76	1	1.4			○					○										

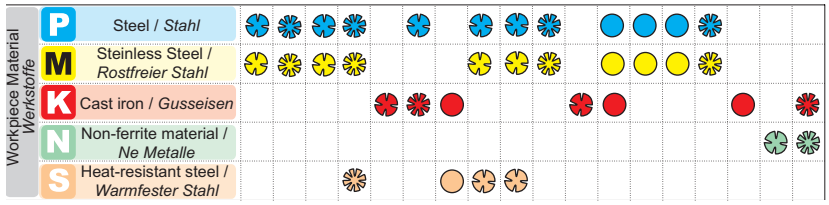
SP*W

Ideal Machining Condition
Gute Bearbeitungsbedingungen

Normal Machining Condition
Normale Bearbeitungsbedingungen

Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen





Insert WSP	Type · Typ	Dimensions (mm) · Abmessungen						CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall			
		r	L	I.C	S	d	α	YBC301	YBC401	YBM251	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**SPKW1204EDFR**	---	12.7	12.7	4.76	5.56	11°								○										
	SPKW1204EDSR	---	12.7	12.7	4.76	5.56	11°								○										

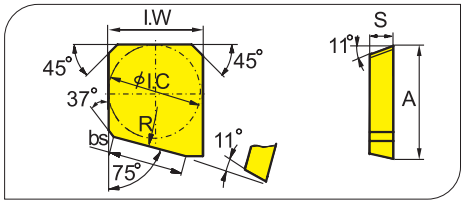
Applicable tool B9-B15
Werkzeug

Tools code key B152-B153
WSP ISO

Grade selection guide B16-B20
Sortenauswahl

Technical data B183-B188
Technische Daten

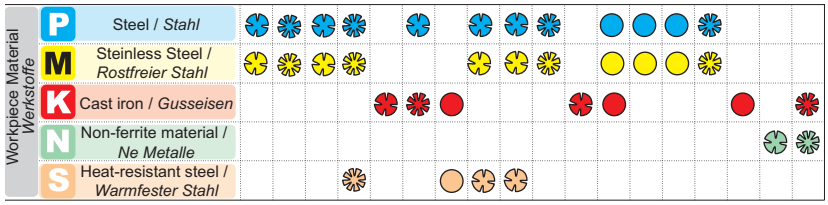
SP*X



Ideal Machining Condition
Gute Bearbeitungsbedingungen

Normal Machining Condition
Normale Bearbeitungsbedingungen

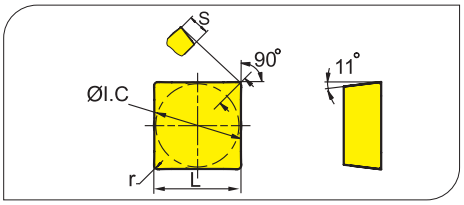
Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen



Insert WSP	Type · Typ	Dimensions (mm) · Abmessungen						CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall			
		A	I.C	I.W	S	bs	R	YBC301	YBC401	YBM251	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**SPEX1203EDL-1**	15	12.7	12.7	3.18	10	500																		○
	SPEX1203EDR-1	15	12.7	12.7	3.18	10	500																		○
	SPEX1504EDL-1	18.2	15.875	15.875	4.76	10	500																		○
	SPEX1504EDR-1	18.2	15.875	15.875	4.76	10	500																		○

● Ex Stock / ab Lager ○ On demand / auf Anfrage

SP**



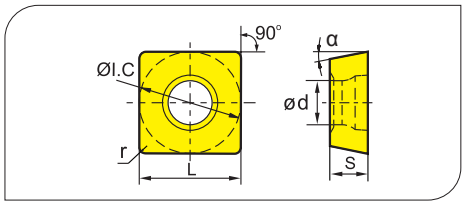
Ideal Machining Condition
Gute Bearbeitungsbedingungen
Normal Machining Condition
Normale Bearbeitungsbedingungen
Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen

Workpiece Material / Werkstoffe

		YBC301	YBC401	YBM251	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD051	YD101	YD201
P	Steel / *Stahl*	✱	✱	✱	✱		✱		✱	✱	✱		●	●	●	✱			
M	Steinless Steel / *Rostfreier Stahl*	✱	✱	✱	✱				✱	✱	✱		●	●	●	✱			
K	Cast iron / *Gusseisen*					✱	✱	●				✱	●				●		✱
N	Non-ferrite material / *Ne Metalle*																	✱	✱
S	Heat-resistant steel / *Warmfester Stahl*				✱			○	✱	✱									

Insert WSP	Type · Typ	Dimensions (mm) · Abmessungen L	I.C	s	r	CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall			
						YBC301	YBC401	YBM251	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**SPMR090304**	9.525	9.525	3.18	0.4			○															
	SPMR09T304	9.525	9.525	3.97	0.4																		
	SPMR090308	9.525	9.525	3.18	0.8			○															
	SPMR120304	12.7	12.7	3.18	0.4			○															
	SPMR120308	12.7	12.7	3.18	0.8			●	○														
	SPMR120312	12.7	12.7	3.18	1.2			○	○														

SP**



Ideal Machining Condition
Gute Bearbeitungsbedingungen
Normal Machining Condition
Normale Bearbeitungsbedingungen
Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen

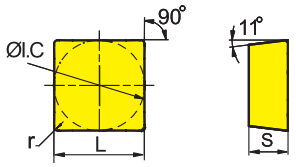
Workpiece Material / Werkstoffe

		YBC301	YBC401	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD101	YD201
P	Steel / *Stahl*	✱	✱	✱	✱	✱		✱		✱	✱	✱		●	●	●	✱		
M	Steinless Steel / *Rostfreier Stahl*	✱	✱	✱	✱	✱				✱	✱	✱		●	●	●	✱		
K	Cast iron / *Gusseisen*						✱	✱	●				✱	●					✱
N	Non-ferrite material / *Ne Metalle*																	✱	✱
S	Heat-resistant steel / *Warmfester Stahl*					✱			○	✱	✱	✱							

Insert WSP	Type · Typ	Dimensions (mm) · Abmessungen r	L	I.C	S	d	α	CVD Coating CVD Beschicht.							PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall		
								YBC301	YBC401	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD101	YD201
	**SPMT060304-KT**	0.4	6.35	6.35	3.18	2.8	11°	○																	
	SPMT060304	0.4	6.35	6.35	3.18	2.8	11°			●															
	SPMT09T308-HT	0.8	9.525	9.525	3.97	4.4	11°		●																
	SPMT09T308	0.8	9.525	9.525	3.97	4.4	11°	●	○																
	SPMT120408	0.8	12.7	12.70	4.76	5.5	11°	●	○	●															
	**SPMT120408-PM**	0.8	12.7	12.70	4.76	5.5	11°				○							●							
	SPMT120408-KM	0.8	12.7	12.70	4.76	5.5	11°											○	●						
	**SPKT1204EDR**	--	12.7	12.7	4.76	5.56	11°									●									

Applicable tool B9-B15
Werkzeug
Tools code key B152-B153
WSP ISO
Grade selection guide B16-B20
Sortenauswahl
Technical data B183-B188
Technische Daten

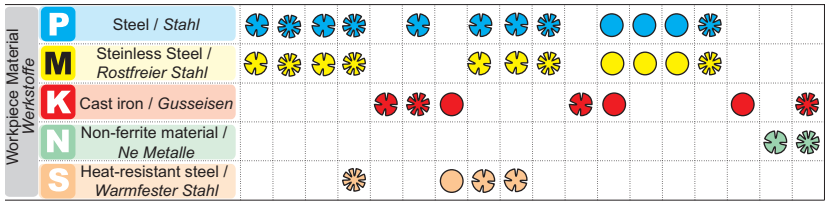
SP**



Ideal Machining Condition
Gute Bearbeitungsbedingungen

Normal Machining Condition
Normale Bearbeitungsbedingungen

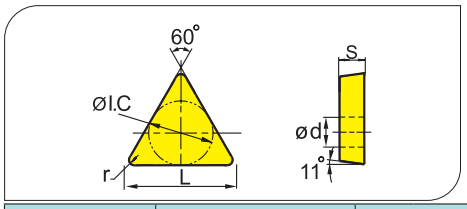
Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen



Insert WSP	Type · Typ	Dimensions (mm) · Abmessungen				CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall			
		L	I.C	s	r	YBC301	YBC401	YBM251	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**SPUN090304**	9.525	9.525	3.18	0.4															●			
	SPUN090308	9.525	9.525	3.18	0.8															○			
	SPUN120304	12.7	12.7	3.18	0.4															●			
	SPUN120308	12.7	12.7	3.18	0.8			●												●			○
	SPUN120312	12.7	12.7	3.18	1.2															●			○
	SPUN150408	15.875	15.875	4.76	0.8															●			○
	SPUN150412	15.875	15.875	4.76	1.2															●			○
	SPUN190408	19.05	19.05	4.76	0.8															●			
	SPUN190412	19.05	19.05	4.76	1.2															○			
	SPUN190416	19.05	19.05	4.76	1.6																		
	**SPGN090304**	9.525	9.525	3.18	0.4																		
	SPGN090308	9.525	9.525	3.18	0.8															○			
	SPGN120304	12.7	12.7	3.18	0.4															○			
	SPGN120308	12.7	12.7	3.18	0.8								○							○			
	SPGN120404	12.7	12.7	4.76	0.4																		
	SPGN120408	12.7	12.7	4.76	0.8																		
	SPGN120412	12.7	12.7	4.76	1.2																		
	SPGN150404	15.875	15.875	4.76	0.4																		
	SPGN150408	15.875	15.875	4.76	0.8																		
	SPGN150412	15.875	15.875	4.76	1.2															○			
	SPGN190408	19.05	19.05	4.76	0.8															○			
	SPGN190416	19.05	19.05	4.76	1.6																		

● Ex Stock / ab Lager ○ On demand / auf Anfrage

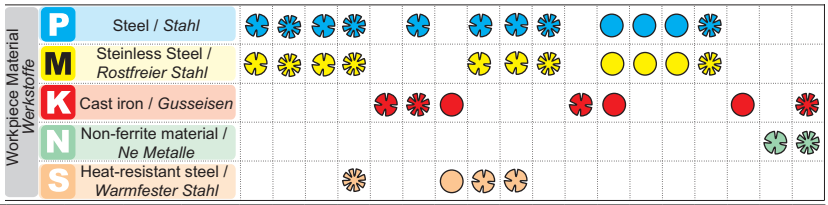
TP**



Ideal Machining Condition
Gute Bearbeitungsbedingungen

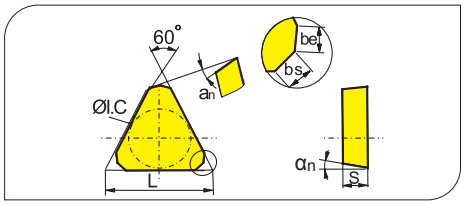
Normal Machining Condition
Normale Bearbeitungsbedingungen

Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen



Insert WSP	Type · Typ	Dimensions (mm) · Abmessungen						CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall			
		L	I.C	bs	be	an	S	YBC301	YBC401	YBM251	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**TPCN1103PPS22PN** (TPCN1103PP)	11	6.35	0.7	0.7	11°	3.18															○			
	TPCN1603PPS42PN (TPCN1603PP)	16.5	9.525	1.2	1.2	11°	3.18	○							○							○			
	TPCN2204PDFR	22	12.7	1.4	1.4	15°	4.76																	○	
	TPCN2204PDSKR (TPCN2204PDR)	22	12.7	1.4	1.4	15°	4.76	○														●			
	TPCN2204PPEN (TPCN2204PPN)	22	12.7	1.4	1.4	11°	4.76	○																	
	**TPAN1103PPS22PN** (TPAN1103PP)	11	6.35	0.7	0.7	11°	3.18	○							○							○			
	TPAN1603PPS42PN (TPAN1603PP)	16.5	9.525	1.2	1.2	11°	3.18	○							○							○			
	TPAN2204PDER (TPAN2204PDR)	22	12.7	1.4	1.4	15°	4.76															○			
	TPAN2204PDFR	22	12.7	1.4	1.4	11°	4.76																		○

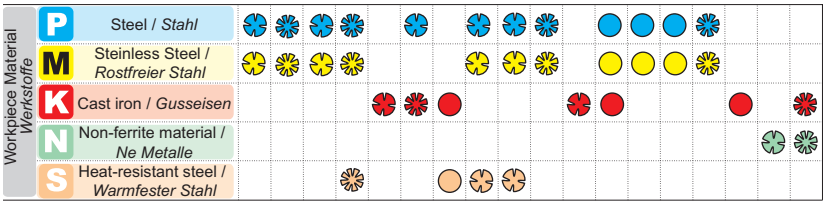
TP**



Ideal Machining Condition
Gute Bearbeitungsbedingungen

Normal Machining Condition
Normale Bearbeitungsbedingungen

Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen

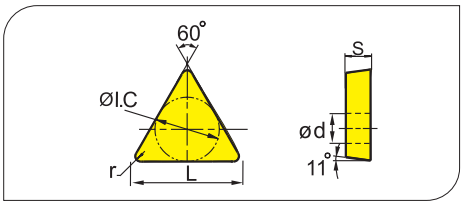


Insert WSP	Type · Typ	Dimensions (mm) · Abmessungen						CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall			
		L	I.C	S	be	bs	an	YBC301	YBC401	YBM251	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**TPKN1603PDSKR** (TPKN1603PDR)	16.5	9.525	3.18	1.2	1	15°	●	○					○	●		○					●			
	TPKN1603PDSKL (TPKN1603PDL)	16.5	9.525	3.18	1.2	1	11°																		
	TPKN1603PPER (TPKN1603PPR)	16.5	9.525	3.18	1.2	1	11°	●	○													●			
	TPKN1603PPFR (TPKN1603PPR)	22	12.7	4.76	1.4	0.7	11°								○										●
	TPKN2204PDTKR	22	12.7	4.76	1.4	0.7	11°							○											
	TPKN2204PDFR	22	12.7	4.76	1.4	0.7	11°																		○
	TPKN2204PDFL	22	12.7	4.76	1.4	0.7	11°																		○
	TPKN2204PDSKR (TPKN2204PDR)	22	12.7	4.76	1.4	0.7	11°	●	●					●	●	●	○					●			
	TPKN2204DL	22	12.7	4.76	1.4	0.7	11°	●														●			
	TPKN2204PDTR	22	12.7	4.76	1.4	0.7	11°	○							○							●			

(old Materialnr. / alte Artikelnr.)

● Ex Stock / ab Lager ○ On demand / auf Anfrage

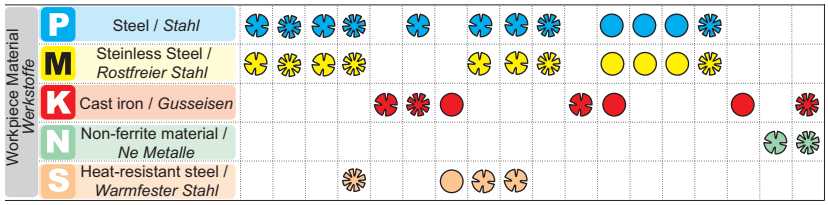
TP**



Ideal Machining Condition
Gute Bearbeitungsbedingungen

Normal Machining Condition
Normale Bearbeitungsbedingungen

Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen



Insert WSP	Type · Typ	Dimensions (mm) · Abmessungen				CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall			
		L	I.C	s	r	YBC301	YBC401	YBM251	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**TPUN110208**	11	6.35	2.38	0.8																		
	TPUN110304	11	6.35	3.18	0.4			●												●			
	TPUN110308	11	6.35	3.18	0.8			●												○			
	TPUN160304	16.5	9.525	3.18	0.4			●												●			●
	TPUN160308	16.5	9.525	3.18	0.8			●	○											●			
	TPUN160312	16.5	9.525	3.18	1.2			●												●			○
	TPUN160408	16.5	9.525	4.76	0.8																		
	TPUN160412	16.5	9.525	4.76	1.2																		
	TPUN220404	22	12.7	4.76	0.4															●			
	TPUN220408	22	12.7	4.76	0.8			●												○			
	TPUN220412	22	12.7	4.76	1.2				●														○
	TPUN220416	22	12.7	4.76	1.6																		
	**TPMR090204**	9.6	5.56	2.38	0.4			○															
	TPMR110304	11	6.35	3.18	0.4			●															
	TPMR110308	11	6.35	3.18	0.8			●															
	TPMR160304	16.5	9.525	3.18	0.4			●	●											●			
	TPMR160308	16.5	9.525	3.18	0.8			●	●											●			
	TPMR160312	16.5	9.525	3.18	1.2			●	●														
	TPMR220412	22	12.7	4.76	1.2			○															
	TPMR330916	33	19.05	9.52	1.6																		

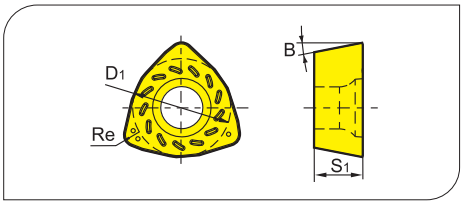
Applicable tool B9-B15
Werkzeug

Tools code key B152-B153
WSP ISO

Grade selection guide B16-B20
Sortenauswahl

Technical data B183-B188
Technische Daten

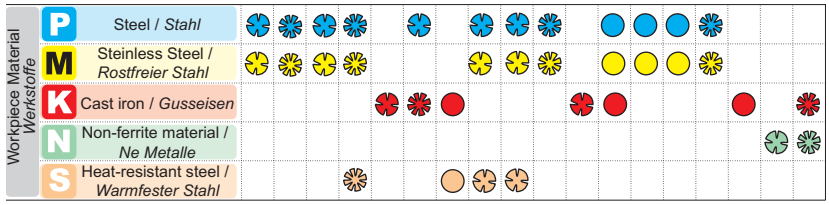
WP**



Ideal Machining Condition
Gute Bearbeitungsbedingungen

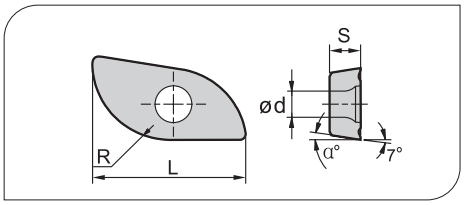
Normal Machining Condition
Normale Bearbeitungsbedingungen

Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen



Insert WSP	Type · Typ	Dimensions (mm) · Abmessungen				CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall			
		B	Re	S_1	D_1	YBC301	YBC401	YBM251	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**WPGT050315ZSR**	11°	1.5	3.5	7.94				●														
	WPGT060415ZSR	11°	1.5	4.2	9.525				●														
	WPGT080615ZSR	11°	1.5	6.35	12.85				●					●									
	WPGT090725ZSR	11°	2.5	7	15				●														

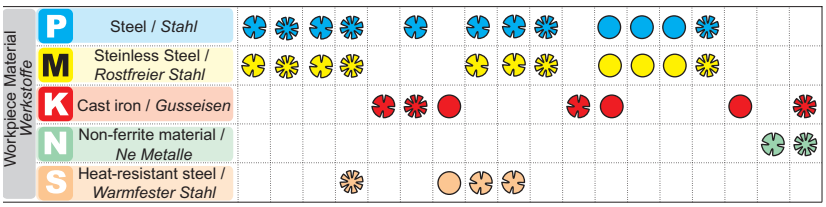
XP**



Ideal Machining Condition
Gute Bearbeitungsbedingungen

Normal Machining Condition
Normale Bearbeitungsbedingungen

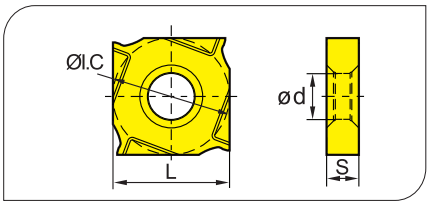
Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen



Insert WSP	Type · Typ	Dimensions (mm) · Abmessungen					CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall			
		R	d	S	α°	L	YBC301	YBC401	YBM251	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**XPHT16R0803-GM**	8	3.1	3.18	9	16										●								
	XPHT20R10T3-GM	10	4.0	3.97	9	20										●								
	XPHT25R1204-GM	12.5	4.7	4.76	9	25										●								
	XPHT30R1506-GM	15	5.8	6.35	11	30										●								
	XPHT32R1606-GM	16	5.8	6.35	9	32										●								
	XPHT40R2007-GM	20	6.8	7.94	9	40										○								
	XPHT50R2507-GM	25	9.2	7.94	9	50										○								

● Ex Stock / ab Lager ○ On demand / auf Anfrage

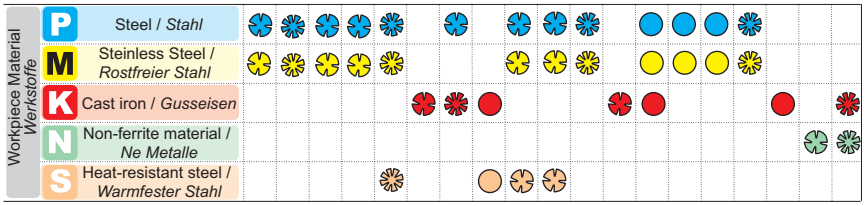
XS**



Ideal Machining Condition
Gute Bearbeitungsbedingungen

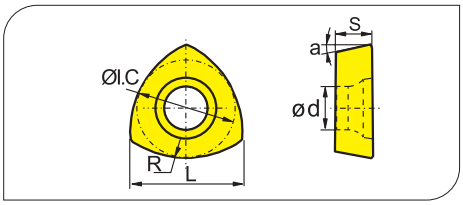
Normal Machining Condition
Normale Bearbeitungsbedingungen

Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen



Insert WSP	Type · Typ	Dimensions (mm) · Abmessungen				CVD Coating CVD Beschicht.							PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall			
		I.C	L	S	d	YBC301	YBC401	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**XSEQ1202**	12.7	12.7	2.3	5.0											●								
	XSEQ1203	12.7	12.7	3.0	5.0				○							●								
	XSEQ12T3	12.7	12.7	3.5	5.0	○										●								
	XSEQ1204	12.7	12.7	4.0	5.0											●								
	XSEQ12T4	12.7	12.7	4.5	5.0											●								

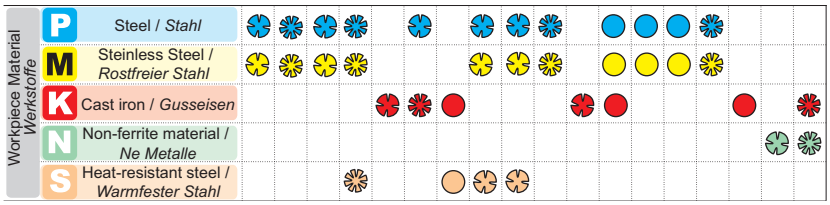
ZD**



Ideal Machining Condition
Gute Bearbeitungsbedingungen

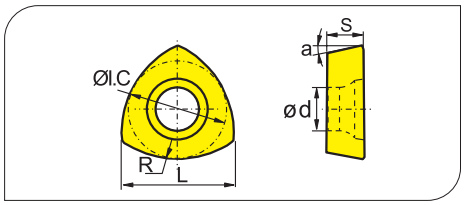
Normal Machining Condition
Normale Bearbeitungsbedingungen

Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen



Insert WSP	Type · Typ	Dimensions (mm) · Abmessungen						CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall			
		I.C	L	S	R	d	α	YBC301	YBC401	YBM251	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**ZDET08T2CYR10**	6.75	8.4	2.78	10	2.8	14°			●															
	ZDET1103CYR12.5	8.5	10.6	3.18	12.5	2.8	14°			●															
	ZDET13T3CYR16	10.5	13.2	3.97	16	4.4	14°																		
	ZDET13T3CYR16-PM	10.5	13.2	3.97	16	4.4	14°			●															

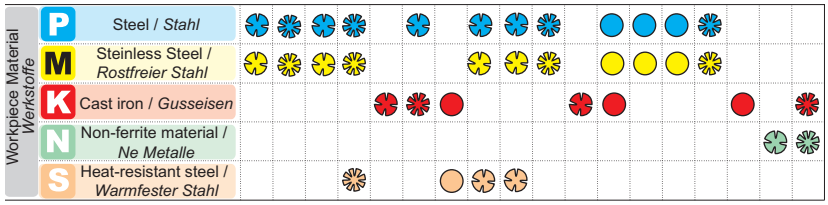
ZP**



Ideal Machining Condition
Gute Bearbeitungsbedingungen

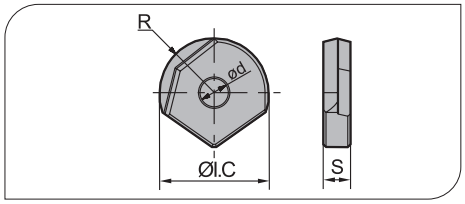
Normal Machining Condition
Normale Bearbeitungsbedingungen

Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen



Insert WSP	Type · Typ	Dimensions (mm) · Abmessungen						CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall			
		I.C	L	S	R	d	α	YBC301	YBC401	YBM251	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**ZPNT2204CY(R20)**	12.7	16.1	4.76	20	5.56	11°			○															
	ZPNT2204CY(R25)	12.7	16.9	4.76	25	5.56	11°			●															
	ZPNT2204CY(R31)	12.7	17.6	4.76	31.5	5.56	11°			●															

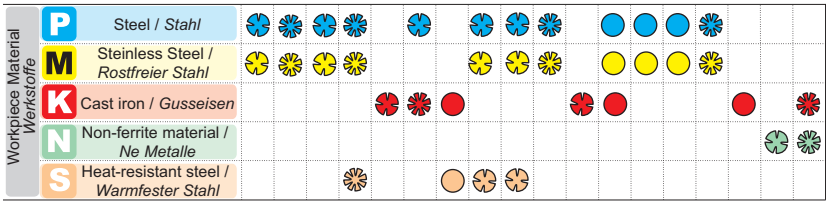
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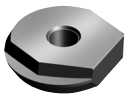
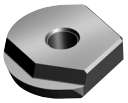


Ideal Machining Condition
Gute Bearbeitungsbedingungen

Normal Machining Condition
Normale Bearbeitungsbedingungen

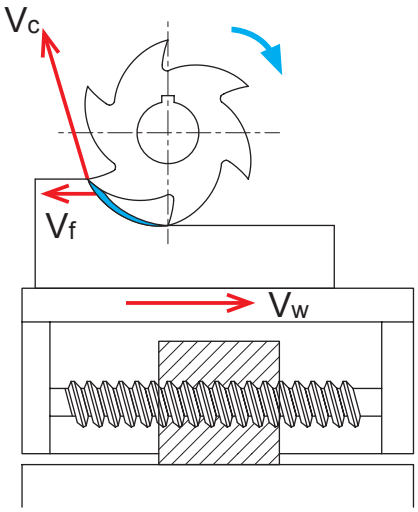
Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen

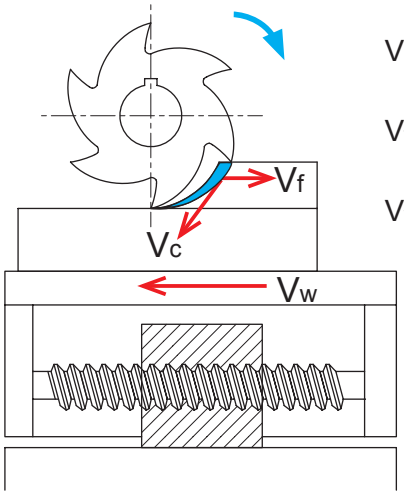


Insert WSP	Type · Typ	Dimensions (mm) · Abmessungen				CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet		Carbide uncoat. unbe. Hartmetall			
		R	I.C	S	d	YBC301	YBC401	YBM251	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	YD051	YD101	YD201
	**ZOHX1203-GF**	6	12	3	4												●						
	ZOHX1604-GF	8	16	4	5												●						
	ZOHX2005-GF	10	20	5	5												●						
	ZOHX2506-GF	12.5	25	6	6												●						
	ZOHX3007-GF	15	30	7	8												●						
	ZOHX3207-GF	16	32	7	8												●						
	**ZOHX1203-GM**	6	12	3	4												●						
	ZOHX1604-GM	8	16	4	5												●						
	ZOHX2005-GM	10	20	5	5												●						
	ZOHX2506-GM	12.5	25	6	6												●						
	ZOHX3007-GM	15	30	7	8												●						
	ZOHX3207-GM	16	32	7	8												●						

● Ex Stock / ab Lager ○ On demand / auf Anfrage

Difference and selection between down milling and up milling
Unterschied zwischen Gleichlauf- und Gegenlauf





Vc = Cutting Speed
Schnittgeschwindigkeit

Vf = Feedrate tool
Vorschub Werkzeug

Vw = Feedrate Workpiece
Vorschub Werkstück

Up milling
Gegenlauffräsen

1. Up milling (conventional milling): the feed direction of workpiece is opposite to that of the milling rotation at the connecting position.

2. Beim Gleichlauffräsen sind die Drehrichtung des Fräswerkzeuges und die Vorschubrichtung des Werkstückes gleich gerichtet.

Down milling
Gleichlauffräsen

1. Down milling (climb milling): the feed direction of workpiece is the same as that of the milling rotation at the connecting position.

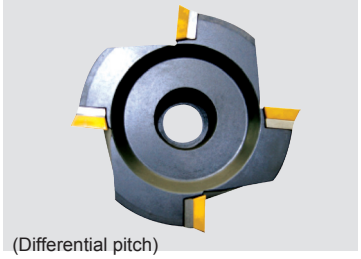
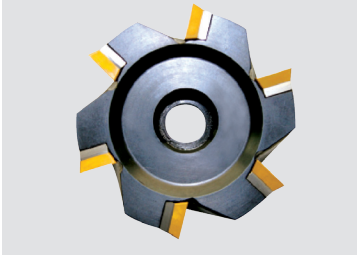
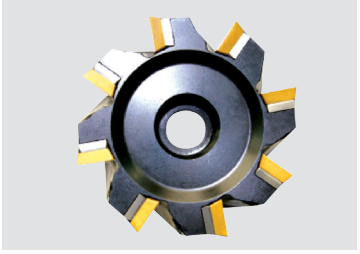
2. Beim Gegenlauffräsen ist die Drehrichtung des Fräswerkzeuges und die Vorschubrichtung des Werkstückes entgegengesetzt.

Advantage and Disadvantage · Vor- und Nachteile:

Direction Richtung	Advantage Vorteil	Disadvantage Nachteil
Up milling Gegenlauffräsen	Prevent hooking of tool, more smooth cut Verhindert das Einhaken des Werkzeuges, ruhigerer Lauf	Bigger stress on cutting edge,tool life shorter Größere Belastung für den Schneidstoff, kürzere Standzeiten
Down milling Gleichlauffräsen	Higher tool life, less thermal stress Höhere Standzeiten, weniger thermische Belastung	Hooking of tool possible Einkaken des Werkzeuges möglich

Pitch selection · Fräserteilung

Pitch is the distance between one point on one cutting edge and the same point on the next edge. Milling cutters are mainly classified into coarse, fine and extra fine pitches,
Als Fräserteilung wird der Abstand von einer Schneidenecke zur nächsten Schneidenecke bezeichnet. Die Einteilung erfolgt in weite (differential), enge und extra enge Teilung.

Operational stability · Bearbeitungsstabilität		
L (Low/ Niedrig)	**M** (Medium/ Mittel)	**H** (High/Hoch)
Coarse pitch· weite Teilung  (Differential pitch)	**Fine pitch · Enge Teilung** 	**Extra fine pitch** **Extra Enge TeilungExtra** 
When the milling width equal to diameter of cutter, the machining system is stable and main power of machine is sufficient, selecting coarse pitch can achieve high productive efficiency. Ist die Fräsbreite gleich dem Fräserdruchmesser, die Maschinen in sich stabil, und mit genügend Leistung, wird eine weite Teilung verwendet, um eine hohe Produktivität zu erreichen.	General milling function and multiple mixed productions Erste Wahl für allgemeine Fräsbearbeitung und Mischbearbeitung	When the milling width is less than diameter of cutter, cutting by maximum edges can achieve high productive efficiency. Ist die Fräsbreite kleiner als der Fräserdurchmesser, ermöglicht eine große Schneidenanzahl eine hohe Produktivität. Für alle Materialien geeignet, besonders auch bei hochwarmfesten Werkstoffen.

Selection of approach angle · Einstellwinkel

The approach angle is composed by insert and tool body, Chip thickness, cutting forces and tool-life are affected especially by the approach angle. Decreasing the approach angle reduces chip thickness and spreads the cutting area between cutting edge and workpiece for a given feed rate.
A smaller approach angle also guarantee that it is stable entrying into or exiting workpiece, to protect the cutting edge and extend tool life. However this will increase higher axial cutting forces on the workpiece, thus is not suitable for machining thin workpiece such as thin plate.

Approach angle Einstellwinkel	Feed rate per tooth Zahnvorschub	Real max. cutting depth Max. Spandicke
90°	f_z	$h_{ex}=f_z \times sinkr$
75°	f_z	$h_{ex}=0.96 \times f_z$
60°	f_z	$h_{ex}=0.86 \times f_z$
45°	f_z	$h_{ex}=0.707 \times f_z$
Round insert	f_z	$h_{ex}=\frac{\sqrt{iC^2 \times (iC-2a_p)^2}}{iC} \times f_z$

Der Einstellwinkel eines Planfräsers steht in Verbindung
mit der Spandicke. Dies ist der Winkel zwischen der Hauptschneide der Wendeschneidplatte und der Werkstückoberfläche. Spandicke, Schnittkräfte und Standzeit werden insbesondere durch den Einstellwinkel beeinflusst. Durch Verringern des Einstellwinkels wird die Spandicke bei einer gegebenen Vorschubrate kleiner. Dieser Effekt führt dazu, dass sich die Werkstückstoffmenge über einen größeren Teil der Schneidkante verteilt. Ein kleiner Einstellwinkel sorgt auch für einen weniger abrupten Eintritt in den Schnitt, wodurch der radiale Druck sinkt und die Schneidkante geschont wird. Die höheren axialen Kräfte verstärken jedoch den Druck auf das Werkstück. Für die Bearbeitung von dünnwandigen Bauteilen nicht geeignet.

General formula · Allgemeine Formeln

V_c : cutting speed (m/min)
Schnittgeschwindigkeit (m/min)

D_c : nominal diameter of milling tool (mm)
Sollmaß von Fräswerkzeugen (mm)

n : spindle speed (rev/min)
Umdrehungsgeschwindigkeit (u/min)

z_n : number of teeth
Zähne Anzahl

Q : metal removal rate (cm^3/min)
Material Abtragungsrate (cm^3/min)

V_f : feed rate of worktable (feed speed) (mm/min)
Vorschub Maschinentisch (feed speed) (mm/min)

f_z : feed rate per tooth (mm/z)
Zahnvorschub (mm/z)

π : circumference ratio≈3.14
Kreiszahl ~3,4

T_c : machining time (min)
Bearbeitungszeit (min)

f_z : feed rate per revolution (mm/rev)
Vorschub pro Umdrehung (mm/u)

● Cutting speed · Schnittgeschwindigkeit

$$V_c = \frac{\pi \times D_c \times n}{1000} \text{ (m/min)}$$

● Spindle speed · Umdrehungsgeschwindigkeit

$$n = \frac{1000 \times V_c}{\pi \times D_c} \text{ (rev/min)}$$

● Feed rate of worktable (feed speed)

● Vorschub des Maschinentisches

$$V_f = f_z \times n \times z_n \text{ (mm/min)}$$

● Feed rate per tooth · Zahnvorschub

$$f_z = \frac{V_f}{n \times Z_n} \text{ (mm/z)}$$

● Feed rate per revolution · Vorschub pro Umdrehung

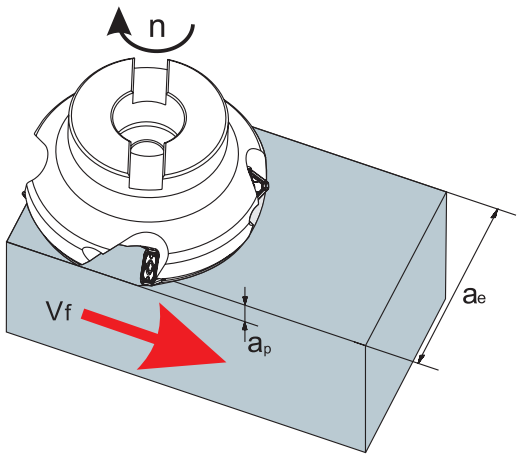
$$f_n = \frac{V_f}{n} \text{ (mm/rev)}$$

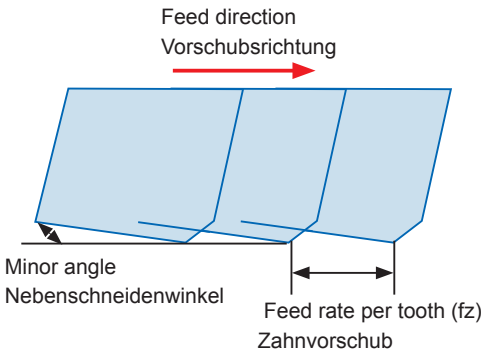
● Machining time · Bearbeitungszeit

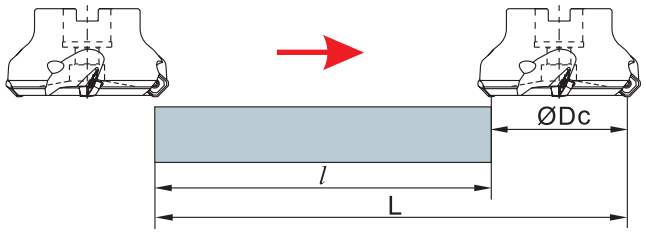
$$T_c = \frac{1000 \times V_c}{\pi \times D_c} \text{ (min)}$$

● Metal removal rate · Zerspanungsvolumen

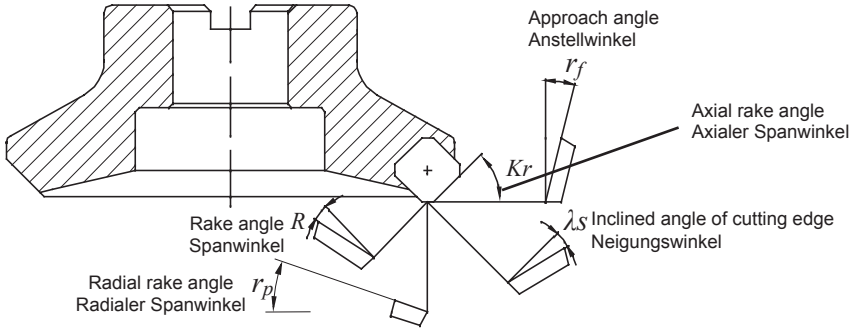
$$Q = \frac{a_p \times a_e \times V_f}{1000} \text{ (cm}^3\text{/min)}$$







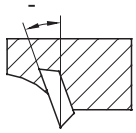
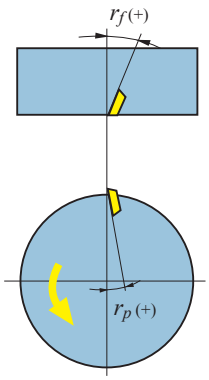
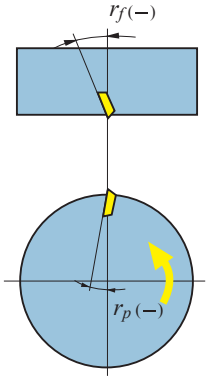
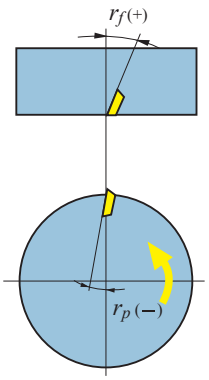
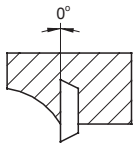
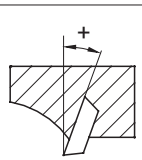
Function of each part in face milling · Winkelfunktion beim Planfräsen



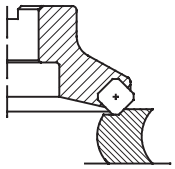
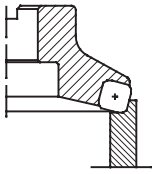
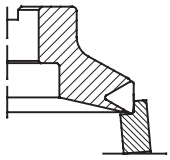
Main angles of face mills · Winkel beim Planfräsen

Designation Winkel	Function Funktion	Effect Auswirkung		
Axial rake angle Axialer Spanwinkel r_f	Determining the chip direction Beeinflusst die Spanflußrichtung	negative angle, excellent chip removal Negativer <Spanwinkel, gute Späneabfuhr		
Radial rake angle Radialer Spanwinkel r_p	Determining sharpness of cutting edge Definiert die Schneidenschärfe	Positive angle, good cutting performance Positive Winkel, gute Schnittleistung		
Approach angle Anstellwinkel Kr	Determining the chip thickness Beeinflusst die Spandicke	Kr↑,chip thickness↑,Kr↓,chip thickness↓; Kr↑,Spandicke↑,Kr↓,chip Spandicke↓;		
Rake angle Spanwinkel R	Determining true sharpness of cutting edge Beeinflusst die wahre Plattenschärfe	Poor cutting performance, high strength of cutting edge Schlechte Schnittleistung, starke Schneidkante	(−)←0→(+)	Good cutting performance, low strength of cutting edge Schlechte Schnittleistung, starke Schneidkante
Inclined angle of cutting edge Neigungswinkel λs	Determining the chip flow direction Beeinflusst die Spanflußrichtung	Poor cutting performance, high strength of cutting edge Gute Schnittleistung, schwächere Schneidkante	(−)←0→(+)	Good cutting performance, low strength of cutting edge Gute Schnittleistung, schwächere Schneidkante

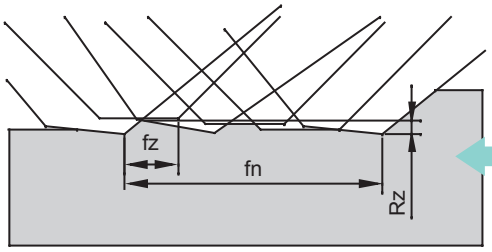
Combination of different rake angels · Kombination von verschiedenen Spanwinkeln

		Double positive Doppelt Positiv	Double negative Doppelt Negativ	One pos., one neg. Postitiv/Negativ
Negative rake angle Negativer Span-winkel				
0° rake angle Neutraler Winkel				
Positive rake angle Positiver Span-winkel				
Axial rake angle r_f / axialer SW		+	−	+
Radial rake angle r_p radialer SW		+	−	−
Applicable material machined Anwendungs-bereich	P	√		√
	M	√		√
	K		√	√
	N	√		
	S	√		√

Cutting performances of different approach angles

Approach angle Anstellwinkel	Schematic diagram Darstellung	Instruction Erklärung
45°		Axial force is largest. It will bend when machining thin-wall workpiece, and reduces the precision of workpiece. It is benefit to avoid fringe breakage of workpiece when machining cast iron Die axiale Kraft ist sehr hoch. Wegen der Verbiegung nicht geeignet für die Bearbeitung von dünnwandigen Bauteilen. Optimal für die Planbearbeitung von Stahl, Guss und rostfreien Materialien.
75°		The main purpose is to resolve the radial cutting force, it is often used for general face milling. Zur Reduzierung der radialen Kräfte. Für die allgemeine Planbearbeitung.
90°		The axial force is zero in theory, suitable for milling thin plate workpiece. Die axiale Kraft ist nahezu null. Für die Zerspanung von dünnen, labilen Werkstücken geeignet.

Wiper insert · Wiper Platte

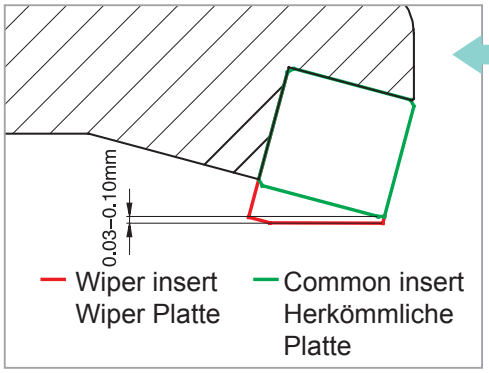


Required Surface roughness with common insert isn´t good.

Geforderte Oberflächengüte mit herkömmlichen Platten wird nicht erreicht.

Solution · Lösung

Aassembling wiper inserts
Einsatz von Wiper Platten

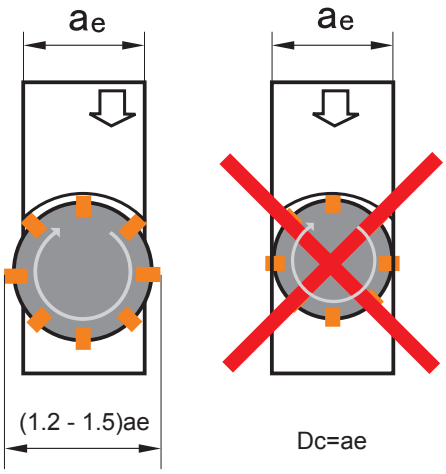


usage · Anwendung

The wiper insert must protrude below the other inserts by 0.03-0.10 mm at axial direction, only that the wiping function can take into effect.
Generally speaking, a cutter can just assemble only one wiper insert. If the diameter of cutter is much bigger or cutter's feed rate per revolution is bigger than the length of wiper edge, 2 to 3 wiper inserts can be assembled.

Die Wiperplatte muss ca. 0,03 – 0,1 mm über den normalen Platten in axialer Richtung stehen, um den Wipereffekt zu erreichen.
Bei Standarddurchmessern reicht eine Wiperplatte.
Bei sehr großen Fräserdurchmessern oder großen Vorschubraten können bis zu 3 Wiperplatten eingesetzt werden.

Selection of cutting width and tool cutting diameter in face milling
Schnittbreiten Auswahl und Werkzeug Durchmesser beim Planfräsen



Generally speaking, the relation between cutting width and tool cutting diameter is Dc=(1.2—1.5) ae. In the machining practice, it need to avoid coincidence of tool center and workpiece center as much as possible.

In der allgemeinen Anwendung sollte der Fräserdurchmesser 1.2 – 1,5 mal ae betragen.
Positionieren Sie den Fräser leicht außermittig.

Dc: Diameter of milling tool · Werkzeugdurchmesser
ae: Cutting width · Seitliche Zustellung

NOTIZEN:

Milling · Fräsen

Solid Carbide End Mills · Vollhartmetallschaftfräser

B 191-195 Solid carbide end mills overview
Vollhartmetall-Schaftfräser Überblick

B 196 Grade introduction for solid carbide end mills
Sortenbeschreibung für VHM Fräser

B 197, 199 Solid carbide end mills code key
Vollhartmetall-Schaftfräser ISO Kennzeichung

B 198, 200 Graphics identification and application
Graphische Werkzeug- und Anwendungsbeschreibung

B 201-348 Solid carbide end mills program
Vollhartmetall-Schaftfräser Programm

B 201-229 **PM** series for general machining
PM Serie für allgemeine Bearbeitung

B 230-284 **GM** series + DIN and ZCC CT Norm for general machining
GM Serie + DIN und ZCC CT Norm für allgemeine Bearbeitung

B 288-318 **HM** series + DIN and ZCC CT Norm for machining high hardness steel
HM Serie + DIN und ZCC CT Norm für die Hartbearbeitung

B 319-325 **NM** series for machining copper
NM Serie für die Kupferbearbeitung

B 326-338 **AL** series for machining aluminum
AL Serie für die Bearbeitung von Aluminiumlegierungen

B 339-348 **HPC** series for general machining
HPC serie für allgemeine Bearbeitung
HPC-VSM series for machining of heat resostance super alloys
HPC-VSM Serie für die Bearbeitung von warmfesten Superlegierungen

B 350-449 Recommended cutting parameters
Empfohlene Schnittdaten

B 451-456 Technical information
Technische Informationen
Order form for non-standard products
Bestellformular für Sonderwerkzeuge

Machining Bearbeitung	Shape Ausführung	Teeth · Zähne	NORM	Serie	Ø	material · Material										Page Seite	
						P		M	K	N		S	H				
						Carbon steel alloy steel Kohlenstoff Stahl Legierter Stahl	Quenched and tempred steel Vergüteter Stahl	Stainless steel · Rostfreier Stahl	Cast iron Grauguss	Copper alloy Kupfer Legierung	Aluminum alloy Alu Legierung	Heat resist. alloy Warmfeste Leg.	Hardened steel gehärteter Stahl < 55HRC	Hardened steel gehärteter Stahl > 55HRC		Specification Spezifikation	Cutting data Schnittdaten
High performance milling · Hoch leistungsfräsen	End mill Eckfräser	2	**PM-2E**		Ø1.0~ Ø20.0	✔	✔	✔	✔			✔	✔			B209	B378
			PM-2EL		Ø3.0~ Ø20.0	✔	✔	✔	✔			✔	✔			B210	B378
		4	**PM-4E-G**		Ø1.0~ Ø20.0	✔	✔	✔	✔			✔	✔			B211	B380
			PM-4EL-G		Ø3.0~ Ø20.0	✔	✔	✔	✔			✔	✔			B212	B380
			PM-4EX-G		Ø3.0~ Ø20.0	✔	✔	✔	✔			✔	✔			B213	B381
			PM-4E		Ø1.0~ Ø20.0	✔	✔	✔	✔			✔	✔			B214	B382
			PM-4EL		Ø3.0~ Ø20.0	✔	✔	✔	✔			✔	✔			B215	B382
		6	**PM-6E**		Ø6.0~ Ø20.0	✔	✔	✔	✔			✔	✔			B216	B383
			PM-6EL		Ø6.0~ Ø20.0	✔	✔	✔	✔			✔	✔			B217	B384
	Ball nose Kugelkopf-fräser	2	**PM-2B**		R0.5~R10.0	✔	✔	✔	✔			✔	✔			B218	B385 -386
			PM-2BFP		R0.5~R10.0	✔	✔	✔	✔			✔	✔			B220	B385 -386
			PM-2BL		R1.0~R10.0	✔	✔	✔	✔			✔	✔			B219	B385 -386
		4	**PM-4B**		R1.5~R10.0	✔	✔	✔	✔			✔	✔			B221	B387
			PM-4BL		R1.5~R10.0	✔	✔	✔	✔			✔	✔			B222	B387
	Ball nose with Conical neck Kugelkopf-fräser mit konischem Hals	2	**PM-2BC**		R0.25~R2.0	✔	✔	✔	✔			✔	✔			B223 -226	B388 -389
	Corner Radius mills Radiuseck-fräser	2	**PM-2R**		Ø1.0~ Ø12.0	✔	✔	✔	✔			✔	✔			B227	B390
		4	**PM-4R**		Ø3.0~ Ø12.0	✔	✔	✔	✔			✔	✔			B228	B391
	High feeding Hoch vorschub	4	**PM-4H**		Ø3.0~ Ø12.0	✔	✔	✔	✔			✔	✔			B229	B392 -393

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cutting edge with protection · Schneidkant mit Schutzfase

scharp cutting edge · scharfe Schneidkante

Machining Bearbeitung	Shape Ausführung	Teeth · Zähne	NORM	Type · Typ	Serie	Ø	material · Material							Page Seite	
							P	M	K	N		S	H		
							Carbon steel alloy steel Kohlenstoff Stahl Legierter Stahl	Stainless steel · Rostfreier Stahl	Cast iron Grauguss	Copper alloy Kupfer Legierung	Aluminum alloy Alu Legierung	Heat resist. alloy Warmfeste Leg.	Hardened steel gehärteter Stahl	Specification Spezifikation	Cutting data Schnittdaten
General machining · Allgemeine Bearbeitung	End mill · Eckfräser	2	DIN	5501R302GM		Ø3.0~Ø20.0	✔	✔	✔					B231	B350 -351
				5601R302GM		Ø3.0~Ø20.0	✔	✔	✔					B232	B351
				5502R302GM		Ø3.0~Ø20.0	✔	✔	✔					B233	B354 -355
				5602R302GM		Ø3.0~Ø20.0	✔	✔	✔					B234	B355
				GM-2E		Ø1.0~Ø20.0	✔	✔	✔					B235	B396
				GM-2EL		Ø3.0~Ø20.0	✔	✔	✔					B236	B396
				GM-2EX		Ø3.0~Ø20.0	✔	✔	✔					B237	B398
				GM-2EFP		Ø6.0~Ø20.0	✔	✔	✔					B238	B399
				GM-2F		Ø1.0~Ø20.0	✔	✔	✔					B239	B397
				GM-2FL		Ø3.0~Ø20.0	✔	✔	✔					B240	B397
		3		GM-3E		Ø1.0~Ø20.0	✔	✔	✔					B241	B400
				GM-3EL		Ø3.0~Ø20.0	✔	✔	✔					B242	B400
			DIN	5501R303GM		Ø3.0~Ø20.0	✔	✔	✔					B243	B352
				5601R303GM		Ø3.0~Ø20.0	✔	✔	✔					B244	B352
				5502R303GM		Ø3.0~Ø20.0	✔	✔	✔					B245	B356
				5602R303GM		Ø3.0~Ø20.0	✔	✔	✔					B246	B356
				5502R453GM		Ø3.0~Ø20.0	✔	✔	✔					B247	B357
				5602R453GM		Ø3.0~Ø20.0	✔	✔	✔					B248	B357

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Machining Bearbeitung	Shape Ausführung	Teeth · Zähne	NORM	Type · Typ	Serie	Ø	material · Material							Page Seite	
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							Carbon steel alloy steel Kohlenstoff Stahl Legierter Stahl	Stainless steel · Rostfreier Stahl	Cast iron Grauguss	Copper alloy Kupfer Legierung	Aluminum alloy Alu Legierung	Heat resist. alloy Warmfeste Leg.	Hardened steel gehärteter Stahl	Specification Spezifikation	Cutting data Schnittdaten
	End mill · Eckfräser	4	DIN	5501R304GF		Ø3.0~Ø20.0	✔	✔	✔					B257	B353
				5601R304GF		Ø3.0~Ø20.0	✔	✔	✔					B258	B353
				5502R304GF		Ø3.0~Ø20.0	✔	✔	✔					B259	B358
				5602R304GF		Ø3.0~Ø20.0	✔	✔	✔					B260	B358
				5508R454GM		Ø3.0~Ø20.0	✔	✔	✔					B261	B356, 358
				5602R454GM		Ø3.0~Ø20.0	✔	✔	✔					B262	B356
				GM-4E-G		Ø1.0~Ø20.0	✔	✔	✔					B249	B401
				GM-4F-G		Ø1.0~Ø20.0	✔	✔	✔					B250	B402
				GM-4EL-G		Ø3.0~Ø20.0	✔	✔	✔					B251	B401
				GM-4FL-G		Ø3.0~Ø20.0	✔	✔	✔					B252	B402
				GM-4EX-G		Ø3.0~Ø20.0	✔	✔	✔					B253	B403
				GM-4E		Ø1.0~Ø20.0	✔	✔	✔					B254	B404
				GM-4EL		Ø3.0~Ø20.0	✔	✔	✔					B255	B404
				GM-4EFP		Ø6.0~Ø20.0	✔	✔	✔					B256	B405
		6	DIN	5589R45MGFR		Ø6.0~Ø20.0	✔	✔	✔					B263	B359
				GM-6E		Ø6.0~Ø20.0	✔	✔	✔					B264	B406
				GM-6EL		Ø6.0~Ø20.0	✔	✔	✔					B265	B407
	Micro end mill Micro-fräser	2		GM-2EP		Ø0.5~Ø5.0	✔	✔	✔					B266 -267	B408 -409
				GM-2ES		Ø0.3~Ø3.0	✔	✔	✔					B268	B410
	Ball nose · Kugelkopffräser	2	DIN	5565R302GF		Ø3.0~Ø16.0	✔	✔	✔					B269	B360
				5665R202GM		Ø3.0~Ø20.0	✔	✔	✔					B270	B360
				5566R302GF		Ø3~Ø12.0	✔	✔	✔					B271	B361
				GM-2B		Ø1.0~Ø20.0	✔	✔	✔					B272	B411
				GM-2BL		R1.0~R10.0	✔	✔	✔					B273	B411
				GM-2BFP		Ø1.0~Ø20.0	✔	✔	✔					B274	B414 -415
		4		GM-4B		R1.5~R10.0	✔	✔	✔					B275	B412
				GM-4BL		R1.5~R10.0	✔	✔	✔					B276	B412
	Micro ball nose Micro Kugelkopf-fräser	2		GM-2BS		R0.15~R1.5	✔	✔	✔					B277	B413
				GM-2BP		R0.25~R2.5	✔	✔	✔					B278 -279	B414 -415

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Machining Bearbeitung	Shape Ausführung	Teeth · Zähne	NORM	Type · Typ	Serie	Ø	material · Material								Page Seite	
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							Carbon steel alloy steel Kohlenstoff Stahl Legierter Stahl		Stainless steel · Rostfreier Stahl	Cast iron Grauguss	Copper alloy Kupfer Legierung	Aluminum alloy Alu Legierung	Heat resist. alloy Warmfeste Leg.	Hardened steel gehärteter Stahl	Specification Spezifikation	Cutting data Schnittdaten
General machining Allgemeine Bearbeitung	Corner Radius mills Radiuseck-fräser	2		**GM-2R**		Ø1.0~Ø12.0	✔		✔	✔			✔		B280	B416
		4		**GM-4R**		Ø3.0~Ø12.0	✔		✔	✔			✔		B281	B417
				GM-4RL		Ø6.0~Ø16.0	✔		✔	✔			✔		B282	B417
	Corrugated edge Kordelfräser,	4	DIN	**5602R304GR**		Ø10.0~Ø20.0	✔			✔			✔		B283	B377
				GM-4W		Ø6.0~Ø20.0	✔			✔			✔		B284	B418 -419
Machining high hardness steel · Hartbearbeitung	End mill Eckfräser	4		**HM-4E**		Ø1.0~Ø20.0				✔				✔	B292	B422
				HM-4EFP		Ø6.0~Ø20.0				✔				✔	B295	B423
				HM-4EL		Ø3.0~Ø20.0				✔				✔	B293	B422
			DIN	**5502R55MHH**		Ø3.0~Ø20.0				✔				✔	B294	B372, 374
		6		**HM-6E**		Ø6.0~Ø20.0				✔				✔	B296	B424
				HM-6EL		Ø6.0~Ø20.0				✔				✔	B297	B425
	Micro end mill Microfräser	2		**HM-2E**		Ø1.0~Ø20.0				✔				✔	B290	B420
				HM-2EP		Ø0.5~Ø5.0				✔				✔	B298 -299	B426 -427
				HM-2EFP		Ø6.0~Ø20.0				✔				✔	B291	B421
				HM-2ES		Ø0.3~Ø3.0				✔				✔	B300	B428
	Ball nose Kugelkopf-fräser		DIN	**5565R302GH**		Ø3.0~Ø16.0				✔				✔	B301	B367
				5566R302GH		Ø3.0~Ø12.0				✔				✔	B302	B368
				HM-2B		R0.5~R10.0				✔				✔	B303	B429
			DIN	**5565R302HH**		Ø3.0~Ø16.0				✔				✔	B304	B372
				5566R302HH		Ø3.0~Ø12.0				✔				✔	B305	B372
				HM-2BL		R1.0~R10.0				✔				✔	B306	B429
				HM-2BFP		R0.5~R10.0				✔				✔	B307	B429
		4	DIN	**5566R304HH**		Ø6.0~Ø12.0				✔				✔	B308	B373
				HM-4B		R1.5~R10.0				✔				✔	B309	B430
				HM-4BL		Ø3.0~Ø20.0				✔				✔	B310	B430
	Micro end mill Microfräser	2		**HM-2BS**		R0.15~R1.5				✔				✔	B311	B431
				HM-2BP		R0.25~R2.5				✔				✔	B312 -313	B432 -433
	Corner Radius mills Radiuseck-fräser	4	DIN	**5585R554HHR**		Ø6.0~Ø16.0				✔				✔	B314	B375
				5586R554HHR		Ø6.0~Ø16.0				✔				✔	B315	B376
				HM-4R		Ø3.0~Ø12.0				✔				✔	B316	B434
				HM-4RF		Ø6.0~Ø12.0				✔				✔	B317	B434
				HM-4RP		Ø6.0~Ø16.0				✔				✔	B318	B434

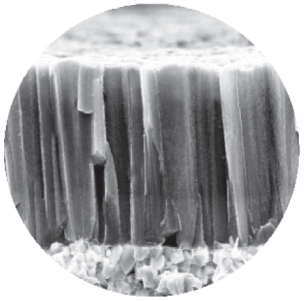
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Machining Bearbeitung	Shape Ausführung	Teeth · Zähne	NORM	Type · Typ	Serie	Ø	material · Material								Page Seite	
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Machining copper Kupferbearbeitung	End mill Eckfräser	2	DIN	**5502R402NM**		Ø6.0~Ø20.0				✔				B320	B362
				NM-2E		Ø1.0~Ø12.0				✔				B321	B435
		4		**NM-4E**		Ø3.0~Ø12.0				✔				B322	B436
	Micro end mill Microfräser	2		**NM-2EP**		Ø0.5~Ø5.0				✔				B323	B437
	Ball nose Kugelkopffräs.			**NM-2B**		R0.5~R6.0				✔				B324	B438
	Micro end mill Microfräser			**NM-2BP**		R0.25~R2.5				✔				B325	B439
Machining aluminum Aluminium Bearbeitung	End mill Eckfräser	2		**AL-2E**		Ø1.0~Ø20.0					✔			B327	B440
				AL-2EL		Ø3.0~Ø20.0					✔			B328	B440
		3		**AL-3E**		Ø1.0~Ø20.0					✔			B329	B441
				AL-3EL		Ø3.0~Ø20.0					✔			B332	B441
	Ball nose Kugelkopffräs.	2	DIN	**5565R302NH**		Ø3.0~Ø16.0					✔			B330	B363
				5566R302NH		Ø3.0~Ø16.0					✔			B331	B364
				AL-2B		R1.0~R6.0					✔			B333	B442
	Roughing end mills, rough pitch form Schruppfräser, fein verzahnt	3		**AL-3W**		Ø6.0~Ø20.0					✔			B334	B443
		2		**AL-2R-AIR**		Ø6.0~Ø20.0					✔			B335	B444
				AL-2RL-AIR		Ø6.0~Ø20.0					✔			B336	B445
		3		**AL-3R-AIR**		Ø12.0~Ø20.0					✔			B337	B446
				AL-3RL-AIR		Ø12.0~Ø20.0					✔			B338	B447
HPC serie with unequal helix angle HPC Serie mit ungleichem Spiralwinkel	General machining Allgemeine Bearbeitung	4	DIN	**5501R38414GM**	 HPC 38° / 41°	Ø4.0~Ø20.0	✔	✔	✔			✔		B342	B394 -395
				5502R38414GM	 HPC 38° / 41°	Ø4.0~Ø20.0	✔	✔	✔			✔		B343	B394 -395
				5602R38414GM	 HPC 38° / 41°	Ø4.0~Ø20.0	✔	✔	✔			✔		B345	B394 -395
				5502R38414GM-R	 HPC 38° / 41°	Ø4.0~Ø20.0	✔	✔	✔			✔		B344	B394 -395
				5602R38414GM-R	 HPC 38° / 41°	Ø4.0~Ø20.0	✔	✔	✔			✔		B346	B394 -395
	Machining heat resistance super alloys Warmfeste Superlegierung Bearb.	4		**VSM-4E**	 HPC 38° / 41°	Ø4.0~Ø20.0	✔	✔				✔		B347	B448
				VSM-4R	 HPC 38° / 41°	Ø6.0~Ø12.0	✔	✔				✔		B348	B449

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Grade introduction for solid carbide end mills
Hartmetallsorten für VHM-Fräser

Coated Grades
Beschichtete Sorten

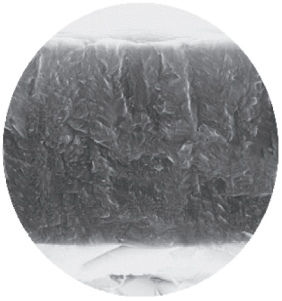


Common TiAlN coating
normale TiAlN Beschichtung

KMG303

It is a combination of ultra-fine carbide substrate and Nano nc-TiAlN coating. It is a universal grade for milling of carbon steel, alloy steel(HRC<=48), cast iron and stainless steel.

Eine Kombination von Ultrafeinkorn-Hartmetall und Nano nc-TiAlN PVD-Beschichtung. Universelle Anwendung zum Fräsen von unlegiertem Stahl, legiertem Stahl (HRC<=48), Guss, rostfreiem Stahl.



nc-TiAlN coating
nc-TiAlN Beschichtung

KMG405

It is a combination of ultra-fine carbide substrate of high strength, toughness and wear resistance with Nano AlTiN (TiAlN) coating and it is suitable for milling of stainless steel, Ti alloys, high-temperature alloys. High-strength materials. Alloy steel and cast iron. It is an optimal grade for the high speed milling of hardened materials (HRC48-55).

Ultrafeinkorn-Hartmetall mit hoher Zugfestigkeit, Zähigkeit und Verschleißfestigkeit, plus Nano-AlTiN (TiAlN) *PVD-Beschichtung. Zum Hartfräsen und HSC-Fräsen von legiertem Stahl (HRC 48-55) und Guss. Sehr gut geeignet für die Bearbeitung von rostfreiem Stahl, Ti-Legierungen, warmfesten Superlegierungen.*

KMG555

It is an optimal combination of superfine carbide substrate of significantly higher wear resistance and high strength with Nano AlTixN coating.It's a special solution for high speed cutting, hard machining until HRC70 and dry machining.

Superfeinkorn-Hartmetall mit deutlich höherer Verschleißfestigkeit und hoher Zugfestigkeit, plus Nano-AltixN Beschichtung. Sonderlösungen für HSC-Fräsen, Hartbearbeitung bis HRC 70 und Trockenbearbeitung.

Uncoated Grades
Unbeschichtete Sorten

YK30F

It is an ultra-fine carbide grade with good wear resistance and it is a universal grade for milling cutters.

Ultrafeinkorn-Hartmetall mit guter Verschleiß-festigkeit. Universelle Sorte zum Fräsen

YK40F

It is an ultra-fine carbide grade with good wear resistance suitable for manufacturing milling cutters in the high speed milling of aluminium alloys.

Ultrafeinkorn-Hartmetall mit guter Verschleißfestigkeit. Geeignet für HSC-Fräser zu Aluminiumbearbeitung.

DIN - STANDARD

Type of function Schneidenausführung	
code	Description Beschreibung
0	End mill Eckfräser
6	Ball nose end mill Kugelkopffräser
8	Radius end mill Fräser mit Eckradius

Helical angle / Spiralwinkel			
00	0°	45	45°
20	20°	55	55°
30	30°	60	60°

Number of teeth Anzahl Zähne	
code	Description Beschreibung
2-4	Number of teeth Anzahl Zähne
M	It is indicated by M when the same type is with different sizes and number of teeth. Wird angegeben, wenn verschiedene Durchmesser verschiedene Zähnezahlen haben.

Type of tools Werkzeugtype	
code	Description Beschreibung
5	End mills / Fräser

Direction of rotation Drehrichtung	
code	Description Beschreibung
R	Right hand / Rechts
L	Left hand / Links

Radius	
code	Description Beschreibung
R05	Radius: 0.5 mm

Durchmesser	
code	Description Beschreibung
0800	8.0 mm in diameter Durchmesser: 8.0mm

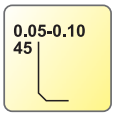
5 5 0 1 R 30 2 GM R05 0800

Type of shank Schaftausführung	
code	Description · Beschreibung
1	Shank · Schaft
5	DIN 6535 HA
6	Weldon DIN 6535 HB
7	Whistel-Notch DIN 6535 HE
9	Taper shank · Morsekegel

Tool shape Ausführung	
code	Description · Beschreibung
1	DIN 6527 K
2	DIN 6527 L
5	As per ZCC-A in QJ ZZQ(TQ)01.002.002 between the radius and the specification Nach Werksnorm ZCC-A
6	As per ZCC-B in QJ ZZQ(TQ)01.002.002 between the radius and the specification Nach Werksnorm ZCC-B
8	DIN 6528
9	As per ZCC-D in QJ ZZQ(TQ)01.002.002 between the radius and the specification Nach Werksnorm ZCC-D

Machining Bearbeitung	
code	Description · Beschreibung
GR	General roughing Allgemeine Schruppbearbeitung
NR	Roughing machining of nonferrous metals Schruppen von NE-Metallen
GM	General semi-finishing Allgemeine mittlere Bearbeitung
SR	Machining of Ti alloys and Heat resist. alloys Zur Bearbeitung von Ti-Legierungen und warmfesten Materialien
GF	General finishing Allgemeine Schlichtbearbeitung
NH	High speed machining of nonferrous Metals Hochgeschwindigkeitsbearb. von NE-Metallen
NM	Semi-finishing of nonferrous Metals Mittlere Bearb. von NE-Metallen
HH	High speed machining of hardened materials Hochgeschwindigkeitsbearbeitung von gehärtetem Material (HRC: 52-65)
GH	High speed machining of general material Hochgeschwindigkeitbearb. von Stahl
PR	Roughing of steel Schruppbearbeitung von Stahl

Graphics identification and application
Graphische Werkzeug- und Anwendungsbeschreibung



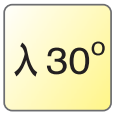
Cylindrical flattened tool nose
Eckenschutzfase



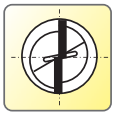
R end mill nose
Eckenradius



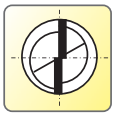
Ball nose end mills
Vollradius



30° helical angle
30° Spiralwinkel



2-tooth mill for center milling with one teeth overpass the center
2-Zähne, ein Zahn über Mitte



2-tooth mill for center milling
2-Zähne mit Zentrumschnitt



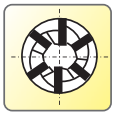
3-tooth mill for center milling with one teeth overpass the center
3-Zähne, ein Zahn über Mitte



4-tooth mill for center milling
4-Zähne mit Zentrumschnitt



4-tooth mill not for center milling
4-Zähne stirnseitig im Zentrum frei



Mills with 6 teeth and above not for center milling
6-Zähne oder mehr stirnseitig im Zentrum frei



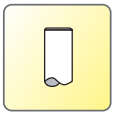
DIN6535HA straight shank
DIN6535HA Zylinderschaft



DIN6535HB weldon
DIN6535HB Weldonspannfläche



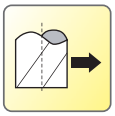
DIN6535HE whistle notch shank
DIN6535HE mit whistle notch Spannfläche



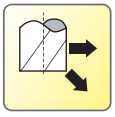
Straight shank
Zylinderschaft



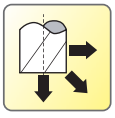
Square and straight shank
Zylinderschaft mit Vierkant



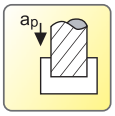
Radial feed
Radiale Bearbeitung



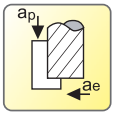
Radial, aslant feed compensated with helical cutting
Bearbeitung: radial, Spiralinterpolation



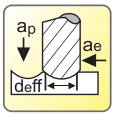
Radial, aslant feed compensated with helical cutting
Bearbeitung: radial, Spiralinterpolation, Eintauchen



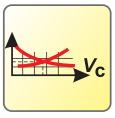
Groove milling
Nutenfräsen



Side milling
Eckfräsen, Umfangfräsen



Profile milling
Profilfräsen



Cutting Data
Schnittdaten

JM - SERIE

Machining Bearbeitung	
GM	Universal machining Allgemeine Bearbeitung
PM	High performance milling Hochleistungsfräsen
HM	For hard materials machining and high speed cutting Zur Hartbearbeitung im HSC Bereich
NM	For copper and nonferrous metals machining Zur Bearbeitung von Kupfer und NE-Metallen
AL	For aluminum alloy machining Zur Bearbeitung von Alumiumlegierungen
SM	For machining of heat resistant super alloys Zur Bearbeitung von warmfesten Superlegierungen

Type of function Schneidenausführung	
E	End mill with cutting edge protection Eckfräser mit Schneidschutz
F	End mill with shanp cutting edge Eckfräser mit Scharfen Schneiderkanten
B	Ball nose end mill Kugelkopffräser
R	Radius end mill Fräser mit Eckradius
W	End mills Kordel geometrie Eckfräser Kordel Geometrie
H	High feeding Hochvorschub

S	Tiny diameter Micro-Durchmesser
P	Shrunken neck Abgesetzter Hals
C	Conical neck Konischer Hals

Radius
Radius

GM -2 E L P -D12 R0.5 -M08

Number of teeth · Anzahl der Zähne

Diameter
Durchmesser

Tool shape Ausführung	
L	Long series · Lange Serie
X	Extral long Extral Lange
F	Short cutting edge Kurze Schneidenlänge
	Series of standard length Standardlängen Serie

Special size instruction Spezielle Baumaße	
G	4-teeth end mills with 30° helical angeln 4-Zähne Fräser mit Spiral Winkel 30°
M	Neck length Halslänge
H	Cutting edge length Schneidenlänge
L	Whole length Gesamtlänge
D	Diameter Durchmesser
S	Slim shank (ø 4mm) Schmale Ausführung
AIR	Extra high speed end mills for machining aluminum in aerospace industry High-Speed Fräser für Luftfahrtindustrie

Graphics identification and application
Graphische Werkzeug- und Anwendungsbeschreibung

Coated end mills
Beschichtete VHM Fräser

Coated Nano-AlTiN	Nano-AlTiN coating · Nano-AlTiN Beschichtung
Coated/Beschichtung TiAlN	TiAlN coating · TiAlN Beschichtung
Coated/Beschichtung CrN	CrN coating · CrN Beschichtung

End mill series
VHM Fräser Serie

	2-flute end mills 2-Schneiden Eckfräser
	2-flute ball nose end mills 2-Schneiden Kugelkopffräser
	2-flute R end mills 2-Schneiden Radiuseckfräser
	3-flute end mills 3-Schneiden Eckfräser
	3-flute R end mills 3-Schneiden Radiuseckfräser
	4-flute end mills 4-Schneiden Eckfräser
	4-flute ball nose end mills 4-Schneiden Kugelkopffräser
	4-flute R end mills 4-Schneiden Radiuseckfräser
	6-flute end mills 6-Schneiden Eckfräser

Helical angle
Spiral Winkel

ß	helical angle Spiral Winkel 30°, 45°, 55°

Cutter diameter tolerance
Fräserdurchmesser Toleranz

D D≤12 0~-0.020 12<D 0~-0.030	Cutter diameter tolerance Fräserdurchmesser Toleranz

Radius tolerance of ball nose end mills
Radius Toleranz von Kugelkopffräsern

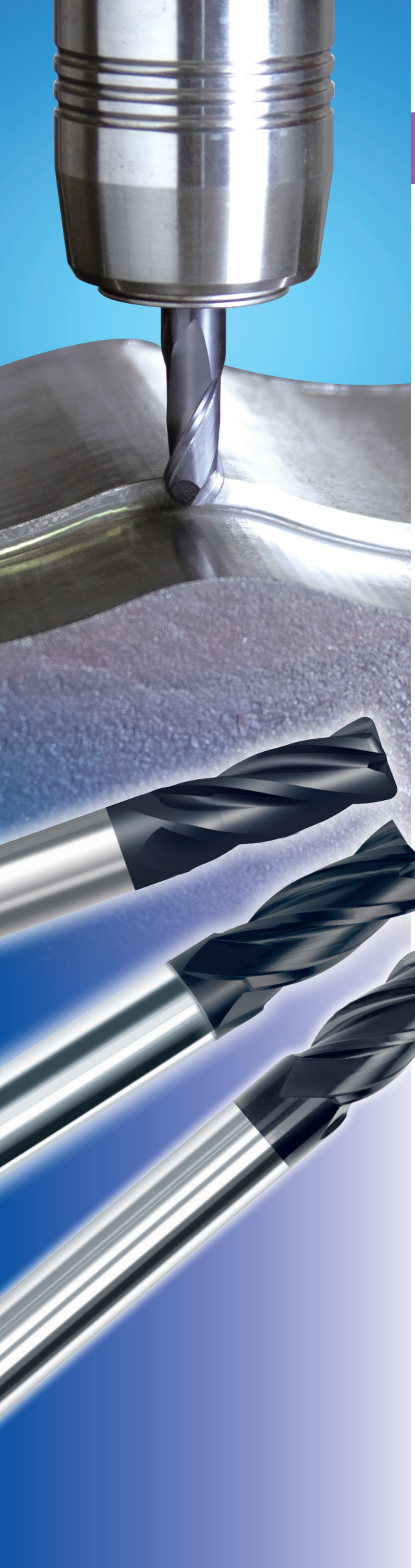
R R±0.01	Radius tolerance Radius Toleranz

Machining operation
Bearbeitungsform

	side face machining Schulterfräsen
	shoulder machining Eckfräsen
	straight slot machining Nutenfräsen
	deep slot machining Nutenfräsen (tief)
	profile machining Profilfräsen
	cavity machining Auskammern
	slot machining (round) Nutenfräsen (rund)
	deep slot machining (deep,round) Nutenfräsen (tief,rund)
	side machining with radius Radius Eckfräsen
	slot machining with radius Nutenfräsen mit Radius
	profile machining Profilfräsen

Cutting edge

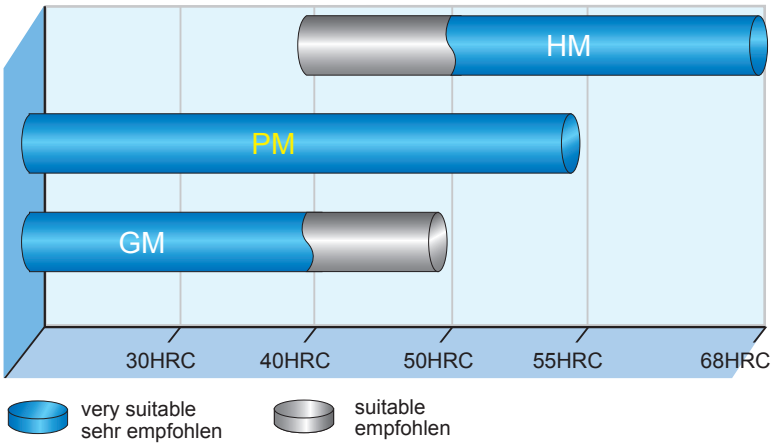
	cutting edge with protection Schneidkante mit Schutzfase
	sharp cutting edge scharfe Schneidkante



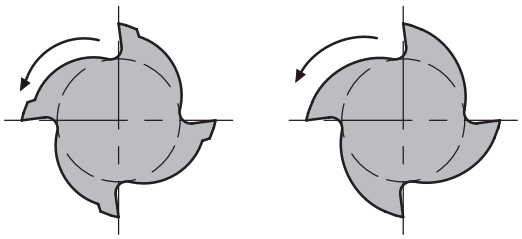
High performance end mills
Hochleistungsfräser

PM

Application in machining of steel
Anwendung in Bearbeitung von Stahl



Optimal geometry,improving chips flow.
Optimierte Geometrie für guten Spanfluß.

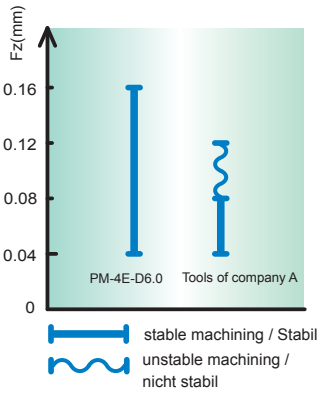


a) PM geometry
PM Geometrie

b) Traditional geometry
Herkömmliche Geometrie

Stabile cutting edge and high rigid, improving feed rate Fz and machining efficiency.

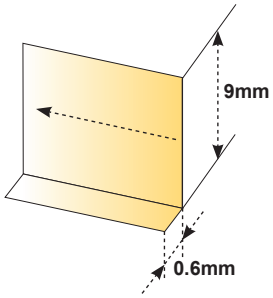
Diameter / Durchmesser : Ø6.0mm
Type: a) PM-4E-D6.0
b) Tools of company A
Machine Tools: Mikron UCP1000
Material: NAK80(40HRC)
Cooling / Kühlung : air cooling / Luft
Operation: side milling / Eckfräsen
Cutting data / Schnittdaten: V_c=100m/min
a_p=9mm
a_e=0.6mm
Fz=0.04mm~0.16mm



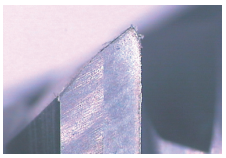
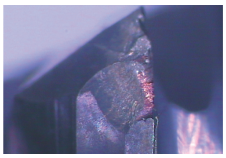
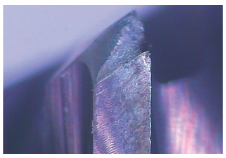
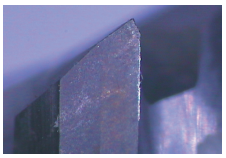
PM geometry in combination of high wear resistance and toughness, better tool life and against cutting edge breakage.
PM Geometrie mit eine Komination aus Verschleißfestigkeit und Zähigkeit, für ausgezeichnete Standzeiten und Schneidkantenstabilität.

T y p e : PM-4E-D6.0
Diameter / Durchmesser: Ø6.0mm
Material: NAK80(40HRC)
Cutting speed / Schnittgeschw.: 5300r/min (100m/min)
Feed rate / Vorschub: 1696mm/min (0.32mm/r)

Axial cutting depth /
Axiale Zustellung: a_p=9mm
Radial cutting deepth /
Radiale Zustellung: a_e=0.6mm
Operation: side milling / Eckfräsen
Cooling / Kühlung: air cooling / Luft
Machine / Maschine: MIKRON
UCP1000

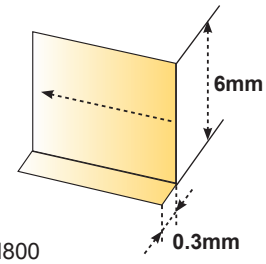


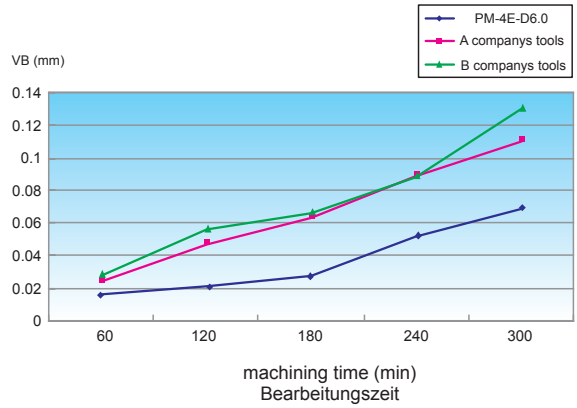
Results / Ergebnis

Machining time Bearbeitungszeit	50 min			
Wear Verschleiß				
Type	PM-4E-D6.0	A companys tools	B companys tools	PM-4E-D6.0

PM-4E-D6.0-G high speed cutting NAK 80
PM-4E-D6.0-G High Speed Fräsen NAK 80:

T y p e : PM-4E-D6.0-G
Diameter / Durchmesser: Ø6.0mm
Material: NAK80(40HRC)
Cutting speed /
Schnittgeschw. : 13260r/min (250m/min)
Feed rate /
Vorschub: 2652mm/min(0.2mm/r)
Axial cutting depth /
Axiale Zustellung: a_p=6mm
radial cutting depth /
Radiale Zustellung: a_e=0.3mm
Operation: side milling / Eckfräsen
Cooling / Kühlung: air cooling / Luft
Machine / Maschine: MIKRON HSM800

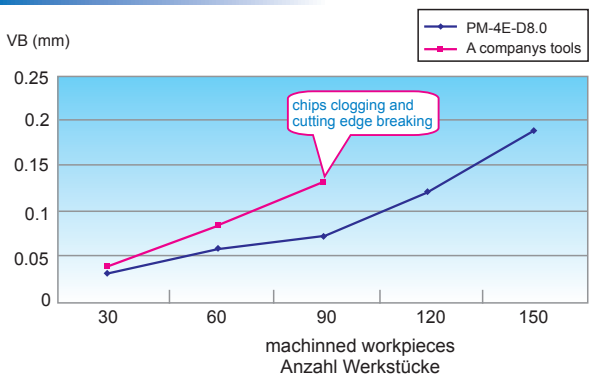




PM-4E-D8.0 effictiv machining of alloy steel
PM-4E-D8.0 Effizientes Bearbeiten von legiertem Stahl

Machine / Maschine:MIKRON UCP1000
Shank / Schaft: HSK63-A
Material: alloy steel
Cutting speed /
Schnittgeschw. : 100(m/min)
Feed rate
Vorschub: 0.04(mm/teeth)
Axial cutting depth
Axiale Zustellung: 8mm
Radial cutting depth /
Radiale Schnittgeschw. (mm): 0-8mm
Cooling / Kühlung: liquid / Emulsion
Operation: profil machinning / Konturfräsen

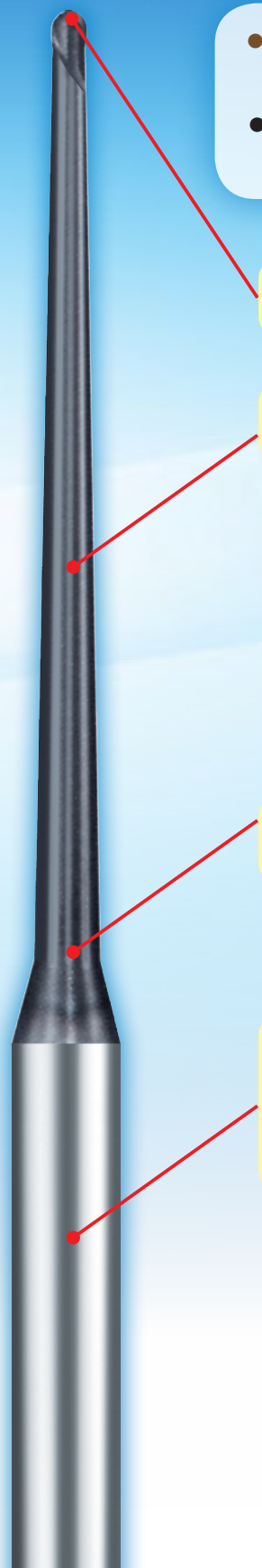




PM-2BC

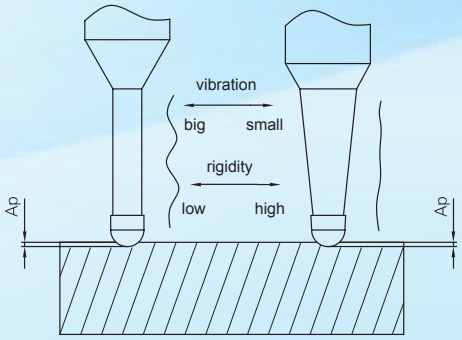
" Pencil neck cutting tools "

- For high rigidity and accorate machining with different taper angle
- Hohe Steifigkeit und hohe Genauigkeit mit unterschiedlichen Kugelwinkeln



High radius accuracy
Hohe Genauigkeit

Conical neck for better rigidity
Konischer Schaft für mehr Steifigkeit

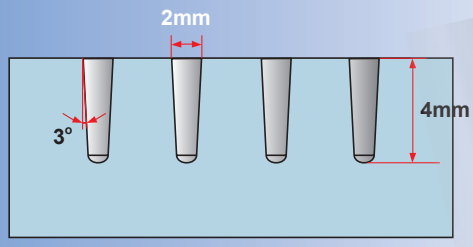


Nano structure coating
Nano-Ti ALN Beschichtung

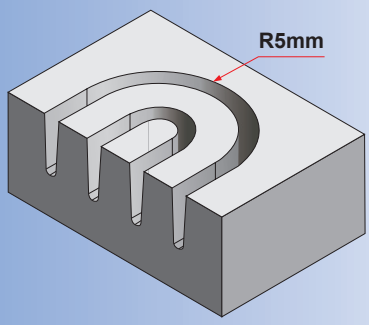
Combination of ultra-fine
carbide substrate of good wear resistance and toughness
Kombination aus Ultrafeinkorn Substrat
für hohe Verschleißfestigkeit und Zähigkeit

PM-2BC15-R0.25-M05

Material: NAK80(40HRC)
Cutting speed / Schnittgeschwindigkeit: 30000r/min
Feed rate / Vorschub: 300mm/min
Axial cutting depth / Axiale Zustellung: a_p=0.03mm
Radial cutting depth / Radiale Zustellung: a_e=0.03mm
Operation: contour machining / Kontarfräsen
Cooling: liquid cooling / Emulsion
Machine / Maschine: MIKRON UCP1000



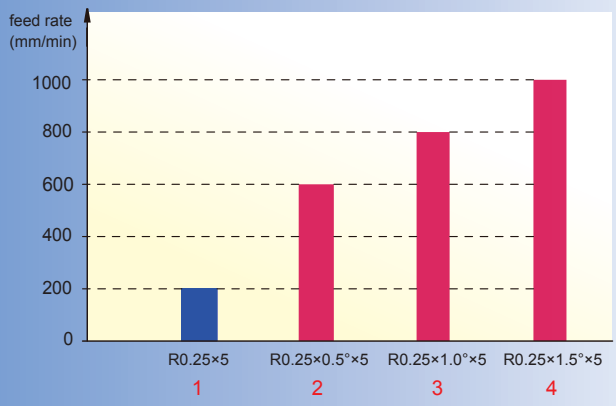
Type Typ	PM-2BC15-R0.25-M05 (conical neck / Konischer Hals) R0.25×1.5°×5	R0.25×5 (cylindrical neck / Zylindischer Hals)
Result Ergebniss	tool life > 160 min Standzeit > 160 min	tool life until 90 min and cutting tools breaking Standzeit unter 90 min und Werkzeugbruch



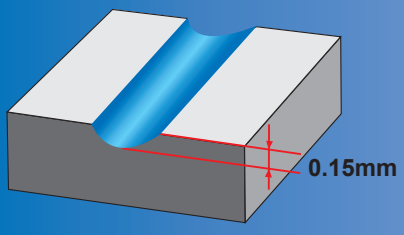
Conical angle and feed rate / Konischer Winkel und Vorschub

Type:

1. PM-2BC05-R0.25-M05(conical neck / Konischer Hals) R0.25×0.5°×5
2. PM-2BC10-R0.25-M05(conical neck / Konischer Hals) R0.25×0.5°×5
3. PM-2BC15-R0.25-M05(conical neck / Konischer Hals) R0.25×0.5°×5
4. R0.25×5 (cylindrical neck / Zylindischer Hals)



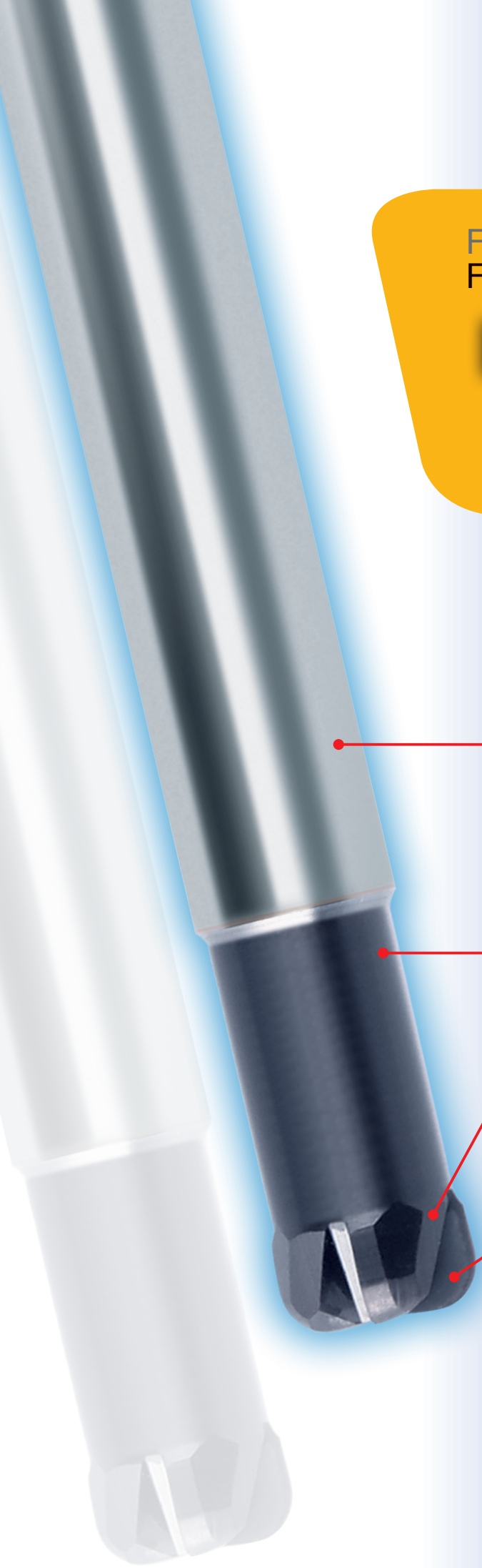
Material: NAK80(37HRC)
Cutting speed / Schnittgeschwindigkeit: 30000r/min
Axial cutting deepth / Axiale Zustellung: a_p=0.15mm
Radial cutting deepth / Radiale Zustellung: gerade Linien
Cooling / Kühlung: air cooling / Luft
Machine / Maschine: MIKRON UCP1000



For effective roughing
Für effektive Schruppbearbeitung

PM-4H

High feed end mills
Hochvorschubfräser



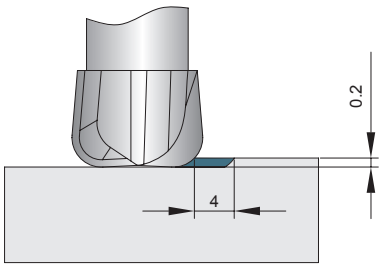
Stabile shaft
Stabiler Schaft

Conical and reduced neck
Konisch freigeschliffen

Short cutting edge with high rigidity for less vibration
Kurze Schneiden mit hoher Steifigkeit zur Reduzierung von Vibrationen

PM-4H-D8.0R2.0

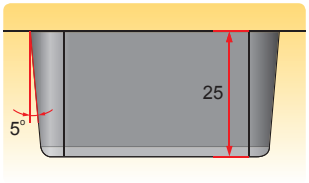
T y p e : PM-4H-D8.0R2.0
Diameter / Durchmesser: Ø8.0mm
Material: NAK80(40HRC)
n: 3980r/min
V c : 100m/min
fn: 9550mm/min
fz: 0.6mm/z
a_p = 0.2mm
a_e = 4mm
Operation: line milling / Bahnenfräsen
Cooling / Kühlung: air cooling / Luft
Machine / Maschine: MIKRON UCP1000
Tool over hang / Auskraglänge: 32mm

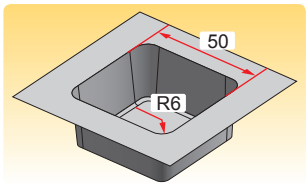


Toollife: > 800m

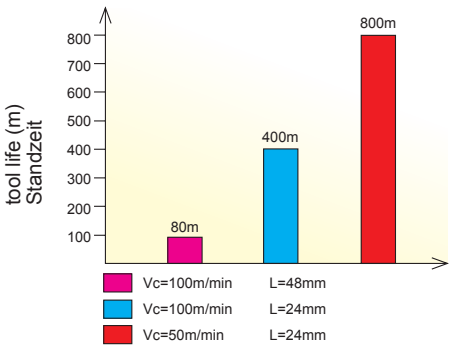
PM-4H-D8.0R2.0

T y p e : PM-4H-D8.0R2.0
Diameter / Durchmesser: Ø8.0mm
Material: NAK80(40HRC)
n: 5970r/min
V c : 150m/min
f n : 7160mm/min
fz: 0.3mm/z
a_p = 0.2mm
a_e = 4mm
Operation: milling of pocket / Taschenfräsen
Cooling / Kühlung: air cooling / Luft
Machine / Maschine: MIKRON UCP1000
Tool over hang / Auskraglänge: 32mm





Type and
tool over hang / Auskraglänge:
1. PM-4H-D6.0R1.5 tool over hang: 24mm
2. PM-4HL-D6.0R1.5 tool over hang: 48mm
Diameter / Durchmesser: Ø6.0mm
Material: NAK80(40HRC)
V c : 50~100m/min
fz: 0.25mm/z
a_p = 0.2mm
a_e = 2mm
Operation: line milling / Bahnenfräsen
Cooling / Kühlung: air cooling / Luft
Machine / Maschine: MIKRON UCP1000



High precision profiling
Hochpräzisions-Profilfräsen

Ballnose end mills with two teeth
Kugelfräser mit zwei Schneiden

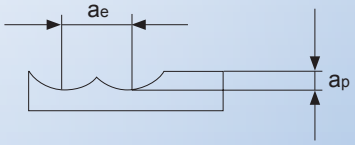
PM-2B PM-2BL PM-2BFP

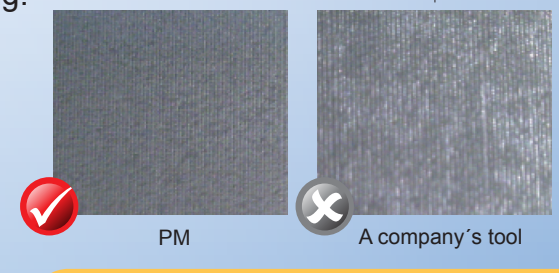
- Perfect crossing of cutting edges,getting good surface quality.
- Perfekte Form der Schneidengeometrie für gute Oberflächenqualität.



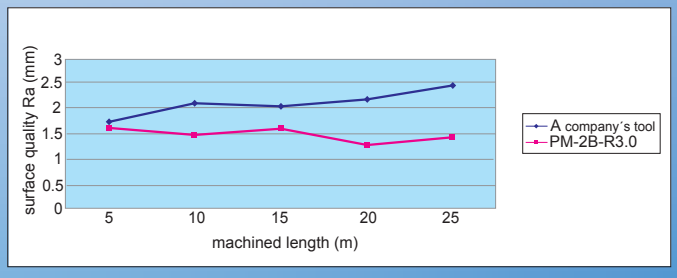
- Updated coating technology.
- Verbesserte Beschichtung.
- High rigid tool structure, reducing vibration.
- Hohe Steifigkeit zur Reduzierung von Vibrationen.
- Ultra - fine carbide substrate.
- Ultrafeinkorn-Substrat.

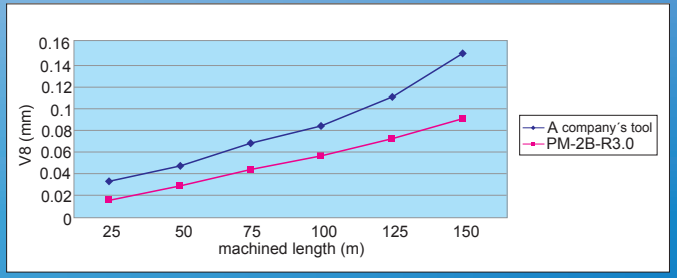
T y p e : PM-2B-R3.0
Diameter / Durchmesser: Ø6.0mm
Material: NAK80(40HRC)
n: 10600r/min (200m/min)
f n : 2120mm/min (0.2mm/r)
a_p = 0.2mm
a_e = 0.3mm
Operation: Milling / Fräsen
Cooling: air cooling / Luft
Machine / Maschine: MIKRON UCP1000
Tool over hang / Auskraglänge: 20mm
Surface quality measuring: TM2000





PM ballnose endmills can get clear working route with good surface quality.
PM Kugelfräser erreichen eine definierte Kugelbahnnut mit guter Oberflächengüte.





PM-4B
PM-4BL

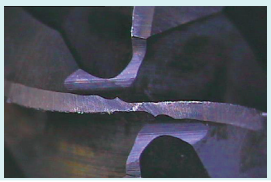
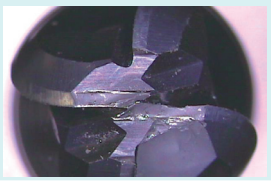
Ballnose end mills with four teeth
Kugelfräser mit vier Schneiden
High precision profil milling
Hoch präzisions Profilfräsen

The ball centere is in combination of strong and sharp cutting edge.
Das Kugelzentrum ist eine Kombination aus scharfen Schneidkanten und großer Steifigkeit.

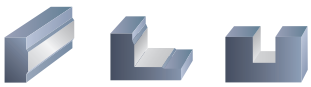


The application of high performance 4-flutes ballnose end mills.
Anwendungsfall Kugelfräser mit vier Schneiden.

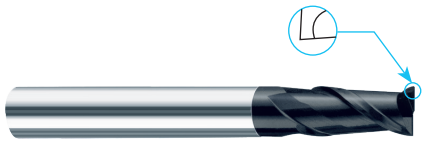
T y p e : PM-4B-R5.0
Diameter / Durchmesser: Ø10.0mm
Material: Cr12(36HRC)
n: 2800r/min (88m/min)
fn: 3000 mm/min
a_p = 1mm
a_e = 0.6mm
Operation: Profiling
Cooling / Kühlung: air cooling / Luft
Machine / Maschine: Xiehong CNC-1600
Tool over hang / Auskraglänge: 45mm
Clamping of workpieces: SafeWay CV-200V
Tooling system: BT50-ER40-100

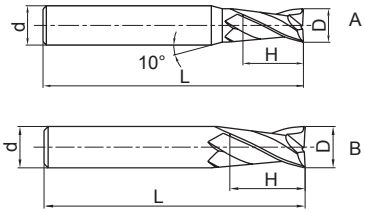
Number of machined workpiece Anzahl Werkstück	5 pcs (150min)	2 pcs (60min)
Wear Verschleiß		
Tools type Werkzeug	PM-4B-R5.0	A company´s tools
Result Ergebnis	It´s less wears after machining 5 workpieces and it can be continued. Geringerer Verschleiß nach 5 Bauteilen. Weiterer Einsatz möglich.	The breakage on center the of ballnose tools after machining two workpieces. Schneidenbruch im Zentrum nach 2 Bauteilen.

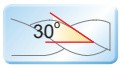
2-flute flattened end mills with straight shank
2-Schneiden Eckfräser mit Zylinderschaft



PM-2E













Type · Typ	Dimension(mm) Abmessungen				Teeth · Zähne Z	Geometry Ausführung	Grade · Sorte KMG 405
	D	d	H	L			
PM-2E-D1.0S	1.0	4	3	50	2	A	●
PM-2E-D1.5S	1.5	4	4	50	2	A	●
PM-2E-D2.0S	2.0	4	6	50	2	A	●
PM-2E-D2.5S	2.5	4	8	50	2	A	●
PM-2E-D3.0S	3.0	4	8	50	2	A	●
PM-2E-D4.0S	4.0	4	11	50	2	B	●
PM-2E-D1.0	1.0	6	3	50	2	A	●
PM-2E-D1.5	1.5	6	4	50	2	A	●
PM-2E-D2.0	2.0	6	6	50	2	A	●
PM-2E-D2.5	2.5	6	8	50	2	A	●
PM-2E-D3.0	3.0	6	8	50	2	A	●
PM-2E-D3.5	3.5	6	10	50	2	A	●
PM-2E-D4.0	4.0	6	11	50	2	A	●
PM-2E-D4.5	4.5	6	11	50	2	A	●
PM-2E-D5.0	5.0	6	13	50	2	A	●
PM-2E-D5.5	5.5	6	16	50	2	A	●
PM-2E-D6.0	6.0	6	16	50	2	B	●
PM-2E-D7.0	7.0	8	20	60	2	A	●
PM-2E-D8.0	8.0	8	20	60	2	B	●
PM-2E-D9.0	9.0	10	22	75	2	A	●
PM-2E-D10.0	10.0	10	25	75	2	B	●
PM-2E-D11.0	11.0	12	26	75	2	A	●
PM-2E-D12.0	12.0	12	30	75	2	B	●
PM-2E-D14.0	14.0	14	32	75	2	B	●
PM-2E-D16.0	16.0	16	45	100	2	B	●
PM-2E-D18.0	18.0	18	45	100	2	B	●
PM-2E-D20.0	20.0	20	45	100	2	B	●

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

KMG405

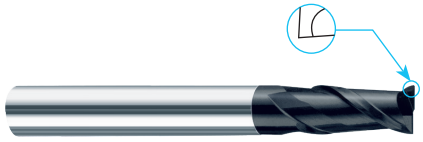
Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~55HRC	~68HRC						
✔	✔	✔	✔	✔		✔	✔			✔	✔

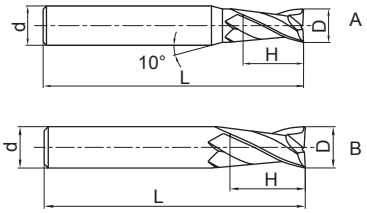
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ISO Kennzeichen
Cutting data B378-393
Schnittdaten
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Order form for non-standard products B455-B456
Bestellformular für Sonderwerkzeuge

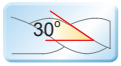
2-flute flattened end mills with straight shank and long cutting edge
2-Schneiden Eckfräser mit langer Schneide und Zylinderschaft



PM-2EL













Type · Typ	Dimension(mm) Abmessungen				Teeth · Zähne Z	Geometry Ausführung	Grade Sorte KMG 405
	D	d	H	L			
PM-2EL-D3.0	3.0	6	12	75	2	A	○
PM-2EL-D4.0	4.0	6	15	75	2	A	○
PM-2EL-D5.0	5.0	6	20	75	2	A	○
PM-2EL-D6.0	6.0	6	20	75	2	B	○
PM-2EL-D8.0	8.0	8	25	100	2	B	○
PM-2EL-D10.0	10.0	10	30	100	2	B	○
PM-2EL-D12.0	12.0	12	35	100	2	B	○
PM-2EL-D14.0	14.0	14	40	100	2	B	○
PM-2EL-D16.0	16.0	16	50	150	2	B	○
PM-2EL-D20.0	20.0	20	55	150	2	B	○

Material Overview · Material Übersicht

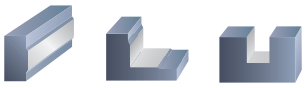
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✔ = Suitable · Empfohlen

KMG405

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~55HRC	~68HRC						
✔	✔	✔	✔	✔		✔	✔			✔	✔

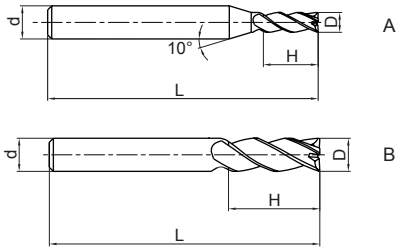
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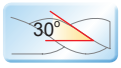
4-flute flattened end mills with straight shank
4-Schneiden Eckfräser mit Zylinderschaft



PM-4E-G













Type · Typ	Dimension(mm) Abmessungen				Teeth · Zähne Z	Geometry Ausführung	Grade Sorte KMG 405
	D	d	H	L			
PM-4E-D1.0S-G	1.0	4	3	50	4	A	●
PM-4E-D1.5S-G	1.5	4	4	50	4	A	●
PM-4E-D2.0S-G	2.0	4	6	50	4	A	●
PM-4E-D2.5S-G	2.5	4	8	50	4	A	●
PM-4E-D3.0S-G	3.0	4	8	50	4	A	●
PM-4E-D4.0S-G	4.0	4	11	50	4	B	●
PM-4E-D1.0-G	1.0	6	3	50	4	A	●
PM-4E-D1.5-G	1.5	6	4	50	4	A	●
PM-4E-D2.0-G	2.0	6	6	50	4	A	●
PM-4E-D2.5-G	2.5	6	8	50	4	A	●
PM-4E-D3.0-G	3.0	6	8	50	4	A	●
PM-4E-D3.5-G	3.5	6	10	50	4	A	●
PM-4E-D4.0-G	4.0	6	11	50	4	A	●
PM-4E-D4.5-G	4.5	6	11	50	4	A	●
PM-4E-D5.0-G	5.0	6	13	50	4	A	●
PM-4E-D5.5-G	5.5	6	16	50	4	A	●
PM-4E-D6.0-G	6.0	6	16	50	4	B	●
PM-4E-D7.0-G	7.0	8	20	60	4	A	●
PM-4E-D8.0-G	8.0	8	20	60	4	B	●
PM-4E-D9.0-G	9.0	10	22	75	4	A	●
PM-4E-D10.0-G	10.0	10	25	75	4	B	●
PM-4E-D11.0-G	11.0	12	26	75	4	A	●
PM-4E-D12.0-G	12.0	12	30	75	4	B	●
PM-4E-D14.0-G	14.0	14	32	75	4	B	●
PM-4E-D16.0-G	16.0	16	45	100	4	B	●
PM-4E-D18.0-G	18.0	18	45	100	4	B	●
PM-4E-D20.0-G	20.0	20	45	100	4	B	●

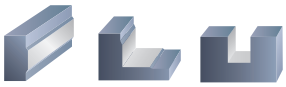
Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
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Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~55HRC	~68HRC						
✔	✔	✔	✔	✔		✔	✔			✔	✔

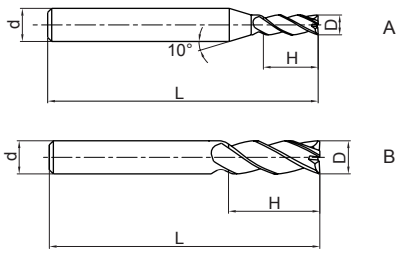
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Bestellformular für Sonderwerkzeuge

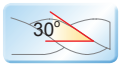
4-flute flattened end mills with straight shank and long cutting edge
4-Schneiden Eckfräser mit langer Schneide und Zylinderschaft



PM-4EL-G













Type · Typ	Dimension(mm) Abmessungen				Teeth · Zähne Z	Geometry Ausführung	Grade Sorte KMG 405
	D	d	H	L			
PM-4EL-D3.0-G	3.0	6	12	75	4	A	○
PM-4EL-D4.0-G	4.0	6	15	75	4	A	○
PM-4EL-D5.0-G	5.0	6	20	75	4	A	○
PM-4EL-D6.0-G	6.0	6	20	75	4	B	○
PM-4EL-D8.0-G	8.0	8	25	100	4	B	○
PM-4EL-D10.0-G	10.0	10	30	100	4	B	○
PM-4EL-D12.0-G	12.0	12	35	100	4	B	○
PM-4EL-D14.0-G	14.0	14	40	100	4	B	○
PM-4EL-D16.0-G	16.0	16	50	150	4	B	○
PM-4EL-D20.0-G	20.0	20	55	150	4	B	○

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KMG405

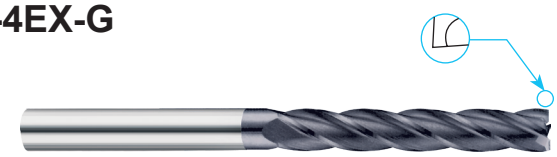
Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~55HRC	~68HRC						
✔	✔	✔	✔	✔		✔	✔			✔	✔

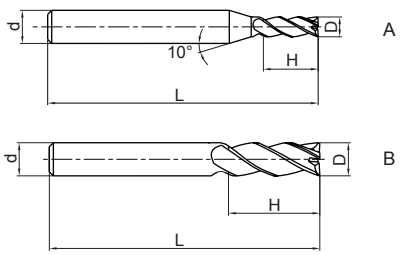
● Ex Stock / ab Lager ○ On demand / auf Anfrage

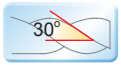
4-flute flattened end mills with straight shank and longer cutting edge
4-Schneiden Eckfräser mit Zylinderschaft und langere Schneide



PM-4EX-G













Type · Typ	Dimension(mm) Abmessungen				Teeth · Zähne Z	Geometry Ausführung	Grade Sorte KMG 405
	D	d	H	L			
PM-4EX-D3.0-G	3.0	6	20	75	4	A	○
PM-4EX-D4.0-G	4.0	6	25	75	4	A	○
PM-4EX-D5.0-G	5.0	6	30	75	4	A	○
PM-4EX-D6.0-G	6.0	6	30	75	4	B	○
PM-4EX-D8.0-G	8.0	8	40	100	4	B	○
PM-4EX-D10.0-G	10.0	10	50	110	4	B	○
PM-4EX-D12.0-G	12.0	12	50	110	4	B	○
PM-4EX-D16.0-G	16.0	16	70	150	4	B	○
PM-4EX-D20.0-G	20.0	20	75	150	4	B	○

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

KMG405

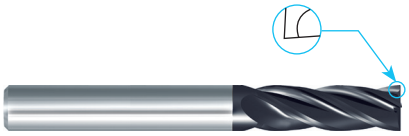
Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~55HRC	~68HRC						
✔	✔	✔	✔	✔		✔	✔			✔	✔

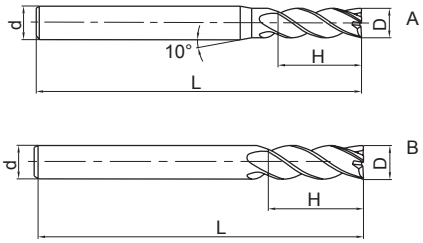
Code key B199
ISO Kennzeichen
Cutting data B378-393
Schnittdaten
Graphics identification & application B200
Graphische Werkzeug- & Anwendungsbeschr.
Order form for non-standard products B455-B456
Bestellformular für Sonderwerkzeuge

4-flute flattened end mills with straight shank
4-Schneiden Eckfräser mit Zylinderschaft



PM-4E







Type · Typ	Dimension(mm) Abmessungen				Teeth · Zähne Z	Geometry Ausführung	Grade Sorte KMG 405
	D	d	H	L			
PM-4E-D1.0S	1.0	4	3	50	4	A	●
PM-4E-D1.5S	1.5	4	4	50	4	A	●
PM-4E-D2.0S	2.0	4	6	50	4	A	●
PM-4E-D2.5S	2.5	4	8	50	4	A	●
PM-4E-D3.0S	3.0	4	8	50	4	A	●
PM-4E-D4.0S	4.0	4	11	50	4	B	●
PM-4E-D1.0	1.0	6	3	50	4	A	●
PM-4E-D1.5	1.5	6	4	50	4	A	●
PM-4E-D2.0	2.0	6	6	50	4	A	●
PM-4E-D2.5	2.5	6	8	50	4	A	●
PM-4E-D3.0	3.0	6	8	50	4	A	●
PM-4E-D3.5	3.5	6	10	50	4	A	●
PM-4E-D4.0	4.0	6	11	50	4	A	●
PM-4E-D4.5	4.5	6	11	50	4	A	●
PM-4E-D5.0	5.0	6	13	50	4	A	●
PM-4E-D5.5	5.5	6	16	50	4	A	●
PM-4E-D6.0	6.0	6	16	50	4	B	●
PM-4E-D7.0	7.0	8	20	60	4	A	●
PM-4E-D8.0	8.0	8	20	60	4	B	●
PM-4E-D9.0	9.0	10	22	75	4	A	●
PM-4E-D10.0	10.0	10	25	75	4	B	●
PM-4E-D11.0	11.0	12	26	75	4	A	●
PM-4E-D12.0	12.0	12	30	75	4	B	●
PM-4E-D14.0	14.0	14	32	75	4	B	●
PM-4E-D16.0	16.0	16	45	100	4	B	●
PM-4E-D18.0	18.0	18	45	100	4	B	●
PM-4E-D20.0	20.0	20	45	100	4	B	●

Material Overview · Material Übersicht

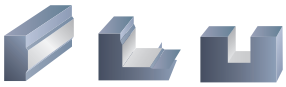
✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

KMG405

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~55HRC	~68HRC						
✔	✔	✔	✔	✔		✔	✔			✔	✔

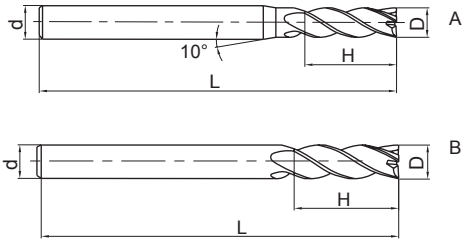
● Ex Stock / ab Lager ○ On demand / auf Anfrage

4-flute flattened end mills with straight shank and long cutting edge
4-Schneiden Eckfräser mit langer Schneide und Zylinderschaft



PM-4EL







Type · Typ	Dimension(mm) Abmessungen				Teeth · Zähne Z	Geometry Ausführung	Grade Sorte KMG 405
	D	d	H	L			
PM-4EL-D3.0	3.0	6	12	75	4	A	●
PM-4EL-D4.0	4.0	6	15	75	4	A	●
PM-4EL-D5.0	5.0	6	20	75	4	A	●
PM-4EL-D6.0	6.0	6	20	75	4	B	●
PM-4EL-D8.0	8.0	8	25	100	4	B	●
PM-4EL-D10.0	10.0	10	30	100	4	B	●
PM-4EL-D12.0	12.0	12	35	100	4	B	●
PM-4EL-D14.0	14.0	14	40	100	4	B	●
PM-4EL-D16.0	16.0	16	50	150	4	B	●
PM-4EL-D20.0	20.0	20	55	150	4	B	●

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

KMG405

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~55HRC	~68HRC						
✔	✔	✔	✔	✔		✔	✔			✔	✔

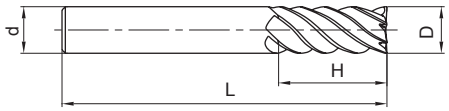
Code key B199
ISO Kennzeichen
Cutting data B378-393
Schnittdaten
Graphics identification & application B200
Graphische Werkzeug- & Anwendungsbeschr.
Order form for non-standard products B455-B456
Bestellformular für Sonderwerkzeuge

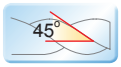
6-flute flattened end mills with straight shank
6-Schneiden Eckfräser mit Zylinderschaft



PM-6E













Type · Typ	Dimension(mm) Abmessungen				eeth · Zähne Z	Grade Sorte KMG 405
	D	d	H	L		
PM-6E-D6.0	6.0	6	18	60	6	○
PM-6E-D8.0	8.0	8	20	60	6	○
PM-6E-D10.0	10.0	10	30	75	6	○
PM-6E-D12.0	12.0	12	32	75	6	○
PM-6E-D16.0	16.0	16	40	100	6	○
PM-6E-D20.0	20.0	20	45	100	6	○

Material Overview · Material Übersicht

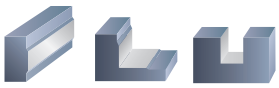
✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

KMG405

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~55HRC	~68HRC						
✔	✔	✔	✔	✔		✔	✔			✔	✔

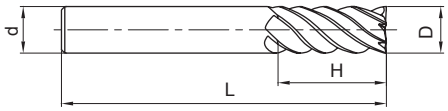
● Ex Stock / ab Lager ○ On demand / auf Anfrage

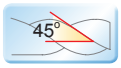
6-flute flattened end mills with straight shank and long cutting edge
6-Schneiden Eckfräser mit langer Schneide und Zylinderschaft



PM-6EL













Type · Typ	Dimension(mm) Abmessungen				eeth · Zähne Z	Grade Sorte KMG 405
	D	d	H	L		
PM-6EL-D6.0	6.0	6	24	75	6	○
PM-6EL-D8.0	8.0	8	32	75	6	○
PM-6EL-D10.0	10.0	10	40	100	6	○
PM-6EL-D12.0	12.0	12	45	100	6	○
PM-6EL-D16.0	16.0	16	64	150	6	○
PM-6EL-D20.0	20.0	20	75	150	6	○

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

KMG405

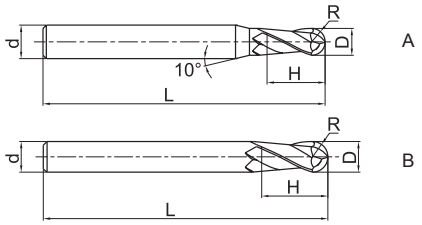
Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~55HRC	~68HRC						
✔	✔	✔	✔	✔		✔	✔			✔	✔

Code key B199
ISO Kennzeichen
Cutting data B378-393
Schnittdaten
Graphics identification & application B200
Graphische Werkzeug- & Anwendungsbeschr.
Order form for non-standard products B455-B456
Bestellformular für Sonderwerkzeuge

2-flute ball nose end mills with straight shank
2-Schneiden Kugelkopffräser mit Zylinderschaft

PM-2B







Type · Typ	Dimension(mm) Abmessungen					eeth · Zähne Z	Geometry Ausführung	Grade Sorte KMG 405
	D	R	d	H	L			
PM-2B-R0.5S	1.0	0.5	4	2	50	2	A	●
PM-2B-R0.75S	1.5	0.75	4	3	50	2	A	●
PM-2B-R1.0S	2.0	1.0	4	4	50	2	A	●
PM-2B-R1.25S	2.5	1.25	4	5	50	2	A	●
PM-2B-R1.5S	3.0	1.5	4	6	50	2	A	●
PM-2B-R2.0S	4.0	2.0	4	8	50	2	B	●
PM-2B-R0.5	1.0	0.5	6	2	50	2	A	●
PM-2B-R0.75	1.5	0.75	6	3	50	2	A	●
PM-2B-R1.0	2.0	1.0	6	4	50	2	A	●
PM-2B-R1.25	2.5	1.25	6	5	50	2	A	●
PM-2B-R1.5	3.0	1.5	6	6	50	2	A	●
PM-2B-R1.75	3.5	1.75	6	8	50	2	A	●
PM-2B-R2.0	4.0	2.0	6	8	50	2	A	●
PM-2B-R2.5	5.0	2.5	6	10	50	2	A	●
PM-2B-R2.75	5.5	2.75	6	12	50	2	A	●
PM-2B-R3.0	6.0	3.0	6	12	50	2	B	●
PM-2B-R3.5	7.0	3.5	8	14	60	2	A	●
PM-2B-R4.0	8.0	4.0	8	16	60	2	B	●
PM-2B-R4.5	9.0	4.5	10	18	75	2	A	●
PM-2B-R5.0	10.0	5.0	10	20	75	2	B	●
PM-2B-R6.0	12.0	6.0	12	24	75	2	B	●
PM-2B-R7.0	14.0	7.0	14	28	75	2	B	●
PM-2B-R8.0	16.0	8.0	16	32	100	2	B	●
PM-2B-R10.0	20.0	10.0	20	40	100	2	B	●

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

KMG405

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~55HRC	~68HRC						
✔	✔	✔	✔	✔		✔	✔			✔	✔

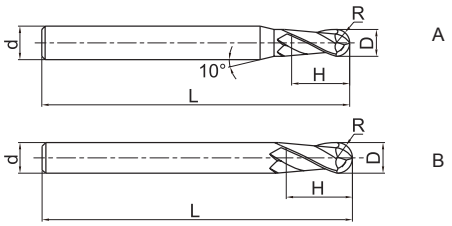
● Ex Stock / ab Lager ○ On demand / auf Anfrage

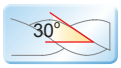
2-flute ball nose end mills with straight shank and long cutting edge
2-Schneiden Kugelkopffräser mit langer Schneide und Zylinderschaft



PM-2BL















Type · Typ	Dimension(mm) Abmessungen					eeth · Zähne Z	Geometry Ausführung	Grade Sorte KMG 405
	D	R	d	H	L			
PM-2BL-R1.0	2.0	1.0	6	4	75	2	A	○
PM-2BL-R1.25	2.5	1.25	6	5	75	2	A	○
PM-2BL-R1.5	3.0	1.5	6	6	75	2	A	○
PM-2BL-R1.75	3.5	1.75	6	8	75	2	A	○
PM-2BL-R2.0	4.0	2.0	6	8	75	2	A	○
PM-2BL-R2.5	5.0	2.5	6	10	75	2	A	○
PM-2BL-R2.75	5.5	2.75	6	12	75	2	A	○
PM-2BL-R3.0	6.0	3.0	6	12	75	2	B	○
PM-2BL-R3.5	7.0	3.5	8	14	75	2	A	○
PM-2BL-R4.0	8.0	4.0	8	16	100	2	B	○
PM-2BL-R4.5	9.0	4.5	10	18	100	2	A	○
PM-2BL-R5.0	10.0	5.0	10	20	100	2	B	○
PM-2BL-R6.0	12.0	6.0	12	24	100	2	B	○
PM-2BL-R7.0	14.0	7.0	14	28	100	2	B	○
PM-2BL-R8.0	16.0	8.0	16	32	150	2	B	○
PM-2BL-R10.0	20.0	10.0	20	40	150	2	B	○

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

KMG405

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~55HRC	~68HRC						
✔	✔	✔	✔	✔		✔	✔			✔	✔

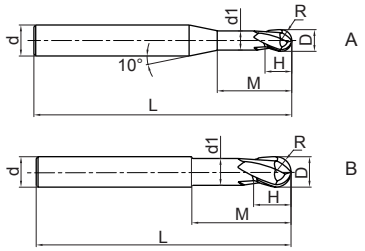
Code key B199
ISO Kennzeichen
Cutting data B378-393
Schnittdaten
Graphics identification & application B200
Graphische Werkzeug- & Anwendungsbeschr.
Order form for non-standard products B455-B456
Bestellformular für Sonderwerkzeuge

2-flute straight shank ball nose end mills with short cutting edge and long neck
2-Schneiden Kugelkopffräser mit kurzer Schneide und Zylinderschaft



PM-2BFP







Type · Typ	Dimension(mm) Abmessungen							Teeth · Zähne Z	Geometry Ausführung	Grade Sorte KMG 405
	D	R	H	d_1	M	d	L			
PM-2BFP-R0.5	1.0	0.5	1	0.95	2.5	6	75	2	A	○
PM-2BFP-R0.75	1.5	0.75	1.5	1.45	3	6	75	2	A	○
PM-2BFP-R1.0	2.0	1.0	2	1.95	4	6	75	2	A	○
PM-2BFP-R1.5	3.0	1.5	3	2.85	6	6	75	2	A	○
PM-2BFP-R2.0	4.0	2.0	4	3.85	8	6	75	2	A	○
PM-2BFP-R2.5	5.0	2.5	5	4.85	10	6	75	2	A	○
PM-2BFP-R3.0	6.0	3.0	6	5.8	12	6	75	2	B	○
PM-2BFP-R4.0	8.0	4.0	8	7.8	16	8	100	2	B	○
PM-2BFP-R5.0	10.0	5.0	10	9.6	20	10	100	2	B	○
PM-2BFP-R6.0	12.0	6.0	12	11.5	24	12	100	2	B	○
PM-2BFP-R8.0	16.0	8.0	16	15.5	32	16	150	2	B	○
PM-2BFP-R10.0	20.0	10.0	20	19.5	40	20	150	2	B	○

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

KMG405

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~55HRC	~68HRC						
✔	✔	✔	✔	✔		✔	✔			✔	✔

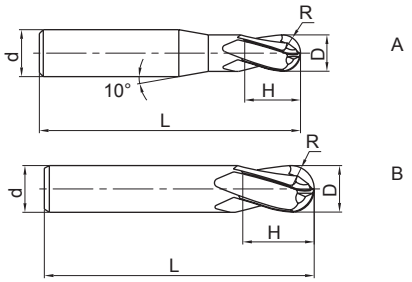
● Ex Stock / ab Lager ○ On demand / auf Anfrage

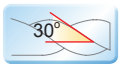
4-flute ball nose end mills with straight shank
4-Schneiden Kugelkopffräser mit Zylinderschaft



PM-4B















Type · Typ	Dimension(mm) Abmessungen					Teeth · Zähne Z	Geometry Ausführung	Grade Sorte KMG 405
	D	R	d	H	L			
PM-4B-R1.5	3.0	1.5	6	6	50	4	A	○
PM-4B-R2.0	4.0	2.0	6	8	50	4	A	○
PM-4B-R2.5	5.0	2.5	6	10	50	4	A	○
PM-4B-R3.0	6.0	3.0	6	12	50	4	B	○
PM-4B-R4.0	8.0	4.0	8	16	60	4	B	○
PM-4B-R5.0	10.0	5.0	10	20	75	4	B	○
PM-4B-R6.0	12.0	6.0	12	24	75	4	B	○
PM-4B-R7.0	14.0	7.0	14	28	75	4	B	○
PM-4B-R8.0	16.0	8.0	16	32	100	4	B	○
PM-4B-R9.0	18.0	9.0	18	36	100	4	B	○
PM-4B-R10.0	20.0	10.0	20	40	100	4	B	○

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

KMG405

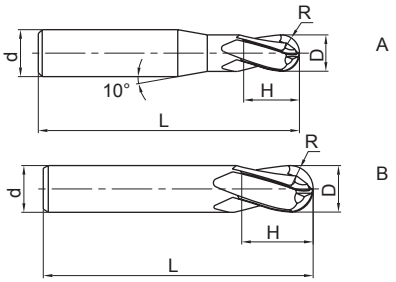
Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~55HRC	~68HRC						
✔	✔	✔	✔	✔		✔	✔			✔	✔

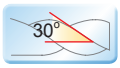
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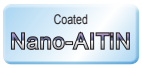
4-flute ball nose end mills with straight shank and long cutting edge
4-Schneiden Kugelkopffräser mit mit langer Schneide und Zylinderschaft

PM-4BL















Type · Typ	Dimension(mm) Abmessungen					Teeth · Zähne Z	Geometry Ausführung	Grade Sorte KMG 405
	D	R	d	H	L			
PM-4BL-R1.5	3.0	1.5	6	6	75	4	A	○
PM-4BL-R2.0	4.0	2.0	6	8	75	4	A	○
PM-4BL-R2.5	5.0	2.5	6	10	75	4	A	○
PM-4BL-R3.0	6.0	3.0	6	12	75	4	B	○
PM-4BL-R4.0	8.0	4.0	8	16	100	4	B	○
PM-4BL-R5.0	10.0	5.0	10	20	100	4	B	○
PM-4BL-R6.0	12.0	6.0	12	24	100	4	B	○
PM-4BL-R7.0	14.0	7.0	14	28	100	4	B	○
PM-4BL-R8.0	16.0	8.0	16	32	150	4	B	○
PM-4BL-R9.0	18.0	9.0	18	36	150	4	B	○
PM-4BL-R10.0	20.0	10.0	20	40	150	4	B	○

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

KMG405

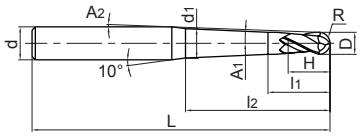
Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~55HRC	~68HRC						
✔	✔	✔	✔	✔		✔	✔			✔	✔

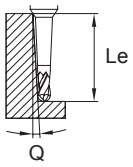
● Ex Stock / ab Lager ○ On demand / auf Anfrage

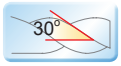
2-flute conical neck ball nose end mills
2-Schneiden Mikro Kugelkopffräser mit konischem Hals

PM-2BC

















Type · Typ	Dimension(mm) Abmessungen										Teeth · Zähne Z	Q = Le				Grade Sorte KMG 405
	D	R	A_1	H	l_2	l_1	A_2	d_1	L	d		0.5°	1°	2°	3°	
PM-2BC05-R0.25-M03	0.5	0.25	0.5°	0.5	3	1.5	7.8°	0.49	50	4	2	3.3	3.5	3.9	4.4	○
PM-2BC05-R0.25-M05					5		6.8°	0.53			2	5.3	5.6	6.2	7.1	○
PM-2BC10-R0.25-M03			1.0°		3		7.8°	0.52			2	-	3.4	3.8	4.3	○
PM-2BC10-R0.25-M05					5		6.9°	0.59			2	-	5.4	6.0	6.8	○
PM-2BC15-R0.25-M03			1.5°		3		7.9°	0.54			2	-	-	3.7	4.1	○
PM-2BC15-R0.25-M05					5		7.0°	0.65			2	-	-	5.8	6.6	○
PM-2BC05-R0.30-M05	0.6	0.30	0.5°	0.6	5	1.6	6.8°	0.62	50	4	2	5.3	5.6	6.2	7.1	○
PM-2BC05-R0.30-M08					8		5.7°	0.68			2	8.3	8.7	9.8	11.1	○
PM-2BC10-R0.30-M05			1.0°		5		6.8°	0.68			2	-	5.4	6.0	6.8	○
PM-2BC10-R0.30-M08					8		5.8°	0.79			2	-	8.4	9.4	10.7	○
PM-2BC10-R0.30-M10					10		5.2°	0.86			2	-	10.4	11.6	13.2	○
PM-2BC10-R0.30-M12					12		4.8°	0.93			2	-	12.4	13.9	15.8	○
PM-2BC10-R0.30-M15					15		4.2°	1.03			2	-	15.4	17.2	19.6	○
PM-2BC15-R0.30-M05			1.5°		5		6.9°	0.74			2	-	-	5.8	6.6	○
PM-2BC15-R0.30-M08					8		5.9°	0.90			2	-	-	9.0	10.2	○
PM-2BC05-R0.40-M08	0.8	0.40	0.5°	0.8	8	1.8	5.5°	0.87	50	4	2	8.3	8.7	9.8	11.1	○
PM-2BC05-R0.40-M12					12		4.5°	0.94	60		2	12.3	13.0	14.5	16.5	○
PM-2BC10-R0.40-M08			1.0°		8		5.6°	0.98	50		2	-	8.4	9.4	10.7	○
PM-2BC10-R0.40-M12					12		4.6°	1.12	60		2	-	12.4	13.9	15.8	○
PM-2BC15-R0.40-M08			1.5°		8		5.8°	1.09	50		2	-	-	9.0	10.2	○
PM-2BC15-R0.40-M12					12		4.8°	1.30	60		2	-	-	13.2	15.0	○

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

KMG405

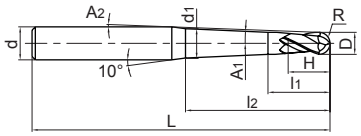
Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~55HRC	~68HRC						
✔	✔	✔	✔	✔		✔	✔			✔	✔

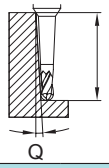
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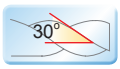
2-flute conical neck ball nose end mills
2-Schneiden Mikro Kugelkopffräser mit konischem Hals

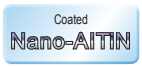
PM-2BC

















Type · Typ	Dimension(mm) Abmessungen										Teeth · Zähne Z	Q ≙ Le				Grade Sorte KMG 405
	D	R	A_1	H	l_2	l_1	A_2	d_1	L	d		0.5°	1°	2°	3°	
PM-2BC05-R0.50-M10	1.0	0.50	0.5°	1.0	10	2.5	6.1°	1.08	60	6	2	10.4	10.9	12.2	13.9	○
PM-2BC05-R0.50-M15					15		5.1°	1.16	60		2	15.4	16.2	18.2	20.7	○
PM-2BC05-R0.50-M20					20		4.4°	1.25	70		2	20.4	21.5	24.1	27.4	○
PM-2BC05-R0.50-M25					25		3.8°	1.34	70		2	25.4	26.8	30.0	34.2	○
PM-2BC05-R0.50-M30					30		3.4°	1.42	70		2	30.4	32.0	35.9	41.0	○
PM-2BC10-R0.50-M10			1.0°		10		6.2°	1.21	60		2	-	10.5	11.8	13.4	○
PM-2BC10-R0.50-M15					15		5.2°	1.38	60		2	-	15.5	17.4	19.8	○
PM-2BC10-R0.50-M20					20		4.5°	1.56	70		2	-	20.5	23.0	26.2	○
PM-2BC10-R0.50-M25					25		3.9°	1.73	70		2	-	25.5	28.6	32.6	○
PM-2BC10-R0.50-M30					30		3.5°	1.91	70		2	-	30.5	34.2	39.0	○
PM-2BC10-R0.50-M35					35		3.2°	2.08	80		2	-	35.5	39.8	45.4	○
PM-2BC15-R0.50-M10			1.5°		10		6.3°	1.34	60		2	-	-	11.3	12.8	○
PM-2BC15-R0.50-M15					15		5.3°	1.60	60		2	-	-	16.6	18.9	○
PM-2BC15-R0.50-M20					20		4.6°	1.86	70		2	-	-	21.9	24.9	○
PM-2BC20-R0.50-M15			2°		15		5.4°	1.82	60		2	-	-	15.8	18.0	○
PM-2BC20-R0.50-M20					20		4.7°	2.17	70		2	-	-	20.8	23.7	○
PM-2BC30-R0.50-M20			3°		20		5.0°	2.78	70		2	-	-	-	21.2	○
PM-2BC50-R0.50-M20			5°		20		5.7°	4.01	70		2	-	-	-	-	○
PM-2BC05-R0.60-M12	1.2	0.60	0.5°	1.2	12	2.7	5.6°	1.31	60	6	2	12.4	13.1	14.6	16.6	○
PM-2BC05-R0.60-M24					24		3.8°	1.52	70		2	24.4	25.7	28.8	32.8	○
PM-2BC10-R0.60-M12			1.0°		12		5.7°	1.47	60		2	-	12.5	14.0	15.9	○
PM-2BC10-R0.60-M24					24		3.9°	1.89	70		2	-	24.5	27.5	31.3	○
PM-2BC15-R0.60-M12			1.5°		12		5.8°	1.63	60		2	-	-	13.4	15.2	○
PM-2BC15-R0.60-M24					24		4.1°	2.26	70		2	-	-	26.2	29.8	○

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~55HRC	~68HRC						
✔	✔	✔	✔	✔		✔	✔			✔	✔

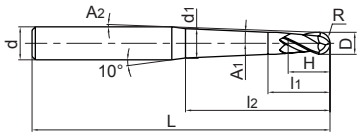
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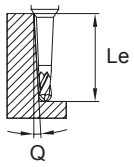
KMG405

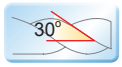
2-flute conical neck ball nose end mills
2-Schneiden Mikro Kugelkopffräser mit konischem Hals

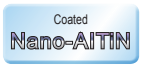
PM-2BC

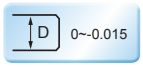
















Type · Typ	Dimension(mm) Abmessungen										Teeth · Zähne Z	Q ≙ Le				Grade Sorte KMG 405
	D	R	A_1	H	l_2	l_1	A_2	d_1	L	d		0.5°	1°	2°	3°	
PM-2BC05-R0.75-M10	1.5	0.75	0.5°	1.5	10	3	5.9°	1.57	60	6	2	10.4	10.9	12.2	13.8	○
PM-2BC05-R0.75-M15					15		4.9°	1.65	60		2	15.4	16.2	18.1	20.6	○
PM-2BC05-R0.75-M30					30		3.2°	1.92	70		2	30.4	32.0	35.9	40.9	○
PM-2BC10-R0.75-M10			1.0°		10		6.0°	1.69	60		2	-	10.5	11.8	13.3	○
PM-2BC10-R0.75-M15					15		5.0°	1.86	60		2	-	15.5	17.4	19.7	○
PM-2BC10-R0.75-M20			1.0°		20		4.2°	2.04	70		2	-	20.5	23.0	26.1	○
PM-2BC10-R0.75-M30					30		3.3°	2.39	70		2	-	30.5	34.2	39.0	○
PM-2BC15-R0.75-M10			1.5°		10		6.1°	1.81	60		2	-	-	11.3	12.8	○
PM-2BC15-R0.75-M15					15		5.1°	2.07	60		2	-	-	16.6	18.9	○
PM-2BC15-R0.75-M30					30		3.4°	2.86	70		2	-	-	32.5	37.0	○
PM-2BC05-R1.0-M20	2.0	1.0	0.5°	2.0	20	4	3.9°	2.18	60	6	2	20.7	21.7	24.3	27.6	○
PM-2BC05-R1.0-M30					30		2.9°	2.36	70		2	30.7	32.3	36.2	no interference	○
PM-2BC05-R1.0-M40					40		2.4°	2.53	80		2	40.7	42.8	48.0	no interference	○
PM-2BC10-R1.0-M20			1.0°		20		4.0°	2.46	60		2	-	20.8	23.3	26.4	○
PM-2BC10-R1.0-M25					25		3.4°	2.64	60		2	-	25.8	28.9	32.9	○
PM-2BC10-R1.0-M30					30		3.0°	2.81	70		2	-	30.8	34.5	39.3	○
PM-2BC10-R1.0-M35					35		2.7°	2.99	80		2	-	35.8	40.1	no interference	○
PM-2BC10-R1.0-M40					40		2.5°	3.16	80		2	-	40.8	45.8	no interference	○
PM-2BC10-R1.0-M50					50		2.1°	3.51	90		2	-	50.8	57.0	no interference	○
PM-2BC15-R1.0-M20	2.0	1.0	1.5°	2	20	4	4.1°	2.74	60	6	2	-	-	22.3	25.3	○
PM-2BC15-R1.0-M30					30		3.1°	3.27	70		2	-	-	32.9	37.4	○
PM-2BC15-R1.0-M40					40		2.6°	3.79	80		2	-	-	43.5	no interference	○
PM-2BC20-R1.0-M30			2°		30		3.3°	3.72	70		2	-	-	31.3	35.5	○
PM-2BC20-R1.0-M40					40		2.7°	4.42	80		2	-	-	41.3	no interference	○
PM-2BC30-R1.0-M30			3°		30		3.5°	4.63	70		2	-	-	-	31.8	○
PM-2BC30-R1.0-M40					40		2.9°	5.68	80		2	-	-	-	no interference	○

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

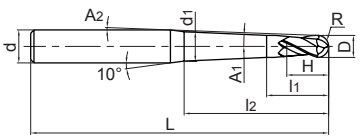
Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~55HRC	~68HRC						
✔	✔	✔	✔	✔		✔	✔			✔	✔

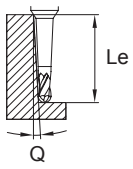
Code key B199
ISO Kennzeichen
Cutting data B378-393
Schnittdaten
Graphics identification & application B200
Graphische Werkzeug- & Anwendungsbeschr.
Order form for non-standard products B455-B456
Bestellformular für Sonderwerkzeuge

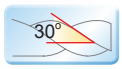
2-flute conical neck ball nose end mills
2-Schneiden Mikro Kugelkopffräser mit konischem Hals

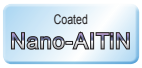
PM-2BC

















Type · Typ	Dimension(mm) Abmessungen										Teeth · Zähne Z	Q ≙ Le				Grade Sorte KMG 405
	D	R	A_1	H	l_2	l_1	A_2	d_1	L	d		0.5°	1°	2°	3°	
PM-2BC05-R1.5-M30	3.0	1.5	0.5°	3	30	6	2.4°	3.32	70	6	2	30.7	32.3	36.2	no interference	○
PM-2BC05-R1.5-M40					40		1.9°	3.50	80		2	40.7	42.9	no interference	no interference	○
PM-2BC05-R1.5-M50					50		1.6°	3.67	90		2	50.7	53.4	no interference	no interference	○
PM-2BC10-R1.5-M30			1.0°		30		2.5°	3.74	70		2	-	31.0	34.7	no interference	○
PM-2BC10-R1.5-M40					40		2.0°	4.09	80		2	-	41.0	45.9	no interference	○
PM-2BC10-R1.5-M50					50		1.7°	4.44	90		2	-	51.0	no interference	no interference	○
PM-2BC15-R1.5-M30			1.5°		30		2.6°	4.16	70		2	-	-	33.1	no interference	○
PM-2BC15-R1.5-M40					40		2.1°	4.69	80		2	-	-	43.8	no interference	○
PM-2BC15-R1.5-M50					50		1.7°	5.21	90		2	-	-	no interference	no interference	○
PM-2BC05-R2.0-M60	4.0	2.0	0.5°	4	60	7	1.0°	4.83	110	6	2	60.8	64.0	no interference	no interference	○
PM-2BC10-R2.0-M60			1.0°		60		1.0°	5.76	110		2	-	61.1	no interference	no interference	○

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

KMG405

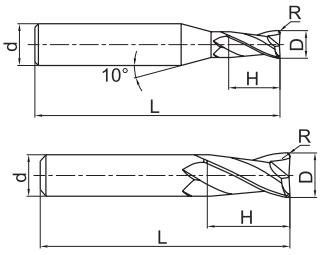
Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~55HRC	~68HRC						
✔	✔	✔	✔	✔		✔	✔			✔	✔

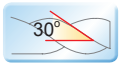
● Ex Stock / ab Lager ○ On demand / auf Anfrage

2-flute radius end mills with straight shank
2-Schneiden Radius Schaftfräser und Zylinderschaft

PM-2R













Type · Typ	Dimension(mm) Abmessungen					Teeth · Zähne Z	Geometry Ausführung	Grade Sorte KMG 405
	D	R	d	H	L			
PM-2R-D1.0R0.2	1.0	0.2	4	3	50	2	A	○
PM-2R-D1.5R0.2	1.5	0.2	4	4	50	2	A	○
PM-2R-D2.0R0.2	2.0	0.2	4	6	50	2	A	○
PM-2R-D2.0R0.5	2.0	0.5	4	6	50	2	A	○
PM-2R-D2.5R0.2	2.5	0.2	4	8	50	2	A	○
PM-2R-D2.5R0.5	2.5	0.5	4	8	50	2	A	○
PM-2R-D3.0R0.2	3.0	0.2	4	8	50	2	A	○
PM-2R-D3.0R0.3	3.0	0.3	4	8	50	2	A	○
PM-2R-D3.0R0.5	3.0	0.5	4	8	50	2	A	○
PM-2R-D4.0R0.2	4.0	0.2	4	11	50	2	B	○
PM-2R-D4.0R0.3	4.0	0.3	4	11	50	2	B	○
PM-2R-D4.0R0.5	4.0	0.5	4	11	50	2	B	○
PM-2R-D4.0R1.0	4.0	1.0	4	11	50	2	B	○
PM-2R-D5.0R0.3	5.0	0.3	6	13	50	2	A	○
PM-2R-D5.0R0.5	5.0	0.5	6	13	50	2	A	○
PM-2R-D5.0R1.0	5.0	1.0	6	13	50	2	A	○
PM-2R-D6.0R0.3	6.0	0.3	6	16	50	2	B	○
PM-2R-D6.0R0.5	6.0	0.5	6	16	50	2	B	○
PM-2R-D6.0R1.0	6.0	1.0	6	16	50	2	B	○
PM-2R-D8.0R0.3	8.0	0.3	8	20	60	2	B	○
PM-2R-D8.0R0.5	8.0	0.5	8	20	60	2	B	○
PM-2R-D8.0R1.0	8.0	1.0	8	20	60	2	B	○
PM-2R-D10.0R0.5	10.0	0.5	10	25	75	2	B	○
PM-2R-D10.0R1.0	10.0	1.0	10	25	75	2	B	○
PM-2R-D10.0R1.5	10.0	1.5	10	25	75	2	B	○
PM-2R-D10.0R2.0	10.0	2.0	10	25	75	2	B	○
PM-2R-D12.0R0.5	12.0	0.5	12	30	75	2	B	○
PM-2R-D12.0R1.0	12.0	1.0	12	30	75	2	B	○
PM-2R-D12.0R1.5	12.0	1.5	12	30	75	2	B	○
PM-2R-D12.0R2.0	12.0	2.0	12	30	75	2	B	○

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

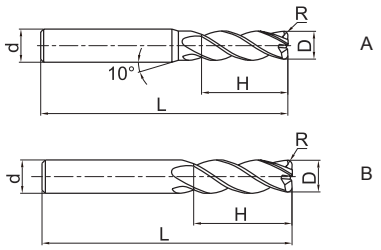
Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~55HRC	~68HRC						
✔	✔	✔	✔	✔		✔	✔			✔	✔

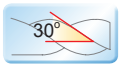
Code key B199
ISO Kennzeichen
Cutting data B378-393
Schnittdaten
Graphics identification & application B200
Graphische Werkzeug- & Anwendungsbeschr.
Order form for non-standard products B455-B456
Bestellformular für Sonderwerkzeuge

4-flute radius end mills with straight shank
4-Schneiden Radius Schaftfräser und Zylinderschaft

PM-4R













Type · Typ	Dimension(mm) Abmessungen					Teeth · Zähne Z	Geometry Ausführung	Grade Sorte KMG 405
	D	R	d	H	L			
PM-4R-D3.0R0.2	3.0	0.2	6	8	50	4	A	●
PM-4R-D4.0R0.3	4.0	0.3	6	10	50	4	A	●
PM-4R-D4.0R0.5	4.0	0.5	6	10	50	4	A	●
PM-4R-D5.0R0.5	5.0	0.5	6	13	50	4	A	●
PM-4R-D5.0R1.0	5.0	1.0	6	13	50	4	A	●
PM-4R-D6.0R0.5	6.0	0.5	6	16	50	4	B	●
PM-4R-D6.0R1.0	6.0	1.0	6	16	50	4	B	●
PM-4R-D8.0R0.5	8.0	0.5	8	20	60	4	B	●
PM-4R-D8.0R1.0	8.0	1.0	8	20	60	4	B	●
PM-4R-D10.0R0.5	10.0	0.5	10	25	75	4	B	●
PM-4R-D10.0R1.0	10.0	1.0	10	25	75	4	B	●
PM-4R-D10.0R2.0	10.0	2.0	10	25	75	4	B	●
PM-4R-D10.0R3.0	10.0	3.0	10	25	75	4	B	●
PM-4R-D12.0R0.5	12.0	0.5	12	30	75	4	B	●
PM-4R-D12.0R1.0	12.0	1.0	12	30	75	4	B	●
PM-4R-D12.0R2.0	12.0	2.0	12	30	75	4	B	●
PM-4R-D12.0R3.0	12.0	3.0	12	30	75	4	B	●

Material Overview · Material Übersicht

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KMG405

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~55HRC	~68HRC						
✔	✔	✔	✔	✔		✔	✔			✔	✔

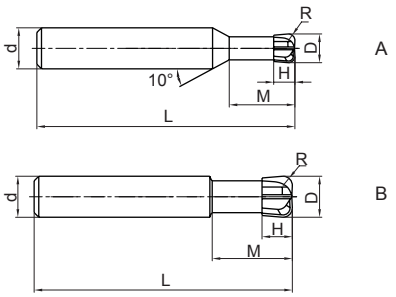
● Ex Stock / ab Lager ○ On demand / auf Anfrage

4-flute high feed end mills
4-Schneiden "High Feed" VHM-Fräser



PM-4H





Coated Nano-AlTiN | D D~-0.030

Type · Typ	Dimension(mm) Abmessungen							Teeth · Zähne Z	Geometry Ausführung	Grade Sorte KMG 405
	D	R	d	d_1	H	M	L			
PM-4H-D3.0R0.8	3.0	0.8	6	2.7	1.2	8	50	4	A	○
PM-4H-D4.0R1.0	4.0	1.0	6	3.6	1.6	10	50	4	A	○
PM-4H-D5.0R1.2	5.0	1.2	6	4.5	2	12.5	50	4	A	○
PM-4H-D6.0R1.0	6.0	1.0	6	5.4	2.5	12	50	4	B	○
PM-4H-D6.0R1.5	6.0	1.5	6	5.4	2.5	12	50	4	B	○
PM-4H-D8.0R1.0	8.0	1.0	8	7.0	3.5	16	60	4	B	○
PM-4H-D8.0R2.0	8.0	2.0	8	7.0	3.5	16	60	4	B	○
PM-4H-D10.0R1.0	10.0	1.0	10	9.0	4	20	75	4	B	○
PM-4H-D10.0R2.0	10.0	2.0	10	9.0	4	20	75	4	B	○
PM-4H-D12.0R2.0	12.0	2.0	12	11.0	5	24	75	4	B	○
PM-4H-D12.0R3.0	12.0	3.0	12	11.0	5	24	75	4	B	○

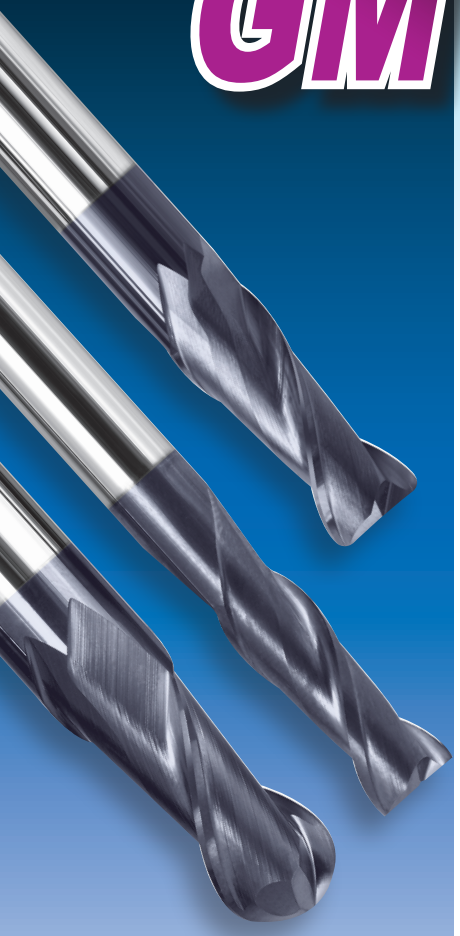
Material Overview · Material Übersicht

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KMG405

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~55HRC	~68HRC						
✔	✔	✔	✔	✔		✔	✔			✔	✔

Code key B199 ISO Kennzeichen
Cutting data B378-393 Schnittdaten
Graphics identification & application B200 Graphische Werkzeug- & Anwendungsbeschr.
Order form for non-standard products B455-B456 Bestellformular für Sonderwerkzeuge



GM

Series end mills for general machining

Serie Eckfräser für allgemeine Anwendung

Wide application: high efficiency machining of common steel up to light hardend steel.

Optimized structure: reasonable combination of sharp cutting edge and tool strength makes cutting much light and fast, achieving longer tool-life.

Completes Programm (application): covers applications from roughing with high metal removal rate to finish machining with high surface quality.

Completes Programm (dimension): the minimum diameter of 0.3 mm, easily complete machining even though the micro part of workpiece.

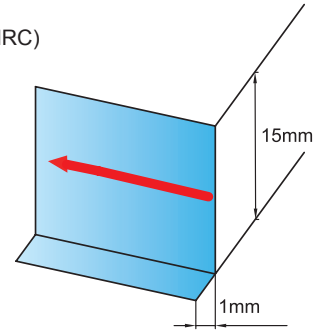
Großer Anwendungsbereich: effiziente Bearbeitung von normalem bis zu leicht gehärtetem Stahl.

Optimiertes Design: Scharfe Schneide mit hoher Kantenstabilität. Für leichte und schnelle Bearbeitung mit hoher Standzeit.

komplettes Programm (Anwendung): vom Schruppen bei hoher Zerspanungsleistung bis Schlichten bei exzellenter Werkstückqualität.

komplettes Programm (Abmessung): ab Durchmesser 0,3 mm für die Bearbeitung von kleinen Werkstücken.

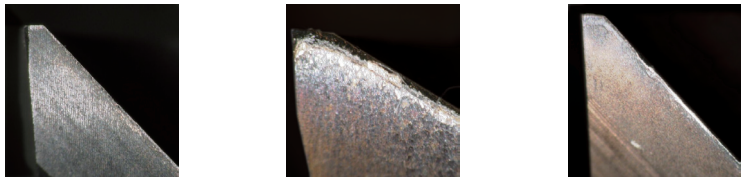
- Tool type: GM-4E-D10.0
- Size: Ø10.0mm
- Workpiece material · Werkstückstoff: NAK80 (40HRC)
- Rotating speed: 3200r/min (100m/min)
- Feed: 640mm/r (0.2mm/r)
- Axial cutting depth
  Axiale Zustellung: Ap=15mm
- Radial cutting depth
  Radiale Zustellung: Ae=1.0mm
- Cutting style: side milling /Eckfräsen
- Cooling system: air blow /Luft
- Machine: MIKRON UCP 1000



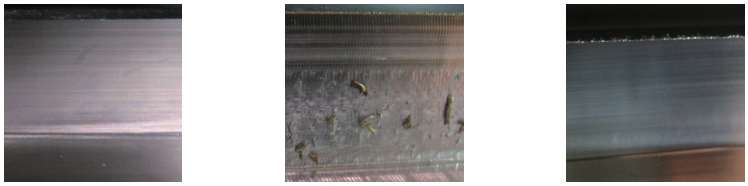
■ Cutting edge wear and surface quality of workpiece · Schneidkantenverschleiß und Werkstück Oberflächenqualität

End mills · Eckfräser	GM-4E-D10.0	Similar product of company A Ähnliches Produkt Firma A	Similar product of company B Ähnliches Produkt Firma B
Cutting length · Schnittlänge	60m	20m	60m

Cutting edge wear
Schneidkantenverschleiß

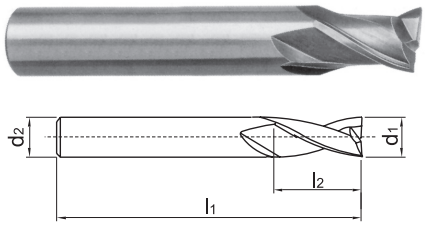


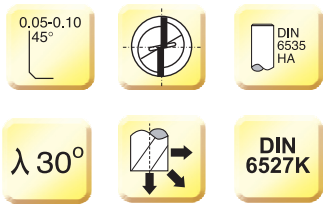
Workpiece surface quality
Werkstück Qualität



DIN 6527K 2-flute slotting end mills · DIN 6527K 2-Schneiden VHM Langlochfräser

5501R302GM





Type · Typ	Dimension(mm) Abmessungen				Teeth Zähne	Application Anwendung	P M K	
	d1(e8)	d2(h6)	l2	l1	z	Grade	YK30F	KMG303
5501R302GM-0300	3.00	6	4	50	2		o	●
5501R302GM-0400	4.00	6	5	54	2		o	●
5501R302GM-0500	5.00	6	6	54	2		o	●
5501R302GM-0600	6.00	6	7	54	2		o	●
5501R302GM-0800	8.00	8	9	58	2		o	●
5501R302GM-1000	10.00	10	11	66	2		o	●
5501R302GM-1200	12.00	12	12	73	2		o	●
5501R302GM-1400	14.00	14	14	75	2		o	●
5501R302GM-1600	16.00	16	16	82	2		o	●
5501R302GM-1800	18.00	18	18	84	2		o	●
5501R302GM-2000	20.00	20	20	92	2		o	●
						Art. Group No. / Produktgruppe Nr. :	**021140**	**021130**

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

KMG303

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
✔	✔	✔	✔			✔	✔				

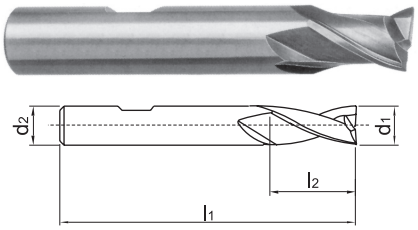
Code key B197 ISO Kennzeichen
Cutting data B350-377 Schnittdaten
Graphics identification & application B198 Graphische Werkzeug- & Anwendungsbeschr.
Order form for non-standard products B455-456 Bestellformular für Sonderwerkzeuge

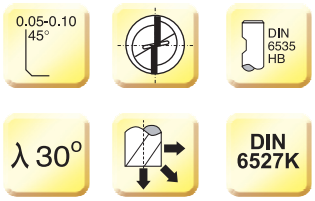
DIN 6527K 2-flute slotting end mills · DIN 6527K 2-Schneiden VHM Langlochfräser



5601R302GM

YK30F: Ultra-fine carbide grade / *Ultrafeinkornhartmetall*
KMG303: nano TiAlN coated ultra-fine carbide / *nano TiAlN beschichtetes Ultrafeinkornhartmetall*





Type *Typ*	Dimension(mm) *Abmessungen*				Teeth *Zähne*	Application *Anwendung*	P M K	
	$d_1(e_8)$	$d_2(h_6)$	l_2	l_1	z	Grade	YK30F	KMG303
5601R302GM-0300	3.00	6	4	50	2		○	●
5601R302GM-0400	4.00	6	5	54	2		○	●
5601R302GM-0500	5.00	6	6	54	2		○	●
5601R302GM-0600	6.00	6	7	54	2		○	●
5601R302GM-0800	8.00	8	9	58	2		○	●
5601R302GM-1000	10.00	10	11	66	2		○	●
5601R302GM-1200	12.00	12	12	73	2		○	●
5601R302GM-1400	14.00	14	14	75	2		○	●
5601R302GM-1600	16.00	16	16	82	2		○	●
5601R302GM-1800	18.00	18	18	84	2		○	●
5601R302GM-2000	20.00	20	20	92	2		○	●
						Art. Group No. / *Produktgruppe Nr.* :	**021140**	**021130**

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

KMG303

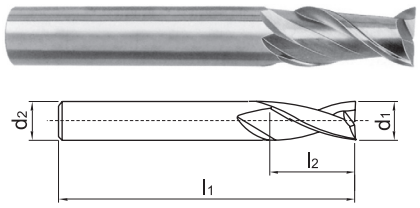
Workpiece material Werkstückstoff										
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
✔	✔	✔	✔			✔	✔				

● Ex Stock / ab Lager ○ On demand / auf Anfrage

DIN 6527L 2-flute slotting end mills · DIN 6527L 2-Schneiden VHM Langlochfräser

5502R302GM

YK30F: Ultra-fine carbide grade / *Ultrafeinkornhartmetall*
KMG303: nano TiAlN coated ultra-fine carbide / *nano TiAlN beschichtetes Ultrafeinkornhartmetall*



0.05-0.10 45°
DIN 6535 HA
λ 30°
DIN 6527L

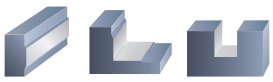
Type *Typ*	Dimension(mm) *Abmessungen*				Teeth *Zähne*	Application *Anwendung*	P M K	
	$d_1(e_8)$	$d_2(h_6)$	l_2	l_1	z	Grade	YK30F	KMG303
5502R302GM-0100	1.00	3	2	38	2		○	●
5502R302GM-0150	1.50	3	3	38	2		○	●
5502R302GM-0200	2.00	6	6	57	2		○	●
5502R302GM-0250	2.50	6	7	57	2		○	●
5502R302GM-0280	2.80	6	7	57	2		○	●
5502R302GM-0300	3.00	6	7	57	2		○	●
5502R302GM-0350	3.50	6	7	57	2		○	●
5502R302GM-0380	3.80	6	8	57	2		○	●
5502R302GM-0400	4.00	6	8	57	2		○	●
5502R302GM-0450	4.50	6	8	57	2		○	●
5502R302GM-0480	4.80	6	8	57	2		○	●
5502R302GM-0500	5.00	6	10	57	2		○	●
5502R302GM-0550	5.50	6	10	57	2		○	●
5502R302GM-0575	5.75	6	10	57	2		○	●
5502R302GM-0600	6.00	6	10	57	2		○	●
5502R302GM-0675	6.75	8	13	63	2		○	●
5502R302GM-0700	7.00	8	13	63	2		○	●
5502R302GM-0750	7.50	8	16	63	2		○	●
5502R302GM-0775	7.75	8	16	63	2		○	●
5502R302GM-0800	8.00	8	16	63	2		○	●
5502R302GM-0870	8.70	10	16	72	2		○	●
5502R302GM-0900	9.00	10	16	72	2		○	●
5502R302GM-0950	9.50	10	16	72	2			○
5502R302GM-1000	10.00	10	19	72	2		○	●
5502R302GM-1100	11.00	12	22	83	2			○
5502R302GM-1170	11.70	12	22	83	2		○	●
5502R302GM-1200	12.00	12	22	83	2		○	●
5502R302GM-1370	13.70	14	22	83	2		○	●
5502R302GM-1400	14.00	14	22	83	2		○	●
5502R302GM-1500	15.00	16	26	92	2			○
5502R302GM-1570	15.70	16	26	92	2		○	●
5502R302GM-1600	16.00	16	26	92	2		○	●
5502R302GM-1700	17.00	18	26	92	2			○
5502R302GM-1800	18.00	18	26	92	2		○	●
5502R302GM-2000	20.00	20	32	104	2		○	●
						Art. Group No. / *Produktgruppe Nr.* :	021140	021130

Code key B197
ISO Kennzeichen
Cutting data B350-377
Schnittdaten
Graphics identification & application B198
Graphische Werkzeug- & Anwendungsbeschr.
Order form for non-standard products B455-456
Bestellformular für Sonderwerkzeuge

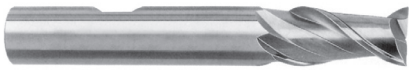
DIN 6527L 2-flute slotting end mills · DIN 6527L 2-Schneiden VHM Langlochfräser

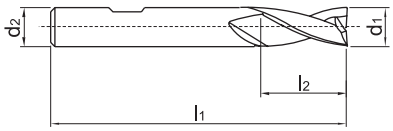


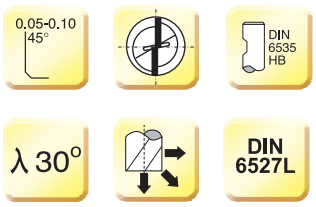
5602R302GM



YK30F: Ultra-fine carbide grade / *Ultrafeinkornhartmetall*
KMG303: nano TiAlN coated ultra-fine carbide / *nano TiAlN beschichtetes Ultrafeinkornhartmetall*







Type *Typ*	Dimension(mm) *Abmessungen*				Teeth *Zähne*	Application *Anwendung*	P M K	
	$d_1(e_8)$	$d_2(h_6)$	l_2	l_1	z	Grade	YK30F	KMG303
5602R302GM-0200	2.00	6	6	57	2		○	●
5602R302GM-0250	2.50	6	7	57	2		○	●
5602R302GM-0280	2.80	6	7	57	2		○	●
5602R302GM-0300	3.00	6	7	57	2		○	●
5602R302GM-0350	3.50	6	7	57	2		○	●
5602R302GM-0380	3.80	6	8	57	2		○	●
5602R302GM-0400	4.00	6	8	57	2		○	●
5602R302GM-0450	4.50	6	8	57	2		○	●
5602R302GM-0480	4.80	6	8	57	2		○	●
5602R302GM-0500	5.00	6	10	57	2		○	●
5602R302GM-0550	5.50	6	10	57	2		○	●
5602R302GM-0575	5.75	6	10	57	2		○	●
5602R302GM-0600	6.00	6	10	57	2		○	●
5602R302GM-0675	6.75	8	13	63	2		○	●
5602R302GM-0700	7.00	8	13	63	2		○	●
5602R302GM-0750	7.50	8	16	63	2		○	●
5602R302GM-0775	7.75	8	16	63	2		○	●
5602R302GM-0800	8.00	8	16	63	2		○	●
5602R302GM-0870	8.70	10	16	72	2		○	●
5602R302GM-0900	9.00	10	16	72	2		○	●
5602R302GM-1000	10.00	10	19	72	2		○	●
5602R302GM-1170	11.70	12	22	83	2		○	●
5602R302GM-1200	12.00	12	22	83	2		○	●
5602R302GM-1370	13.70	14	22	83	2		○	●
5602R302GM-1400	14.00	14	22	83	2		○	●
5602R302GM-1570	15.70	16	26	92	2		○	●
5602R302GM-1600	16.00	16	26	92	2		○	●
5602R302GM-1800	18.00	18	26	92	2		○	●
5602R302GM-2000	20.00	20	32	104	2		○	●
			Art. Group No. / *Produktgruppe Nr.* :				021140	021130

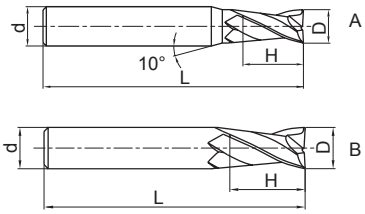
● Ex Stock / ab Lager ○ On demand / auf Anfrage

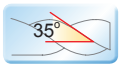
GM-2E

2-flute flattened end mills with straight shank
2-Schneiden Eckfräser mit Zylinderschaft















Type · Typ	Dimension(mm) Abmessungen				Teeth · Zähne Z	Geometry Ausführung	Grade · Sorte KMG 303
	D	d	H	L			
GM-2E-D1.0S	1.0	4	3	50	2	A	●
GM-2E-D1.5S	1.5	4	4	50	2	A	●
GM-2E-D2.0S	2.0	4	6	50	2	A	●
GM-2E-D2.5S	2.5	4	8	50	2	A	●
GM-2E-D3.0S	3.0	4	8	50	2	A	●
GM-2E-D4.0S	4.0	4	11	50	2	B	●
GM-2E-D1.0	1.0	6	3	50	2	A	●
GM-2E-D1.5	1.5	6	4	50	2	A	●
GM-2E-D2.0	2.0	6	6	50	2	A	●
GM-2E-D2.5	2.5	6	8	50	2	A	●
GM-2E-D3.0	3.0	6	8	50	2	A	●
GM-2E-D3.5	3.5	6	10	50	2	A	●
GM-2E-D4.0	4.0	6	11	50	2	A	●
GM-2E-D4.5	4.5	6	11	50	2	A	●
GM-2E-D5.0	5.0	6	13	50	2	A	●
GM-2E-D5.5	5.5	6	16	50	2	A	●
GM-2E-D6.0	6.0	6	16	50	2	B	●
GM-2E-D7.0	7.0	8	20	60	2	A	●
GM-2E-D8.0	8.0	8	20	60	2	B	●
GM-2E-D9.0	9.0	10	22	75	2	A	●
GM-2E-D10.0	10.0	10	25	75	2	B	●
GM-2E-D11.0	11.0	12	26	75	2	A	●
GM-2E-D12.0	12.0	12	30	75	2	B	●
GM-2E-D14.0	14.0	14	32	75	2	B	●
GM-2E-D16.0	16.0	16	45	100	2	B	●
GM-2E-D18.0	18.0	18	45	100	2	B	●
GM-2E-D20.0	20.0	20	45	100	2	B	●

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~55HRC	~68HRC						
✔	✔	✔	✔			✔	✔				

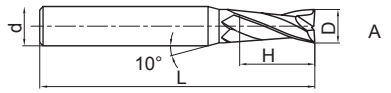
Code key B199
ISO Kennzeichen
Cutting data B394-419
Schnittdaten
Graphics identification & application B200
Graphische Werkzeug- & Anwendungsbeschr.
Order form for non-standard products B455-B456
Bestellformular für Sonderwerkzeuge

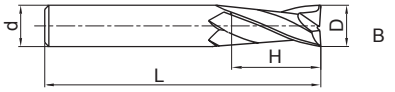
GM-2EL series for general machining · GM-2EL Serie für allgemeine Bearbeitung

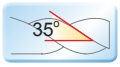
2-flute flattened end mills with straight shank and long cutting edge
2-Schneiden Eckfräser mit langer Schneide und Zylinderschaft



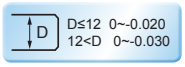














Type · Typ	Dimension(mm) Abmessungen				Teeth · Zähne Z	Geometry Ausführung	Grade · Sorte KMG 303
	D	d	H	L			
GM-2EL-D3.0	3.0	6	12	75	2	A	●
GM-2EL-D4.0	4.0	6	15	75	2	A	●
GM-2EL-D5.0	5.0	6	20	75	2	A	●
GM-2EL-D6.0	6.0	6	20	75	2	B	●
GM-2EL-D8.0	8.0	8	25	100	2	B	●
GM-2EL-D10.0	10.0	10	30	100	2	B	●
GM-2EL-D12.0	12.0	12	35	100	2	B	●
GM-2EL-D14.0	14.0	14	40	100	2	B	●
GM-2EL-D16.0	16.0	16	50	150	2	B	●
GM-2EL-D20.0	20.0	20	55	150	2	B	●

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

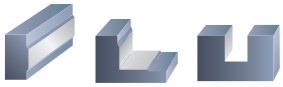
KMG303

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
✔	✔	✔	✔			✔	✔				

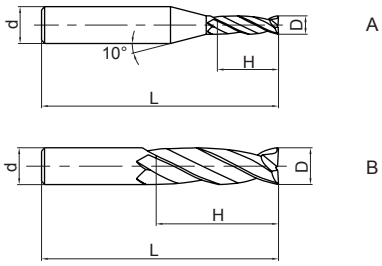
● Ex Stock / ab Lager ○ On demand / auf Anfrage

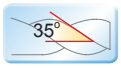
GM-2EX

2-flute flattened end mills with straight shank and very long cutting edge
2-Schneiden Eckfräser mit extra langer Schneide und Zylinderschaft















Type · Typ	Dimension(mm) Abmessungen				Teeth · Zähne Z	Geometry Ausführung	Grade · Sorte KMG 303
	D	d	H	L			
GM-2EX-D3.0	3.0	6	20	75	2	A	○
GM-2EX-D4.0	4.0	6	25	75	2	A	○
GM-2EX-D5.0	5.0	6	30	75	2	A	○
GM-2EX-D6.0	6.0	6	30	75	2	B	○
GM-2EX-D8.0	8.0	8	40	100	2	B	○
GM-2EX-D10.0	10.0	10	50	110	2	B	○
GM-2EX-D12.0	12.0	12	50	110	2	B	○
GM-2EX-D16.0	16.0	16	70	150	2	B	○
GM-2EX-D20.0	20.0	20	75	150	2	B	○

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

KMG303

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~55HRC	~68HRC						
✔	✔	✔	✔			✔	✔				

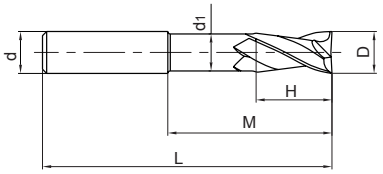
Code key B199
ISO Kennzeichen
Cutting data B394-419
Schnittdaten
Graphics identification & application B200
Graphische Werkzeug- & Anwendungsbeschr.
Order form for non-standard products B455-B456
Bestellformular für Sonderwerkzeuge

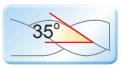
GM-2EFP

2-flute end mills with straight shank and short cutting edge and long neck
2-Schneiden Eckfräser mit kurzer Schneide und Zylinderschaft

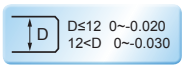














Type · Typ	Dimension(mm) Abmessungen					Geometry Ausführung	Teeth · Zähne Z	Grade · Sorte KMG 303
	D	d	H	L				
GM-2EFP-D6.0	6.0	6	9	30	5.8	75	2	○
GM-2EFP-D8.0	8.0	8	12	40	7.8	100	2	○
GM-2EFP-D10.0	10.0	10	15	50	9.6	100	2	○
GM-2EFP-D12.0	12.0	12	18	50	11.5	100	2	○
GM-2EFP-D16.0	16.0	16	24	50	15.5	150	2	○
GM-2EFP-D20.0	20.0	20	30	60	19.5	150	2	○

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

KMG303

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~55HRC	~68HRC						
✔	✔	✔	✔			✔	✔				

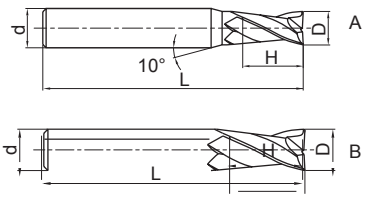
● Ex Stock / ab Lager ○ On demand / auf Anfrage

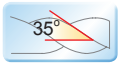
GM-2F

2-flute flattened end mills with straight shank
2-Schneiden Eckfräser mit Zylinderschaft

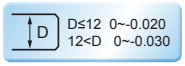














Type · Typ	Dimension(mm) Abmessungen				Teeth · Zähne Z	Geometry Ausführung	Grade · Sorte KMG 303
	D	d	H	L			
GM-2F-D1.0S	1.0	4	3	50	2	A	○
GM-2F-D1.5S	1.5	4	4	50	2	A	○
GM-2F-D2.0S	2.0	4	6	50	2	A	○
GM-2F-D2.5S	2.5	4	8	50	2	A	○
GM-2F-D3.0S	3.0	4	8	50	2	A	○
GM-2F-D4.0S	4.0	4	11	50	2	B	○
GM-2F-D1.0	1.0	6	3	50	2	A	○
GM-2F-D1.5	1.5	6	4	50	2	A	○
GM-2F-D2.0	2.0	6	6	50	2	A	○
GM-2F-D2.5	2.5	6	8	50	2	A	○
GM-2F-D3.0	3.0	6	8	50	2	A	○
GM-2F-D3.5	3.5	6	10	50	2	A	○
GM-2F-D4.0	4.0	6	11	50	2	A	○
GM-2F-D4.5	4.5	6	11	50	2	A	○
GM-2F-D5.0	5.0	6	13	50	2	A	○
GM-2F-D5.5	5.5	6	16	50	2	A	○
GM-2F-D6.0	6.0	6	16	50	2	B	○
GM-2F-D7.0	7.0	8	20	60	2	A	○
GM-2F-D8.0	8.0	8	20	60	2	B	○
GM-2F-D9.0	9.0	10	22	75	2	A	○
GM-2F-D10.0	10.0	10	25	75	2	B	○
GM-2F-D11.0	11.0	12	26	75	2	A	○
GM-2F-D12.0	12.0	12	30	75	2	B	○
GM-2F-D14.0	14.0	14	32	75	2	B	○
GM-2F-D16.0	16.0	16	45	100	2	B	○
GM-2F-D18.0	18.0	18	45	100	2	B	○
GM-2F-D20.0	20.0	20	45	100	2	B	○

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

KMG303

Workpiece material Werkstückstoff										
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~55HRC	~68HRC						
✔	✔	✔	✔			✔	✔				

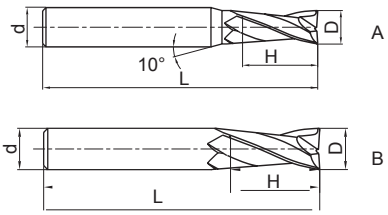
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ISO Kennzeichen
Cutting data B394-419
Schnittdaten
Graphics identification & application B200
Graphische Werkzeug- & Anwendungsbeschr.
Order form for non-standard products B455-B456
Bestellformular für Sonderwerkzeuge

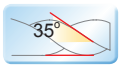
GM-2FL

2-flute end mills with straight shank and long cutting edge and long neck
2-Schneiden Eckfräser mit langer Schneide und Zylinderschaft















Type · Typ	Dimension(mm) Abmessungen				Teeth · Zähne Z	Geometry Ausführung	Grade · Sorte KMG 303
	D	d	H	L			
GM-2FL-D3.0	3.0	6	12	75	2	A	○
GM-2FL-D4.0	4.0	6	15	75	2	A	○
GM-2FL-D5.0	5.0	6	20	75	2	A	○
GM-2FL-D6.0	6.0	6	20	75	2	B	○
GM-2FL-D8.0	8.0	8	25	100	2	B	○
GM-2FL-D10.0	10.0	10	30	100	2	B	○
GM-2FL-D12.0	12.0	12	35	100	2	B	○
GM-2FL-D14.0	14.0	14	40	100	2	B	○
GM-2FL-D16.0	16.0	16	50	150	2	B	○
GM-2FL-D20.0	20.0	20	55	150	2	B	○

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

KMG303

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~55HRC	~68HRC						
✔	✔	✔	✔			✔	✔				

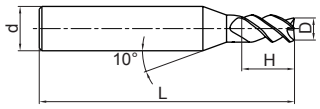
● Ex Stock / ab Lager ○ On demand / auf Anfrage

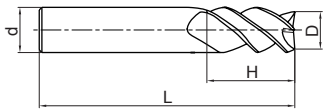
GM-3E

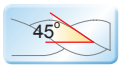
3-flute flattened end mills with straight shank
3-Schneiden Eckfräser mit Zylinderschaft

















Type · Typ	Dimension(mm) Abmessungen				Teeth · Zähne Z	Geometry Ausführung	Grade · Sorte KMG 303
	D	d	H	L			
GM-3E-D1.0S	1.0	4	3	50	3	A	○
GM-3E-D1.5S	1.5	4	4	50	3	A	○
GM-3E-D2.0S	2.0	4	6	50	3	A	○
GM-3E-D2.5S	2.5	4	8	50	3	A	○
GM-3E-D3.0S	3.0	4	8	50	3	A	○
GM-3E-D4.0S	4.0	4	11	50	3	B	○
GM-3E-D1.0	1.0	6	3	50	3	A	○
GM-3E-D1.5	1.5	6	4	50	3	A	○
GM-3E-D2.0	2.0	6	6	50	3	A	○
GM-3E-D2.5	2.5	6	8	50	3	A	○
GM-3E-D3.0	3.0	6	8	50	3	A	○
GM-3E-D3.5	3.5	6	10	50	3	A	○
GM-3E-D4.0	4.0	6	11	50	3	A	○
GM-3E-D4.5	4.5	6	11	50	3	A	○
GM-3E-D5.0	5.0	6	13	50	3	A	○
GM-3E-D5.5	5.5	6	16	50	3	A	○
GM-3E-D6.0	6.0	6	16	50	3	B	○
GM-3E-D7.0	7.0	8	20	60	3	A	○
GM-3E-D8.0	8.0	8	20	60	3	B	○
GM-3E-D9.0	9.0	10	22	75	3	A	○
GM-3E-D10.0	10.0	10	25	75	3	B	○
GM-3E-D11.0	11.0	12	26	75	3	A	○
GM-3E-D12.0	12.0	12	30	75	3	B	○
GM-3E-D14.0	14.0	14	32	75	3	B	○
GM-3E-D16.0	16.0	16	45	100	3	B	○
GM-3E-D18.0	18.0	18	45	100	3	B	○
GM-3E-D20.0	20.0	20	45	100	3	B	○

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

KMG303

Workpiece material Werkstückstoff										
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~55HRC	~68HRC						
✔	✔	✔	✔			✔	✔				

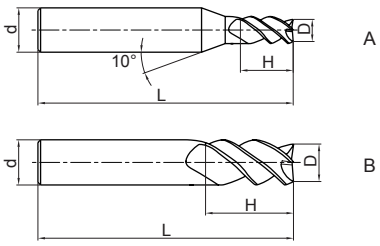
Code key B199 ISO Kennzeichen
Cutting data B394-419 Schnittdaten
Graphics identification & application B200 Graphische Werkzeug- & Anwendungsbeschr.
Order form for non-standard products B455-B456 Bestellformular für Sonderwerkzeuge

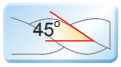
GM-3EL

3-flute end mills with straight shank and long cutting edge and long neck
3-Schneiden Eckfräser mit langer Schneide und Zylinderschaft















Type · Typ	Dimension(mm) Abmessungen				Teeth · Zähne Z	Geometry Ausführung	Grade · Sorte KMG 303
	D	d	H	L			
GM-3EL-D3.0	3.0	6	12	75	3	A	○
GM-3EL-D4.0	4.0	6	15	75	3	A	○
GM-3EL-D5.0	5.0	6	20	75	3	A	○
GM-3EL-D6.0	6.0	6	20	75	3	B	○
GM-3EL-D8.0	8.0	8	25	100	3	B	○
GM-3EL-D10.0	10.0	10	30	100	3	B	○
GM-3EL-D12.0	12.0	12	35	100	3	B	○
GM-3EL-D14.0	14.0	14	40	100	3	B	○
GM-3EL-D16.0	16.0	16	50	150	3	B	○
GM-3EL-D20.0	20.0	20	55	150	3	B	○

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

KMG303

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~55HRC	~68HRC						
✔	✔	✔	✔			✔	✔				

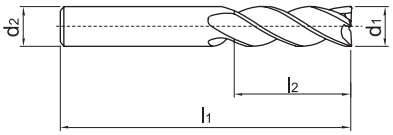
● Ex Stock / ab Lager ○ On demand / auf Anfrage

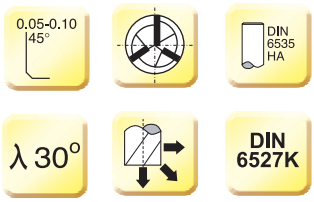
DIN 6527K 3-flute slotting end mills · DIN 6527K 3-Schneiden VHM Langlochfräser

5501R303GM

YK30F: Ultra-fine carbide grade / *Ultrafeinkornhartmetall*
KMG303: nano TiAlN coated ultra-fine carbide / *nano TiAlN beschichtetes Ultrafeinkornhartmetall*







Type *Typ*	Dimension(mm) *Abmessungen*				Teeth *Zähne*	Application *Anwendung*	P M K	
	$d_1(e_8)$	$d_2(h_6)$	l_2	l_1	z	Grade	YK30F	KMG303
5501R303GM-0300	3.00	6	4	50	3		○	●
5501R303GM-0400	4.00	6	5	54	3		○	●
5501R303GM-0500	5.00	6	6	54	3		○	●
5501R303GM-0600	6.00	6	7	54	3		○	●
5501R303GM-0800	8.00	8	9	58	3		○	●
5501R303GM-1000	10.00	10	11	66	3		○	●
5501R303GM-1200	12.00	12	12	73	3		○	●
5501R303GM-1400	14.00	14	14	75	3		○	●
5501R303GM-1600	16.00	16	16	82	3		○	●
5501R303GM-1800	18.00	18	18	84	3		○	●
5501R303GM-2000	20.00	20	20	92	3		○	●
						Art. Group No. / *Produktgruppe Nr.* :	**021140**	**021130**

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

KMG303

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
✔	✔	✔	✔			✔	✔				

Code key ISO Kennzeichen B197
Cutting data Schnittdaten B350-377
Graphics identification & application Graphische Werkzeug- & Anwendungsbeschr. B198
Order form for non-standard products Bestellformular für Sonderwerkzeuge B455-456

DIN 6527K 3-flute slotting end mills · DIN 6527K 3-Schneiden VHM Langlochfräser

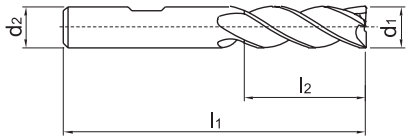


5601R303GM



YK30F: Ultra-fine carbide grade / *Ultrafeinkornhartmetall*
KMG303: nano TiAlN coated ultra-fine carbide / *nano TiAlN beschichtetes Ultrafeinkornhartmetall*







Type *Typ*	Dimension(mm) *Abmessungen*				Teeth *Zähne*	Application *Anwendung*	P M K	
	$d_1(e_8)$	$d_2(h_6)$	l_2	l_1	z	Grade	YK30F	KMG303
5601R303GM-0300	3.00	6	4	50	3		○	●
5601R303GM-0400	4.00	6	5	54	3		○	●
5601R303GM-0500	5.00	6	6	54	3		○	●
5601R303GM-0600	6.00	6	7	54	3		○	●
5601R303GM-0800	8.00	8	9	58	3		○	●
5601R303GM-1000	10.00	10	11	66	3		○	●
5601R303GM-1200	12.00	12	12	73	3		○	●
5601R303GM-1400	14.00	14	14	75	3		○	●
5601R303GM-1600	16.00	16	16	82	3		○	●
5601R303GM-1800	18.00	18	18	84	3		○	●
5601R303GM-2000	20.00	20	20	92	3		○	●
						Art. Group No. / *Produktgruppe Nr.* :	**021140**	**021130**

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

KMG303

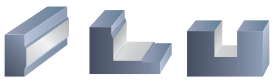
Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
✔	✔	✔	✔			✔	✔				

● Ex Stock / ab Lager ○ On demand / auf Anfrage

DIN 6527L 3-flute slotting end mills · DIN 6527L 3-Schneiden VHM Langlochfräser

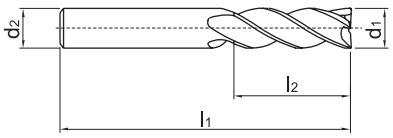


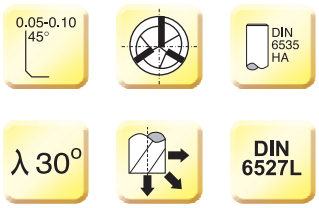
5502R303GM



YK30F: Ultra-fine carbide grade / *Ultrafeinkornhartmetall*
KMG303: nano TiAlN coated ultra-fine carbide / *nano TiAlN beschichtetes Ultrafeinkornhartmetall*







Type *Typ*	Dimension(mm) *Abmessungen*				Teeth *Zähne*	Application *Anwendung*	P M K	
	$d_1(h_{10})$	$d_2(h_6)$	l_2	l_1	z	Grade	YK30F	KMG303
5502R303GM-0300	3.00	6	7	57	3		○	●
5502R303GM-0400	4.00	6	8	57	3		○	●
5502R303GM-0500	5.00	6	10	57	3		○	●
5502R303GM-0600	6.00	6	10	57	3		○	●
5502R303GM-0800	8.00	8	16	63	3		○	●
5502R303GM-1000	10.00	10	19	72	3		○	●
5502R303GM-1200	12.00	12	22	83	3		○	●
5502R303GM-1400	14.00	14	22	83	3		○	●
5502R303GM-1600	16.00	16	26	92	3		○	●
5502R303GM-1800	18.00	18	26	92	3		○	●
5502R303GM-2000	20.00	20	32	104	3		○	●
						Art. Group No. / *Produktgruppe Nr.* :	**021140**	**021130**

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
✔	✔	✔	✔			✔	✔				

Code key B197 ISO Kennzeichen
Cutting data B350-377 Schnittdaten
Graphics identification & application B198 Graphische Werkzeug- & Anwendungsbeschr.
Order form for non-standard products B455-456 Bestellformular für Sonderwerkzeuge

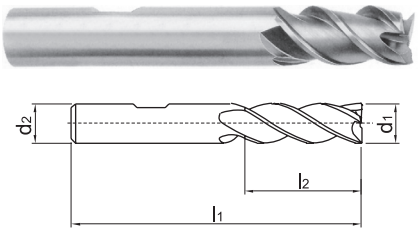
DIN 6527L 3-flute slotting end mills · DIN 6527L 3-Schneiden VHM Langlochfräser



5602R303GM

YK30F: Ultra-fine carbide grade / *Ultrafeinkornhartmetall*
KMG303: nano TiAlN coated ultra-fine carbide / *nano TiAlN beschichtetes Ultrafeinkornhartmetall*







Type *Typ*	Dimension(mm) *Abmessungen*				Teeth *Zähne*	Application *Anwendung*	P M K	
	$d_1(h_{10})$	$d_2(h_6)$	l_2	l_1	z	Grade	YK30F	KMG303
5602R303GM-0300	3.00	6	7	57	3		○	●
5602R303GM-0400	4.00	6	8	57	3		○	●
5602R303GM-0500	5.00	6	10	57	3		○	●
5602R303GM-0600	6.00	6	10	57	3		○	●
5602R303GM-0800	8.00	8	16	63	3		○	●
5602R303GM-1000	10.00	10	19	72	3		○	●
5602R303GM-1200	12.00	12	22	83	3		○	●
5602R303GM-1400	14.00	14	22	83	3		○	●
5602R303GM-1600	16.00	16	26	92	3		○	●
5602R303GM-1800	18.00	18	26	92	3		○	●
5602R303GM-2000	20.00	20	32	104	3		○	●
						Art. Group No. / *Produktgruppe Nr.* :	**021140**	**021130**

Material Overview · Material Übersicht

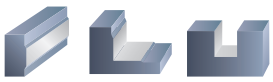
✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

KMG303

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
✔	✔	✔	✔			✔	✔				

● Ex Stock / ab Lager ○ On demand / auf Anfrage

DIN 6527L 3-flute end mills · DIN 6527L 3-Schneiden VHM Schaftfräser

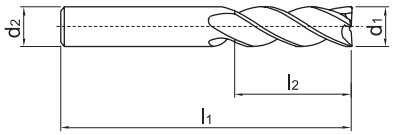




5502R453GM

KMG405: nano TiAlN coated ultra-fine carbide / *nano TiAlN beschichtetes Ultrafeinkornhartmetall*







Type *Typ*	Dimension(mm) *Abmessungen*				Teeth *Zähne*	Application *Anwendung*	P M K S
	$d_1(h_{10})$	$d_2(h_6)$	l_2	l_1	z	Grade	KMG405
5502R453GM-0300	3.00	6	7	57	3		●
5502R453GM-0400	4.00	6	8	57	3		●
5502R453GM-0500	5.00	6	10	57	3		●
5502R453GM-0600	6.00	6	10	57	3		●
5502R453GM-0800	8.00	8	16	63	3		●
5502R453GM-1000	10.00	10	19	72	3		●
5502R453GM-1200	12.00	12	22	83	3		●
5502R453GM-1400	14.00	14	22	83	3		●
5502R453GM-1600	16.00	16	26	92	3		●
5502R453GM-1800	18.00	18	26	92	3		●
5502R453GM-2000	20.00	20	32	104	3		●
					Art. Group No. / *Produktgruppe Nr.* :		**021130**

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

KMG405

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
✔	✔	✔	✔			✔	✔			✔	✔

Code key B197
ISO Kennzeichen
Cutting data B350-377
Schnittdaten
Graphics identification & application B198
Graphische Werkzeug- & Anwendungsbeschr.
Order form for non-standard products B455-456
Bestellformular für Sonderwerkzeuge

DIN 6527L 3-flute end mills · DIN 6527L 3-Schneiden VHM Schaftfräser

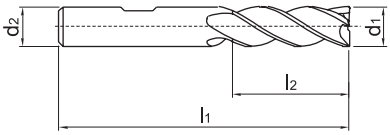




5602R453GM

KMG405: nano TiAlN coated ultra-fine carbide / *nano TiAlN beschichtetes Ultrafeinkornhartmetall*
KMG303: nano TiAlN coated ultra-fine carbide / *nano TiAlN beschichtetes Ultrafeinkornhartmetall*







Type *Typ*	Dimension(mm) *Abmessungen*				Teeth *Zähne*	Application *Anwendung*	P M K S	
	$d_1(h_{10})$	$d_2(h_6)$	l_2	l_1	z	Grade	KMG303	KMG405
5602R453GM-0300	3.00	6	7	57	3		●	●
5602R453GM-0400	4.00	6	8	57	3		●	●
5602R453GM-0500	5.00	6	10	57	3		●	●
5602R453GM-0600	6.00	6	10	57	3		●	●
5602R453GM-0800	8.00	8	16	63	3		●	●
5602R453GM-1000	10.00	10	19	72	3		●	●
5602R453GM-1200	12.00	12	22	83	3		●	●
5602R453GM-1400	14.00	14	22	83	3		●	●
5602R453GM-1600	16.00	16	26	92	3		●	●
5602R453GM-1800	18.00	18	26	92	3		●	●
5602R453GM-2000	20.00	20	32	104	3		●	●

Art. Group No. / *Produktgruppe Nr.* : 021130

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

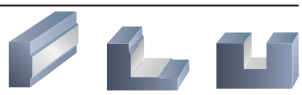
KMG405

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
✔	✔	✔	✔			✔	✔			✔	✔

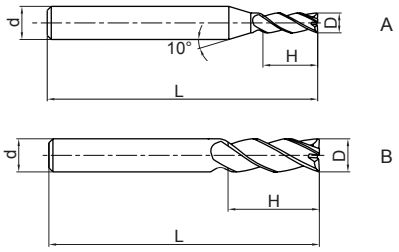
● Ex Stock / ab Lager ○ On demand / auf Anfrage

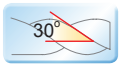
GM-4E-G

4-flute flattened end mills with straight shank
4-Schneiden Eckfräser mit Zylinderschaft















Type · Typ	Dimension(mm) Abmessungen				Teeth · Zähne Z	Geometry Ausführung	Grade · Sorte KMG 303
	D	d	H	L			
GM-4E-D1.0S-G	1.0	4	3	50	4	A	●
GM-4E-D1.5S-G	1.5	4	4	50	4	A	●
GM-4E-D2.0S-G	2.0	4	6	50	4	A	●
GM-4E-D2.5S-G	2.5	4	8	50	4	A	●
GM-4E-D3.0S-G	3.0	4	8	50	4	A	●
GM-4E-D4.0S-G	4.0	4	11	50	4	B	●
GM-4E-D1.0-G	1.0	6	3	50	4	A	●
GM-4E-D1.5-G	1.5	6	4	50	4	A	●
GM-4E-D2.0-G	2.0	6	6	50	4	A	●
GM-4E-D2.5-G	2.5	6	8	50	4	A	●
GM-4E-D3.0-G	3.0	6	8	50	4	A	●
GM-4E-D3.5-G	3.5	6	10	50	4	A	●
GM-4E-D4.0-G	4.0	6	11	50	4	A	●
GM-4E-D4.5-G	4.5	6	11	50	4	A	●
GM-4E-D5.0-G	5.0	6	13	50	4	A	●
GM-4E-D5.5-G	5.5	6	16	50	4	A	●
GM-4E-D6.0-G	6.0	6	16	50	4	B	●
GM-4E-D7.0-G	7.0	8	20	60	4	A	●
GM-4E-D8.0-G	8.0	8	20	60	4	B	●
GM-4E-D9.0-G	9.0	10	22	75	4	A	●
GM-4E-D10.0-G	10.0	10	25	75	4	B	●
GM-4E-D11.0-G	11.0	12	26	75	4	A	●
GM-4E-D12.0-G	12.0	12	30	75	4	B	●
GM-4E-D14.0-G	14.0	14	32	75	4	B	●
GM-4E-D16.0-G	16.0	16	45	100	4	B	●
GM-4E-D18.0-G	18.0	18	45	100	4	B	●
GM-4E-D20.0-G	20.0	20	45	100	4	B	●

Material Overview · Material Übersicht

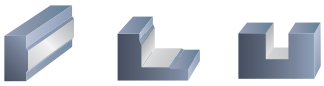
✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
✔	✔	✔	✔			✔	✔				

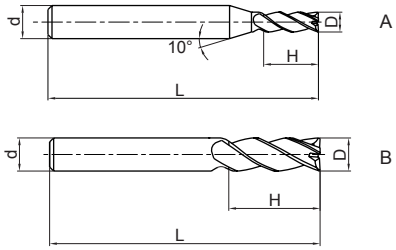
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Cutting data B394-419 Schnittdaten
Graphics identification & application B200 Graphische Werkzeug- & Anwendungsbeschr.
Order form for non-standard products B455-B456 Bestellformular für Sonderwerkzeuge

GM-4F-G

4-flute flattened end mills with straight shank
4-Schneiden Eckfräser mit Zylinderschaft









Type · Typ	Dimension(mm) Abmessungen				Teeth · Zähne Z	Geometry Ausführung	Grade · Sorte KMG 303
	D	d	H	L			
GM-4F-D1.0S-G	1.0	4	3	50	4	A	○
GM-4F-D1.5S-G	1.5	4	4	50	4	A	○
GM-4F-D2.0S-G	2.0	4	6	50	4	A	○
GM-4F-D2.5S-G	2.5	4	8	50	4	A	○
GM-4F-D3.0S-G	3.0	4	8	50	4	A	○
GM-4F-D4.0S-G	4.0	4	11	50	4	B	○
GM-4F-D1.0-G	1.0	6	3	50	4	A	○
GM-4F-D1.5-G	1.5	6	4	50	4	A	○
GM-4F-D2.0-G	2.0	6	6	50	4	A	○
GM-4F-D2.5-G	2.5	6	8	50	4	A	○
GM-4F-D3.0-G	3.0	6	8	50	4	A	○
GM-4F-D3.5-G	3.5	6	10	50	4	A	○
GM-4F-D4.0-G	4.0	6	11	50	4	A	○
GM-4F-D4.5-G	4.5	6	11	50	4	A	○
GM-4F-D5.0-G	5.0	6	13	50	4	A	○
GM-4F-D5.5-G	5.5	6	16	50	4	A	○
GM-4F-D6.0-G	6.0	6	16	50	4	B	○
GM-4F-D7.0-G	7.0	8	20	60	4	A	○
GM-4F-D8.0-G	8.0	8	20	60	4	B	○
GM-4F-D9.0-G	9.0	10	22	75	4	A	○
GM-4F-D10.0-G	10.0	10	25	75	4	B	○
GM-4F-D11.0-G	11.0	12	26	75	4	A	○
GM-4F-D12.0-G	12.0	12	30	75	4	B	○
GM-4F-D14.0-G	14.0	14	32	75	4	B	○
GM-4F-D16.0-G	16.0	16	45	100	4	B	○
GM-4F-D18.0-G	18.0	18	45	100	4	B	○
GM-4F-D20.0-G	20.0	20	45	100	4	B	○

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

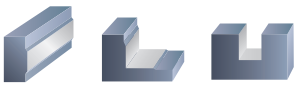
KMG303

Workpiece material Werkstückstoff										
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
✔	✔	✔	✔			✔	✔				

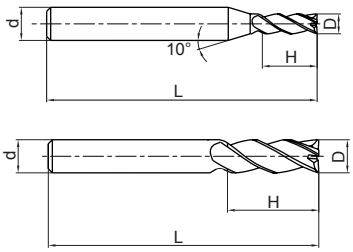
● Ex Stock / ab Lager ○ On demand / auf Anfrage

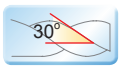
GM-4EL-G

4-flute flattened end mills with straight shank and long cutting edge
4-Schneiden Eckfräser mit langer Schneide und Zylinderschaft















Type · Typ	Dimension(mm) Abmessungen				Teeth · Zähne Z	Geometry Ausführung	Grade · Sorte KMG 303
	D	d	H	L			
GM-4EL-D3.0-G	3.0	6	12	75	4	A	○
GM-4EL-D4.0-G	4.0	6	15	75	4	A	○
GM-4EL-D5.0-G	5.0	6	20	75	4	A	○
GM-4EL-D6.0-G	6.0	6	20	75	4	B	○
GM-4EL-D8.0-G	8.0	8	25	100	4	B	○
GM-4EL-D10.0-G	10.0	10	30	100	4	B	○
GM-4EL-D12.0-G	12.0	12	35	100	4	B	○
GM-4EL-D14.0-G	14.0	14	40	100	4	B	○
GM-4EL-D16.0-G	16.0	16	50	150	4	B	○
GM-4EL-D20.0-G	20.0	20	55	150	4	B	○

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

KMG303

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
✔	✔	✔	✔			✔	✔				

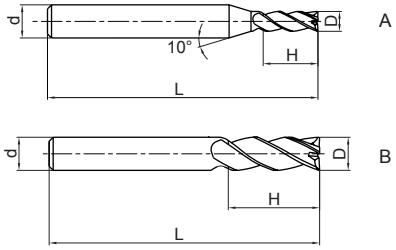
Code key B199
ISO Kennzeichen
Cutting data B394-419
Schnittdaten
Graphics identification & application B200
Graphische Werkzeug- & Anwendungsbeschr.
Order form for non-standard products B455-B456
Bestellformular für Sonderwerkzeuge

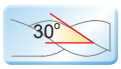
GM-4FL-G

4-flute flattened end mills with straight shank and long cutting edge
4-Schneiden Eckfräser mit langer Schneide und Zylinderschaft















Type · Typ	Dimension(mm) Abmessungen				Teeth · Zähne Z	Geometry Ausführung	Grade · Sorte KMG 303
	D	d	H	L			
GM-4FL-D3.0-G	3.0	6	12	75	4	A	○
GM-4FL-D4.0-G	4.0	6	15	75	4	A	○
GM-4FL-D5.0-G	5.0	6	20	75	4	A	○
GM-4FL-D6.0-G	6.0	6	20	75	4	B	○
GM-4FL-D8.0-G	8.0	8	25	100	4	B	○
GM-4FL-D10.0-G	10.0	10	30	100	4	B	○
GM-4FL-D12.0-G	12.0	12	35	100	4	B	○
GM-4FL-D14.0-G	14.0	14	40	100	4	B	○
GM-4FL-D16.0-G	16.0	16	50	150	4	B	○
GM-4FL-D20.0-G	20.0	20	55	150	4	B	○

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

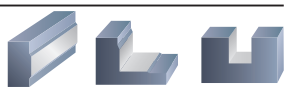
KMG303

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
✔	✔	✔	✔			✔	✔				

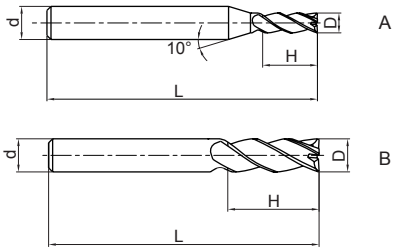
● Ex Stock / ab Lager ○ On demand / auf Anfrage

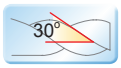
GM-4EX-G

4-flute flattened end mills with straight shank and extra long cutting edge
4-Schneiden Eckfräser mit extra langer Schneide und Zylinderschaft















Type · Typ	Dimension(mm) Abmessungen				Teeth · Zähne Z	Geometry Ausführung	Grade · Sorte KMG 303
	D	d	H	L			
GM-4EX-D3.0-G	3.0	6	20	75	4	A	○
GM-4EX-D4.0-G	4.0	6	25	75	4	A	○
GM-4EX-D5.0-G	5.0	6	30	75	4	A	○
GM-4EX-D6.0-G	6.0	6	30	75	4	B	○
GM-4EX-D8.0-G	8.0	8	40	100	4	B	○
GM-4EX-D10.0-G	10.0	10	50	110	4	B	○
GM-4EX-D12.0-G	12.0	12	50	110	4	B	○
GM-4EX-D16.0-G	16.0	16	70	150	4	B	○
GM-4EX-D20.0-G	20.0	20	75	150	4	B	○
GM-4FL-D20.0-G	20.0	20	55	150	4	B	○

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

KMG303

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
✔	✔	✔	✔			✔	✔				

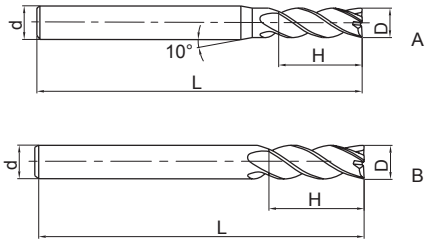
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ISO Kennzeichen
Cutting data B394-419
Schnittdaten
Graphics identification & application B200
Graphische Werkzeug- & Anwendungsbeschr.
Order form for non-standard products B455-B456
Bestellformular für Sonderwerkzeuge

GM-4E series for general machining · GM-4E Serie für allgemeine Bearbeitung

4-flute flattened end mills with straight shank
4-Schneiden Eckfräser mit Zylinderschaft







Type · Typ	Dimension(mm) Abmessungen				Teeth · Zähne Z	Geometry Ausführung	Grade · Sorte KMG 303
	D	d	H	L			
GM-4E-D1.0S	1.0	4	3	50	4	A	●
GM-4E-D1.5S	1.5	4	4	50	4	A	●
GM-4E-D2.0S	2.0	4	6	50	4	A	●
GM-4E-D2.5S	2.5	4	8	50	4	A	●
GM-4E-D3.0S	3.0	4	8	50	4	A	●
GM-4E-D4.0S	4.0	4	11	50	4	B	●
GM-4E-D1.0	1.0	6	3	50	4	A	●
GM-4E-D1.5	1.5	6	4	50	4	A	●
GM-4E-D2.0	2.0	6	6	50	4	A	●
GM-4E-D2.5	2.5	6	8	50	4	A	●
GM-4E-D3.0	3.0	6	8	50	4	A	●
GM-4E-D3.5	3.5	6	10	50	4	A	●
GM-4E-D4.0	4.0	6	11	50	4	A	●
GM-4E-D4.5	4.5	6	11	50	4	A	●
GM-4E-D5.0	5.0	6	13	50	4	A	●
GM-4E-D5.5	5.5	6	16	50	4	A	●
GM-4E-D6.0	6.0	6	16	50	4	B	●
GM-4E-D7.0	7.0	8	20	60	4	A	●
GM-4E-D8.0	8.0	8	20	60	4	B	●
GM-4E-D9.0	9.0	10	22	75	4	A	●
GM-4E-D10.0	10.0	10	25	75	4	B	●
GM-4E-D11.0	11.0	12	26	75	4	A	●
GM-4E-D12.0	12.0	12	30	75	4	B	●
GM-4E-D14.0	14.0	14	32	75	4	B	●
GM-4E-D16.0	16.0	16	45	100	4	B	●
GM-4E-D18.0	18.0	18	45	100	4	B	●
GM-4E-D20.0	20.0	20	45	100	4	B	●

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

KMG303

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
✔	✔	✔	✔			✔	✔				

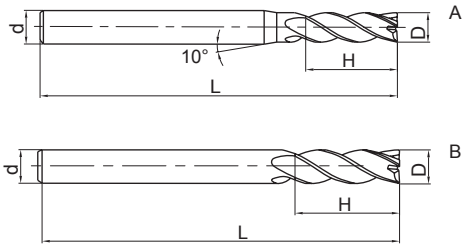
● Ex Stock / ab Lager ○ On demand / auf Anfrage

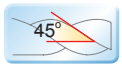
GM-4EL series for general machining · GM-4EL Serie für allgemeine Bearbeitung

4-flute flattened end mills with straight shank and long cutting edge
4-Schneiden Eckfräser mit langer Schneide und Zylinderschaft















Type · Typ	Dimension(mm) Abmessungen				Teeth · Zähne Z	Geometry Ausführung	Grade · Sorte KMG 303
	D	d	H	L			
GM-4EL-D3.0	3.0	6	12	75	4	A	●
GM-4EL-D4.0	4.0	6	15	75	4	A	●
GM-4EL-D5.0	5.0	6	20	75	4	A	●
GM-4EL-D6.0	6.0	6	20	75	4	B	●
GM-4EL-D8.0	8.0	8	25	100	4	B	●
GM-4EL-D10.0	10.0	10	30	100	4	B	●
GM-4EL-D12.0	12.0	12	35	100	4	B	●
GM-4EL-D14.0	14.0	14	40	100	4	B	●
GM-4EL-D16.0	16.0	16	50	150	4	B	●
GM-4EL-D20.0	20.0	20	55	150	4	B	●

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

KMG303

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
✔	✔	✔	✔			✔	✔				

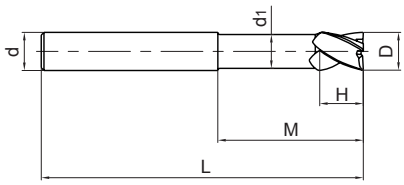
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Cutting data B394-419
Schnittdaten
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Graphische Werkzeug- & Anwendungsbeschr.
Order form for non-standard products B455-B456
Bestellformular für Sonderwerkzeuge

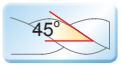
GM-4EFP

4-flute end mills with straight shank and short cutting edge and long neck
4-Schneiden Eckfräser mit kurzer Schneide und Zylinderschaft

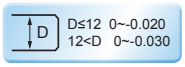














Type · Typ	Dimension(mm) Abmessungen						Teeth · Zähne Z	Grade · Sorte KMG 303
	D	d	H	M	d_1	L		
GM-4EFP-D6.0	6.0	6	9	30	5.8	75	4	○
GM-4EFP-D8.0	8.0	8	12	40	7.8	100	4	○
GM-4EFP-D10.0	10.0	10	15	50	9.6	100	4	○
GM-4EFP-D12.0	12.0	12	18	50	11.5	100	4	○
GM-4EFP-D16.0	16.0	16	24	50	15.5	150	4	○
GM-4EFP-D20.0	20.0	20	30	60	19.5	150	4	○

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

KMG303

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
✔	✔	✔	✔			✔	✔				

● Ex Stock / ab Lager ○ On demand / auf Anfrage

DIN 6527K 4-flute end mills · DIN 6527K 4-Schneiden VHM Schaftfräser

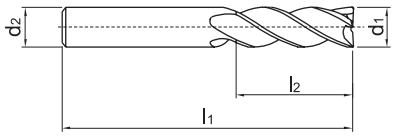


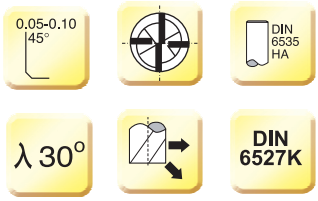
5501R304GF



YK30F: Ultra-fine carbide grade / *Ultrafeinkornhartmetall*
KMG303: nano TiAlN coated ultra-fine carbide / *nano TiAlN beschichtetes Ultrafeinkornhartmetall*







Type *Typ*	Dimension(mm) *Abmessungen*				Teeth *Zähne*	Application *Anwendung*	P M K	
	$d_1(h_{10})$	$d_2(h_6)$	l_2	l_1	z	Grade	YK30F	KMG303
5501R304GF-0300	3.00	6	5	50	4		○	●
5501R304GF-0400	4.00	6	8	54	4		○	●
5501R304GF-0500	5.00	6	9	54	4		○	●
5501R304GF-0600	6.00	6	10	54	4		○	●
5501R304GF-0800	8.00	8	12	58	4		○	●
5501R304GF-1000	10.00	10	14	66	4		○	●
5501R304GF-1200	12.00	12	16	73	4		○	●
5501R304GF-1400	14.00	14	18	75	4		○	●
5501R304GF-1600	16.00	16	22	82	4		○	●
5501R304GF-1800	18.00	18	24	84	4		○	●
5501R304GF-2000	20.00	20	26	92	4		○	●
						Art. Group No. / *Produktgruppe Nr.* :	**021140**	**021130**

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

KMG303

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
✔	✔	✔	✔			✔	✔				

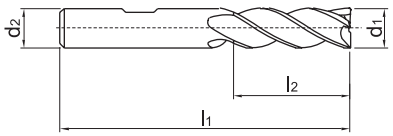
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ISO Kennzeichen
Cutting data B350-377
Schnittdaten
Graphics identification & application B198
Graphische Werkzeug- & Anwendungsbeschr.
Order form for non-standard products B455-456
Bestellformular für Sonderwerkzeuge

DIN 6527K 4-flute end mills · DIN 6527K 4-Schneiden VHM Schaftfräser

5601R304GF

YK30F: Ultra-fine carbide grade / *Ultrafeinkornhartmetall*
KMG303: nano TiAlN coated ultra-fine carbide / *nano TiAlN beschichtetes Ultrafeinkornhartmetall*







Type *Typ*	Dimension(mm) *Abmessungen*				Teeth *Zähne*	Application *Anwendung*	P M K	
	$d_1(h_{10})$	$d_2(h_6)$	l_2	l_1	z	Grade	YK30F	KMG303
5601R304GF-0300	3.00	6	5	50	4		○	●
5601R304GF-0400	4.00	6	8	54	4		○	●
5601R304GF-0500	5.00	6	9	54	4		○	●
5601R304GF-0600	6.00	6	10	54	4		○	●
5601R304GF-0800	8.00	8	12	58	4		○	●
5601R304GF-1000	10.00	10	14	66	4		○	●
5601R304GF-1200	12.00	12	16	73	4		○	●
5601R304GF-1400	14.00	14	18	75	4		○	●
5601R304GF-1600	16.00	16	22	82	4		○	●
5601R304GF-1800	18.00	18	24	84	4		○	●
5601R304GF-2000	20.00	20	26	92	4		○	●
						Art. Group No. / *Produktgruppe Nr.* :	**021140**	**021130**

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

KMG303

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
✔	✔	✔	✔			✔	✔				

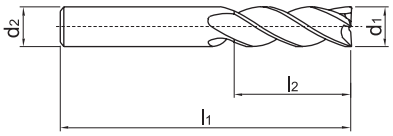
● Ex Stock / ab Lager ○ On demand / auf Anfrage

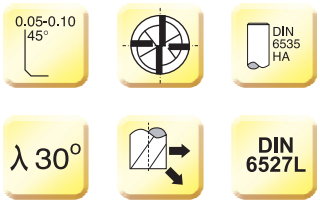
DIN 6527L 4-flute end mills · DIN 6527L 4-Schneiden VHM Schaftfräser

5502R304GF

YK30F: Ultra-fine carbide grade / *Ultrafeinkornhartmetall*
KMG303: nano TiAlN coated ultra-fine carbide / *nano TiAlN beschichtetes Ultrafeinkornhartmetall*







Type *Typ*	Dimension(mm) *Abmessungen*				Teeth *Zähne*	Application *Anwendung*	P M K	
	$d_1(h_{10})$	$d_2(h_6)$	l_2	l_1	z	Grade	YK30F	KMG303
5502R304GF-0300	3.00	6	8	57	4		○	●
5502R304GF-0400	4.00	6	11	57	4		○	●
5502R304GF-0500	5.00	6	13	57	4		○	●
5502R304GF-0600	6.00	6	13	57	4		○	●
5502R304GF-0800	8.00	8	19	63	4		○	●
5502R304GF-1000	10.00	10	22	72	4		○	●
5502R304GF-1200	12.00	12	26	83	4		○	●
5502R304GF-1400	14.00	14	26	83	4		○	●
5502R304GF-1600	16.00	16	32	92	4		○	●
5502R304GF-1800	18.00	18	32	92	4		○	●
5502R304GF-2000	20.00	20	38	104	4		○	●
						Art. Group No. / *Produktgruppe Nr.* :	**021140**	**021130**

Material Overview · Material Übersicht

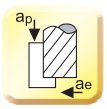
✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

KMG303

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
✔	✔	✔	✔			✔	✔				

Code key B197 ISO Kennzeichen
Cutting data B350-377 Schnittdaten
Graphics identification & application B198 Graphische Werkzeug- & Anwendungsbeschr.
Order form for non-standard products B455-456 Bestellformular für Sonderwerkzeuge

DIN 6527L 4-flute end mills · DIN 6527L 4-Schneiden VHM Schaftfräser

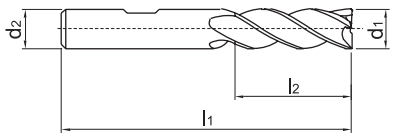


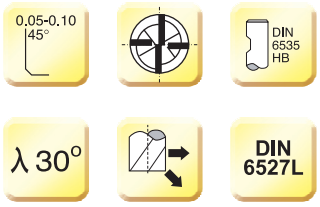
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YK30F: Ultra-fine carbide grade / *Ultrafeinkornhartmetall*
KMG303: nano TiAlN coated ultra-fine carbide / *nano TiAlN beschichtetes Ultrafeinkornhartmetall*









Type *Typ*	Dimension(mm) *Abmessungen*				Teeth *Zähne*	Application *Anwendung*	P M K	
	$d_1(h_{10})$	$d_2(h_6)$	l_2	l_1	z	Grade	YK30F	KMG303
5602R304GF-0300	3.00	6	8	57	4		○	●
5602R304GF-0400	4.00	6	11	57	4		○	●
5602R304GF-0500	5.00	6	13	57	4		○	●
5602R304GF-0600	6.00	6	13	57	4		○	●
5602R304GF-0800	8.00	8	19	63	4		○	●
5602R304GF-1000	10.00	10	22	72	4		○	●
5602R304GF-1200	12.00	12	26	83	4		○	●
5602R304GF-1400	14.00	14	26	83	4		○	●
5602R304GF-1600	16.00	16	32	92	4		○	●
5602R304GF-1800	18.00	18	32	92	4		○	●
5602R304GF-2000	20.00	20	38	104	4		○	●
						Art. Group No. / *Produktgruppe Nr.* :	**021140**	**021130**

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

KMG303

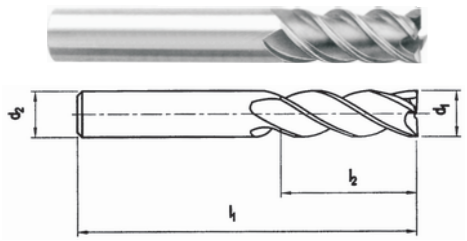
Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
✔	✔	✔	✔			✔	✔				

● Ex Stock / ab Lager ○ On demand / auf Anfrage

DIN 6528 4-flute end mills · DIN 6528 4-Schneiden VHM Schaftfräser

5508R454GM

YK30F: Ultra-fine carbide grade / *Ultrafeinkornhartmetall*
KMG303: nano TiAlN coated ultra-fine carbide / *nano TiAlN beschichtetes Ultrafeinkornhartmetall*



0.05-0.10 | 45° · DIN 6535 HA · λ 45° · DIN 6528

Type *Typ*	Dimension(mm) *Abmessungen*				Teeth *Zähne*	Application *Anwendung*	P M K	
	$d_1(h_{10})$	$d_2(h_6)$	l_2	l_1	z	Grade	YK30F	KMG303
5508R454GM-0300	3.00	3	8	45	4		○	●
5508R454GM-0400	4.00	4	11	50	4		○	●
5508R454GM-0500	5.00	5	13	50	4		○	●
5508R454GM-0600	6.00	6	13	57	4		○	●
5508R454GM-0800	8.00	8	19	63	4		○	●
5508R454GM-1000	10.00	10	22	72	4		○	●
5508R454GM-1200	12.00	12	26	83	4		○	●
5508R454GM-1400	14.00	14	26	83	4		○	●
5508R454GM-1600	16.00	16	32	92	4		○	●
5508R454GM-1800	18.00	18	32	92	4		○	●
5508R454GM-2000	20.00	20	38	104	4		○	●
						Art. Group No. / *Produktgruppe Nr.* :	**021140**	**021130**

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

KMG303

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
✔	✔	✔	✔			✔	✔				

Code key B197 ISO Kennzeichen
Cutting data B350-377 Schnittdaten
Graphics identification & application B198 Graphische Werkzeug- & Anwendungsbeschr.
Order form for non-standard products B455-456 Bestellformular für Sonderwerkzeuge

DIN 6527L 4-flute end mills · DIN 6527L 4-Schneiden VHM Schaftfräser

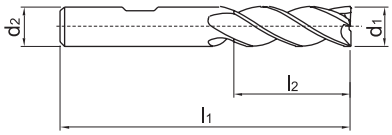


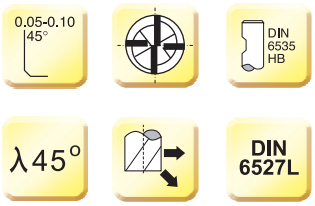
5602R454GM



YK30F: Ultra-fine carbide grade / *Ultrafeinkornhartmetall*
KMG303: nano TiAlN coated ultra-fine carbide / *nano TiAlN beschichtetes Ultrafeinkornhartmetall*







Type *Typ*	Dimension(mm) *Abmessungen*				Teeth *Zähne*	Application *Anwendung*	P M K
	$d_1(h_{10})$	$d_2(h_6)$	l_2	l_1	z	Grade	KMG303
5602R454GM-0300	3.00	6	8	57	4		●
5602R454GM-0400	4.00	6	11	57	4		●
5602R454GM-0500	5.00	6	13	57	4		●
5602R454GM-0600	6.00	6	13	57	4		●
5602R454GM-0800	8.00	8	19	63	4		●
5602R454GM-1000	10.00	10	22	72	4		●
5602R454GM-1200	12.00	12	26	83	4		●
5602R454GM-1400	14.00	14	26	83	4		●
5602R454GM-1600	16.00	16	32	92	4		●
5602R454GM-1800	18.00	18	32	92	4		●
5602R454GM-2000	20.00	20	38	104	4		●
					Art. Group No. / *Produktgruppe Nr.* :		**021130**

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

KMG303

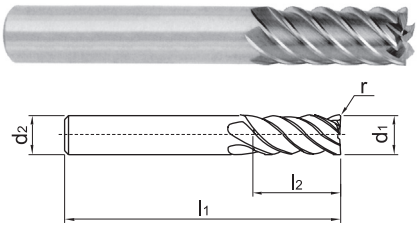
Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
✔	✔	✔	✔			✔	✔				

● Ex Stock / ab Lager ○ On demand / auf Anfrage

ZCC CT 6-flute slotting end mills (HRC<=50) · ZCC CT 6-Schneiden VHM Langlochfräser (HRC<=50)

5589R45MGFR

KMG405: nano TiAlN coated ultra-fine carbide / *nano TiAlN beschichtetes Ultrafeinkornhartmetall*



DIN 6535 HA

λ 45°

ZCCCT NORM

Type *Typ*	Dimension(mm) *Abmessungen*					Teeth *Zähne*	Application *Anwendung*	P K
	$d_1(e_8)$	$d_2(h_6)$	l_2	l_1		z	Grade	KMG405
5589R45MGFR02-0600	6	6	19	63	0.2	6		●
5589R45MGFR02-0800	8	8	28	72	0.2	6		●
5589R45MGFR02-1000	10	10	34	84	0.2	6		●
5589R45MGFR02-1200	12	12	40	97	0.2	6		●
5589R45MGFR03-1600	16	16	48	108	0.3	8		●
5589R45MGFR03-2000	20	20	56	122	0.3	10		●
						Art. Group No. / *Produktgruppe Nr.* :		**021130**

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

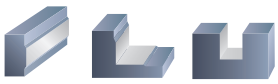
KMG405

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
✔	✔	✔	✔			✔	✔				

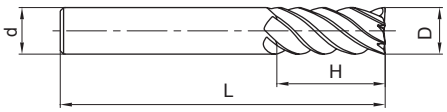
Code key B197 ISO Kennzeichen
Cutting data B350-377 Schnittdaten
Graphics identification & application B198 Graphische Werkzeug- & Anwendungsbeschr.
Order form for non-standard products B455-456 Bestellformular für Sonderwerkzeuge

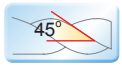
GM-6E

6-flute end mills with straight shank
6-Schneiden Eckfräser mit Zylinderschaft

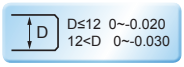














Type · Typ	Dimension(mm) Abmessungen				Teeth · Zähne Z	Grade · Sorte KMG 303
	D	d	H	L		
GM-6E-D6.0	6.0	6	18	60	6	●
GM-6E-D8.0	8.0	8	20	60	6	●
GM-6E-D10.0	10.0	10	30	75	6	●
GM-6E-D12.0	12.0	12	32	75	6	●
GM-6E-D16.0	16.0	16	40	100	6	●
GM-6E-D20.0	20.0	20	45	100	6	●

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

KMG303

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
✔	✔	✔	✔			✔	✔				

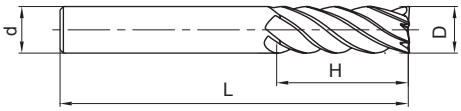
● Ex Stock / ab Lager ○ On demand / auf Anfrage

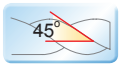
GM-6EL series for general machining · GM-6EL Serie für allgemeine Bearbeitung

6-flute end mills with straight shank and long cutting edge
6-Schneiden Eckfräser mit langer Schneide und Zylinderschaft















Type · Typ	Dimension(mm) Abmessungen				Teeth · Zähne Z	Grade · Sorte KMG 303
	D	d	H	L		
GM-6EL-D6.0	6.0	6	24	75	6	○
GM-6EL-D8.0	8.0	8	32	75	6	○
GM-6EL-D10.0	10.0	10	40	100	6	○
GM-6EL-D12.0	12.0	12	45	100	6	○
GM-6EL-D16.0	16.0	16	64	150	6	○
GM-6EL-D20.0	20.0	20	75	150	6	○

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

KMG303

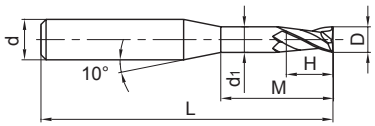
Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
✔	✔	✔	✔			✔	✔				

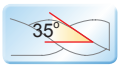
Code key B199
ISO Kennzeichen
Cutting data B394-419
Schnittdaten
Graphics identification & application B200
Graphische Werkzeug- & Anwendungsbeschr.
Order form for non-standard products B455-B456
Bestellformular für Sonderwerkzeuge

GM-2EP series for general machining · GM-2EP Serie für allgemeine Bearbeitung

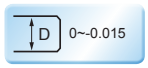
2-flute end mills with straight shank and short cutting edge and long neck
2-Schneiden Eckfräser mit kurzer Schneide und Zylinderschaft

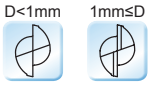












Type · Typ	Dimension(mm) Abmessungen						Teeth · Zähne Z	Grade Sorte KMG 303
	D	d	H	M	d1	L		
GM-2EP-D0.5-M04	0.5	4.0	0.7	4.0	0.45	50	2	●
GM-2EP-D0.5-M06	0.5	4.0	0.7	6.0	0.45	50	2	●
GM-2EP-D0.5-M08	0.5	4.0	0.7	8.0	0.45	50	2	●
GM-2EP-D0.8-M04	0.8	4.0	1.2	4.0	0.75	50	2	●
GM-2EP-D0.8-M06	0.8	4.0	1.2	6.0	0.75	50	2	●
GM-2EP-D0.8-M08	0.8	4.0	1.2	8.0	0.75	50	2	●
GM-2EP-D0.8-M10	0.8	4.0	1.2	10.0	0.75	50	2	●
GM-2EP-D1.0-M04	1.0	4.0	1.5	4.0	0.95	50	2	●
GM-2EP-D1.0-M06	1.0	4.0	1.5	6.0	0.95	50	2	●
GM-2EP-D1.0-M08	1.0	4.0	1.5	8.0	0.95	50	2	●
GM-2EP-D1.0-M10	1.0	4.0	1.5	10.0	0.95	50	2	●
GM-2EP-D1.0-M12	1.0	4.0	1.5	12.0	0.95	50	2	●
GM-2EP-D1.0-M14	1.0	4.0	1.5	14.0	0.95	50	2	●
GM-2EP-D1.2-M06	1.2	4.0	1.8	6.0	1.15	50	2	●
GM-2EP-D1.2-M08	1.2	4.0	1.8	8.0	1.15	50	2	●
GM-2EP-D1.2-M10	1.2	4.0	1.8	10.0	1.15	50	2	●
GM-2EP-D1.2-M12	1.2	4.0	1.8	12.0	1.15	50	2	○
GM-2EP-D1.5-M06	1.5	4.0	2.3	6.0	1.45	50	2	●
GM-2EP-D1.5-M08	1.5	4.0	2.3	8.0	1.45	50	2	●
GM-2EP-D1.5-M10	1.5	4.0	2.3	10.0	1.45	50	2	●
GM-2EP-D1.5-M12	1.5	4.0	2.3	12.0	1.45	50	2	●
GM-2EP-D1.5-M14	1.5	4.0	2.3	14.0	1.45	50	2	●
GM-2EP-D2.0-M06	2.0	4.0	3.0	6.0	1.95	50	2	●
GM-2EP-D2.0-M08	2.0	4.0	3.0	8.0	1.95	50	2	●

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

KMG303

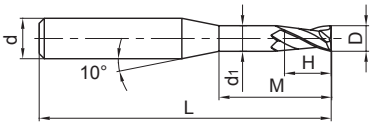
Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
✔	✔	✔	✔			✔	✔				

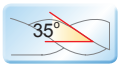
● Ex Stock / ab Lager ○ On demand / auf Anfrage

GM-2EP series for general machining · GM-2EP Serie für allgemeine Bearbeitung

2-flute end mills with straight shank and short cutting edge and long neck
2-Schneiden Eckfräser mit kurzer Schneide und Zylinderschaft















Type · Typ	Dimension(mm) Abmessungen						Teeth · Zähne Z	Grade Sorte KMG 303
	D	d	H	M	d_1	L		
GM-2EP-D2.0-M10	2.0	4.0	3.0	10.0	1.95	50	2	●
GM-2EP-D2.0-M12	2.0	4.0	3.0	12.0	1.95	50	2	●
GM-2EP-D2.0-M14	2.0	4.0	3.0	14.0	1.95	50	2	●
GM-2EP-D2.0-M16	2.0	4.0	3.0	16.0	1.95	50	2	●
GM-2EP-D2.5-M08	2.5	4.0	3.7	8.0	2.4	50	2	●
GM-2EP-D2.5-M10	2.5	4.0	3.7	10.0	2.4	50	2	●
GM-2EP-D2.5-M12	2.5	4.0	3.7	12.0	2.4	50	2	●
GM-2EP-D2.5-M14	2.5	4.0	3.7	14.0	2.4	50	2	●
GM-2EP-D2.5-M16	2.5	4.0	3.7	16.0	2.4	60	2	●
GM-2EP-D2.5-M18	2.5	4.0	3.7	18.0	2.4	60	2	●
GM-2EP-D2.5-M20	2.5	4.0	3.7	20.0	2.4	60	2	●
GM-2EP-D3.0-M06	3.0	6.0	4.5	6.0	2.85	50	2	●
GM-2EP-D3.0-M08	3.0	6.0	4.5	8.0	2.85	50	2	●
GM-2EP-D3.0-M10	3.0	6.0	4.5	10.0	2.85	50	2	●
GM-2EP-D3.0-M12	3.0	6.0	4.5	12.0	2.85	50	2	●
GM-2EP-D3.0-M14	3.0	6.0	4.5	14.0	2.85	60	2	●
GM-2EP-D3.0-M16	3.0	6.0	4.5	16.0	2.85	60	2	●
GM-2EP-D3.0-M18	3.0	6.0	4.5	18.0	2.85	60	2	●
GM-2EP-D3.0-M20	3.0	6.0	4.5	20.0	2.85	60	2	●
GM-2EP-D4.0-M12	4.0	6.0	6.0	12.0	3.85	50	2	●
GM-2EP-D4.0-M14	4.0	6.0	6.0	14.0	3.85	60	2	●
GM-2EP-D4.0-M16	4.0	6.0	6.0	16.0	3.85	60	2	●
GM-2EP-D4.0-M20	4.0	6.0	6.0	20.0	3.85	60	2	●
GM-2EP-D4.0-M25	4.0	6.0	6.0	25.0	3.85	60	2	●
GM-2EP-D5.0-M16	5.0	6.0	7.5	16.0	4.85	60	2	●
GM-2EP-D5.0-M25	5.0	6.0	7.5	25.0	4.85	70	2	●

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

KMG303

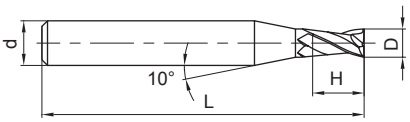
Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
✔	✔	✔	✔			✔	✔				

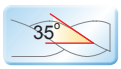
Code key B199 ISO Kennzeichen
Cutting data B394-419 Schnittdaten
Graphics identification & application B200 Graphische Werkzeug- & Anwendungsbeschr.
Order form for non-standard products B455-B456 Bestellformular für Sonderwerkzeuge

GM-2ES series for general machining · GM-2ES Serie für allgemeine Bearbeitung

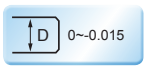
2-flute micro end mills with straight shank
2-Schneiden Mirco Eckfräser mit langer Schneide



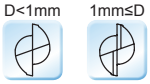








D<1mm 1mm≤D



Type · Typ	Dimension(mm) Abmessungen				Teeth · Zähne Z	Grade Sorte KMG303
	D	d	H	L		
GM-2ES-D0.3	0.3	4.0	0.6	50	2	●
GM-2ES-D0.4	0.4	4.0	0.8	50	2	●
GM-2ES-D0.5	0.5	4.0	1.0	50	2	●
GM-2ES-D0.6	0.6	4.0	1.2	50	2	●
GM-2ES-D0.7	0.7	4.0	1.4	50	2	●
GM-2ES-D0.8	0.8	4.0	1.6	50	2	●
GM-2ES-D0.9	0.9	4.0	1.8	50	2	●
GM-2ES-D1.0	1.0	4.0	2.0	50	2	●
GM-2ES-D1.1	1.1	4.0	2.0	50	2	●
GM-2ES-D1.2	1.2	4.0	2.5	50	2	●
GM-2ES-D1.3	1.3	4.0	2.5	50	2	●
GM-2ES-D1.4	1.4	4.0	3.0	50	2	●
GM-2ES-D1.5	1.5	4.0	3.0	50	2	●
GM-2ES-D1.6	1.6	4.0	3.5	50	2	●
GM-2ES-D1.7	1.7	4.0	3.5	50	2	●
GM-2ES-D1.8	1.8	4.0	4.0	50	2	●
GM-2ES-D1.9	1.9	4.0	4.0	50	2	●
GM-2ES-D2.0	2.0	4.0	4.0	50	2	●
GM-2ES-D2.1	2.1	4.0	4.0	50	2	●
GM-2ES-D2.2	2.2	4.0	4.5	50	2	●
GM-2ES-D2.3	2.3	4.0	4.5	50	2	●
GM-2ES-D2.4	2.4	4.0	5.0	50	2	●
GM-2ES-D2.5	2.5	4.0	5.0	50	2	●
GM-2ES-D2.6	2.6	4.0	5.0	50	2	●
GM-2ES-D2.7	2.7	4.0	5.5	50	2	●
GM-2ES-D2.8	2.8	4.0	5.5	50	2	●
GM-2ES-D2.9	2.9	4.0	6.0	50	2	●
GM-2ES-D3.0	3.0	4.0	6.0	50	2	●

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

KMG303

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
✔	✔	✔	✔			✔	✔				

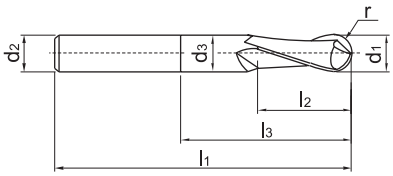
● Ex Stock / ab Lager ○ On demand / auf Anfrage

ZCC CT 2-flute ball nose end mills · ZCC CT 2-Schneiden VHM Kugelkopffräser

5565R302GF

KMG303: nano TiAlN coated ultra-fine carbide / *nano TiAlN beschichtetes Ultrafeinkornhartmetall*





DIN 6535 HA

λ 30°

ZCCCT NORM

Type *Typ*	Dimension(mm) *Abmessungen*								Teeth *Zähne*	Application *Anwendung*	P K M
	d_1	$d_2(h_6)$	l_2	l_1	d_3	l_3	$r(f_8)$	α°	z	Grade	KMG303
5565R302GF-0300	3.00	6	4	57	2.80	9	1.50	6	2		●
5565R302GF-0400	4.00	6	5	57	3.70	12	2.00	4	2		●
5565R302GF-0500	5.00	6	6	57	4.60	15	2.50	2	2		●
5565R302GF-0600	6.00	6	7	57	5.50	20	3.00		2		●
5565R302GF-0800	8.00	8	9	63	7.40	26	4.00		2		●
5565R302GF-1000	10.00	10	11	72	9.20	31	5.00		2		●
5565R302GF-1200	12.00	12	12	83	11.00	37	6.00		2		●
5565R302GF-1600	16.00	16	16	92	15.00	43	8.00		2		●
5565R302GF-2000	20.00	20	20	104	19.00	50	10.00		2		●

Art. Group No. / *Produktgruppe Nr.* : 021130

Material Overview · Material Übersicht

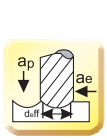
✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

KMG303

Workpiece material Werkstückstoff										
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
✔	✔	✔	✔			✔	✔				

Code key B197 ISO Kennzeichen
Cutting data B350-377 Schnittdaten
Graphics identification & application B198 Graphische Werkzeug- & Anwendungsbeschr.
Order form for non-standard products B455-456 Bestellformular für Sonderwerkzeuge

ZCC CT 2-flute ball nose end mills · ZCC CT 2-Schneiden VHM Kugelkopffräser

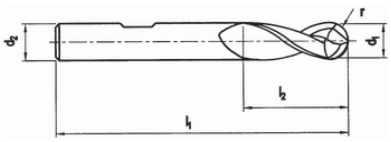


5665R202GM

KMG303: nano TiAlN coated ultra-fine carbide / *nano TiAlN beschichtetes Ultrafeinkornhartmetall*









Type *Typ*	Dimension(mm) *Abmessungen*								Teeth *Zähne*	Application *Anwendung*	P K M
	d_1	$d_2(h_6)$	l_2	l_1	d_3	l_3	r	α°	z	Grade	KMG303
5665R202GM-0300	3.00	6	4	57	2.80	9	1.50	7	2		●
5665R202GM-0400	4.00	6	5	57	3.70	12	2.00	5	2		●
5665R202GM-0500	5.00	6	6	57	4.60	15	2.50	3	2		●
5665R202GM-0600	6.00	6	7	57	5.50	20	3.00		2		●
5665R202GM-0800	8.00	8	9	63	7.40	26	4.00		2		●
5665R202GM-1000	10.00	10	11	72	9.20	31	5.00		2		●
5665R202GM-1200	12.00	12	12	83	11.00	37	6.00		2		●
5665R202GM-1600	16.00	16	16	92	15.00	43	8.00		2		●
5665R202GM-2000	20.00	20	20	104	19.00	50	10.00		2		●

Art. Group No. / *Produktgruppe Nr.* : 021130

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

KMG303

Workpiece material Werkstückstoff										
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
✔	✔	✔	✔			✔	✔				

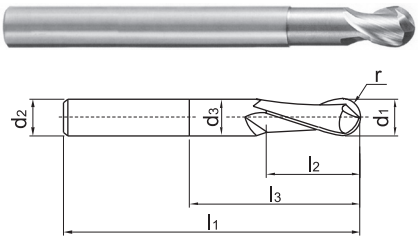
● Ex Stock / ab Lager ○ On demand / auf Anfrage

ZCC CT 2-flute ball nose end mills (long) · ZCC CT 2-Schneiden VHM Kugelkopffräser (Lang)



5566R302GF

KMG303: nano TiAlN coated ultra-fine carbide / *nano TiAlN beschichtetes Ultrafeinkornhartmetall*





Type *Typ*	Dimension(mm) *Abmessungen*								Teeth *Zähne*	Application *Anwendung*	P M K
	d_1	$d_2(h_6)$	l_2	l_1	d_3	l_3	$r(f_8)$	α°	z	Grade	KMG303
5566R302GF-0300	3.00	6	4	75	2.80	15	1.50		2		●
5566R302GF-0400	4.00	6	5	75	3.70	20	2.00		2		●
5566R302GF-0500	5.00	6	6	80	4.60	25	2.50		2		●
5566R302GF-0600	6.00	6	7	80	5.50	30	3.00		2		●
5566R302GF-0800	8.00	8	9	90	7.40	35	4.00		2		●
5566R302GF-1000	10.00	10	11	100	9.20	40	5.00		2		●
5566R302GF-1200	12.00	12	12	120	11.00	50	6.00		2		●

Art. Group No. / *Produktgruppe Nr.* : 021130

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

KMG303

Workpiece material Werkstückstoff										
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
✔	✔	✔	✔			✔	✔				

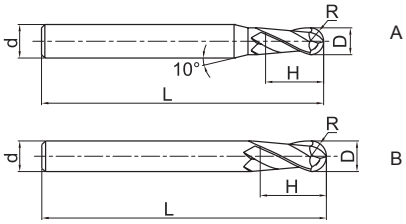
Code key B197 ISO Kennzeichen
Cutting data B350-377 Schnittdaten
Graphics identification & application B198 Graphische Werkzeug- & Anwendungsbeschr.
Order form for non-standard products B455-456 Bestellformular für Sonderwerkzeuge

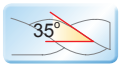
GM-2B

2-flute ball nose end mills with straight shank
2-Schneiden Kugelkopffräser mit Zylinderschaft

















Type · Typ	Dimension(mm) Abmessungen					Teeth · Zähne Z	Geometry Ausführung	Grade Sorte KMG 303
	D	R	d	H	L			
GM-2B-R0.5S	1.0	0.5	4	2	50	2	A	●
GM-2B-R0.75S	1.5	0.75	4	3	50	2	A	●
GM-2B-R1.0S	2.0	1.0	4	4	50	2	A	●
GM-2B-R1.25S	2.5	1.25	4	5	50	2	A	●
GM-2B-R1.5S	3.0	1.5	4	6	50	2	A	●
GM-2B-R2.0S	4.0	2.0	4	8	50	2	B	●
GM-2B-R0.5	1.0	0.5	6	2	50	2	A	●
GM-2B-R0.75	1.5	0.75	6	3	50	2	A	●
GM-2B-R1.0	2.0	1.0	6	4	50	2	A	●
GM-2B-R1.25	2.5	1.25	6	5	50	2	A	●
GM-2B-R1.5	3.0	1.5	6	6	50	2	A	●
GM-2B-R1.75	3.5	1.75	6	8	50	2	A	●
GM-2B-R2.0	4.0	2.0	6	8	50	2	A	●
GM-2B-R2.5	5.0	2.5	6	10	50	2	A	●
GM-2B-R2.75	5.5	2.75	6	12	50	2	A	●
GM-2B-R3.0	6.0	3.0	6	12	50	2	B	●
GM-2B-R3.5	7.0	3.5	8	14	60	2	A	●
GM-2B-R4.0	8.0	4.0	8	16	60	2	B	●
GM-2B-R4.5	9.0	4.5	10	18	75	2	A	●
GM-2B-R5.0	10	5.0	10	20	75	2	B	●
GM-2B-R6.0	12	6.0	12	24	75	2	B	●
GM-2B-R7.0	14	7.0	14	28	75	2	B	●
GM-2B-R8.0	16	8.0	16	32	100	2	B	●
GM-2B-R10.0	20	10.0	20	40	100	2	B	●

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
✔	✔	✔	✔			✔	✔				

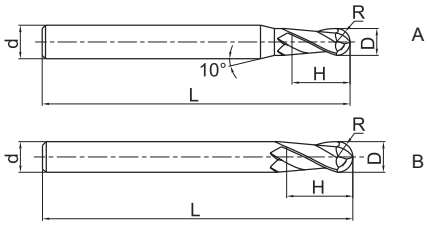
● Ex Stock / ab Lager ○ On demand / auf Anfrage

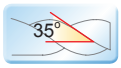
GM-2BL series for general machining · GM-2BL Serie für allgemeine Bearbeitung

2-flute ball nose end mills with with straight shank and long cutting edge
2-Schneiden Kugelkopffräser mit langer Schneide und Zylinderschaft

















Type · Typ	Dimension(mm) Abmessungen					Teeth · Zähne Z	Geometry Ausführung	Grade Sorte KMG 303
	D	R	d	H	L			
GM-2BL-R1.0	2.0	1.0	6.0	4.0	75	2	A	●
GM-2BL-R1.25	2.5	1.25	6.0	5.0	75	2	A	●
GM-2BL-R1.5	3.0	1.5	6.0	6.0	75	2	A	●
GM-2BL-R1.75	3.5	1.75	6.0	8.0	75	2	A	●
GM-2BL-R2.0	4.0	2.0	6.0	8.0	75	2	A	●
GM-2BL-R2.5	5.0	2.5	6.0	10.0	75	2	A	●
GM-2BL-R2.75	5.5	2.75	6.0	12.0	75	2	A	●
GM-2BL-R3.0	6.0	3.0	6.0	12.0	75	2	B	●
GM-2BL-R3.5	7.0	3.5	8.0	14.0	75	2	A	●
GM-2BL-R4.0	8.0	4.0	8.0	16.0	100	2	B	●
GM-2BL-R4.5	9.0	4.5	10.0	18.0	100	2	A	●
GM-2BL-R5.0	10.0	5.0	10.0	20.0	100	2	B	●
GM-2BL-R6.0	12.0	6.0	12.0	24.0	100	2	B	●
GM-2BL-R7.0	14.0	7.0	14.0	28.0	100	2	B	●
GM-2BL-R8.0	16.0	8.0	16.0	32.0	150	2	B	●
GM-2BL-R10.0	20.0	10.0	20.0	40.0	150	2	B	●

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

KMG303

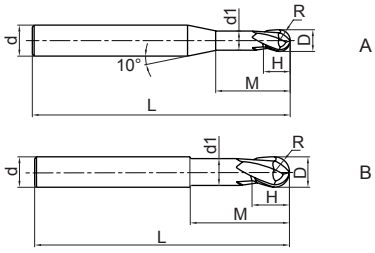
Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
✔	✔	✔	✔			✔	✔				

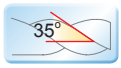
Code key B199
ISO Kennzeichen
Cutting data B394-419
Schnittdaten
Graphics identification & application B200
Graphische Werkzeug- & Anwendungsbeschr.
Order form for non-standard products B455-B456
Bestellformular für Sonderwerkzeuge

GM-2BFP

2-flute straight shank ball nose end mills with short cutting edge and long neck
2-Schneiden Kugelkopffräser mit kurzer Schneide und Zylinderschaft















Type · Typ	Dimension(mm) Abmessungen							Teeth · Zähne Z	Geometry Ausführung	Grade Sorte KMG 303
	D	R	H	d_1	M	d	L			
GM-2BFP-R0.5	1.0	0.5	1	0.95	2.5	6	75	2	A	○
GM-2BFP-R0.75	1.5	0.75	1	1.45	3	6	75	2	A	○
GM-2BFP-R1.0	2.0	1.0	2	1.95	4	6	75	2	A	○
GM-2BFP-R1.5	3.0	1.5	3	2.85	6	6	75	2	A	○
GM-2BFP-R2.0	4.0	2.0	4	3.85	8	6	75	2	A	○
GM-2BFP-R2.5	5.0	2.5	5	4.85	10	6	75	2	A	○
GM-2BFP-R3.0	6.0	3.0	6	5.8	12	6	75	2	B	○
GM-2BFP-R4.0	8.0	4.0	8	7.8	16	8	100	2	B	○
GM-2BFP-R5.0	10.0	5.0	10	9.6	20	10	100	2	B	○
GM-2BFP-R6.0	12.0	6.0	12	11.5	24	12	100	2	B	○
GM-2BFP-R8.0	16.0	8.0	16	15.5	32	16	150	2	B	○
GM-2BFP-R10.0	20.0	10.0	20	19.5	40	20	150	2	B	○

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

KMG303

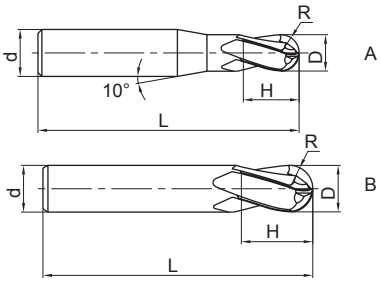
Workpiece material Werkstückstoff										
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
✔	✔	✔	✔			✔	✔				

● Ex Stock / ab Lager ○ On demand / auf Anfrage

GM-4B series for general machining · GM-4B Serie für allgemeine Bearbeitung

4-flute ball nose end mills with straight shank
4-Schneiden Kugelkopffräser mit Zylinderschaft





35° | Coated TiAlN | D D≤12 0~-0.020 12<D 0~-0.030 | R R±0.01

Type · Typ	Dimension(mm) Abmessungen					Teeth · Zähne Z	Geometry Ausführung	Grade Sorte KMG 303
	D	R	d	H	L			
GM-4B-R1.5	3.0	1.5	6.0	6.0	50	4	A	●
GM-4B-R2.0	4.0	2.0	6.0	8.0	50	4	A	●
GM-4B-R2.5	5.0	2.5	6.0	10.0	50	4	A	●
GM-4B-R3.0	6.0	3.0	6.0	12.0	50	4	B	●
GM-4B-R4.0	8.0	4.0	8.0	16.0	60	4	B	●
GM-4B-R5.0	10.0	5.0	10.0	20.0	75	4	B	●
GM-4B-R6.0	12.0	6.0	12.0	24.0	75	4	B	●
GM-4B-R7.0	14.0	7.0	14.0	28.0	75	4	B	●
GM-4B-R8.0	16.0	8.0	16.0	32.0	100	4	B	●
GM-4B-R9.0	18.0	9.0	18.0	36.0	100	4	B	●
GM-4B-R10.0	20.0	10.0	20.0	40.0	100	4	B	●

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

KMG303

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
✔	✔	✔	✔			✔	✔				

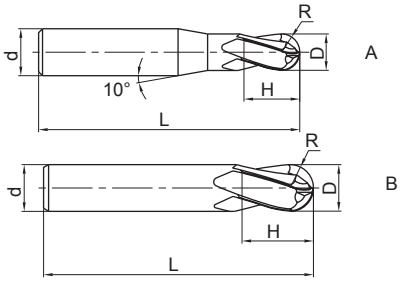
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Cutting data B394-419 Schnittdaten
Graphics identification & application B200 Graphische Werkzeug- & Anwendungsbeschr.
Order form for non-standard products B455-B456 Bestellformular für Sonderwerkzeuge

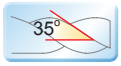
GM-4BL

4-flute ball nose end mills with with straight shank and long cutting edge
4-Schneiden Kugelkopffräser mit langer Schneide und Zylinderschaft

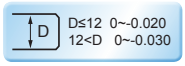
















Type · Typ	Dimension(mm) Abmessungen					Teeth · Zähne Z	Geometry Ausführung	Grade Sorte KMG 303
	D	R	d	H	L			
GM-4BL-R1.5	3.0	1.5	6	6	75	4	A	○
GM-4BL-R2.0	4.0	2.0	6	8	75	4	A	○
GM-4BL-R2.5	5.0	2.5	6	10	75	4	A	○
GM-4BL-R3.0	6.0	3.0	6	12	75	4	B	○
GM-4BL-R4.0	8.0	4.0	8	16	100	4	B	○
GM-4BL-R5.0	10.0	5.0	10	20	100	4	B	○
GM-4BL-R6.0	12.0	6.0	12	24	100	4	B	○
GM-4BL-R7.0	14.0	7.0	14	28	100	4	B	○
GM-4BL-R8.0	16.0	8.0	16	32	150	4	B	○
GM-4BL-R9.0	18.0	9.0	18	36	150	4	B	○
GM-4BL-R10.0	20.0	10.0	20	40	150	4	B	○

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

KMG303

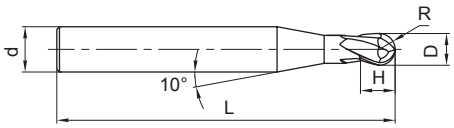
Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
✔	✔	✔	✔			✔	✔				

● Ex Stock / ab Lager ○ On demand / auf Anfrage

GM-2BS series for general machining · GM-2BS Serie für allgemeine Bearbeitung

2-flute tiny ball nose end mills with straight shank
2-Schneiden Micro-Kugelkopffräser mit Zylinderschaft





35° | Coated TiAlN | D 0~-0.015 | R R±0.005 R<0.5 R±0.01 R≥0.5

Type · Typ	Dimension(mm) Abmessungen					Teeth · Zähne Z	Grade · Sorte KMG 303
	D	R	d	H	L		
GM-2BS-R0.15	0.30	0.15	4.0	0.5	50	2	●
GM-2BS-R0.20	0.40	0.20	4.0	0.6	50	2	●
GM-2BS-R0.25	0.50	0.25	4.0	0.8	50	2	●
GM-2BS-R0.30	0.60	0.30	4.0	0.9	50	2	●
GM-2BS-R0.35	0.70	0.35	4.0	1.0	50	2	●
GM-2BS-R0.40	0.80	0.40	4.0	1.2	50	2	●
GM-2BS-R0.45	0.90	0.45	4.0	1.3	50	2	●
GM-2BS-R0.50	1.00	0.50	4.0	1.5	50	2	●
GM-2BS-R0.60	1.20	0.60	4.0	1.8	50	2	●
GM-2BS-R0.70	1.40	0.70	4.0	2.0	50	2	●
GM-2BS-R0.75	1.50	0.75	4.0	2.3	50	2	●
GM-2BS-R0.80	1.60	0.80	4.0	2.5	50	2	●
GM-2BS-R0.90	1.80	0.90	4.0	2.7	50	2	●
GM-2BS-R1.00	2.00	1.00	4.0	3.0	50	2	●
GM-2BS-R1.25	2.50	1.25	4.0	3.7	50	2	●
GM-2BS-R1.50	3.00	1.50	4.0	4.5	50	2	●

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

KMG303

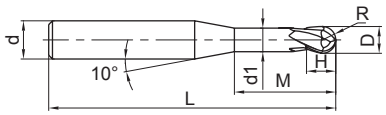
Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
✔	✔	✔				✔	✔				

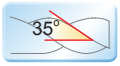
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Cutting data Schnittdaten B394-419
Graphics identification & application Graphische Werkzeug- & Anwendungsbeschr. B200
Order form for non-standard products Bestellformular für Sonderwerkzeuge B455-B456

GM-2BP series for general machining · GM-2BP Serie für allgemeine Bearbeitung

2-flute ball nose end mills with short cutting edge and long neck
2-Schneiden Kugelkopffräser mit einer kurzen Schneide und Zylinderschaft

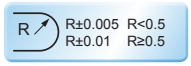














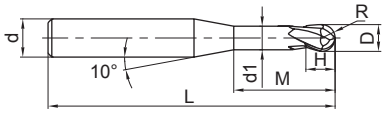
Type · Typ	Dimension(mm) Abmessungen							Teeth Zähne Z	Grade Sorte KMG 303
	D	R	H	d_1	M	d	L		
GM-2BP-R0.25-M04	0.5	0.25	0.7	0.45	4.0	4.0	50	2	●
GM-2BP-R0.25-M06	0.5	0.25	0.7	0.45	6.0	4.0	50	2	●
GM-2BP-R0.3-M04	0.6	0.3	0.9	0.55	4.0	4.0	50	2	●
GM-2BP-R0.3-M06	0.6	0.3	0.9	0.55	6.0	4.0	50	2	●
GM-2BP-R0.3-M08	0.6	0.3	0.9	0.55	8.0	4.0	50	2	●
GM-2BP-R0.4-M04	0.8	0.4	1.2	0.75	4.0	4.0	50	2	●
GM-2BP-R0.4-M06	0.8	0.4	1.2	0.75	6.0	4.0	50	2	●
GM-2BP-R0.4-M08	0.8	0.4	1.2	0.75	8.0	4.0	50	2	●
GM-2BP-R0.4-M10	0.8	0.4	1.2	0.75	10.0	4.0	50	2	●
GM-2BP-R0.5-M04	1.0	0.5	1.5	0.95	4.0	4.0	50	2	●
GM-2BP-R0.5-M06	1.0	0.5	1.5	0.95	6.0	4.0	50	2	●
GM-2BP-R0.5-M08	1.0	0.5	1.5	0.95	8.0	4.0	50	2	●
GM-2BP-R0.5-M10	1.0	0.5	1.5	0.95	10.0	4.0	50	2	●
GM-2BP-R0.5-M12	1.0	0.5	1.5	0.95	12.0	4.0	50	2	●
GM-2BP-R0.6-M06	1.2	0.6	1.8	1.15	6.0	4.0	50	2	●
GM-2BP-R0.6-M08	1.2	0.6	1.8	1.15	8.0	4.0	50	2	●
GM-2BP-R0.6-M12	1.2	0.6	1.8	1.15	12.0	4.0	50	2	●
GM-2BP-R0.6-M16	1.2	0.6	1.8	1.15	16.0	4.0	50	2	●
GM-2BP-R0.75-M08	1.5	0.75	2.3	1.45	8.0	4.0	50	2	●
GM-2BP-R0.75-M12	1.5	0.75	2.3	1.45	12.0	4.0	50	2	●
GM-2BP-R0.75-M16	1.5	0.75	2.3	1.45	16.0	4.0	50	2	●
GM-2BP-R1.0-M06	2.0	1.0	3.0	1.95	6.0	4.0	50	2	●
GM-2BP-R1.0-M08	2.0	1.0	3.0	1.95	8.0	4.0	50	2	●
GM-2BP-R1.0-M10	2.0	1.0	3.0	1.95	10.0	4.0	50	2	●
GM-2BP-R1.0-M12	2.0	1.0	3.0	1.95	12.0	4.0	50	2	●
GM-2BP-R1.0-M16	2.0	1.0	3.0	1.95	16.0	4.0	50	2	●
GM-2BP-R1.0-M20	2.0	1.0	3.0	1.95	20.0	4.0	50	2	●
GM-2BP-R1.25-M08	2.5	1.25	3.7	2.4	8.0	4.0	50	2	●
GM-2BP-R1.25-M12	2.5	1.25	3.7	2.4	12.0	4.0	50	2	●
GM-2BP-R1.25-M16	2.5	1.25	3.7	2.4	16.0	4.0	60	2	●
GM-2BP-R1.25-M20	2.5	1.25	3.7	2.4	20.0	4.0	60	2	●

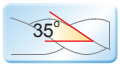
● Ex Stock / ab Lager ○ On demand / auf Anfrage

GM-2BP series for general machining · **GM-2BP** Serie für allgemeine Bearbeitung

2-flute straight shank ball nose end mills with short cutting edge and long neck
2-Schneiden Kugelkopffräser mit kurzer Schneide und Zylinderschaft

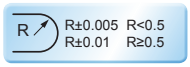














Type · Typ	Dimension(mm) Abmessungen							Teeth · Zähne Z	Grade Sorte KMG 303
	D	R	H	d_1	M	d	L		
GM-2BP-R1.5-M08	3.0	1.5	4.5	2.85	8.0	6.0	50	2	●
GM-2BP-R1.5-M10	3.0	1.5	4.5	2.85	10.0	6.0	50	2	●
GM-2BP-R1.5-M12	3.0	1.5	4.5	2.85	12.0	6.0	50	2	●
GM-2BP-R1.5-M16	3.0	1.5	4.5	2.85	16.0	6.0	60	2	●
GM-2BP-R1.5-M20	3.0	1.5	4.5	2.85	20.0	6.0	60	2	●
GM-2BP-R2.0-M10	4.0	2.0	6.0	3.85	10.0	6.0	60	2	●
GM-2BP-R2.0-M16	4.0	2.0	6.0	3.85	16.0	6.0	60	2	●
GM-2BP-R2.0-M20	4.0	2.0	6.0	3.85	20.0	6.0	60	2	●
GM-2BP-R2.0-M25	4.0	2.0	6.0	3.85	25.0	6.0	60	2	●
GM-2BP-R2.5-M16	5.0	2.5	7.5	4.85	16.0	6.0	60	2	●
GM-2BP-R2.5-M25	5.0	2.5	7.5	4.85	25.0	6.0	70	2	●

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

KMG303

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
✔	✔	✔				✔	✔				

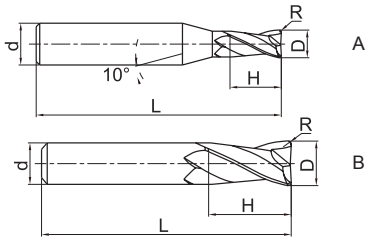
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ISO Kennzeichen
Cutting data B394-419
Schnittdaten
Graphics identification & application B200
Graphische Werkzeug- & Anwendungsbeschr.
Order form for non-standard products B455-B456
Bestellformular für Sonderwerkzeuge

GM-2R series for general machining · GM-2R Serie für allgemeine Bearbeitung

2-flute radius end mills with straight shank
2-Schneiden Radius Schaftfräser und Zylinderschaft







Type · Typ	Dimension(mm) Abmessungen					Teeth · ZähneZ	Grade Sorte KMG 303
	D	R	d	H	L		
GM-2R-D1.0R0.2	1.0	0.2	4	3	50	2	○
GM-2R-D1.5R0.2	1.5	0.2	4	4	50	2	○
GM-2R-D2.0R0.2	2.0	0.2	4	6	50	2	○
GM-2R-D2.0R0.5	2.0	0.5	4	6	50	2	○
GM-2R-D2.5R0.2	2.5	0.2	4	8	50	2	○
GM-2R-D2.5R0.5	2.5	0.5	4	8	50	2	○
GM-2R-D3.0R0.2	3.0	0.2	4	8	50	2	○
GM-2R-D3.0R0.3	3.0	0.3	4	8	50	2	○
GM-2R-D3.0R0.5	3.0	0.5	4	8	50	2	○
GM-2R-D4.0R0.2	4.0	0.2	4	11	50	2	○
GM-2R-D4.0R0.3	4.0	0.3	4	11	50	2	○
GM-2R-D4.0R0.5	4.0	0.5	4	11	50	2	○
GM-2R-D4.0R1.0	4.0	1.0	4	11	50	2	○
GM-2R-D5.0R0.3	5.0	0.3	6	13	50	2	○
GM-2R-D5.0R0.5	5.0	0.5	6	13	50	2	○
GM-2R-D5.0R1.0	5.0	1.0	6	13	50	2	○
GM-2R-D6.0R0.3	6.0	0.3	6	16	50	2	○
GM-2R-D6.0R0.5	6.0	0.5	6	16	50	2	○
GM-2R-D6.0R1.0	6.0	1.0	6	16	50	2	○
GM-2R-D8.0R0.3	8.0	0.3	8	20	60	2	○
GM-2R-D8.0R0.5	8.0	0.5	8	20	60	2	○
GM-2R-D8.0R1.0	8.0	1.0	8	20	60	2	○
GM-2R-D10.0R0.5	10.0	0.5	10	25	75	2	○
GM-2R-D10.0R1.0	10.0	1.0	10	25	75	2	○
GM-2R-D10.0R1.5	10.0	1.5	10	25	75	2	○
GM-2R-D10.0R2.0	10.0	2.0	10	25	75	2	○
GM-2R-D12.0R0.5	12.0	0.5	12	30	75	2	○
GM-2R-D12.0R1.0	12.0	1.0	12	30	75	2	○
GM-2R-D12.0R1.5	12.0	1.5	12	30	75	2	○
GM-2R-D12.0R2.0	12.0	2.0	12	30	75	2	○

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

KMG303

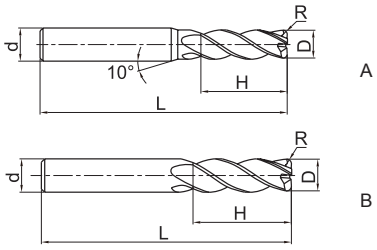
Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
✔	✔	✔	✔			✔	✔			✔	✔

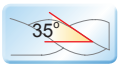
● Ex Stock / ab Lager ○ On demand / auf Anfrage

GM-4R series for general machining · **GM-4R** Serie für allgemeine Bearbeitung

4-flute radius end mills with straight shank
4-Schneiden Radius-Schaftfräser und Zylinderschaft













Type · Typ	Dimension(mm) Abmessungen					Teeth · Zähne Z	Geometry Ausführung	Grade Sorte KMG 303
	D	R	d	H	L			
GM-4R-D3.0R0.2	3.0	0.2	4	8	50	4	A	●
GM-4R-D4.0R0.3	4.0	0.3	4	10	50	4	B	●
GM-4R-D4.0R0.5	4.0	0.5	4	10	50	4	B	●
GM-4R-D5.0R0.5	5.0	0.5	6	13	50	4	A	●
GM-4R-D5.0R1.0	5.0	1.0	6	13	50	4	A	●
GM-4R-D6.0R0.5	6.0	0.5	6	16	50	4	B	●
GM-4R-D6.0R1.0	6.0	1.0	6	16	50	4	B	●
GM-4R-D8.0R0.5	8.0	0.5	8	20	60	4	B	●
GM-4R-D8.0R1.0	8.0	1.0	8	20	60	4	B	●
GM-4R-D10.0R0.5	10.0	0.5	10	25	75	4	B	●
GM-4R-D10.0R1.0	10.0	1.0	10	25	75	4	B	●
GM-4R-D10.0R2.0	10.0	2.0	10	25	75	4	B	●
GM-4R-D10.0R3.0	10.0	3.0	10	25	75	4	B	●
GM-4R-D12.0R0.5	12.0	0.5	12	30	75	4	B	●
GM-4R-D12.0R1.0	12.0	1.0	12	30	75	4	B	●
GM-4R-D12.0R2.0	12.0	2.0	12	30	75	4	B	●
GM-4R-D12.0R3.0	12.0	3.0	12	30	75	4	B	●

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

KMG303

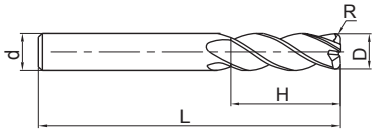
Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
✔	✔	✔	✔			✔	✔			✔	✔

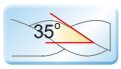
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Cutting data Schnittdaten B394-419
Graphics identification & application Graphische Werkzeug- & Anwendungsbeschr. B200
Order form for non-standard products Bestellformular für Sonderwerkzeuge B455-B456

GM-4RL series for general machining · GM-4RL Serie für allgemeine Bearbeitung

4-flute radius end mills with straight shank
4-Schneiden Gesenkfräser mit Eckenradius u. Zylinderschaft













Type · Typ	Dimension(mm) Abmessungen					Teeth · Zähne Z	Grade · Sorte KMG 303
	D	R	d	H	L		
GM-4RL-D6.0R0.5	6.0	0.5	6	16	75	4	●
GM-4RL-D6.0R1.0	6.0	1.0	6	16	75	4	●
GM-4RL-D8.0R0.5	8.0	0.5	8	20	100	4	●
GM-4RL-D8.0R1.0	8.0	1.0	8	20	100	4	●
GM-4RL-D10.0R0.5	10.0	0.5	10	25	100	4	●
GM-4RL-D10.0R1.0	10.0	1.0	10	25	100	4	●
GM-4RL-D10.0R2.0	10.0	2.0	10	25	100	4	●
GM-4RL-D12.0R0.5	12.0	0.5	12	30	100	4	●
GM-4RL-D12.0R1.0	12.0	1.0	12	30	100	4	●
GM-4RL-D12.0R2.0	12.0	2.0	12	30	100	4	●
GM-4RL-D16.0R1.0	16.0	1.0	16	45	150	4	●
GM-4RL-D16.0R2.0	16.0	2.0	16	45	150	4	●

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

KMG303

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
✔	✔	✔	✔			✔	✔			✔	✔

● Ex Stock / ab Lager ○ On demand / auf Anfrage

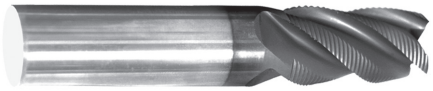
DIN 6527L Roughing end mills · DIN 6527L VHM Schruppfräser

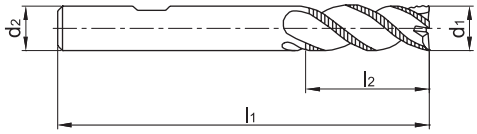


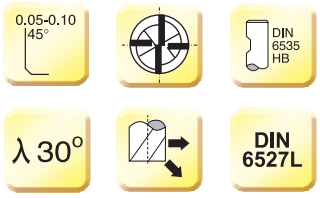


5602R303/304GR

KMG303: nano TiAlN coated ultra-fine carbide / *nano TiAlN beschichtetes Ultrafeinkornhartmetall*







Type *Typ*	Dimension(mm) *Abmessungen*				Teeth *Zähne*	Application *Anwendung*	P K S
	$d_1(h_{10})$	$d_2(h_6)$	l_2	l_1	z	Grade	KMG303
5602R303GR-0600	6	6	13	57	3		●
5602R303GR-0800	8	8	19	63	3		●
5602R304GR-1000	10	10	22	72	4		●
5602R304GR-1200	12	12	26	83	4		●
5602R304GR-1600	16	16	32	92	4		●
5602R304GR-2000	20	20	38	104	4		●
					Art. Group No. / *Produktgruppe Nr.* :		**021130**

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

KMG303

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
✔	✔	✔	✔				✔			✔	✔

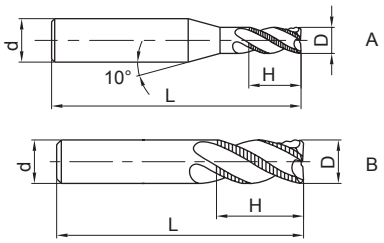
Code key ISO Kennzeichen B197
Cutting data Schnittdaten B350-377
Graphics identification & application Graphische Werkzeug- & Anwendungsbeschr. B198
Order form for non-standard products Bestellformular für Sonderwerkzeuge B455-456

GM-4W series for general machining · GM-4W Serie für allgemeine Bearbeitung

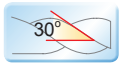
4-flute end mills with straight shank for roughing
4-Schneiden Schruppfräser mit Zylinderschaft



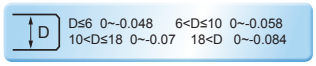




- Most suitable for effectively rough machining.









Type · Typ	Dimension(mm) Abmessungen				Teeth · Zähne Z	Geometry Ausführung	Grade · Sorte KMG 405
	D	d	H	L			
GM-4W-D6.0	6	6	16	50	4	B	●
GM-4W-D7.0	7	8	20	60	4	A	●
GM-4W-D8.0	8	8	20	60	4	B	●
GM-4W-D9.0	9	10	22	75	4	A	●
GM-4W-D10.0	10	10	25	75	4	B	●
GM-4W-D11.0	11	12	26	75	4	A	●
GM-4W-D12.0	12	12	30	75	4	B	●
GM-4W-D16.0	16	16	45	100	4	B	●
GM-4W-D20.0	20	20	45	100	4	B	●

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

KMG303

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
✔	✔	✔	✔				✔			✔	✔

● Ex Stock / ab Lager ○ On demand / auf Anfrage

NOTIZEN:

NOTIZEN:

NOTIZEN:

HM

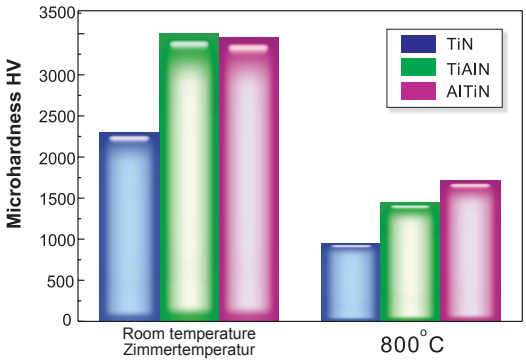
series end mills for machining high-hardness steel

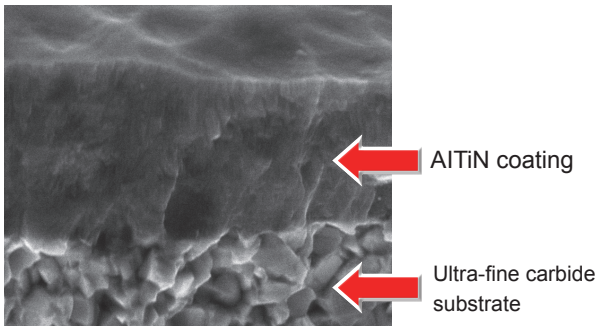
Serie Vollhartmetall Schaftfräser zur Bearbeitung von gehärtetem Stahl

1. Excellent tool design covers large chip pocket, good stability and high machining efficiency.
2. Optimized cutting geometry (rake angle) assures edge stability and sharpness. The application area is wider.
3. The outstanding high cutting performance based on the perfect combination of ultrafine grain carbide substrate with high wear resistance and stable cutting edge.
4. The optimized Nano-AITIN coating is the base for hardmachining with high speed at high temperature.

1. Exzellentes Werkzeug Design, mit großem Spanraum für kontrollierte Spanabfuhr, hervorragende Stabilität und höchste Bearbeitungswirtschaftlichkeit.
2. Trotz großem Spanwinkel und scharfer Schneide ist die Schneidenstabilität gewährleistet. Der Anwendungsbereich wird dadurch deutlich erweitert.
3. Das ultrafeine Hartmetall Substrat, und die optimierte Beschichtung ist speziell für die Bearbeitung von gehärtetem Stahl entwickelt.
4. Die Nano-AITIN Beschichtung ist perfekt geeignet für die Hartbearbeitung bei hohen Temperaturen.



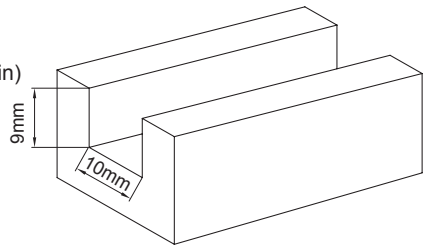




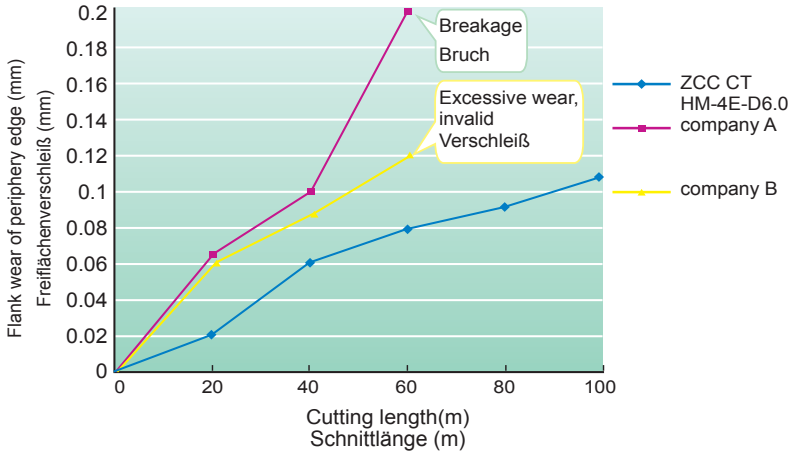
HM series end mills for machining high hardness steel
HM Serie Eckfräser für die Bearbeitung von gehärtetem Stahl

Tool type · Werkzeugtyp : HM-4E-D6.0

Size: Ø 6mm
Workpiece material
Werkstückstoff: SKD11(62HRC)
Rotating / Speed: 10000 r/min(188m/min)
Feed : 2000 mm/min (0.2mm/r)
Axial cutting depth: Ap=9mm
Radial cutting depth: Ae=0.1mm
Cutting style: cycloid machining
Cooling system: air blow
Machine: MIKRON UCP 1000

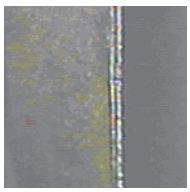


Cycloid machining of end mill
Zyklische Bearbeitung

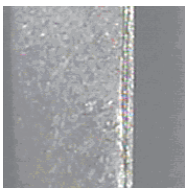


■ Tool wear · Werkzeugverschleiß

HM-4E-D6.0

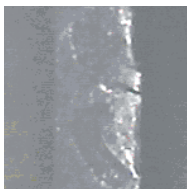


Cutting length: 60m
Schnittlänge: 60m



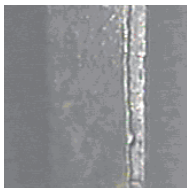
Cutting length: 100m
Schnittlänge: 100m

Similar product of company A



Cutting length: 60m
Schnittlänge: 60m

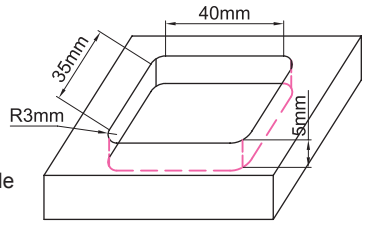
Similar product of company B



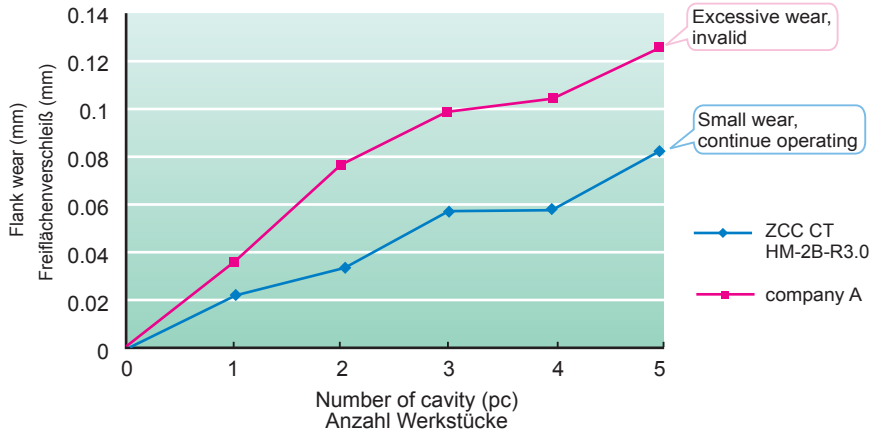
Cutting length: 60m
Schnittlänge: 60m

Tool type: HM-2B-R3.0

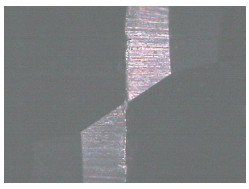
Size: Ø 3.0mm
Workpiece material
Werkstückstoff: SKD61(52HRC)
Rotating speed: 6400r/min (120m/min)
Feed: 1280mm/min (0.2mm/r)
Axial cutting depth: Ap=0.12mm
Radial cutting depth: Ae=0.24mm
Cutting style: machining cavity with 2° taper angle
Cooling system: air blow
Machine: MIKRON UCP 1000



Cavity machining with ball nose end mills
Auskammern mit Kugelkopffräsern



■ Wear after machining 5 cavities
Verschleiß nach 5 Werkstücken



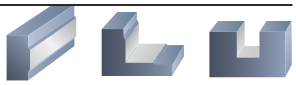
HM-2B-R3.0



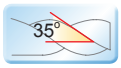
Similar product of company A

HM-2E

2-flute end mills with straight shank
2-Schneiden Eckfräser mit Zylinderschaft



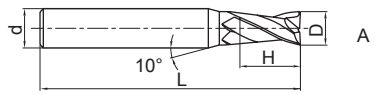


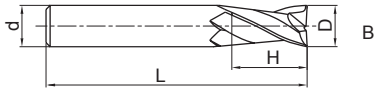












Type · Typ	Dimension(mm) Abmessungen				Teeth · Zähne Z	Geometry Ausführung	Grade · Sorte KMG 555
	D	d	H	L			
HM-2E-D1.0S	1.0	4	3	50	2	A	●
HM-2E-D1.5S	1.5	4	4	50	2	A	●
HM-2E-D2.0S	2.0	4	6	50	2	A	●
HM-2E-D2.5S	2.5	4	8	50	2	A	●
HM-2E-D3.0S	3.0	4	8	50	2	A	●
HM-2E-D4.0S	4.0	4	11	50	2	B	●
HM-2E-D1.0	1.0	6	3	50	2	A	●
HM-2E-D1.5	1.5	6	4	50	2	A	●
HM-2E-D2.0	2.0	6	6	50	2	A	●
HM-2E-D2.5	2.5	6	8	50	2	A	●
HM-2E-D3.0	3.0	6	8	50	2	A	●
HM-2E-D3.5	3.5	6	10	50	2	A	●
HM-2E-D4.0	4.0	6	11	50	2	A	●
HM-2E-D4.5	4.5	6	11	50	2	A	●
HM-2E-D5.0	5.0	6	13	50	2	A	●
HM-2E-D5.5	5.5	6	16	50	2	A	●
HM-2E-D6.0	6.0	6	16	50	2	B	●
HM-2E-D7.0	7.0	8	20	60	2	A	●
HM-2E-D8.0	8.0	8	20	60	2	B	●
HM-2E-D9.0	9.0	10	22	75	2	A	●
HM-2E-D10.0	10.0	10	25	75	2	B	●
HM-2E-D11.0	11.0	12	26	75	2	A	●
HM-2E-D12.0	12.0	12	30	75	2	B	●
HM-2E-D14.0	14.0	14	32	100	2	B	●
HM-2E-D16.0	16.0	16	45	100	2	B	●
HM-2E-D18.0	18.0	18	45	100	2	B	●
HM-2E-D20.0	20.0	20	45	100	2	B	●

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

KMG555

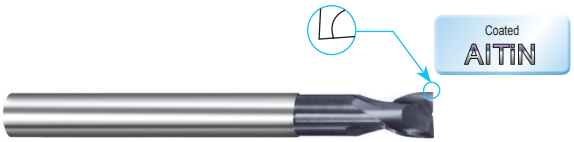
Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
			✔	✔	✔		✔				

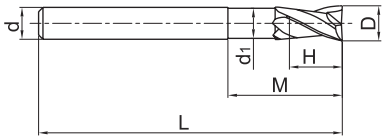
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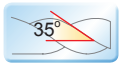
HM-2EFP

2-flute flute end mills with straight shank and short cutting edge and long neck
2-Schneiden Eckfräser mit kurzer Schneide und Zylinderschaft















Type · Typ	Dimension(mm) Abmessungen						Teeth · Zähne Z	Grade · Sorte KMG 555
	D	d	H	L				
HM-2EFP-D6.0	6.0	6	9	30	5.8	75	2	●
HM-2EFP-D8.0	8.0	8	12	40	7.8	100	2	●
HM-2EFP-D10.0	10.0	10	15	50	9.6	100	2	●
HM-2EFP-D12.0	12.0	12	18	50	11.5	100	2	●
HM-2EFP-D16.0	16.0	16	24	50	15.5	150	2	●
HM-2EFP-D20.0	20.0	20	30	60	19.5	150	2	●

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

KMG555

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
			✔	✔	✔		✔				

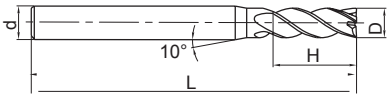
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ISO Kennzeichen
Cutting data B420-434
Schnittdaten
Graphics identification & application B200
Graphische Werkzeug- & Anwendungsbeschr.
Order form for non-standard products B455-B456
Bestellformular für Sonderwerkzeuge

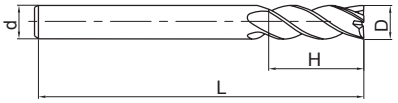
HM-4E series for machining high hardness steel · HM-4E Serie für die Hartbearbeitung

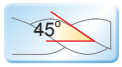
4-flute end mills with straight shank
4-Schneiden Schaftfräser mit Zylinderschaft



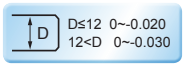














Type · Typ	Dimension(mm) Abmessungen				Teeth · Zähne Z	Geometry Ausführung	Grade · Sorte KMG 555
	D	d	H	L			
HM-4E-D1.0S	1.0	4	3	50	4	A	●
HM-4E-D1.5S	1.5	4	4	50	4	A	●
HM-4E-D2.0S	2.0	4	6	50	4	A	●
HM-4E-D2.5S	2.5	4	8	50	4	A	●
HM-4E-D3.0S	3.0	4	8	50	4	A	●
HM-4E-D4.0S	4.0	4	11	50	4	B	●
HM-4E-D1.0	1.0	6	3	50	4	A	●
HM-4E-D1.5	1.5	6	4	50	4	A	●
HM-4E-D2.0	2.0	6	6	50	4	A	●
HM-4E-D2.5	2.5	6	8	50	4	A	●
HM-4E-D3.0	3.0	6	8	50	4	A	●
HM-4E-D3.5	3.5	6	10	50	4	A	●
HM-4E-D4.0	4.0	6	11	50	4	A	●
HM-4E-D4.5	4.5	6	11	50	4	A	●
HM-4E-D5.0	5.0	6	13	50	4	A	●
HM-4E-D5.5	5.5	6	16	50	4	A	●
HM-4E-D6.0	6.0	6	16	50	4	B	●
HM-4E-D7.0	7.0	8	20	60	4	A	●
HM-4E-D8.0	8.0	8	20	60	4	B	●
HM-4E-D9.0	9.0	10	22	75	4	A	●
HM-4E-D10.0	10.0	10	25	75	4	B	●
HM-4E-D11.0	11.0	12	26	75	4	A	●
HM-4E-D12.0	12.0	12	30	75	4	B	●
HM-4E-D14.0	14.0	14	32	75	4	B	●
HM-4E-D16.0	16.0	16	45	100	4	B	●
HM-4E-D18.0	18.0	18	45	100	4	B	●
HM-4E-D20.0	20.0	20	45	100	4	B	●

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

KMG555

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
			✔	✔	✔		✔				

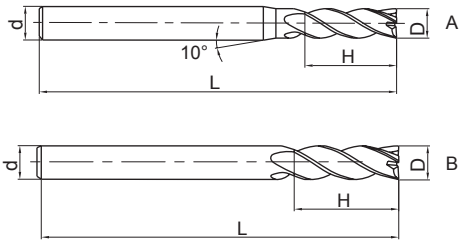
● Ex Stock / ab Lager ○ On demand / auf Anfrage

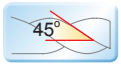
HM-4EL series for machining high hardness steel · HM-4EL Serie für die Hartbearbeitung

4-flute end mills with straight shank and long cutting edges
4-Schneiden Schaftfräser mit Zylinderschaft und langer Schneide

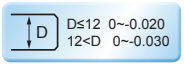














Type · Typ	Dimension(mm) Abmessungen				Teeth · Zähne Z	Geometry Ausführung	Grade · Sorte KMG 555
	D	d	H	L			
HM-4EL-D3.0	3.0	6	12	75	4	A	●
HM-4EL-D4.0	4.0	6	15	75	4	A	●
HM-4EL-D5.0	5.0	6	20	75	4	A	●
HM-4EL-D6.0	6.0	6	20	75	4	B	●
HM-4EL-D8.0	8.0	8	25	100	4	B	●
HM-4EL-D10.0	10.0	10	30	100	4	B	●
HM-4EL-D12.0	12.0	12	35	100	4	B	●
HM-4EL-D14.0	14.0	14	40	100	4	B	●
HM-4EL-D16.0	16.0	16	50	150	4	B	●
HM-4EL-D20.0	20.0	20	55	150	4	B	●

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

KMG555

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
			✔	✔	✔		✔				

Code key B199
ISO Kennzeichen
Cutting data B420-434
Schnittdaten
Graphics identification & application B200
Graphische Werkzeug- & Anwendungsbeschr.
Order form for non-standard products B455-B456
Bestellformular für Sonderwerkzeuge

DIN 6527L mills for HSC machining high hardness steel (HRC>48)
DIN 6527L VHM Radiusfräser für die Hartbearbeitung im HSC Bereich (HRC>48)

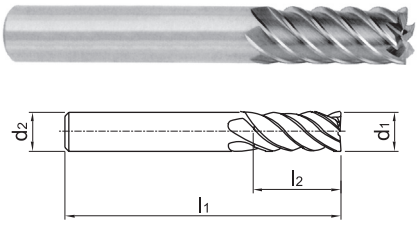


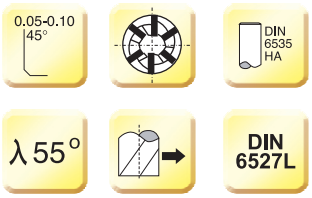


5502R55MHH

KMG405: nano AlTiN Coated Untra-fine carbide / *nano AlTiN beschichtetes Ultrafeinkornhartmetall*
For HSC maching of steel (HRC<63) / *Für HSC Bearbeitung von Stahl (HRC<63)*

KMG555: nano AlTixN Coated super-fine carbide / *nano AlTixN beschichtetes Superfeinkornhartmetall*
For HSC maching and dry maching of steel (HRC<=70) /
Für HSC Bearbeitung und Trockenbearbeitung von Stahl (HRC<=70)





Type *Typ*	Dimension(mm) *Abmessungen*				Teeth *Zähne*	Application *Anwendung*	H K	
	$d_1(e_8)$	$d_2(h_6)$	l_2	l_1	z	Grade	KMG555	KMG405
5502R55MHH-0300	3.00	6	8	57	4		●	●
5502R55MHH-0400	4.00	6	11	57	4		●	●
5502R55MHH-0500	5.00	6	13	57	5		●	●
5502R55MHH-0600	6.00	6	13	57	6		●	●
5502R55MHH-0800	8.00	8	19	63	6		●	●
5502R55MHH-1000	10.00	10	22	72	6		●	●
5502R55MHH-1200	12.00	12	26	83	6		●	●
5502R55MHH-1600	16.00	16	32	92	6		●	●
5502R55MHH-2000	20.00	20	38	104	8		●	●

Art. Group No. / *Produktgruppe Nr.* : 024130

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

KMG555

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
		✔	✔	✔	✔		✔				

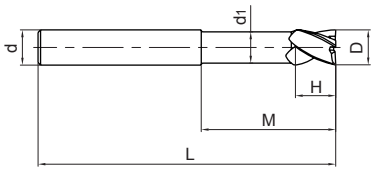
● Ex Stock / ab Lager ○ On demand / auf Anfrage

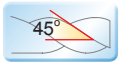
HM-4EFP

4-flute flute end mills with straight shank and short cutting edge and long neck
4-Schneiden Eckfräser mit kurzer Schneide und Zylinderschaft

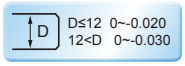














Type · Typ	Dimension(mm) Abmessungen						Teeth · Zähne Z	Grade · Sorte KMG 555
	D	d	H	M	d_1	L		
HM-4EFP-D6.0	6.0	6	9	30	5.8	75	4	●
HM-4EFP-D8.0	8.0	8	12	40	7.8	100	4	●
HM-4EFP-D10.0	10.0	10	15	50	9.6	100	4	●
HM-4EFP-D12.0	12.0	12	18	50	11.5	100	4	●
HM-4EFP-D16.0	16.0	16	24	50	15.5	150	4	●
HM-4EFP-D20.0	20.0	20	30	60	19.5	150	4	●

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

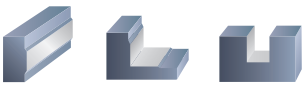
KMG555

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
			✔	✔	✔		✔				

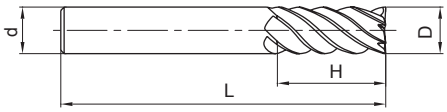
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Schnittdaten
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Graphische Werkzeug- & Anwendungsbeschr.
Order form for non-standard products B455-B456
Bestellformular für Sonderwerkzeuge

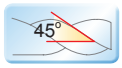
HM-6E

6-flute end mills with straight shank
6-Schneiden Schaftfräser mit Zylinderschaft















Type · Typ	Dimension(mm) Abmessungen				Teeth · Zähne Z	Grade · Sorte KMG 555
	D	d	H	L		
HM-6E-D6.0	6.0	6	18	60	6	●
HM-6E-D8.0	8.0	8	20	60	6	●
HM-6E-D10.0	10.0	10	30	75	6	●
HM-6E-D12.0	12.0	12	32	75	6	●
HM-6E-D16.0	16.0	16	40	100	6	●
HM-6E-D20.0	20.0	20	45	100	6	●

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

KMG555

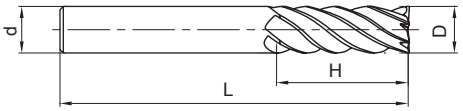
Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
			✔	✔	✔		✔				

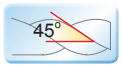
● Ex Stock / ab Lager ○ On demand / auf Anfrage

HM-6EL series for machining high hardness steel · HM-6EL Serie für die Hartbearbeitung

6-flute end mills with straight shank and long cutting edges
6-Schneiden Schaftfräser mit Zylinderschaft und langer Schneide













Type · Typ	Dimension(mm) Abmessungen				Teeth · Zähne Z	Grade · Sorte KMG 555
	D	d	H	L		
HM-6EL-D6.0	6.0	6	24	75	6	●
HM-6EL-D8.0	8.0	8	32	75	6	●
HM-6EL-D10.0	10.0	10	40	100	6	●
HM-6EL-D12.0	12.0	12	45	100	6	●
HM-6EL-D16.0	16.0	16	64	150	6	●
HM-6EL-D20.0	20.0	20	75	150	6	●

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

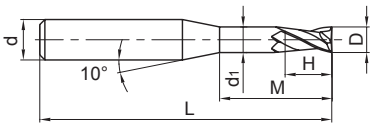
Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
			✔	✔	✔		✔				

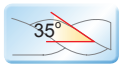
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ISO Kennzeichen
Cutting data B420-434
Schnittdaten
Graphics identification & application B200
Graphische Werkzeug- & Anwendungsbeschr.
Order form for non-standard products B455-B456
Bestellformular für Sonderwerkzeuge

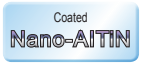
HM-2EP series for machining high hardness steel · HM-2EP Serie für die Hartbearbeitung

2-flute slot end mills with short cutting edge and long neck
2-Schneiden Nutenfräser mit kurzer Schneide und Zylinderschaft

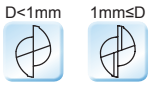












Type · Typ	Dimension(mm) Abmessungen						Teeth · Zähne Z	Grade · Sorte KMG 555
	D	d	H	M	d_1	L		
HM-2EP-D0.5-M04	0.5	4.0	0.7	4.0	0.45	50	2	●
HM-2EP-D0.5-M06	0.5	4.0	0.7	6.0	0.45	50	2	●
HM-2EP-D0.5-M08	0.5	4.0	0.7	8.0	0.45	50	2	●
HM-2EP-D0.8-M04	0.8	4.0	1.2	4.0	0.75	50	2	●
HM-2EP-D0.8-M06	0.8	4.0	1.2	6.0	0.75	50	2	●
HM-2EP-D0.8-M08	0.8	4.0	1.2	8.0	0.75	50	2	●
HM-2EP-D0.8-M10	0.8	4.0	1.2	10.0	0.75	50	2	●
HM-2EP-D1.0-M04	1.0	4.0	1.5	4.0	0.95	50	2	●
HM-2EP-D1.0-M06	1.0	4.0	1.5	6.0	0.95	50	2	●
HM-2EP-D1.0-M08	1.0	4.0	1.5	8.0	0.95	50	2	●
HM-2EP-D1.0-M10	1.0	4.0	1.5	10.0	0.95	50	2	●
HM-2EP-D1.0-M12	1.0	4.0	1.5	12.0	0.95	50	2	●
HM-2EP-D1.0-M14	1.0	4.0	1.5	14.0	0.95	50	2	●
HM-2EP-D1.2-M06	1.2	4.0	1.8	6.0	1.15	50	2	●
HM-2EP-D1.2-M08	1.2	4.0	1.8	8.0	1.15	50	2	●
HM-2EP-D1.2-M10	1.2	4.0	1.8	10.0	1.15	50	2	●
HM-2EP-D1.2-M12	1.2	4.0	1.8	12.0	1.15	50	2	●
HM-2EP-D1.5-M06	1.5	4.0	2.3	6.0	1.45	50	2	●
HM-2EP-D1.5-M08	1.5	4.0	2.3	8.0	1.45	50	2	●
HM-2EP-D1.5-M10	1.5	4.0	2.3	10.0	1.45	50	2	●
HM-2EP-D1.5-M12	1.5	4.0	2.3	12.0	1.45	50	2	●
HM-2EP-D1.5-M14	1.5	4.0	2.3	14.0	1.45	50	2	●
HM-2EP-D2.0-M06	2.0	4.0	3.0	6.0	1.95	50	2	●
HM-2EP-D2.0-M08	2.0	4.0	3.0	8.0	1.95	50	2	●
HM-2EP-D2.0-M10	2.0	4.0	3.0	10.0	1.95	50	2	●
HM-2EP-D2.0-M12	2.0	4.0	3.0	12.0	1.95	50	2	●
HM-2EP-D2.0-M14	2.0	4.0	3.0	14.0	1.95	50	2	●
HM-2EP-D2.0-M16	2.0	4.0	3.0	16.0	1.95	50	2	●

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

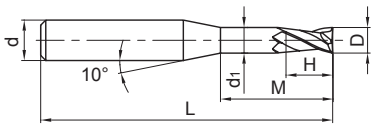
Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
			✔	✔	✔		✔				

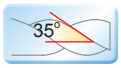
● Ex Stock / ab Lager ○ On demand / auf Anfrage

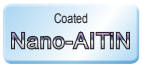
HM-2EP series for machining high hardness steel · HM-2EP Serie für die Hartbearbeitung

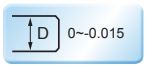
2-flute slot end mills with short cutting edge and long neck
2-Schneiden Nutenfräser mit kurzer Schneide und Zylinderschaft















Type · Typ	Dimension(mm) Abmessungen						Teeth · Zähne Z	Grade · Sorte KMG 555
	D	d	H	M	d_1	L		
HM-2EP-D2.5-M08	2.5	4.0	3.7	8.0	2.4	50	2	●
HM-2EP-D2.5-M10	2.5	4.0	3.7	10.0	2.4	50	2	●
HM-2EP-D2.5-M12	2.5	4.0	3.7	12.0	2.4	50	2	●
HM-2EP-D2.5-M14	2.5	4.0	3.7	14.0	2.4	50	2	●
HM-2EP-D2.5-M16	2.5	4.0	3.7	16.0	2.4	60	2	●
HM-2EP-D2.5-M18	2.5	4.0	3.7	18.0	2.4	60	2	●
HM-2EP-D2.5-M20	2.5	4.0	3.7	20.0	2.4	60	2	●
HM-2EP-D3.0-M06	3.0	6.0	4.5	6.0	2.85	50	2	●
HM-2EP-D3.0-M08	3.0	6.0	4.5	8.0	2.85	50	2	●
HM-2EP-D3.0-M10	3.0	6.0	4.5	10.0	2.85	50	2	●
HM-2EP-D3.0-M12	3.0	6.0	4.5	12.0	2.85	50	2	●
HM-2EP-D3.0-M14	3.0	6.0	4.5	14.0	2.85	60	2	●
HM-2EP-D3.0-M16	3.0	6.0	4.5	16.0	2.85	60	2	●
HM-2EP-D3.0-M18	3.0	6.0	4.5	18.0	2.85	60	2	●
HM-2EP-D3.0-M20	3.0	6.0	4.5	20.0	2.85	60	2	●
HM-2EP-D4.0-M12	4.0	6.0	6.0	12.0	3.85	60	2	●
HM-2EP-D4.0-M16	4.0	6.0	6.0	16.0	3.85	60	2	●
HM-2EP-D4.0-M20	4.0	6.0	6.0	20.0	3.85	60	2	●
HM-2EP-D4.0-M25	4.0	6.0	6.0	25.0	3.85	60	2	●
HM-2EP-D5.0-M16	5.0	6.0	7.5	16.0	4.85	60	2	●
HM-2EP-D5.0-M25	5.0	6.0	7.5	25.0	4.85	70	2	●

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

KMG555

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
			✔	✔	✔		✔				

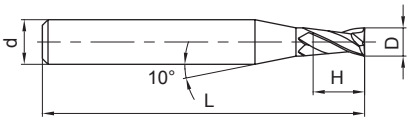
Code key B199
ISO Kennzeichen
Cutting data B420-434
Schnittdaten
Graphics identification & application B200
Graphische Werkzeug- & Anwendungsbeschr.
Order form for non-standard products B455-B456
Bestellformular für Sonderwerkzeuge

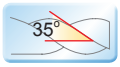
HM-2ES series machining high hardness steel · HM-2ES Serie für die Hartbearbeitung

2-flute tiny diameter end mills with straight shank
2-Schneiden Mirco-Fräser mit Zylinderschaft



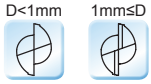












Type · Typ	Dimension(mm) · Abmessungen				Teeth · Zähne Z	Grade · Sorte KMG 555
	D	d	H	L		
HM-2ES-D0.3	0.3	4.0	0.6	50	2	●
HM-2ES-D0.4	0.4	4.0	0.8	50	2	●
HM-2ES-D0.5	0.5	4.0	1.0	50	2	●
HM-2ES-D0.6	0.6	4.0	1.2	50	2	●
HM-2ES-D0.7	0.7	4.0	1.4	50	2	●
HM-2ES-D0.8	0.8	4.0	1.6	50	2	●
HM-2ES-D0.9	0.9	4.0	1.8	50	2	●
HM-2ES-D1.0	1.0	4.0	2.0	50	2	●
HM-2ES-D1.1	1.1	4.0	2.0	50	2	●
HM-2ES-D1.2	1.2	4.0	2.5	50	2	●
HM-2ES-D1.3	1.3	4.0	2.5	50	2	●
HM-2ES-D1.4	1.4	4.0	3.0	50	2	●
HM-2ES-D1.5	1.5	4.0	3.0	50	2	●
HM-2ES-D1.6	1.6	4.0	3.5	50	2	●
HM-2ES-D1.7	1.7	4.0	3.5	50	2	●
HM-2ES-D1.8	1.8	4.0	4.0	50	2	●
HM-2ES-D1.9	1.9	4.0	4.0	50	2	●
HM-2ES-D2.0	2.0	4.0	4.0	50	2	●
HM-2ES-D2.1	2.1	4.0	4.0	50	2	●
HM-2ES-D2.2	2.2	4.0	4.5	50	2	●
HM-2ES-D2.3	2.3	4.0	4.5	50	2	●
HM-2ES-D2.4	2.4	4.0	5.0	50	2	●
HM-2ES-D2.5	2.5	4.0	5.0	50	2	●
HM-2ES-D2.6	2.6	4.0	5.0	50	2	●
HM-2ES-D2.7	2.7	4.0	5.5	50	2	●
HM-2ES-D2.8	2.8	4.0	5.5	50	2	●
HM-2ES-D2.9	2.9	4.0	6.0	50	2	●
HM-2ES-D3.0	3.0	4.0	6.0	50	2	●

Material Overview · Material Übersicht

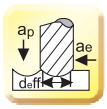
✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

KMG555

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
			✔	✔	✔		✔				

● Ex Stock / ab Lager ○ On demand / auf Anfrage

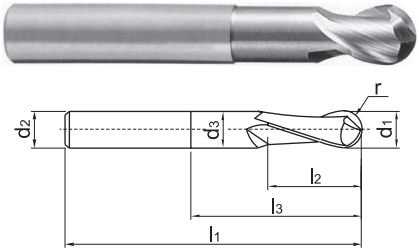
ZCC CT 2-flute ball nose end mills for HSC machining high hardness steel (HRC>48) short
ZCC CT 2 Schneiden VHM Vollradiusfräser für Hartbearbeitung im HSC Bereich (HRC>48) kurz



5565R302GH



KMG405: nano AlTiN Coated Untra-fine carbide / *nano AlTiN beschichtetes Ultrafeinkornhartmetall*





Type *Typ*	Dimension(mm) *Abmessungen*								Teeth *Zähne*	Application *Anwendung*	P K H
	d_1	$d_2(h_6)$	l_2	l_1	d_3	l_3	$r(f_8)$	α°	z	Grade	KMG405
5565R302GH-0300	3.00	6	4	57	2.80	9	1.50	6	2		●
5565R302GH-0400	4.00	6	5	57	3.70	12	2.00	4	2		●
5565R302GH-0500	5.00	6	6	57	4.60	15	2.50	2	2		●
5565R302GH-0600	6.00	6	7	57	5.50	20	3.00		2		●
5565R302GH-0800	8.00	8	9	63	7.40	26	4.00		2		●
5565R302GH-1000	10.00	10	11	72	9.20	31	5.00		2		●
5565R302GH-1200	12.00	12	12	83	11.00	37	6.00		2		●
5565R302GH-1600	16.00	16	16	92	15.00	43	8.00		2		●

Art. Group No. / *Produktgruppe Nr.* : 025130

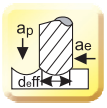
Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
		✔	✔	✔			✔				

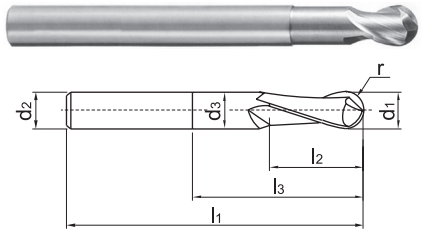
Code key ISO Kennzeichen B197
Cutting data Schnittdaten B350-377
Graphics identification & application Graphische Werkzeug- & Anwendungsbeschr. B198
Order form for non-standard products Bestellformular für Sonderwerkzeuge B455-456

ZCC CT 2-flute ball nose end mills for HSC machining high hardness steel (HRC>48) lang
ZCC CT 2 Schneiden VHM Vollradiusfräser für Hartbearbeitung im HSC Bereich (HRC>48) lang



5566R302GH

KMG405: nano AlTiN Coated Untra-fine carbide / *nano AlTiN beschichtetes Ultrafeinkornhartmetall*





Type *Typ*	Dimension(mm) *Abmessungen*								Teeth *Zähne*	Application *Anwendung*	P K H
	d_1	$d_2(h_6)$	l_2	l_1	d_3	l_3	$r(f_8)$	α°	z	Grade	KMG405
5566R302GH-0300	3.00	6	4	75	2.80	15	1.50	6	2		●
5566R302GH-0400	4.00	6	5	75	3.70	20	2.00	4	2		●
5566R302GH-0500	5.00	6	6	80	4.60	25	2.50	2	2		●
5566R302GH-0600	6.00	6	7	80	5.50	30	3.00		2		●
5566R302GH-0800	8.00	8	9	90	7.40	35	4.00		2		●
5566R302GH-1000	10.00	10	11	100	9.20	40	5.00		2		●
5566R302GH-1200	12.00	12	12	120	11.00	50	6.00		2		●

Art. Group No. / *Produktgruppe Nr.* : 025130

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
		✔	✔	✔			✔				

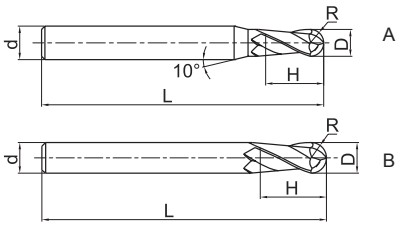
● Ex Stock / ab Lager ○ On demand / auf Anfrage

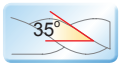
HM-2B series machining high hardness steel · HM-2B Serie für die Hartbearbeitung

2-flute ball nose end mills with straight shank
2-Schneiden Kugelkopffräser mit Zylinderschaft

















Type · Typ	Dimension(mm) Abmessungen					Teeth · Zähne Z	Geometry Ausführung	Grade · Sorte KMG 555
	D	R	d	H	L			
HM-2B-R0.5S	1.0	0.5	4.0	2.0	50	2	A	●
HM-2B-R0.75S	1.5	0.75	4.0	3.0	50	2	A	●
HM-2B-R1.0S	2.0	1.0	4.0	4.0	50	2	A	●
HM-2B-R1.25S	2.5	1.25	4.0	5.0	50	2	A	●
HM-2B-R1.5S	3.0	1.5	4.0	6.0	50	2	A	●
HM-2B-R2.0S	4.0	2.0	4.0	8.0	50	2	B	●
HM-2B-R0.5	1.0	0.5	6.0	2.0	50	2	A	●
HM-2B-R0.75	1.5	0.75	6.0	3.0	50	2	A	●
HM-2B-R1.0	2.0	1.0	6.0	4.0	50	2	A	●
HM-2B-R1.25	2.5	1.25	6.0	5.0	50	2	A	●
HM-2B-R1.5	3.0	1.5	6.0	6.0	50	2	A	●
HM-2B-R1.75	3.5	1.75	6.0	8.0	50	2	A	●
HM-2B-R2.0	4.0	2.0	6.0	8.0	50	2	A	●
HM-2B-R2.5	5.0	2.5	6.0	10.0	50	2	A	●
HM-2B-R2.75	5.5	2.75	6.0	12.0	50	2	A	●
HM-2B-R3.0	6.0	3.0	6.0	12.0	50	2	B	●
HM-2B-R3.5	7.0	3.5	8.0	14.0	60	2	A	●
HM-2B-R4.0	8.0	4.0	8.0	16.0	60	2	B	●
HM-2B-R4.5	9.0	4.5	10.0	18.0	75	2	A	●
HM-2B-R5.0	10.0	5.0	10.0	20.0	75	2	B	●
HM-2B-R6.0	12.0	6.0	12.0	24.0	75	2	B	●
HM-2B-R7.0	14.0	7.0	14.0	28.0	75	2	B	●
HM-2B-R8.0	16.0	8.0	16.0	32.0	100	2	B	●
HM-2B-R10.0	20.0	10.0	20.0	40.0	100	2	B	●

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

KMG555

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
			✔	✔	✔		✔				

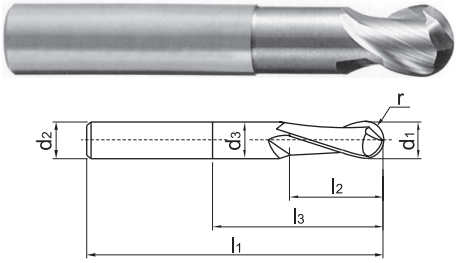
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ISO Kennzeichen
Cutting data B350-377
Schnittdaten
Graphics identification & application B198
Graphische Werkzeug- & Anwendungsbeschr.
Order form for non-standard products B455-456
Bestellformular für Sonderwerkzeuge

ZCC CT 2-flute ball nose end mills for HSC machining high hardness steel (HRC>48)
ZCC CT 2 Schneiden VHM Kugelkopffräser für Hartbearbeitung im HSC Bereich (HRC>48)



5565R302HH

KMG405: nano AlTiN Coated Untra-fine carbide / *nano AlTiN beschichtetes Ultrafeinkornhartmetall*





Type *Typ*	Dimension(mm) *Abmessungen*								Teeth *Zähne*	Application *Anwendung*	P K H
	d_1	$d_2(h_6)$	l_2	l_1	d_3	l_3	$r(f_8)$	α°	z	Grade	KMG405
5565R302HH-0300	3	6	4	57	2.8	9	1.5	6	2		●
5565R302HH-0400	4	6	5	57	3.7	12	2.0	4	2		●
5565R302HH-0500	5	6	6	57	4.6	15	2.5	2	2		●
5565R302HH-0600	6	6	7	57	5.5	20	3.0		2		●
5565R302HH-0800	8	8	9	63	7.4	26	4.0		2		●
5565R302HH-1000	10	10	11	72	9.2	31	5.0		2		●
5565R302HH-1200	12	12	12	83	11	37	6.0		2		●
5565R302HH-1600	16	16	16	92	15	43	8.0		2		●

Art. Group No. / *Produktgruppe Nr.* : 026130

Material Overview · Material Übersicht

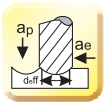
✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
		✔	✔	✔	✔		✔				

● Ex Stock / ab Lager ○ On demand / auf Anfrage

ZCC CT 2-flute ball nose end mills for HSC machining high hardness steel (HRC>48)
ZCC CT 2 Schneiden VHM Kugelkopffräser für Hartbearbeitung im HSC Bereich (HRC>48)

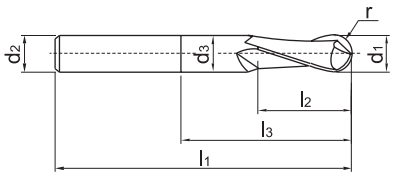




5566R302HH

KMG405: nano AlTiN Coated Untra-fine carbide / *nano AlTiN beschichtetes Ultrafeinkornhartmetall*







Type *Typ*	Dimension(mm) *Abmessungen*								Teeth *Zähne*	Application *Anwendung*	P K H
	d_1	$d_2(h_6)$	l_2	l_1	d_3	l_3	$r(f_8)$	α°	z	Grade	KMG405
5566R302HH-0300	3	6	4	75	2.8	15	1.5	6	2		●
5566R302HH-0400	4	6	5	75	3.7	20	2.0	4	2		●
5566R302HH-0500	5	6	6	80	4.6	25	2.5	2	2		●
5566R302HH-0600	6	6	7	80	5.5	30	3.0		2		●
5566R302HH-0800	8	8	9	90	7.4	35	4.0		2		●
5566R302HH-1000	10	10	11	100	9.2	40	5.0		2		●
5566R302HH-1200	12	12	12	120	11.0	50	6.0		2		●

Art. Group No. / *Produktgruppe Nr.* : 026130

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
		✔	✔	✔	✔		✔				

Code key ISO Kennzeichen B197
Cutting data Schnittdaten B350-377
Graphics identification & application Graphische Werkzeug- & Anwendungsbeschr. B198
Order form for non-standard products Bestellformular für Sonderwerkzeuge B455-456

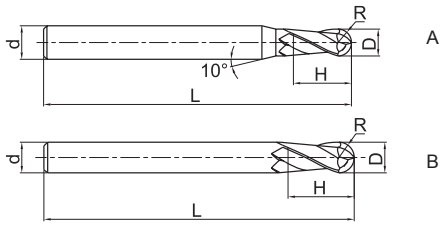
HM-2BL series for machining high hardness steel · **HM-2BL** Serie für die Hartbearbeitung

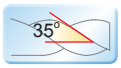
2-flute ball nose end mills with long straight shank
2-Schneiden Nutenfräser mit langem Zylinderschaft



















Type · Typ	Dimension(mm) Abmessungen					Teeth · Zähne Z	Geometry Ausführung	Grade · Sorte KMG 555
	D	R	d	H	L			
HM-2BL-R1.0	2.0	1.0	6.0	4.0	75	2	A	●
HM-2BL-R1.25	2.5	1.25	6.0	6.0	75	2	A	●
HM-2BL-R1.5	3.0	1.5	6.0	6.0	75	2	A	●
HM-2BL-R1.75	3.5	1.75	6.0	8.0	75	2	A	●
HM-2BL-R2.0	4.0	2.0	6.0	8.0	75	2	A	●
HM-2BL-R2.5	5.0	2.5	6.0	10.0	75	2	A	●
HM-2BL-R2.75	5.5	2.75	6.0	12.0	75	2	A	●
HM-2BL-R3.0	6.0	3.0	6.0	12.0	75	2	B	●
HM-2BL-R3.5	7.0	3.5	8.0	14.0	75	2	A	●
HM-2BL-R4.0	8.0	4.0	8.0	16.0	100	2	B	●
HM-2BL-R4.5	9.0	4.5	10.0	18.0	100	2	A	●
HM-2BL-R5.0	10.0	5.0	10.0	20.0	100	2	B	●
HM-2BL-R6.0	12.0	6.0	12.0	24.0	100	2	B	●
HM-2BL-R7.0	14.0	7.0	14.0	28.0	100	2	B	●
HM-2BL-R8.0	16.0	8.0	16.0	32.0	150	2	B	●
HM-2BL-R10.0	20.0	10.0	20.0	40.0	150	2	B	●

Material Overview · Material Übersicht

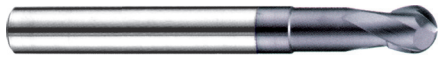
✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

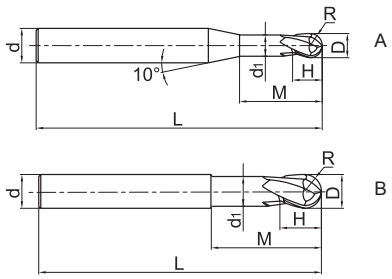
Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
			✔	✔	✔		✔				

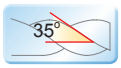
● Ex Stock / ab Lager ○ On demand / auf Anfrage

HM-2BFP series for machining high hardness steel · HM-2BFP Serie für die Hartbearbeitung

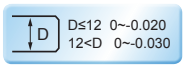
2-flute ball nose mills with long straight shank
2-Schneiden Kugelkopffräser mit langem Zylinderschaft















Type · Typ	Dimension(mm) Abmessungen							Teeth · Zähne Z	Geometry Ausführung	Grade · Sorte KMG 555
	D	R	H	d_1	M	d	L			
HM-2BFP-R0.5	1.0	0.5	1.0	0.95	2.5	6	75	2	A	○
HM-2BFP-R0.75	1.5	0.75	1.5	1.45	3.0	6	75	2	A	○
HM-2BFP-R1.0	2.0	1.0	2.0	1.95	4.0	6	75	2	A	○
HM-2BFP-R1.5	3.0	1.5	3.0	2.85	6.0	6	75	2	A	○
HM-2BFP-R2.0	4.0	2.0	4.0	3.85	8.0	6	75	2	A	○
HM-2BFP-R2.5	5.0	2.5	5.0	4.85	10.0	6	75	2	A	○
HM-2BFP-R3.0	6.0	3.0	6.0	5.8	12.0	6	75	2	B	○
HM-2BFP-R4.0	8.0	4.0	8.0	7.8	16.0	8	100	2	B	○
HM-2BFP-R5.0	10.0	5.0	10	9.6	20.0	10	100	2	B	○
HM-2BFP-R6.0	12.0	6.0	12	11.5	24.0	12	100	2	B	○
HM-2BFP-R8.0	16.0	8.0	16	15.5	32.0	16	150	2	B	○
HM-2BFP-R10.0	20.0	10.0	20	19.5	40.0	20	150	2	B	○

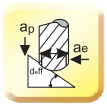
Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
			✔	✔	✔		✔				

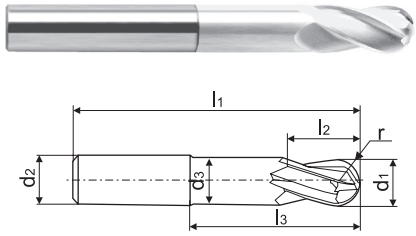
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ISO Kennzeichen
Cutting data B420-434
Schnittdaten
Graphics identification & application B200
Graphische Werkzeug- & Anwendungsbeschr.
Order form for non-standard products B455-B456
Bestellformular für Sonderwerkzeuge

ZCC CT 4-flute ball nose end mills for HSC machining high hardness steel (HRC>48) short
ZCC CT 4 Schneiden VHM Kugelkopffräser für Hartbearbeitung im HSC Bereich (HRC>48) kurz



5566R304HH

KMG405: nano AlTiN Coated Untra-fine carbide / *nano AlTiN beschichtetes Ultrafeinkornhartmetall*





Type *Typ*	Dimension(mm) *Abmessungen*							Teeth *Zähne*	Application *Anwendung*	P K H
	d_1	$d_2(h_6)$	l_2	l_1	d_3	l_3	$r(js_8)$	z	Grade	KMG405
5566R304HH-0600	6.00	6	7	80	5.50	20	3.00	4		●
5566R304HH-0800	8.00	8	9	90	7.40	26	4.00	4		●
5566R304HH-1000	10.00	10	11	100	9.20	31	5.00	4		●
5566R304HH-1200	12.00	12	12	120	11.00	37	6.00	4		●
								Art. Group No. / *Produktgruppe Nr.* :		**024130**

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

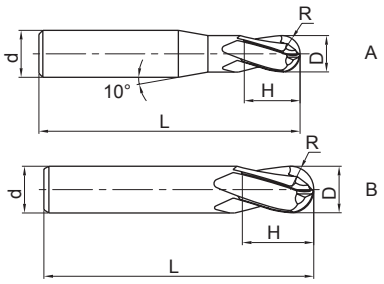
Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
		✔	✔	✔	✔		✔				

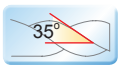
● Ex Stock / ab Lager ○ On demand / auf Anfrage

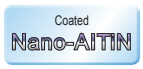
HM-4B series for machining high hardness steel · HM-4B Serie für die Hartbearbeitung

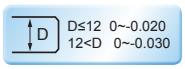
4-flute ball nose mills with long straight shank
4-Schneiden Kugelkopffräser mit Zylinderschaft















Type · Typ	Dimension(mm) Abmessungen					Teeth · Zähne Z	Geometry Ausführung	Grade · Sorte KMG 555
	D	R	d	H	L			
HM-4B-R1.5	3.0	1.5	6.0	6.0	50	4	A	●
HM-4B-R2.0	4.0	2.0	6.0	8.0	50	4	A	●
HM-4B-R2.5	5.0	2.5	6.0	10.0	50	4	A	●
HM-4B-R3.0	6.0	3.0	6.0	12.0	50	4	B	●
HM-4B-R4.0	8.0	4.0	8.0	16.0	60	4	B	●
HM-4B-R5.0	10.0	5.0	10.0	20.0	75	4	B	●
HM-4B-R6.0	12.0	6.0	12.0	24.0	75	4	B	●
HM-4B-R7.0	14.0	7.0	14.0	28.0	75	4	B	●
HM-4B-R8.0	16.0	8.0	16.0	32.0	100	4	B	●
HM-4B-R9.0	18.0	9.0	18.0	36.0	100	4	B	●
HM-4B-R10.0	20.0	10.0	20.0	40.0	100	4	B	●

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
			✔	✔	✔		✔				

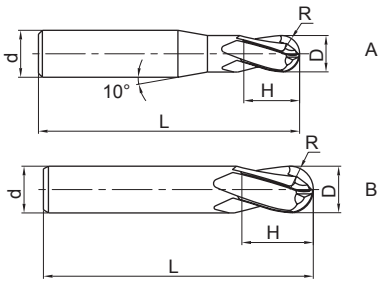
Code key B199
ISO Kennzeichen
Cutting data B420-434
Schnittdaten
Graphics identification & application B200
Graphische Werkzeug- & Anwendungsbeschr.
Order form for non-standard products B455-B456
Bestellformular für Sonderwerkzeuge

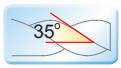
HM-4BL

4-flute ball nose mills with long straight shank and long cutting edge
4-Schneiden Kugelkopffräser mit mit langer Schneide und Zylinderschaft

















Type · Typ	Dimension(mm) Abmessungen					Teeth · Zähne Z	Typ	Grade · Sorte KMG 555
	D	R	d	H	L			
HM-4BL-R1.5	3.0	1.5	6	6	75	4	A	○
HM-4BL-R2.0	4.0	2.0	6	8	75	4	A	○
HM-4BL-R2.5	5.0	2.5	6	10	75	4	A	○
HM-4BL-R3.0	6.0	3.0	6	12	75	4	B	○
HM-4BL-R4.0	8.0	4.0	8	16	100	4	B	○
HM-4BL-R5.0	10.0	5.0	10	20	100	4	B	○
HM-4BL-R6.0	12.0	6.0	12	24	100	4	B	○
HM-4BL-R7.0	14.0	7.0	14	28	100	4	B	○
HM-4BL-R8.0	16.0	8.0	16	32	150	4	B	○
HM-4BL-R9.0	18.0	9.0	18	36	150	4	B	○
HM-4BL-R10.0	20.0	10.0	20	40	150	4	B	○

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

KMG555

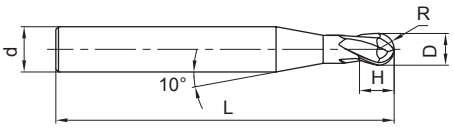
Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
			✔	✔	✔		✔				

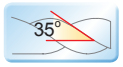
● Ex Stock / ab Lager ○ On demand / auf Anfrage

HM-2BS series for machining high hardness steel · HM-2BS Serie für die Hartbearbeitung

2-flute tiny diameter ball nose end mills with straight shank
2-Schneiden Mirco-Kugelkopffräser mit Zylinderschaft

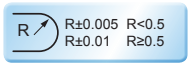














Type · Typ	Dimension(mm) Abmessungen					Teeth · Zähne Z	Grade · Sorte KMG 555
	D	R	d	H	L		
HM-2BS-R0.15	0.30	0.15	4.0	0.5	50	2	●
HM-2BS-R0.20	0.40	0.20	4.0	0.6	50	2	●
HM-2BS-R0.25	0.50	0.25	4.0	0.8	50	2	●
HM-2BS-R0.30	0.60	0.30	4.0	0.9	50	2	●
HM-2BS-R0.35	0.70	0.35	4.0	1.0	50	2	●
HM-2BS-R0.40	0.80	0.40	4.0	1.2	50	2	●
HM-2BS-R0.45	0.90	0.45	4.0	1.3	50	2	●
HM-2BS-R0.50	1.00	0.50	4.0	1.5	50	2	●
HM-2BS-R0.60	1.20	0.60	4.0	1.8	50	2	●
HM-2BS-R0.70	1.40	0.70	4.0	2.0	50	2	●
HM-2BS-R0.75	1.50	0.75	4.0	2.3	50	2	●
HM-2BS-R0.80	1.60	0.80	4.0	2.5	50	2	●
HM-2BS-R0.90	1.80	0.90	4.0	2.7	50	2	●
HM-2BS-R1.00	2.00	1.00	4.0	3.0	50	2	●
HM-2BS-R1.25	2.50	1.25	4.0	3.7	50	2	●
HM-2BS-R1.50	3.00	1.50	4.0	4.5	50	2	●

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

KMG555

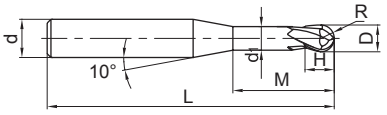
Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
			✔	✔	✔		✔				

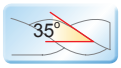
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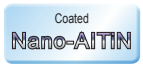
HM-2BP series for machining high hardness steel · HM-2BP Serie für die Hartbearbeitung

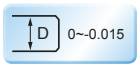
2-flute short cutting edge ball nose micro end mills with straight shank and long neck
2-Schneiden Micro Kugelkopffräser mit kurze Schneide und Zylinderschaft

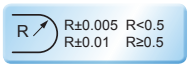














Type · Typ	Dimension(mm) Abmessungen							Teeth · Zähne Z	Grade · Sorte KMG 555
	D	R	H	d_1	M	d	L		
HM-2BP-R0.25-M04	0.5	0.25	0.7	0.45	4.0	4.0	50	2	●
HM-2BP-R0.25-M06	0.5	0.25	0.7	0.45	6.0	4.0	50	2	●
HM-2BP-R0.3-M04	0.6	0.3	0.9	0.55	4.0	4.0	50	2	●
HM-2BP-R0.3-M06	0.6	0.3	0.9	0.55	6.0	4.0	50	2	●
HM-2BP-R0.3-M08	0.6	0.3	0.9	0.55	8.0	4.0	50	2	●
HM-2BP-R0.4-M04	0.8	0.4	1.2	0.75	4.0	4.0	50	2	●
HM-2BP-R0.4-M06	0.8	0.4	1.2	0.75	6.0	4.0	50	2	●
HM-2BP-R0.4-M08	0.8	0.4	1.2	0.75	8.0	4.0	50	2	●
HM-2BP-R0.4-M10	0.8	0.4	1.2	0.75	10.0	4.0	50	2	●
HM-2BP-R0.5-M04	1.0	0.5	1.5	0.95	4.0	4.0	50	2	●
HM-2BP-R0.5-M06	1.0	0.5	1.5	0.95	6.0	4.0	50	2	●
HM-2BP-R0.5-M08	1.0	0.5	1.5	0.95	8.0	4.0	50	2	●
HM-2BP-R0.5-M10	1.0	0.5	1.5	0.95	10.0	4.0	50	2	●
HM-2BP-R0.5-M12	1.0	0.5	1.5	0.95	12.0	4.0	50	2	●
HM-2BP-R0.6-M06	1.2	0.6	1.8	1.15	6.0	4.0	50	2	●
HM-2BP-R0.6-M08	1.2	0.6	1.8	1.15	8.0	4.0	50	2	●
HM-2BP-R0.6-M12	1.2	0.6	1.8	1.15	12.0	4.0	50	2	●
HM-2BP-R0.6-M16	1.2	0.6	1.8	1.15	16.0	4.0	50	2	●
HM-2BP-R0.75-M08	1.5	0.75	2.3	1.45	8.0	4.0	50	2	●
HM-2BP-R0.75-M12	1.5	0.75	2.3	1.45	12.0	4.0	50	2	●
HM-2BP-R0.75-M16	1.5	0.75	2.3	1.45	16.0	4.0	50	2	●
HM-2BP-R1.0-M06	2.0	1.0	3.0	1.95	6.0	4.0	50	2	●
HM-2BP-R1.0-M08	2.0	1.0	3.0	1.95	8.0	4.0	50	2	●
HM-2BP-R1.0-M10	2.0	1.0	3.0	1.95	10.0	4.0	50	2	●
HM-2BP-R1.0-M12	2.0	1.0	3.0	1.95	12.0	4.0	50	2	●
HM-2BP-R1.0-M16	2.0	1.0	3.0	1.95	16.0	4.0	50	2	●
HM-2BP-R1.0-M20	2.0	1.0	3.0	1.95	20.0	4.0	50	2	●
HM-2BP-R1.25-M08	2.5	1.25	3.7	2.4	8.0	4.0	50	2	●
HM-2BP-R1.25-M12	2.5	1.25	3.7	2.4	12.0	4.0	50	2	●
HM-2BP-R1.25-M16	2.5	1.25	3.7	2.4	16.0	4.0	60	2	●
HM-2BP-R1.25-M20	2.5	1.25	3.7	2.4	20.0	4.0	60	2	●

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

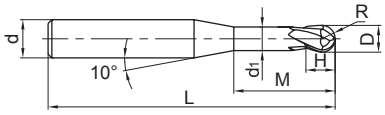
Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
			✔	✔	✔		✔				

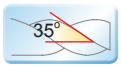
● Ex Stock / ab Lager ○ On demand / auf Anfrage

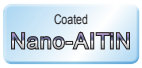
HM-2BP series for machining high hardness steel · HM-2BP Serie für die Hartbearbeitung

2-flute short cutting edge ball nose micro end mills with straight shank and long neck
2-Schneiden Micro Kugelkopffräser mit kurzer Schneide und Zylinderschaft

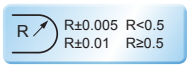








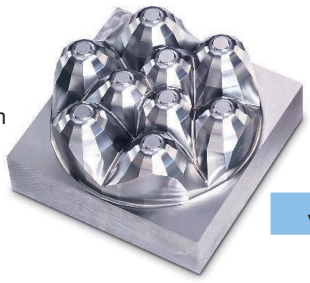






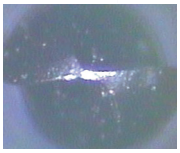
Type · Typ	Dimension(mm) Abmessungen							Teeth · Zähne Z	Grade · Sorte KMG 555
	D	R	H	d1	M	d	L		
HM-2BP-R1.5-M08	3.0	1.5	4.5	2.85	8.0	6.0	50	2	●
HM-2BP-R1.5-M10	3.0	1.5	4.5	2.85	10.0	6.0	50	2	●
HM-2BP-R1.5-M12	3.0	1.5	4.5	2.85	12.0	6.0	50	2	●
HM-2BP-R1.5-M16	3.0	1.5	4.5	2.85	16.0	6.0	60	2	●
HM-2BP-R1.5-M20	3.0	1.5	4.5	2.85	20.0	6.0	60	2	●
HM-2BP-R2.0-M10	4.0	2.0	6.0	3.85	10.0	6.0	60	2	●
HM-2BP-R2.0-M16	4.0	2.0	6.0	3.85	16.0	6.0	60	2	●
HM-2BP-R2.0-M20	4.0	2.0	6.0	3.85	20.0	6.0	60	2	●
HM-2BP-R2.0-M25	4.0	2.0	6.0	3.85	25.0	6.0	60	2	●
HM-2BP-R2.5-M16	5.0	2.5	7.5	4.85	16.0	6.0	60	2	●
HM-2BP-R2.5-M25	5.0	2.5	7.5	4.85	25.0	6.0	70	2	●

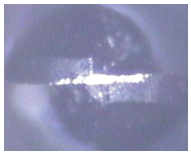
Tool type: HM-2BP-R0.3-M08
Size: R 0.3mm
Workpiece material
Werkstückstoff: S136/52HRC
Rotating/speed: 30000 r/min
Feed: 200 mm/min
Axial cutting depth: Ap=0.02mm
Radial cutting depth: Ae=0.04mm
Cutting style: contour machining (mould of car light)
Cooling system: air blow
Machine: MIKRON HSM 800



End mill Schaftfräser	HM-2BP-R0.3-M08	Similar product of company A
Cutting time Standzeit	300 min	180 min
Wear value Verschleiß	0.025 mm	0.048 mm

Wear Verschleiß





KMG555

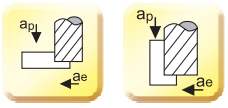
Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
			✔	✔	✔		✔				

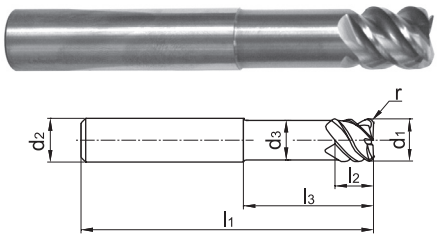
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Cutting data B420-434
Schnittdaten
Graphics identification & application B200
Graphische Werkzeug- & Anwendungsbeschr.
Order form for non-standard products B455-B456
Bestellformular für Sonderwerkzeuge

ZCC CT 4-flute radius end mills for machining of steel (HRC>48)
ZCC CT 4 Schneiden VHM Schaftfräser mit Eckenradius für die Stahlbearbeitung (HRC>48)



5585R554HHR

KMG405: nano AlTiN Coated Untra-fine carbide /
nano AlTiN beschichtetes Ultrafeinkornhartmetall







Type *Typ*	Dimension(mm) *Abmessungen*							Teeth *Zähne*	Application *Anwendung*	P K H
	$d_1(e_8)$	$d_2(h_6)$	l_2	l_1	d_3	l_3	$r_{(+0.03)}$	z	Grade	KMG405
5585R554HHR03-0600	6	6	7	57	5.5	20	0.3	4		●
5585R554HHR15-0600	6	6	7	57	5.5	20	1.5	4		●
5585R554HHR03-0800	8	8	9	63	7.4	26	0.3	4		●
5585R554HHR20-0800	8	8	9	63	7.4	26	2.0	4		●
5585R554HHR05-1000	10	10	11	72	9.2	31	0.5	4		●
5585R554HHR25-1000	10	10	11	72	9.2	31	2.5	4		●
5585R554HHR05-1200	12	12	12	83	11.0	37	0.5	4		●
5585R554HHR30-1200	12	12	12	83	11.0	37	3.0	4		●
5585R554HHR10-1600	16	16	16	92	15.0	43	1.0	4		●
5585R554HHR40-1600	16	16	16	92	15.0	43	4.0	4		●

Art. Group No. / *Produktgruppe Nr.* : 024130

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
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KMG405

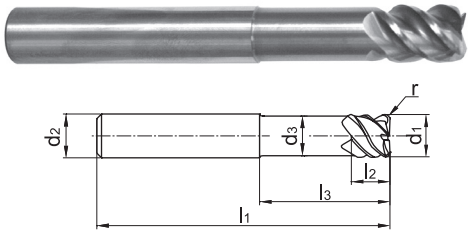
Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
		✔	✔	✔	✔		✔				

● Ex Stock / ab Lager ○ On demand / auf Anfrage

ZCC CT 4-flute ball nose end mills machining high hardness steel (HRC>48)
ZCC CT 4 Schneiden VHM Schaftfräser für Hartbearbeitung (HRC>48)

5586R554HHR

KMG405: nano AlTiN Coated Untra-fine carbide /
nano AlTiN beschichtetes Ultrafeinkornhartmetall



Type *Typ*	Dimension(mm) *Abmessungen*							Teeth *Zähne*	Application *Anwendung*	P H
	$d_1(e_8)$	$d_2(h_6)$	l_2	l_1	d_3	l_3	$r_{(+0.03)}$	z	Grade	KMG405
5586R554HHR03-0600	6	6	7	80	5.5	43	0.3	4		●
5586R554HHR15-0600	6	6	7	80	5.5	43	1.5	4		●
5586R554HHR03-0800	8	8	9	90	7.4	53	0.3	4		●
5586R554HHR20-0800	8	8	9	90	7.4	53	2.0	4		●
5586R554HHR05-1000	10	10	11	100	9.2	59	0.5	4		●
5586R554HHR25-1000	10	10	11	100	9.2	59	2.5	4		●
5586R554HHR05-1200	12	12	12	120	11.0	74	0.5	4		●
5586R554HHR30-1200	12	12	12	120	11.0	74	3.0	4		●
5586R554HHR10-1600	16	16	16	140	15.0	91	1.0	4		●
5586R554HHR40-1600	16	16	16	140	15.0	91	4.0	4		●

Art. Group No. / *Produktgruppe Nr.* : 024130

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

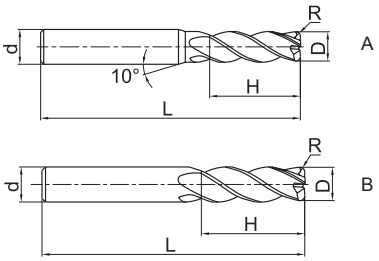
Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
		✔	✔	✔	✔		✔				

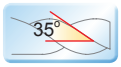
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Cutting data B350-377 Schnittdaten
Graphics identification & application B198 Graphische Werkzeug- & Anwendungsbeschr.
Order form for non-standard products B455-456 Bestellformular für Sonderwerkzeuge

HM-4R series for machining high hardness steel · **HM-4R** Serie für die Hartbearbeitung

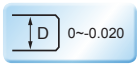
4-flute radius end mills with straight shank
4-Schneiden Radiuseckfräser mit Zylinderschaft













Type · Typ	Dimension(mm) Abmessungen					Teeth · Zähne Z	Geometry Ausführung	Grade · Sorte KMG 555
	D	R	d	H	L			
HM-4R-D3.0R0.2	3.0	0.2	4	8	50	4	A	●
HM-4R-D4.0R0.3	4.0	0.3	4	10	50	4	B	●
HM-4R-D4.0R0.5	4.0	0.5	4	10	50	4	B	●
HM-4R-D5.0R0.5	5.0	0.5	6	13	50	4	A	●
HM-4R-D5.0R1.0	5.0	1.0	6	13	50	4	A	●
HM-4R-D6.0R0.5	6.0	0.5	6	16	50	4	B	●
HM-4R-D6.0R1.0	6.0	1.0	6	16	50	4	B	●
HM-4R-D8.0R0.5	8.0	0.5	8	20	60	4	B	●
HM-4R-D8.0R1.0	8.0	1.0	8	20	60	4	B	●
HM-4R-D10.0R0.5	10.0	0.5	10	25	75	4	B	●
HM-4R-D10.0R1.0	10.0	1.0	10	25	75	4	B	●
HM-4R-D10.0R2.0	10.0	2.0	10	25	75	4	B	●
HM-4R-D10.0R3.0	10.0	3.0	10	25	75	4	B	●
HM-4R-D12.0R0.5	12.0	0.5	12	30	75	4	B	●
HM-4R-D12.0R1.0	12.0	1.0	12	30	75	4	B	●
HM-4R-D12.0R2.0	12.0	2.0	12	30	75	4	B	●
HM-4R-D12.0R3.0	12.0	3.0	12	30	75	4	B	●

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

KMG555

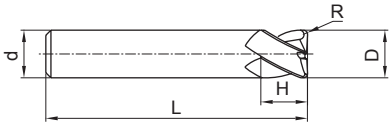
Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
			✔	✔	✔		✔				

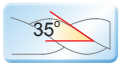
● Ex Stock / ab Lager ○ On demand / auf Anfrage

HM-4RF series for machining high hardness steel · HM-4RF Serie für die Hartbearbeitung

4-flute short cutting edge R end mills with straight shank
4-Schneiden Radiuseckfräser mit kurzer Schneide und Zylinderschaft













Type · Typ	Dimension(mm) Abmessungen					Teeth · Zähne Z	Grade · Sorte KMG 555
	D	R	d	H	L		
HM-4RF-D6.0R0.5	6.0	0.5	6.0	6	50	4	○
HM-4RF-D6.0R1.0	6.0	1.0	6.0	6	50	4	○
HM-4RF-D8.0R0.5	8.0	0.5	8.0	8	60	4	○
HM-4RF-D8.0R1.0	8.0	1.0	8.0	8	60	4	○
HM-4RF-10.0R0.5	10.0	0.5	10.0	10	75	4	○
HM-4RF-D10.0R1.0	10.0	1.0	10.0	10	75	4	○
HM-4RF-D10.0R2.0	10.0	2.0	10.0	10	75	4	○
HM-4RF-D12.0R0.5	12.0	0.5	12.0	12	75	4	○
HM-4RF-D12.0R1.0	12.0	1.0	12.0	12	75	4	○
HM-4RF-D12.0R2.0	12.0	2.0	12.0	12	75	4	○

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

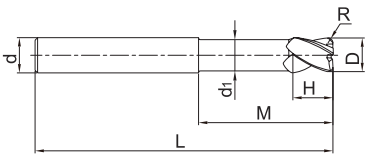
Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff. Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg.	Aluminum alloy Alu. Leg.	Titanium alloy Titan Leg.	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
			✔	✔	✔		✔				

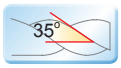
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Cutting data B420-434 Schnittdaten
Graphics identification & application B200 Graphische Werkzeug- & Anwendungsbeschr.
Order form for non-standard products B455-B456 Bestellformular für Sonderwerkzeuge

HM-4RP series for machining high hardness steel · HM-4RP Serie für die Hartbearbeitung

4-flute short cutting edge R end mills with straight shank and long neck
4-Schneiden Radiuseckfräser mit kurzer Schneide und Zylinderschaft













Type · Typ	Dimension(mm) Abmessungen							Teeth · Zähne Z	Grade · Sorte KMG 555
	D	R	d	d_1	H	M	L		
HM-4RP-D6.0R0.5	6.0	0.5	6.0	5.8	6.0	18	75	4	○
HM-4RP-D6.0R1.0	6.0	1.0	6.0	5.8	6.0	18	75	4	○
HM-4RP-D8.0R0.5	8.0	0.5	8.0	7.8	8.0	24	100	4	○
HM-4RP-D8.0R1.0	8.0	1.0	8.0	7.8	8.0	24	100	4	○
HM-4RP-10.0R0.5	10.0	0.5	10.0	9.6	10.0	30	100	4	○
HM-4RP-10.0R1.0	10.0	1.0	10.0	9.6	10.0	30	100	4	○
HM-4RP-10.0R2.0	10.0	2.0	10.0	9.6	10.0	30	100	4	○
HM-4RP-12.0R0.5	12.0	0.5	12.0	11.5	12.0	36	100	4	○
HM-4RP-12.0R1.0	12.0	1.0	12.0	11.5	12.0	36	100	4	○
HM-4RP-12.0R2.0	12.0	2.0	12.0	11.5	12.0	36	100	4	○
HM-4RP-D16.0R1.0	16.0	1.0	16.0	15.5	16.0	40	150	4	○
HM-4RP-D16.0R2.0	16.0	2.0	16.0	15.5	16.0	40	150	4	○

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
			✔	✔	✔		✔				

● Ex Stock / ab Lager ○ On demand / auf Anfrage

NM series end mills for machining copper
Serie VHM-Fräser für die Kupferbearbeitung

Extremely outstanding NM series end mills, greatly improve the machining performance in copper or copper alloy.

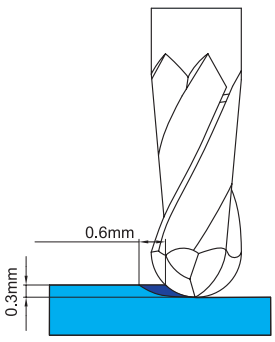
Extrem leistungsstarke NM Schaftfräser , für die wirtschaftliche Bearbeitung von Kupfer und Kupferlegierungen.

- Transcendent sharpness is very suitable for high precision machining copper or copper alloy.
- CrN coating with perfect lubricating property and minimal friction factor, achieves light and fast cutting process, extra long tool life and high surface quality.
- Hervorragende Schneidenschärfe ist besonders geeignet für die Präzisions-bearbeitung von Kupfer oder Kupferlegierungen.
- Bei Einsatz von Kühlmittel erzeugt die CrN-beschichtete Schneidplatte geringste Reibung. Das Ergebnis ist leichte und schnelle Zerspanung bei besonders langer Werkezeugstandzeit und sehr guter Werkstück-Oberflächenqualität.

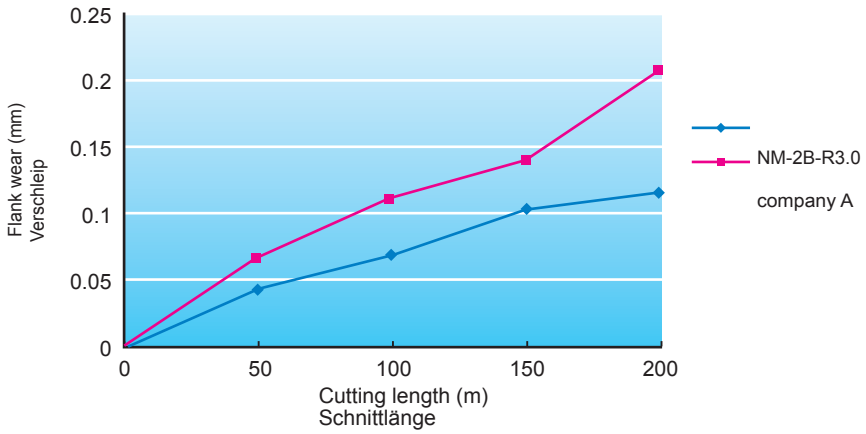
Coating Beschichtung	Micro hardness (hv) Mikrohärte	Friction factor Bruchfaktor	Initial temperature of oxidation Oxidations temperatur (°C)	Bonding strength with substrate Zähigkeit
CrN	1800	0.25	700	✔
TiN	2200	0.4	500	✔
TiCN	2700	0.3	400	✔
TiAlN	2800	0.3	800	✔

common › excellent ›

- Tool type / Werkzeug: NM-2B-R3.0
- Size / Größe: R3.0mm
- Workpiece material / Werkstückstoff: C1100
- Rotating speed / Drehzall: 8000r/min (150m/min)
- Feed / Vorschub: 1200mm/min (0.15mm/r)
- Axial cutting depth / Axiale Zustellung: Ap=0.3mm
- Radial cutting depth / Radiale Zustellung: Ae=0.6mm
- Cutting style / Bearbeitung: face milling / Planfräse (down milling)
- Cooling system: air blow
- Machine: MIKRON UCP 1000



■ Ball nose end mills for machining copper alloy
Kugelkopffräser für Kupferbearbeitung



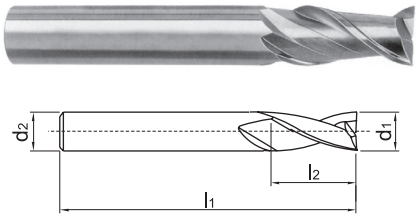
DIN 6527L 2-flute end mills · DIN 6527L 2-Schneiden VHM Schaftfräser

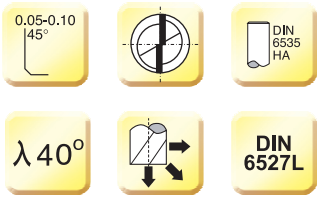


5502R402NM

YK30F: Ultra-fine carbide / *Ultrafeinkornhartmetall*







Type *Typ*	Dimension(mm) *Abmessungen*				Teeth *Zähne*	Application *Anwendung*	N
	$d_1(e_8)$	$d_2(h_6)$	l_2	l_1	z	Grade	YK30F
5502R402NM-0300	3.00	6	8	57	2		●
5502R402NM-0400	4.00	6	11	57	2		●
5502R402NM-0500	5.00	6	13	57	2		●
5502R402NM-0600	6.00	6	13	57	2		●
5502R402NM-0800	8.00	8	19	63	2		●
5502R402NM-1000	10.00	10	22	72	2		●
5502R402NM-1200	12.00	12	26	83	2		●
5502R402NM-1400	14.00	14	26	83	2		●
5502R402NM-1600	16.00	16	32	92	2		●
5502R402NM-1800	18.00	18	32	92	2		●
5502R402NM-2000	20.00	20	38	104	2		●
						Art. Group No. / *Produktgruppe Nr.* :	**022140**

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

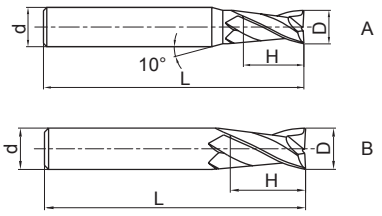
Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
								✔			

● Ex Stock / ab Lager ○ On demand / auf Anfrage

NM-2E series for machining cooper · NM-2E Serie für die Bearbeitung von Kupfer

2-flute end mills with straight shank
2-Schneiden Schaftfräser mit Zylinderschaft





35° | Coated CrN | D 0~-0.020

Type · Typ	Dimension(mm) Abmessungen				Teeth · Zähne Z	Geometry Ausführung	Grade · Sorte KMG309
	D	d	H	L			
NM-2E-D1.0	1.0	4	3	50	2	A	○
NM-2E-D2.0	2.0	4	6	50	2	A	○
NM-2E-D3.0	3.0	6	8	50	2	A	○
NM-2E-D4.0	4.0	6	11	50	2	A	○
NM-2E-D5.0	5.0	6	13	50	2	A	○
NM-2E-D6.0	6.0	6	16	50	2	B	○
NM-2E-D8.0	8.0	8	20	60	2	B	○
NM-2E-D10.0	10.0	10	25	75	2	B	○
NM-2E-D12.0	12.0	12	30	75	2	B	○

Material Overview · Material Übersicht

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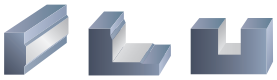
KMG309

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
								✔			

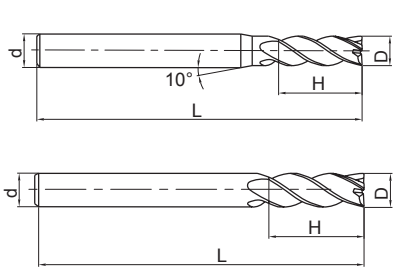
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Cutting data B435-439 Schnittdaten
Graphics identification & application B200 Graphische Werkzeug- & Anwendungsbeschr.
Order form for non-standard products B455-B456 Bestellformular für Sonderwerkzeuge

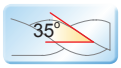
NM-4E series for machining cooper · NM-4E Serie für die Bearbeitung von Kupfer

4-flute end mills with straight shank
4-Schneiden Schaftfräser mit Zylinderschaft

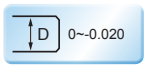














Type · Typ	Dimension(mm) Abmessungen				Teeth · Zähne Z	Geometry Ausführung	Grade · Sorte KMG309
	D	d	H	L			
NM-4E-D3.0	3.0	6	8	50	4	A	○
NM-4E-D4.0	4.0	6	11	50	4	A	○
NM-4E-D5.0	5.0	6	13	50	4	A	○
NM-4E-D6.0	6.0	6	16	50	4	B	○
NM-4E-D8.0	8.0	8	20	60	4	B	○
NM-4E-D10.0	10.0	10	25	75	4	B	○
NM-4E-D12.0	12.0	12	30	75	4	B	○

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KMG309

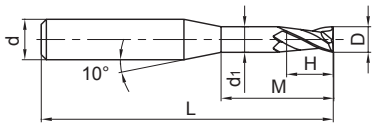
Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
								✔			

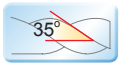
● Ex Stock / ab Lager ○ On demand / auf Anfrage

NM-2EP series for machining cooper · NM-2EP Serie für die Bearbeitung von Kupfer

2-flute short cutting edge end mills with straight shank with long neck
2-Schneiden Schaftfräser mit Zylinderschaft















Type · Typ	Dimension(mm) Abmessungen						Teeth · Zähne Z	Grade · Sorte KMG309
	D	d	H	M	d_1	L		
NM-2EP-D0.5-M04	0.5	4.0	0.7	4.0	0.45	50	2	○
NM-2EP-D0.5-M06	0.5	4.0	0.7	6.0	0.45	50	2	○
NM-2EP-D0.5-M08	0.5	4.0	0.7	8.0	0.45	50	2	○
NM-2EP-D0.8-M04	0.8	4.0	1.2	4.0	0.75	50	2	○
NM-2EP-D0.8-M06	0.8	4.0	1.2	6.0	0.75	50	2	○
NM-2EP-D0.8-M08	0.8	4.0	1.2	8.0	0.75	50	2	○
NM-2EP-D0.8-M10	0.8	4.0	1.2	10.0	0.75	50	2	○
NM-2EP-D1.0-M04	1.0	4.0	1.5	4.0	0.95	50	2	○
NM-2EP-D1.0-M06	1.0	4.0	1.5	6.0	0.95	50	2	○
NM-2EP-D1.0-M08	1.0	4.0	1.5	8.0	0.95	50	2	○
NM-2EP-D1.0-M10	1.0	4.0	1.5	10.0	0.95	50	2	○
NM-2EP-D1.0-M12	1.0	4.0	1.5	12.0	0.95	50	2	○
NM-2EP-D1.0-M14	1.0	4.0	1.5	14.0	0.95	50	2	○
NM-2EP-D1.5-M08	1.5	4.0	2.3	8.0	1.45	50	2	○
NM-2EP-D1.5-M16	1.5	4.0	2.3	16.0	1.45	50	2	○
NM-2EP-D2.0-M06	2.0	4.0	3.0	6.0	1.95	50	2	○
NM-2EP-D2.0-M08	2.0	4.0	3.0	8.0	1.95	50	2	○
NM-2EP-D2.0-M10	2.0	4.0	3.0	10.0	1.95	50	2	○
NM-2EP-D2.0-M12	2.0	4.0	3.0	12.0	1.95	50	2	○
NM-2EP-D2.0-M14	2.0	4.0	3.0	14.0	1.95	50	2	○
NM-2EP-D2.0-M16	2.0	4.0	3.0	16.0	1.95	50	2	○
NM-2EP-D2.5-M10	2.5	4.0	3.7	10.0	2.4	50	2	○
NM-2EP-D2.5-M20	2.5	4.0	3.7	20.0	2.4	60	2	○
NM-2EP-D3.0-M10	3.0	6.0	4.5	10.0	2.85	50	2	○
NM-2EP-D3.0-M20	3.0	6.0	4.5	20.0	2.85	60	2	○
NM-2EP-D4.0-M16	4.0	6.0	6.0	16.0	3.85	60	2	○
NM-2EP-D4.0-M25	4.0	6.0	6.0	25.0	3.85	60	2	○
NM-2EP-D5.0-M16	5.0	6.0	7.5	16.0	4.85	60	2	○
NM-2EP-D5.0-M25	5.0	6.0	7.5	25.0	4.85	70	2	○

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

KMG309

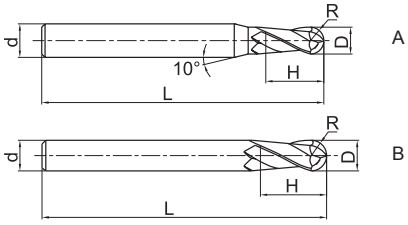
Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
								✔			

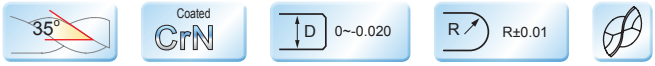
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ISO Kennzeichen
Cutting data B435-439
Schnittdaten
Graphics identification & application B200
Graphische Werkzeug- & Anwendungsbeschr.
Order form for non-standard products B455-B456
Bestellformular für Sonderwerkzeuge

NM-2B series for machining cooper · **NM-2B** Serie für die Bearbeitung von Kupfer

2-flute ball nose mills with straight shank
2-Schneiden Kugelkopffräser mit Zylinderschaft







Type · Typ	Dimension(mm) Abmessungen					Teeth · Zähne Z	Geometry Ausführung	Grade · Sorte KMG309
	D	R	d	H	L			
NM-2B-R0.5	1.0	0.5	4.0	2.0	50	2	A	○
NM-2B-R0.75	1.5	0.75	4.0	3.0	50	2	A	○
NM-2B-R1.0	2.0	1.0	4.0	4.0	50	2	A	○
NM-2B-R1.25	2.5	1.25	4.0	5.0	50	2	A	○
NM-2B-R1.5	3.0	1.5	6.0	6.0	50	2	A	○
NM-2B-R1.75	3.5	1.75	6.0	8.0	50	2	A	○
NM-2B-R2.0	4.0	2.0	6.0	8.0	50	2	A	○
NM-2B-R2.5	5.0	2.5	6.0	10.0	50	2	A	○
NM-2B-R3.0	6.0	3.0	6.0	12.0	50	2	B	○
NM-2B-R4.0	8.0	4.0	8.0	16.0	60	2	B	○
NM-2B-R5.0	10.0	5.0	10.0	20.0	75	2	B	○
NM-2B-R6.0	12.0	6.0	12.0	24.0	75	2	B	○

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

KMG309

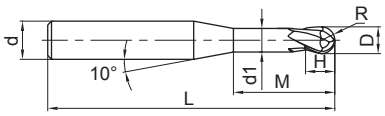
Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
								✔			

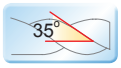
● Ex Stock / ab Lager ○ On demand / auf Anfrage

NM-2BP series for machining cooper · NM-2BP Serie für die Bearbeitung von Kupfer

2-flute short cutting edge ball nose micro end mills with straight shank and long
2-Schneiden Micro Kugelkopffräser, mit kurzer Schneide und Zylinderschaft (lang)















Type · Typ	Dimension(mm) Abmessungen							Teeth · Zähne Z	Grade · Sorte KMG309
	D	R	H	d1	M	d	L		
NM-2BP-R0.25-M04	0.5	0.25	0.7	0.45	4.0	4.0	50	2	○
NM-2BP-R0.25-M06	0.5	0.25	0.7	0.45	6.0	4.0	50	2	○
NM-2BP-R0.3-M04	0.6	0.3	0.9	0.55	4.0	4.0	50	2	○
NM-2BP-R0.3-M06	0.6	0.3	0.9	0.55	6.0	4.0	50	2	○
NM-2BP-R0.3-M08	0.6	0.3	0.9	0.55	8.0	4.0	50	2	○
NM-2BP-R0.4-M04	0.8	0.4	1.2	0.75	4.0	4.0	50	2	○
NM-2BP-R0.4-M06	0.8	0.4	1.2	0.75	6.0	4.0	50	2	○
NM-2BP-R0.4-M08	0.8	0.4	1.2	0.75	8.0	4.0	50	2	○
NM-2BP-R0.4-M10	0.8	0.4	1.2	0.75	10.0	4.0	50	2	○
NM-2BP-R0.5-M04	1.0	0.5	1.5	0.95	4.0	4.0	50	2	○
NM-2BP-R0.5-M06	1.0	0.5	1.5	0.95	6.0	4.0	50	2	○
NM-2BP-R0.5-M08	1.0	0.5	1.5	0.95	8.0	4.0	50	2	○
NM-2BP-R0.5-M10	1.0	0.5	1.5	0.95	10.0	4.0	50	2	○
NM-2BP-R0.5-M12	1.0	0.5	1.5	0.95	12.0	4.0	50	2	○
NM-2BP-R0.75-M08	1.5	0.75	2.3	1.45	8.0	4.0	50	2	○
NM-2BP-R0.75-M16	1.5	0.75	2.3	1.45	16.0	4.0	50	2	○
NM-2BP-R1.0-M06	2.0	1.0	3.0	1.95	6.0	4.0	50	2	○
NM-2BP-R1.0-M08	2.0	1.0	3.0	1.95	8.0	4.0	50	2	○
NM-2BP-R1.0-M10	2.0	1.0	3.0	1.95	10.0	4.0	50	2	○
NM-2BP-R1.0-M12	2.0	1.0	3.0	1.95	12.0	4.0	50	2	○
NM-2BP-R1.0-M16	2.0	1.0	3.0	1.95	16.0	4.0	50	2	○
NM-2BP-R1.0-M20	2.0	1.0	3.0	1.95	20.0	4.0	60	2	○
NM-2BP-R1.5-M10	3.0	1.5	4.5	2.85	10.0	6.0	50	2	○
NM-2BP-R1.5-M20	3.0	1.5	4.5	2.85	20.0	6.0	60	2	○
NM-2BP-R2.0-M10	4.0	2.0	6.0	3.85	10.0	6.0	60	2	○
NM-2BP-R2.0-M16	4.0	2.0	6.0	3.85	16.0	6.0	60	2	○
NM-2BP-R2.0-M20	4.0	2.0	6.0	3.85	20.0	6.0	60	2	○
NM-2BP-R2.0-M25	4.0	2.0	6.0	3.85	25.0	6.0	60	2	○
NM-2BP-R2.5-M16	5.0	2.5	7.5	4.85	16.0	6.0	60	2	○
NM-2BP-R2.5-M25	5.0	2.5	7.5	4.85	25.0	6.0	70	2	○

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
								✔			

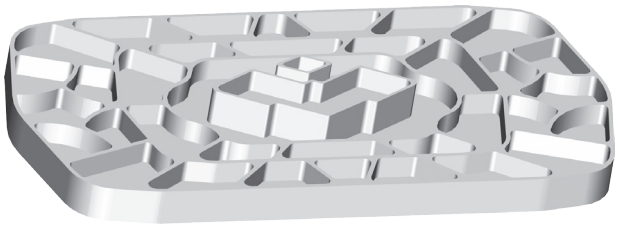
Code key B199 ISO Kennzeichen
Cutting data B435-439 Schnittdaten
Graphics identification & application B200 Graphische Werkzeug- & Anwendungsbeschr.
Order form for non-standard products B455-B456 Bestellformular für Sonderwerkzeuge

AL series end mills for machining aluminum
Serie VHM-Schaftfräser für die Bearbeitung von Aluminium

Complete product category for machining Al alloy from general to ultra high speed.

- Tool type: AL-3E-D6.0
- Size: Ø6.0mm
- Workpiece material/ Werkstückstoff: LC4
- Rotating speed: 13000r/min (250m/min)
- Feed: 1950mm/min (0.15mm/r)
- Axial cutting depth: Ap=9.0mm
- Radial cutting depth: Ae=1.0mm
- Cutting style : complicated cavity machining
- Cooling system: air blow
- Machine: MIKRON UCP 1000

Komplettes leistungstarkes Programm, für die Bearbeitung von Alu.-Legierung, unter normalen und äußerst hohen Schnittgeschwindigkeiten.

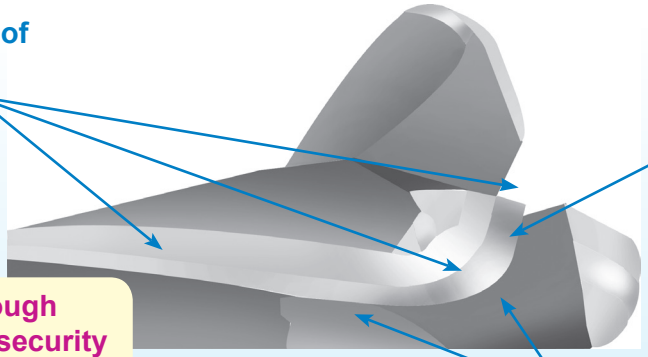


AL-2R, AL-2RL, AL-3R, AL-3RL series are released for ultra high speed milling aerospace Al alloy.

Serie AL-2R, AL-2RL, AL-3R, AL-3RL für die Fräsbearbeitung von Aluminium-Legierungen für die Luftfahrt mit "high speed" Schnittgeschwindigkeiten.

Anti-vibration design of whole cutting edge

Antivibrations - Schneidengeometrie



Wiper benefit to improve surface quality

Wiper Geometrie für hohe Oberflächenqualität.

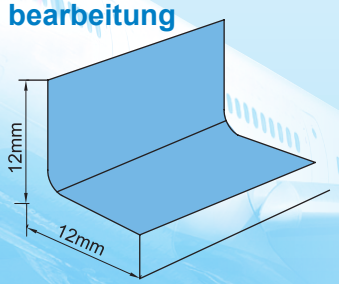
All end mills pass through dynamic balance and security tests.
Alle Fräser sind auf dynamische Balance und Sicherheit getestet worden.

Big chip pocket is suitable for high feed machining

Großer Spanraum für die Spanabfuhr, bei Hochgeschwindigtkeits-bearbeitung

AL-3R ultrahigh speed machining performance

- Tool type: AL-3R-D20.0R3.0-AIR
- Size: Ø20.0mm
- Workpiece materialWerstückm.: A7075
- Cutting speed · Schnittgeschw.: 1500m/min
- Rotating speed: 25000r/min
- Feed rate per tooth: 0.48mm/r
- Feed: 12000mm/min
- Axial cutting depth: Ap=12mm
- Radial cutting depth: Ae=12mm
- Metal removal rate: 1800cm^3/min
- Cutting style: side milling (down milling)
- Cooling system: air blow
- Machine: horizontal machining center

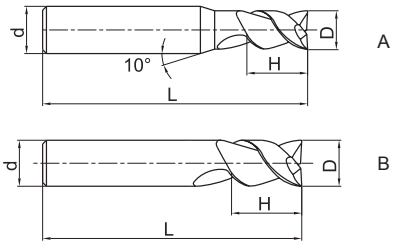


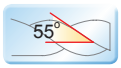
Note: Cutting speed
Schnittgeschw. reach 1500m/min, metal removal rate is 1800cm^3/min

AL-2E series for machining aluminium · AL-2E Serie für die Bearbeitung von Aluminium

2-flute end mills with straight shank
2-Schneiden Schaftfräser mit Zylinderschaft











Type · Typ	Dimension(mm) Abmessungen				Teeth · Zähne Z	Geometry Ausführung	Grade · Sorte YK30F
	D	d	H	L			
AL-2E-D1.0	1.0	4	3	50	2	A	●
AL-2E-D1.5	1.5	4	4	50	2	A	●
AL-2E-D2.0	2.0	4	6	50	2	A	●
AL-2E-D2.5	2.5	4	7	50	2	A	●
AL-2E-D3.0	3.0	6	9	50	2	A	●
AL-2E-D4.0	4.0	6	12	50	2	A	●
AL-2E-D5.0	5.0	6	15	50	2	A	●
AL-2E-D6.0	6.0	6	18	60	2	B	●
AL-2E-D8.0	8.0	8	20	60	2	B	●
AL-2E-D10.0	10.0	10	30	75	2	B	●
AL-2E-D12.0	12.0	12	32	75	2	B	●
AL-2E-D16.0	16.0	16	45	100	2	B	●
AL-2E-D20.0	20.0	20	45	100	2	B	●

Material Overview · Material Übersicht

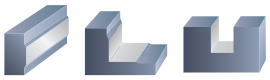
✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
									✔		

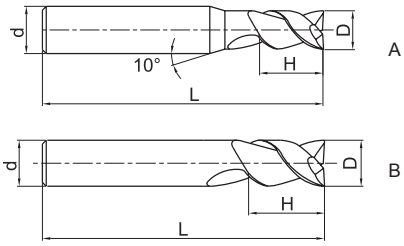
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ISO Kennzeichen
Cutting data B440-447
Schnittdaten
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Graphische Werkzeug- & Anwendungsbeschr.
Order form for non-standard products B455-B456
Bestellformular für Sonderwerkzeuge

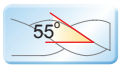
AL-2EL series for machining aluminium · **AL-2EL** Serie für die Bearbeitung von Aluminium

2-flute long cutting edge end mills with straight shank
2-Schneiden Schaftfräser mit langer Schneide und Zylinderschaft













Type · Typ	Dimension(mm) Abmessungen				Teeth · Zähne Z	Geometry Ausführung	Grade · Sorte YK30F
	D	d	H	L			
AL-2EL-D3.0	3.0	6	12	60	2	A	●
AL-2EL-D4.0	4.0	6	16	60	2	A	●
AL-2EL-D5.0	5.0	6	20	60	2	A	●
AL-2EL-D6.0	6.0	6	25	75	2	B	●
AL-2EL-D8.0	8.0	8	32	75	2	B	●
AL-2EL-D10.0	10.0	10	45	100	2	B	●
AL-2EL-D12.0	12.0	12	45	100	2	B	●
AL-2EL-D16.0	16.0	16	65	150	2	B	●
AL-2EL-D20.0	20.0	20	75	150	2	B	●

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

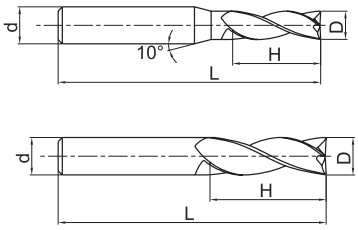
Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
									✔		

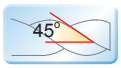
● Ex Stock / ab Lager ○ On demand / auf Anfrage

AL-3E series for machining aluminium · AL-3E Serie für die Bearbeitung von Aluminium

3-flute end mills with straight shank
3-Schneiden Schaftfräser mit Zylinderschaft











Type · Typ	Dimension(mm) Abmessungen				Teeth · Zähne Z	Geometry Ausführung	Grade · Sorte YK30F
	D	d	H	L			
AL-3E-D1.0	1.0	4	3	50	3	A	●
AL-3E-D1.5	1.5	4	4	50	3	A	●
AL-3E-D2.0	2.0	4	6	50	3	A	●
AL-3E-D2.5	2.5	4	7	50	3	A	●
AL-3E-D3.0	3.0	6	9	50	3	A	●
AL-3E-D4.0	4.0	6	12	50	3	A	●
AL-3E-D5.0	5.0	6	15	50	3	A	●
AL-3E-D6.0	6.0	6	18	60	3	B	●
AL-3E-D8.0	8.0	8	20	60	3	B	●
AL-3E-D10.0	10.0	10	30	75	3	B	●
AL-3E-D12.0	12.0	12	32	75	3	B	●
AL-3E-D16.0	16.0	16	45	100	3	B	●
AL-3E-D20.0	20.0	20	45	100	3	B	●

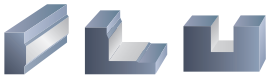
Material Overview · Material Übersicht

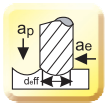
✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
									✔		

Code key B199
ISO Kennzeichen
Cutting data B440-447
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Graphics identification & application B200
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Order form for non-standard products B455-B456
Bestellformular für Sonderwerkzeuge

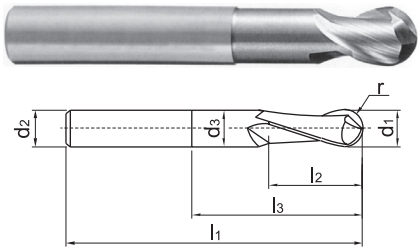
ZCC CT series for machining aluminium · **ZCC CT** Serie für die Bearbeitung von Aluminium





5565R302NH

YK40F: Ultrafine carbide / *Ultrafeinkornhartmetall*





Type *Typ*	Dimension(mm) *Abmessungen*								Teeth *Zähne*	Application *Anwendung*	N
	d_1	$d_2(h_6)$	l_2	l_1	D_3	l_3	$r(f_8)$	α°	z	Grade	YK40F
5565R302NH-0300	3.00	6	6	57	2.80	9	1.50	6	2		●
5565R302NH-0400	4.00	6	8	57	3.70	12	2.00	4	2		●
5565R302NH-0500	5.00	6	10	57	4.60	15	2.50	2	2		●
5565R302NH-0600	6.00	6	12	57	5.50	20	3.00		2		●
5565R302NH-0800	8.00	8	16	63	7.40	26	4.00		2		●
5565R302NH-1000	10.00	10	20	72	9.20	31	5.00		2		●
5565R302NH-1200	12.00	12	24	83	11.00	37	6.00		2		●
5565R302NH-1600	16.00	16	32	92	15.00	43	8.00		2		●

Art. Group No. / *Produktgruppe Nr.* : **023140**

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

Workpiece material Werkstückstoff										
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
									✔		

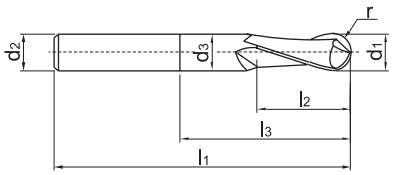
● Ex Stock / ab Lager ○ On demand / auf Anfrage

ZCC CT series for machining aluminium · ZCC CT Serie für die Bearbeitung von Aluminium

5566R302NH

YK40F: Ultrafine carbide / *Ultrafeinkornhartmetall*





DIN 6535 HA

λ 30°

ZCCCT NORM

Type *Typ*	Dimension(mm) *Abmessungen*								Teeth *Zähne*	Application *Anwendung*	N
	d_1	$d_2(h_6)$	l_2	l_1	d_3	l_3	$r(f_8)$	α°	z	Grade	YK40F
5566R302NH-0300	3.00	6	6	75	2.80	9	1.50	6	2		●
5566R302NH-0400	4.00	6	8	75	3.70	12	2.00	4	2		●
5566R302NH-0500	5.00	6	10	80	4.60	15	2.50	2	2		●
5566R302NH-0600	6.00	6	12	80	5.50	20	3.00		2		●
5566R302NH-0800	8.00	8	16	90	7.40	26	4.00		2		●
5566R302NH-1000	10.00	10	20	100	9.20	31	5.00		2		●
5566R302NH-1200	12.00	12	24	120	11.00	37	6.00		2		●
5566R302NH-1600	16.00	16	32	140	15.00	43	8.00		2		●

Art. Group No. / *Produktgruppe Nr.* : 023140

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
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Workpiece material Werkstückstoff										
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
									✔		

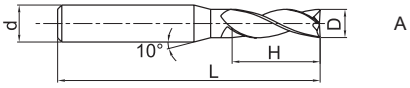
Code key B197 ISO Kennzeichen
Cutting data B350-377 Schnittdaten
Graphics identification & application B198 Graphische Werkzeug- & Anwendungsbeschr.
Order form for non-standard products B455-456 Bestellformular für Sonderwerkzeuge

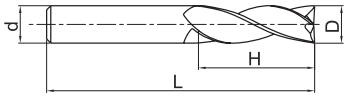
AL-3EL

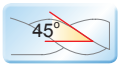
3-flute end mills with straight shank and long cutting edge
3-Schneiden Schaftfräser mit langer Schneide und Zylinderschaft















Type · Typ	Dimension(mm) Abmessungen				Teeth · Zähne Z	Geometry Ausführung	Grade · Sorte YK30F
	D	d	H	L			
AL-3EL-D3.0	3.0	6	12	60	3	A	●
AL-3EL-D4.0	4.0	6	16	60	3	A	●
AL-3EL-D5.0	5.0	6	20	60	3	A	●
AL-3EL-D6.0	6.0	6	25	75	3	B	●
AL-3EL-D8.0	8.0	8	32	75	3	B	●
AL-3EL-D10.0	10.0	10	45	100	3	B	●
AL-3EL-D12.0	12.0	12	45	100	3	B	●
AL-3EL-D16.0	16.0	16	65	150	3	B	●
AL-3EL-D20.0	20.0	20	75	150	3	B	●

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
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YK 30F

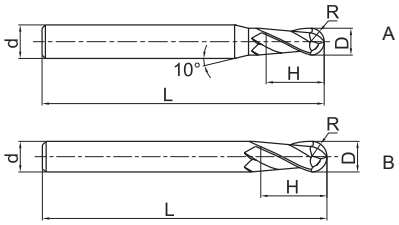
Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
									✔		

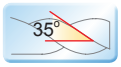
● Ex Stock / ab Lager ○ On demand / auf Anfrage

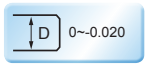
AL-2B series for machining aluminium · **AL-2B** Serie für die Bearbeitung von Aluminium

2-flute ball nose end mills with straight shank
2-Schneiden Kugelkopffräser mit Zylinderschaft













Type · Typ	Dimension(mm) Abmessungen					Teeth · Zähne Z	Geometry Ausführung	Grade · Sorte YK30F
	D	R	d	H	L			
AL-2B-R1.0	2.0	1.0	6.0	4.0	60	2	A	○
AL-2B-R1.5	3.0	1.5	6.0	6.0	60	2	A	○
AL-2B-R2.0	4.0	2.0	6.0	8.0	60	2	A	○
AL-2B-R2.5	5.0	2.5	6.0	10.0	60	2	A	○
AL-2B-R3.0	6.0	3.0	6.0	12.0	60	2	B	○
AL-2B-R4.0	8.0	4.0	8.0	16.0	75	2	B	○
AL-2B-R5.0	10.0	5.0	10.0	20.0	75	2	B	○
AL-2B-R6.0	12.0	6.0	12.0	24.0	75	2	B	○

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

YK 30F

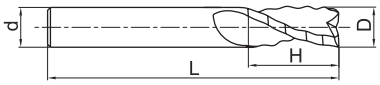
Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
									✔		

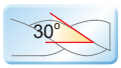
Code key B199
ISO Kennzeichen
Cutting data B440-447
Schnittdaten
Graphics identification & application B200
Graphische Werkzeug- & Anwendungsbeschr.
Order form for non-standard products B455-B456
Bestellformular für Sonderwerkzeuge

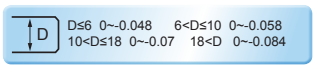
AL-3W series for machining aluminium · AL-3W Serie für die Bearbeitung von Aluminium

3-flute rough end mills with straight shank, rough pitch form
3-Schneiden Schruppfräser mit Zylinderschaft, grob verzahnt











Type · Typ	Dimension(mm) Abmessungen				Teeth · Zähne Z	Grade · Sorte YK30F
	D	d	H	L		
AL-3W-D6.0	6	6	16	50	3	●
AL-3W-D8.0	8	8	20	60	3	●
AL-3W-D10.0	10	10	25	75	3	●
AL-3W-D12.0	12	12	30	75	3	●
AL-3W-D16.0	16	16	45	100	3	●
AL-3W-D20.0	20	20	45	100	3	●

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

YK 30F

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
									✔		

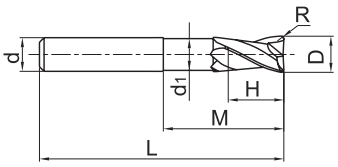
● Ex Stock / ab Lager ○ On demand / auf Anfrage

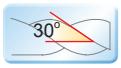
AL-2R-AIR series for machining aluminium · AL-2R-AIR Serie für die Bearbeitung von Aluminium

2-flute end mills with straight shank
2-Schneiden Schaftfräser mit Zylinderschaft

Ultrahigh speed HSC











Type · Typ	Dimension(mm) Abmessungen							Teeth · Zähne Z	Grade · Sorte YK40F
	D	R	d	d_1	H	M	L		
AL-2R-D6.0R1.0- AIR	6	1.0	6	5.5	7	20	57	2	○
AL-2R-D8.0R1.0- AIR	8	1.0	8	7.4	9	26	63	2	○
AL-2R-D10.0R1.0- AIR	10	1.0	10	9.2	11	31	72	2	○
AL-2R-D10.0R2.0- AIR	10	2.0	10	9.2	11	31	72	2	○
AL-2R-D12.0R1.0- AIR	12	1.0	12	11	12	37	83	2	○
AL-2R-D12.0R2.0- AIR	12	2.0	12	11	12	37	83	2	○
AL-2R-D12.0R3.0- AIR	12	3.0	12	11	12	37	83	2	○
AL-2R-D16.0R1.0- AIR	16	1.0	16	15	16	43	92	2	○
AL-2R-D16.0R2.0- AIR	16	2.0	16	15	16	43	92	2	○
AL-2R-D16.0R3.0- AIR	16	3.0	16	15	16	43	92	2	○
AL-2R-D16.0R4.0- AIR	16	4.0	16	15	16	43	92	2	○
AL-2R-D20.0R1.0- AIR	20	1.0	20	19	20	53	104	2	○
AL-2R-D20.0R2.0- AIR	20	2.0	20	19	20	53	104	2	○
AL-2R-D20.0R3.0- AIR	20	3.0	20	19	20	53	104	2	○
AL-2R-D20.0R4.0- AIR	20	4.0	20	19	20	53	104	2	○
AL-2R-D20.0R5.0- AIR	20	5.0	20	19	20	53	104	2	○
AL-2R-D20.0R6.0- AIR	20	6.0	20	19	20	53	104	2	○

for air space industry · für Luft- und Raumfahrt - Industrie

Material Overview · Material Übersicht

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YK 40F

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
									✔		

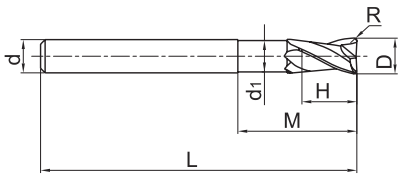
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ISO Kennzeichen
Cutting data B440-447
Schnittdaten
Graphics identification & application B200
Graphische Werkzeug- & Anwendungsbeschr.
Order form for non-standard products B455-B456
Bestellformular für Sonderwerkzeuge

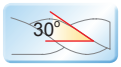
AL-2RL-AIR series for machining aluminium · AL-2RL-AIR Serie für die Bearbeitung von Aluminium

2-flute radius end mills with long straight shank
2-Schneiden Radiusfräser mit langem Zylinderschaft

Ultrahigh speed HSC











Type · Typ	Dimension(mm) Abmessungen							Teeth · Zähne Z	Grade · Sorte YK40F
	D	R	d	d_1	H	M	L		
AL-2RL-D6.0R1.0- AIR	6	1.0	6	5.5	7	43	80	2	○
AL-2RL-D8.0R1.0- AIR	8	1.0	8	7.4	9	53	90	2	○
AL-2RL-D10.0R1.0- AIR	10	1.0	10	9.2	11	59	100	2	○
AL-2RL-D10.0R2.0- AIR	10	2.0	10	9.2	11	59	100	2	○
AL-2RL-D12.0R1.0- AIR	12	1.0	12	11	12	74	120	2	○
AL-2RL-D12.0R2.0- AIR	12	2.0	12	11	12	74	120	2	○
AL-2RL-D12.0R3.0- AIR	12	3.0	12	11	12	74	120	2	○
AL-2RL-D16.0R1.0- AIR	16	1.0	16	15	16	84	140	2	○
AL-2RL-D16.0R2.0- AIR	16	2.0	16	15	16	84	140	2	○
AL-2RL-D16.0R3.0- AIR	16	3.0	16	15	16	84	140	2	○
AL-2RL-D16.0R4.0- AIR	16	4.0	16	15	16	84	140	2	○
AL-2RL-D20.0R1.0- AIR	20	1.0	20	19	20	89	140	2	○
AL-2RL-D20.0R2.0- AIR	20	2.0	20	19	20	89	140	2	○
AL-2RL-D20.0R3.0- AIR	20	3.0	20	19	20	89	140	2	○
AL-2RL-D20.0R4.0- AIR	20	4.0	20	19	20	89	140	2	○
AL-2RL-D20.0R5.0- AIR	20	5.0	20	19	20	89	140	2	○
AL-2RL-D20.0R6.0- AIR	20	6.0	20	19	20	89	140	2	○

for air space industry · für Luft- und Raumfahrt - Industrie

Material Overview · Material Übersicht

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Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
									✔		

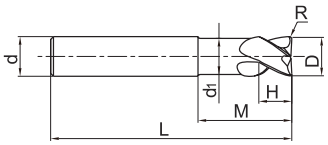
● Ex Stock / ab Lager ○ On demand / auf Anfrage

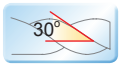
AL-3R-AIR series for machining aluminium · AL-3R-AIR Serie für die Bearbeitung von Aluminium

3-flute radius end mills with straight shank
3-Schneiden Radiusfräser mit langem Zylinderschaft

Ultrahigh speed











Type · Typ	Dimension(mm) Abmessungen							Teeth · Zähne Z	Grade · Sorte YK40F
	D	R	d	d_1	H	M	L		
AL-3R-D12.0R1.0- AIR	12	1.0	12	11	12	37	83	3	○
AL-3R-D12.0R2.0- AIR	12	2.0	12	11	12	37	83	3	○
AL-3R-D12.0R3.0- AIR	12	3.0	12	11	12	37	83	3	○
AL-3R-D16.0R1.0- AIR	16	1.0	16	15	16	43	92	3	○
AL-3R-D16.0R2.0- AIR	16	2.0	16	15	16	43	92	3	○
AL-3R-D16.0R3.0- AIR	16	3.0	16	15	16	43	92	3	○
AL-3R-D16.0R4.0- AIR	16	4.0	16	15	16	43	92	3	○
AL-3R-D20.0R1.0- AIR	20	1.0	20	19	20	53	104	3	○
AL-3R- D20.0R2.0- AIR	20	2.0	20	19	20	53	104	3	○
AL-3R- D20.0R3.0- AIR	20	3.0	20	19	20	53	104	3	○
AL-3R-D20.0R4.0- AIR	20	4.0	20	19	20	53	104	3	○
AL-3R- D20.0R5.0- AIR	20	5.0	20	19	20	53	104	3	○
AL-3R- D20.0R6.0- AIR	20	6.0	20	19	20	53	104	3	○

for air space industry · für Luft- und Raumfahrt - Industrie

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✔ = Suitable · Empfohlen

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist. alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
									✔		

Code key B199
ISO Kennzeichen
Cutting data B440-447
Schnittdaten
Graphics identification & application B200
Graphische Werkzeug- & Anwendungsbeschr.
Order form for non-standard products B455-B456
Bestellformular für Sonderwerkzeuge

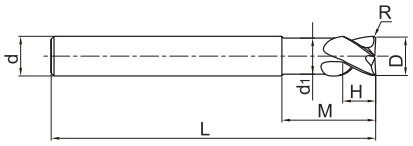
AL-3RL-AIR series for machining aluminium · AL-3RL-AIR Serie für die Bearbeitung von Aluminium

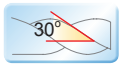
3-flute radius end mills with long straight shank
3-Schneiden Radiusfräser mit langem Zylinderschaft



Ultrahigh speed HSC











Type · Typ	Dimension(mm) Abmessungen							Teeth · Zähne Z	Grade · Sorte YK40F
	D	R	d	d_1	H	M	L		
AL-3RL-D12.0R1.0- AIR	12	1.0	12	11	12	74	120	3	○
AL-3RL-D12.0R2.0- AIR	12	2.0	12	11	12	74	120	3	○
AL-3RL-D12.0R3.0- AIR	12	3.0	12	11	12	74	120	3	○
AL-3RL-D16.0R1.0- AIR	16	1.0	16	15	16	84	140	3	○
AL-3RL-D16.0R2.0- AIR	16	2.0	16	15	16	84	140	3	○
AL-3RL-D16.0R3.0- AIR	16	3.0	16	15	16	84	140	3	○
AL-3RL-D16.0R4.0- AIR	16	4.0	16	15	16	84	140	3	○
AL-3RL-D20.0R1.0- AIR	20	1.0	20	19	20	89	140	3	○
AL-3RL- D20.0R2.0- AIR	20	2.0	20	19	20	89	140	3	○
AL-3RL- D20.0R3.0- AIR	20	3.0	20	19	20	89	140	3	○
AL-3RL-D20.0R4.0- AIR	20	4.0	20	19	20	89	140	3	○
AL-3RL- D20.0R5.0- AIR	20	5.0	20	19	20	89	140	3	○
AL-3RL- D20.0R6.0- AIR	20	6.0	20	19	20	89	140	3	○

for air space industry · für Luft- und Raumfahrt - Industrie

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist. alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
								✔			

● Ex Stock / ab Lager ○ On demand / auf Anfrage

YK 40F

HPC Endmills / HPC Fräser

- Unique geometry design with unequal helix angle (38°/41°) in optimal combination of top grade, KMG 405.
- Suitable for roughing and finishing of steel, alloy steel and stainless steel, heat resistance super alloy.
- Effective milling with higher feed rate and bigger cutting depth.
- Quiet machining without vibration.
- Long tool life and good surface finishing.

- Einzigartige Geometrie mit ungleichem Spiralwinkel (38°/41°), in Kombination mit der Hochleistungssorte KMG 405.
- Geeignet zur Schrupp- und Schlichtbearbeitung von Stahl, legiertem Stahl, rostfreiem Stahl.
- Effektive Fräsbearbeitung mit höheren Vorschüben und größeren Schnitttiefen.
- Ruhige Bearbeitung ohne Vibrationen.
- Höhere Standzeit und bessere Oberflächenqualität.



HPC Endmills
HPC Fräser

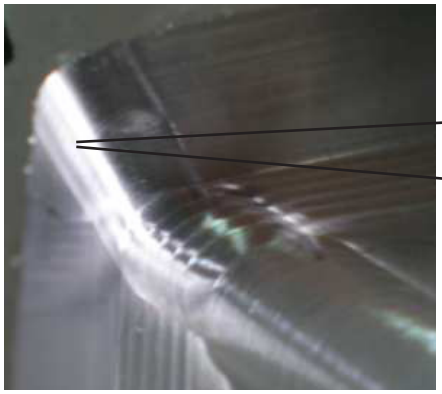
High Performance Solide Carbide Endmills
Hochleistungs-VHM-Fräser

Vibration Test / Vibrationsuntersuchung

Diameter / Durchmesser Ømm	Material	V_c m/min	f_z mm/z	a_p mm	a_e mm
6	1Cr18Ni9Ti	80	0,05	9	0,3



- Surface quality of the contour with the conventional end mills
- Oberflächengüte der Kontur mit herkömmlichem VHM-Fräser



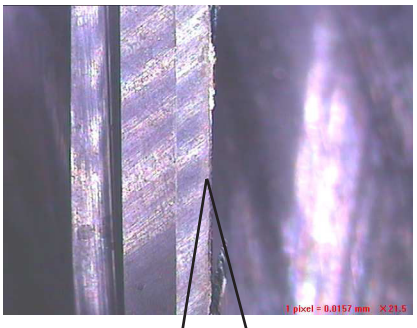
- Surface quality of the contour with the ZCCCT HPC end mill
- Oberflächengüte der Kontur mit HPC VHM-Fräser von ZCCCT

Tool Life / Standzeit (Machining time / Bearbeitungszeit: 180min.)

Diameter / Durchmesser Ømm	Material	V_c m/min	f_z mm/z	a_p mm	a_e mm
8	42CrMo HRC35	160	0,04	12	1,2



Company A
HPC35˚/38˚
Vbmax = 0,117mm



ZCCCT
HPC 38˚/41˚
Vbmax=0.072mm

Roughing / Schruppen

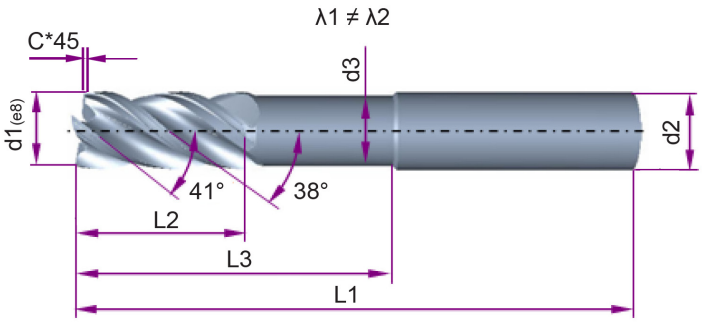


Workpiece	Werkstück	alloy steel leg. Stahl	alloy steel leg. Stahl	Ferritic stainless steel rostfreier Stahl	Ferritic stainless steel rostfreier Stahl
Material	Werkstoff	1.2714 steel	1.2714 steel	1.4313 X5CrNi134	1.4301 X5CrNi189
Hardness **Tensile Strength**	Härte Zugfestigkeit N/mm²	1400	1400		
Cutting tools	Werkzeug				
Teeth Z	Zähnezahl Z	4	4	4	4
Producer/Supplier	Hersteller (Werkzeug)	ZCCCT	ZCCCT	ZCCCT	ZCCCT
Grade	Schneidstoff Sorte	KMG405	KMG405	KMG405	KMG405
Solid carbide tools art no.	Vollhartmetallwerkzeug Nr.	D8, λ=38/41	D12, λ=38/41	D12, λ=38/41	D12, λ=38/41
Cutting condition	Schnittdaten				
RPM n=r/min	Drehzahl n=U/min	5971	3980	4775	4775
Cutting speed Vc=m/min	Schnittgeschw. Vc=m/min	150	150	180	180
Feed rate f=mm/r	Vorschub f=mm/U	fz=0.05	fz=0.075	0.15	0.15
Depth of cut ap mm	Schnitttiefe ap mm	8	12	25	25
Depth of cut ae mm	Schnittbreite ae mm	3,6	5,4	1,5	1,5

5501R38414GM

4-flute end mills
4-Schneiden VHM Schaftfräser





Type Typ	Dimension(mm) Abmessungen							Teeth Zähne	Application Anwendung	P M K
	d1(e8)	d2(h6)	L1	L2	d3	L3	C*45°	Z	Grade Sorte	KMG 405
5501R38414GM-0400	4	6	54	8	3.70	16	0.01-0.06	4		●
5501R38414GM-0500	5	6	54	9	4.70	17	0.01-0.06	4		●
5501R38414GM-0600	6	6	54	10	5.70	18	0.06-0.10	4		●
5501R38414GM-0800	8	8	58	12	7.70	22	0.06-0.10	4		●
5501R38414GM-1000	10	10	66	14	9.50	26	0.06-0.10	4		●
5501R38414GM-1200	12	12	73	16	11.50	28	0.10-0.15	4		●
5501R38414GM-1400	14	14	75	18	13.50	30	0.10-0.15	4		●
5501R38414GM-1600	16	16	82	22	15.50	34	0.10-0.15	4		●
5501R38414GM-1800	18	18	84	24	17.50	36	0.10-0.15	4		●
5501R38414GM-2000	20	20	92	26	19.50	42	0.15-0.20	4		●

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
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KMG405

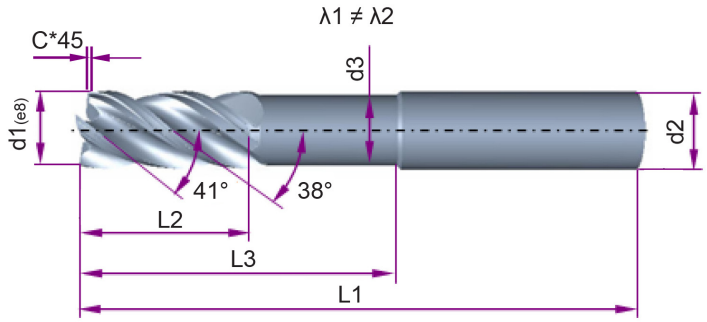
Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist. alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
✔	✔	✔	✔			✔	✔			✔	✔

● Ex Stock / ab Lager ○ On demand / auf Anfrage

5502R38414GM

4-flute end mills
4-Schneiden VHM Schaftfräser





Type · Typ	Dimension(mm) Abmessungen							Teeth Zähne	Applicaion Anwendung	
	d1(e8)	d2(h6)	L1	L2	d3	L3	C*45°	Z	Grade Sorte	P M K KMG 405
5502R38414GM-0400	4	6	57	11	3.70	19	0.01-0.06	4		●
5502R38414GM-0500	5	6	57	13	4.70	21	0.01-0.06	4		●
5502R38414GM-0600	6	6	57	13	5.70	21	0.06-0.10	4		●
5502R38414GM-0800	8	8	63	19	7.70	27	0.06-0.10	4		●
5502R38414GM-1000	10	10	72	22	9.50	32	0.06-0.10	4		●
5502R38414GM-1200	12	12	83	26	11.50	38	0.10-0.15	4		●
5502R38414GM-1400	14	14	83	26	13.50	38	0.10-0.15	4		●
5502R38414GM-1600	16	16	92	32	15.50	44	0.10-0.15	4		●
5502R38414GM-1800	18	18	92	32	17.50	44	0.10-0.15	4		●
5502R38414GM-2000	20	20	104	38	19.50	54	0.15-0.20	4		●

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
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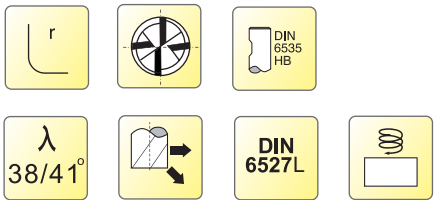
Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist. alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
✔	✔	✔	✔			✔	✔			✔	✔

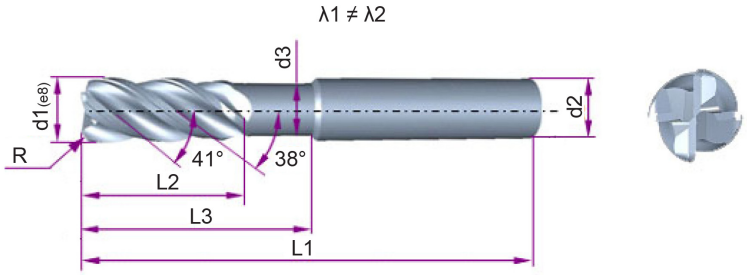
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ISO Kennzeichen
Cutting data B394-419
Schnittdaten
Graphics identification & application B200
Graphische Werkzeug- & Anwendungsbeschr.
Order form for non-standard products B455-B456
Bestellformular für Sonderwerkzeuge

5502R38414GM-R

4-flute end mills with radius
4-Schneiden VHM Schaftfräser mit Radius







Type · Typ	Dimension(mm) Abmessungen							Teeth Zähne	Application Anwendung	P M K
	d1(e8)	R±0.01	d2(h6)	L1	L2	d3	L3	Z	Grade Sorte	KMG 405
5502R38414GM-R02-0400	4	0.2	6	57	11	3.70	19	4		•
5502R38414GM-R05-0400	4	0.5	6	57	11	3.70	19	4		•
5502R38414GM-R02-0500	5	0.2	6	57	13	4.70	21	4		•
5502R38414GM-R05-0500	5	0.5	6	57	13	4.70	21	4		•
5502R38414GM-R02-0600	6	0.2	6	57	13	5.70	21	4		•
5502R38414GM-R05-0600	6	0.5	6	57	13	5.70	21	4		•
5502R38414GM-R10-0600	6	1.0	6	57	13	5.70	21	4		•
5502R38414GM-R02-0800	8	0.2	8	63	19	7.70	27	4		•
5502R38414GM-R05-0800	8	0.5	8	63	19	7.70	27	4		•
5502R38414GM-R10-0800	8	1.0	8	63	19	7.70	27	4		•
5502R38414GM-R15-0800	8	1.5	8	63	19	7.70	27	4		•
5502R38414GM-R20-0800	8	2.0	8	63	19	7.70	27	4		•
5502R38414GM-R02-1000	10	0.2	10	72	22	9.50	32	4		•
5502R38414GM-R05-1000	10	0.5	10	72	22	9.50	32	4		•
5502R38414GM-R10-1000	10	1.0	10	72	22	9.50	32	4		•
5502R38414GM-R15-1000	10	1.5	10	72	22	9.50	32	4		•
5502R38414GM-R20-1000	10	2.0	10	72	22	9.50	32	4		•
5502R38414GM-R05-1200	12	0.5	12	83	26	11.50	38	4		•
5502R38414GM-R10-1200	12	1.0	12	83	26	11.50	38	4		•
5502R38414GM-R15-1200	12	1.5	12	83	26	11.50	38	4		•
5502R38414GM-R20-1200	12	2.0	12	83	26	11.50	38	4		•
5502R38414GM-R10-1600	16	1.0	16	92	32	15.50	44	4		•
5502R38414GM-R15-1600	16	1.5	16	92	32	15.50	44	4		•
5502R38414GM-R20-1600	16	2.0	16	92	32	15.50	44	4		•
5502R38414GM-R30-1600	16	3.0	16	92	32	15.50	44	4		•
5502R38414GM-R10-2000	20	1.0	20	104	38	19.50	54	4		•
5502R38414GM-R15-2000	20	1.5	20	104	38	19.50	54	4		•
5502R38414GM-R20-2000	20	2.0	20	104	38	19.50	54	4		•
5502R38414GM-R30-2000	20	3.0	20	104	38	19.50	54	4		•

Material Overview · Material Übersicht

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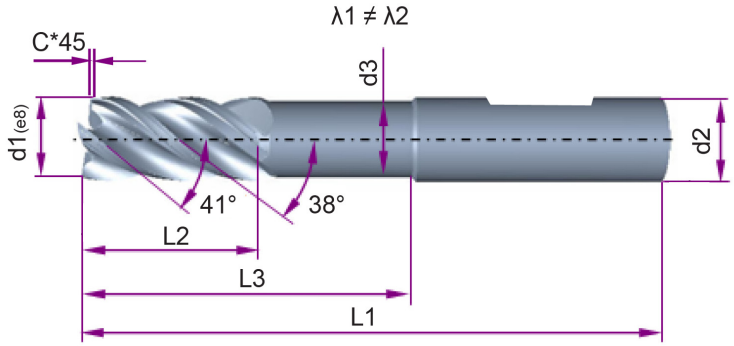
Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist. alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
✔	✔	✔	✔			✔	✔			✔	✔

5602R38414GM

4-flute end mills
4-Schneiden VHM Schaftfräser







Type · Typ	Dimension(mm) Abmessungen							Teeth Zähne	Application Anwendung	P M K
	d1(e8)	d2(h6)	L1	L2	d3	L3	C*45°	Z	Grade Sorte	KMG 405
5602R38414GM-0400	4	6	57	11	3.70	19	0.01-0.06	4		●
5602R38414GM-0500	5	6	57	13	4.70	21	0.01-0.06	4		●
5602R38414GM-0600	6	6	57	13	5.70	21	0.06-0.10	4		●
5602R38414GM-0800	8	8	63	19	7.70	27	0.06-0.10	4		●
5602R38414GM-1000	10	10	72	22	9.50	32	0.06-0.10	4		●
5602R38414GM-1200	12	12	83	26	11.50	38	0.10-0.15	4		●
5602R38414GM-1400	14	14	83	26	13.50	38	0.10-0.15	4		●
5602R38414GM-1600	16	16	92	32	15.50	44	0.10-0.15	4		●
5602R38414GM-1800	18	18	92	32	17.50	44	0.10-0.15	4		●
5602R38414GM-2000	20	20	104	38	19.50	54	0.15-0.20	4		●

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
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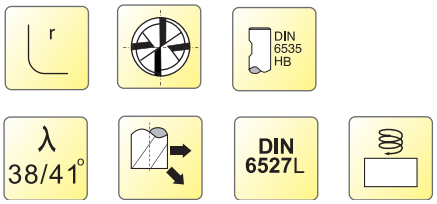
Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist. alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
✔	✔	✔	✔			✔	✔			✔	✔

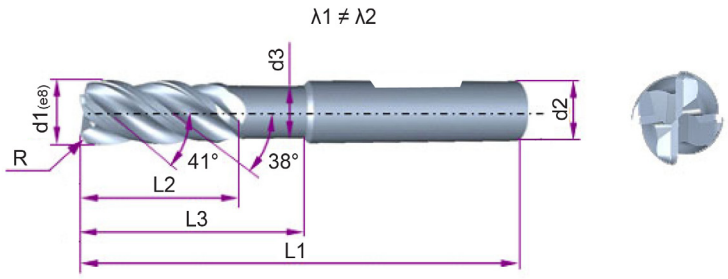
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ISO Kennzeichen
Cutting data B394-419
Schnittdaten
Graphics identification & application B200
Graphische Werkzeug- & Anwendungsbeschr.
Order form for non-standard products B455-B456
Bestellformular für Sonderwerkzeuge

5602R38414GM-R

4-flute end mills with radius
4-Schneiden VHM Schaftfräser mit Radius







Type · Typ	Dimension(mm) Abmessungen							Teeth Zähne	Application Anwendung	P M K
	d1(e8)	R±0.01	d2(h6)	L1	L2	d3	L3	Z	Grade Sorte	KMG 405
5602R38414GM-R02-0400	4	0.2	6	57	11	3.70	19	4		●
5602R38414GM-R05-0400	4	0.5	6	57	11	3.70	19	4		●
5602R38414GM-R02-0500	5	0.2	6	57	13	4.70	21	4		●
5602R38414GM-R05-0500	5	0.5	6	57	13	4.70	21	4		●
5602R38414GM-R02-0600	6	0.2	6	57	13	5.70	21	4		●
5602R38414GM-R05-0600	6	0.5	6	57	13	5.70	21	4		●
5602R38414GM-R10-0600	6	1.0	6	57	13	5.70	21	4		●
5602R38414GM-R02-0800	8	0.2	8	63	19	7.70	27	4		●
5602R38414GM-R05-0800	8	0.5	8	63	19	7.70	27	4		●
5602R38414GM-R10-0800	8	1.0	8	63	19	7.70	27	4		●
5602R38414GM-R15-0800	8	1.5	8	63	19	7.70	27	4		●
5602R38414GM-R20-0800	8	2.0	8	63	19	7.70	27	4		●
5602R38414GM-R02-1000	10	0.2	10	72	22	9.50	32	4		●
5602R38414GM-R05-1000	10	0.5	10	72	22	9.50	32	4		●
5602R38414GM-R10-1000	10	1.0	10	72	22	9.50	32	4		●
5602R38414GM-R15-1000	10	1.5	10	72	22	9.50	32	4		●
5602R38414GM-R20-1000	10	2.0	10	72	22	9.50	32	4		●
5602R38414GM-R05-1200	12	0.5	12	83	26	11.50	38	4		●
5602R38414GM-R10-1200	12	1.0	12	83	26	11.50	38	4		●
5602R38414GM-R15-1200	12	1.5	12	83	26	11.50	38	4		●
5602R38414GM-R20-1200	12	2.0	12	83	26	11.50	38	4		●
5602R38414GM-R10-1600	16	1.0	16	92	32	15.50	44	4		●
5602R38414GM-R15-1600	16	1.5	16	92	32	15.50	44	4		●
5602R38414GM-R20-1600	16	2.0	16	92	32	15.50	44	4		●
5602R38414GM-R30-1600	16	3.0	16	92	32	15.50	44	4		●
5602R38414GM-R10-2000	20	1.0	20	104	38	19.50	54	4		●
5602R38414GM-R15-2000	20	1.5	20	104	38	19.50	54	4		●
5602R38414GM-R20-2000	20	2.0	20	104	38	19.50	54	4		●
5602R38414GM-R30-2000	20	3.0	20	104	38	19.50	54	4		●

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

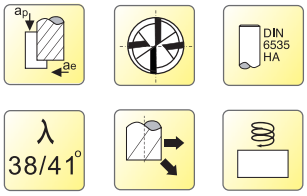
Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist. alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
✔	✔	✔	✔			✔	✔			✔	✔

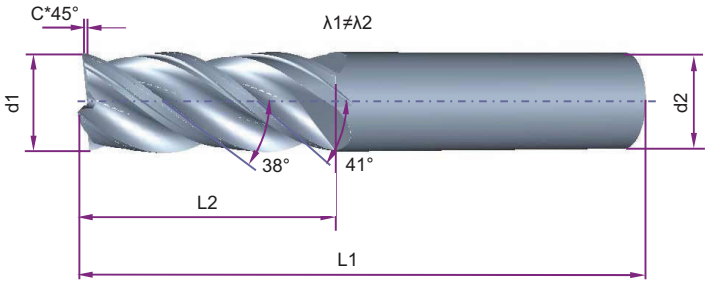
● Ex Stock / ab Lager ○ On demand / auf Anfrage

VSM-4E for difficult to machine material with sharp cutting edge
VSM-4E für schwerzerspanbares Material, mit scharfer Schneide

4-flute end mills with straight shank and long cutting edge
4-Schneiden Eckfräser mit langer Schneide und Zylinderschaft







Type · Typ	Dimension(mm) Abmessungen					Teeth Zähne	Application Anwendung	P M S
	d1	d2	L2	L1	C*45°	Z	Grade Sorte	KMG 405
VSM-4E-D4.0	4	6	11	50	0.01-0.06	4		●
VSM-4E-D5.0	5	6	13	50	0.01-0.06	4		●
VSM-4E-D6.0	6	6	16	50	0.06-0.10	4		●
VSM-4E-D8.0	8	8	20	60	0.06-0.10	4		●
VSM-4E-D10.0	10	10	25	75	0.06-0.10	4		●
VSM-4E-D12.0	12	12	30	75	0.10-0.15	4		●
VSM-4E-D16.0	16	16	45	100	0.10-0.15	4		●
VSM-4E-D20.0	20	20	45	100	0.15-0.20	4		●

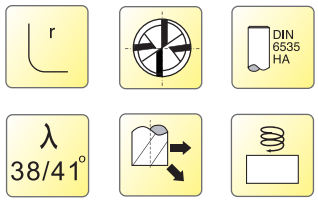
Material Overview · Material Übersicht

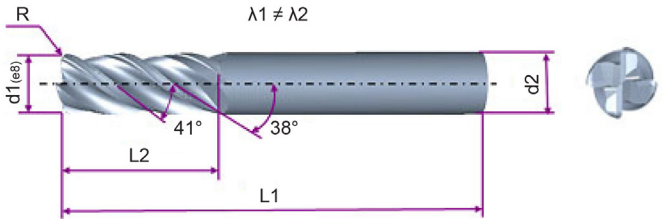
✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist. alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
✔	✔	✔				✔				✔	✔

VSM-4R for difficult to machine material with radius
VSM-4R für schwerzerspanbares Material, mit Radius

4-flute end mills with radius
4-Schneiden VHM Schaftfräser mit Radius





Type · Typ	Dimension(mm) Abmessungen					Teeth Zähne	Applicaion Anwendung	
	d1(e8)	R±0.01	d2(h6)	L1	L2	Z	Grade Sorte	P K M 40 S
VSM-4R-D4.0R0.2	4	0.2	6	50	11	4		•
VSM-4R-D4.0R0.5	4	0.5	6	50	11	4		•
VSM-4R-D5.0R0.2	5	0.2	6	50	13	4		•
VSM-4R-D5.0R0.5	5	0.5	6	50	13	4		•
VSM-4R-D6.0R0.2	6	0.2	6	50	16	4		•
VSM-4R-D6.0R0.5	6	0.5	6	50	16	4		•
VSM-4R-D6.0R1.0	6	1.0	6	50	16	4		•
VSM-4R-D6.0R1.5	6	1.5	6	50	16	4		•
VSM-4R-D8.0R0.5	8	0.5	8	63	20	4		•
VSM-4R-D8.0R0.8	8	0.8	8	63	20	4		•
VSM-4R-D8.0R1.0	8	1.0	8	63	20	4		•
VSM-4R-D8.0R1.5	8	1.5	8	63	20	4		•
VSM-4R-D8.0R2.0	8	2.0	8	63	20	4		•
VSM-4R-D10.0R0.5	10	0.5	10	75	25	4		•
VSM-4R-D10.0R0.8	10	0.8	10	75	25	4		•
VSM-4R-D10.0R1.0	10	1.0	10	75	25	4		•
VSM-4R-D10.0R1.5	10	1.5	10	75	25	4		•
VSM-4R-D10.0R2.0	10	2.0	10	75	25	4		•
VSM-4R-D12.0R0.5	12	0.5	12	75	30	4		•
VSM-4R-D12.0R0.8	12	0.8	12	75	30	4		•
VSM-4R-D12.0R1.0	12	1.0	12	75	30	4		•
VSM-4R-D12.0R1.5	12	1.5	12	75	30	4		•
VSM-4R-D12.0R2.0	12	2.0	12	75	30	4		•
VSM-4R-D12.0R2.5	12	2.5	12	75	30	4		•
VSM-4R-D12.0R3.0	12	3.0	12	75	30	4		•
VSM-4R-D12.0R4.0	12	4.0	12	75	30	4		•
VSM-4R-D16.0R0.5	16	0.5	16	100	45	4		•
VSM-4R-D16.0R0.8	16	0.8	16	100	45	4		•
VSM-4R-D16.0R1.0	16	1.0	16	100	45	4		•
VSM-4R-D16.0R1.5	16	1.5	16	100	45	4		•
VSM-4R-D16.0R2.0	16	2.0	16	100	45	4		•
VSM-4R-D16.0R2.5	16	2.5	16	100	45	4		•
VSM-4R-D16.0R3.0	16	3.0	16	100	45	4		•
VSM-4R-D16.0R4.0	16	4.0	16	100	45	4		•
VSM-4R-D20.0R0.5	20	0.5	20	100	45	4		•
VSM-4R-D20.0R1.0	20	1.0	20	100	45	4		•
VSM-4R-D20.0R1.5	20	1.5	20	100	45	4		•
VSM-4R-D20.0R2.0	20	2.0	20	100	45	4		•
VSM-4R-D20.0R2.5	20	2.5	20	100	45	4		•
VSM-4R-D20.0R3.0	20	3.0	20	100	45	4		•
VSM-4R-D20.0R4.0	20	4.0	20	100	45	4		•

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

Material Overview · Material Übersicht

Workpiece material Werkstückstoff											
Carbon steel Kohlenstoff Stahl	Alloy steel Legierter Stahl	Quenched and tempered steel · Vergüteter Stahl		Hardened steel · Gehärteter Stahl		Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg	Aluminum alloy Alu Leg	Titanium alloy Titan Leg	Heat resist. alloy warmfeste Leg
		~40HRC	~50HRC	~60HRC	~68HRC						
✔	✔	✔				✔				✔	✔

NOTIZEN:

Recommended cutting data · Empfohlene Schnittdaten

Type *Typ*	Grade *Sorte*	Material *Werkstoffe*		d_1 (mm)	z	Vc (m/min)	f_z (mm/z)	a_p (mm)	a_e (mm)	n (min^{-1})	V_f (mm/min)
5501R302GM	YK30F	K	Cast iron *Guss*	3.00	2	60	0.010	1.50	3.00	6360	127
				4.00	2	60	0.015	2.00	4.00	4770	143
				5.00	2	60	0.020	2.50	5.00	3810	152
				6.00	2	60	0.024	3.00	6.00	3180	153
				8.00	2	60	0.032	4.00	8.00	2380	152
				10.00	2	60	0.038	5.00	10.00	1900	144
				12.00	2	60	0.046	6.00	12.00	1590	146
				16.00	2	60	0.054	8.00	16.00	1190	129
				20.00	2	60	0.066	10.00	20.00	950	125
		N	Aluminum alloy *Alu-Legierung* Si<=10%	3.00	2	220	0.010	1.50	3.00	23340	467
				4.00	2	220	0.015	2.00	4.00	17500	525
				5.00	2	220	0.020	2.50	5.00	14000	560
				6.00	2	220	0.024	3.00	6.00	11670	560
				8.00	2	220	0.032	4.00	8.00	8750	560
				10.00	2	220	0.038	5.00	10.00	7000	532
				12.00	2	220	0.046	6.00	12.00	5830	536
				16.00	2	220	0.054	8.00	16.00	4370	472
				20.00	2	220	0.066	10.00	20.00	3500	462
			Brass Bronze *Kupfer*	3.00	2	90	0.010	1.50	3.00	9540	191
				4.00	2	90	0.015	2.00	4.00	7160	215
				5.00	2	90	0.020	2.50	5.00	5720	229
				6.00	2	90	0.024	3.00	6.00	4770	229
				8.00	2	90	0.032	4.00	8.00	3580	229
				10.00	2	90	0.038	5.00	10.00	2860	217
				12.00	2	90	0.046	6.00	12.00	2380	219
				16.00	2	90	0.054	8.00	16.00	1790	193
				20.00	2	90	0.066	10.00	20.00	1430	189





- Please start a test cutting with 85% of the Vc or 75% of the fz, then increase the cutting speed and feed rate.
- Please use high precision and high rigidity clamping system. The oscillation of the tool can not be over 0.01 mm.
- When $a_p=1*d_1$, f_z =75% as the data in the table

- Bitte führen Sie einen Testschnitt mit 85% der Vc und 75% des fz durch.
Nach erfolgtem Test können Sie die Schnittgeschwindigkeit bzw. die Vorschubwerte entsprechend erhöhen.
- Bitte verwenden Sie nur Spannmittel mit einer hohen Genauigkeit und einer hohen Spannkraft.
Überprüfen Sie den Rundlauf der Werkzeuge. Sie sollten darauf achten, dass der Rundlauffehler nicht größer als 0.01mm ist.
- Bei Fräsoperationen, die mit einer $a_p=1*d_1$ durchgeführt werden, ist f_z um 25% zu reduzieren.

Recommended cutting data · Empfohlene Schnittdaten

Type *Typ*	Grade *Sorte*		Material *Werkstoffe*	d_1 (mm)	z	Vc (m/min)	f_z (mm/z)	a_p (mm)	a_e (mm)	n (min^{-1})	V_f (mm/min)
5501R302GM	KMG303	P	Steel *Stahl* HRC<25	3.00	2	105	0.010	1.50	3.00	11140	223
5601R302GM	KMG303			4.00	2	105	0.015	2.00	4.00	8350	251
				5.00	2	105	0.020	2.50	5.00	6680	267
				6.00	2	105	0.024	3.00	6.00	5570	267
				8.00	2	105	0.032	4.00	8.00	4170	267
				10.00	2	105	0.038	5.00	10.00	3340	254
				12.00	2	105	0.046	6.00	12.00	2780	256
				16.00	2	105	0.054	8.00	16.00	2080	225
				20.00	2	105	0.066	10.00	20.00	1670	220
		P	Steel, Steel alloy *Stahl, legierter Stahl* HRC=25-38	3.00	2	75	0.010	1.50	3.00	7950	159
				4.00	2	75	0.015	2.00	4.00	5960	179
				5.00	2	75	0.020	2.50	5.00	4770	191
				6.00	2	75	0.024	3.00	6.00	3970	191
				8.00	2	75	0.032	4.00	8.00	2980	191
				10.00	2	75	0.038	5.00	10.00	2380	181
				12.00	2	75	0.046	6.00	12.00	1980	182
				16.00	2	75	0.054	8.00	16.00	1490	161
				20.00	2	75	0.066	10.00	20.00	1190	157
		P	High ally steel *Hochlegierter Stahl*	3.00	2	40	0.010	1.50	3.00	4240	85
				4.00	2	40	0.010	2.00	4.00	3180	64
				5.00	2	40	0.014	2.50	5.00	2540	71
		M	Stainless steel *Rostfreier Stahl*	6.00	2	40	0.017	3.00	6.00	2120	72
				8.00	2	40	0.024	4.00	8.00	1590	76
				10.00	2	40	0.030	5.00	10.00	1270	76
		S	Ti and Ti alloys *Ti-Legierungen*	12.00	2	40	0.036	6.00	12.00	1060	76
				16.00	2	40	0.045	8.00	16.00	790	71
				20.00	2	40	0.057	10.00	20.00	630	72
		K	Cast iron *Guss*	3.00	2	120	0.010	1.50	3.00	12730	255
				4.00	2	120	0.015	2.00	4.00	9540	286
				5.00	2	120	0.020	2.50	5.00	7630	305
				6.00	2	120	0.024	3.00	6.00	6360	305
				8.00	2	120	0.032	4.00	8.00	4770	305
				10.00	2	120	0.038	5.00	10.00	3810	290
				12.00	2	120	0.046	6.00	12.00	3180	293
				16.00	2	120	0.054	8.00	16.00	2380	257
				20.00	2	120	0.066	10.00	20.00	1900	251
		N	Aluminum alloy *Alu-Legierung* Si<=10%	3.00	2	220	0.010	1.50	3.00	23340	467
				4.00	2	220	0.015	2.00	4.00	17500	525
				5.00	2	220	0.020	2.50	5.00	14000	560
				6.00	2	220	0.024	3.00	6.00	11670	560
				8.00	2	220	0.032	4.00	8.00	8750	560
				10.00	2	220	0.038	5.00	10.00	7000	532
				12.00	2	220	0.046	6.00	12.00	5830	536
				16.00	2	220	0.054	8.00	16.00	4370	472
				20.00	2	220	0.066	10.00	20.00	3500	462
		N	Brass Bronze *Kupfer*	3.00	2	90	0.010	1.50	3.00	9540	191
				4.00	2	90	0.015	2.00	4.00	7160	215
				5.00	2	90	0.020	2.50	5.00	5720	229
				6.00	2	90	0.024	3.00	6.00	4770	229
				8.0	2	90	0.032	4.00	8.00	3580	229
				10.00	2	90	0.038	5.00	10.00	2860	217
				12.00	2	90	0.046	6.00	12.00	2380	219
				16.00	2	90	0.054	8.00	16.00	1790	193
				20.00	2	90	0.066	10.00	20.00	1430	189





- Please start a test cutting with 85% of the Vc or 75% of the f_z, then increase the cutting speed and feed rate.
- Please use high precision and high rigidity clamping system. The oscillation of the tool cannot be over 0.01 mm.
- When $a_p=1*d_1$, f_z =75% as the data in the table

- *Bitte führen Sie einen Testschnitt mit 85% der Vc und 75% des fz durch. Nach erfolgtem Test können Sie die Schnittgeschwindigkeit bzw. die Vorschubwerte entsprechend erhöhen.*
- *Bitte verwenden Sie nur Spannmittel mit einer hohen Genauigkeit und einer hohen Spannkraft. Überprüfen Sie den Rundlauf der Werkzeuge. Sie sollten darauf achten, dass der Rundlauffehler nicht größer als 0.01mm ist.*
- *Bei Fräsoperationen, die mit einer $a_p=1*d_1$ durchgeführt werden, ist f_z um 25% zu reduzieren.*

Recommended cutting data · Empfohlene Schnittdaten

Type *Typ*	Grade *Sorte*		Material *Werkstoffe*	d_1 (mm)	z	Vc (m/min)	f_z (mm/z)	a_p (mm)	a_e (mm)	n (min^{-1})	V_f (mm/min)
5501R303GM	KMG303	P	Steel *Stahl* HRC<25	3.00	3	100	0.010	1.50	3.00	10610	318
5601R303GM	KMG303			4.00	3	100	0.015	2.00	4.00	7950	358
				5.00	3	100	0.020	2.50	5.00	6360	382
				6.00	3	100	0.024	3.00	6.00	5300	382
				8.00	3	100	0.032	4.00	8.00	3970	381
				10.00	3	100	0.038	5.00	10.00	3180	363
				12.00	3	100	0.046	6.00	12.00	2650	366
				16.00	3	100	0.054	8.00	16.00	1980	321
				20.00	3	100	0.066	10.00	20.00	1590	315
			Steel, Steel alloy *Stahl, legierter Stahl* HRC=25-38	3.00	3	70	0.010	1.50	3.00	7420	223
				4.00	3	70	0.015	2.00	4.00	5570	251
				5.00	3	70	0.020	2.50	5.00	4450	267
				6.00	3	70	0.024	3.00	6.00	3710	267
				8.00	3	70	0.032	4.00	8.00	2780	267
				10.00	3	70	0.038	5.00	10.00	2220	253
				12.00	3	70	0.046	6.00	12.00	1850	255
				16.00	3	70	0.054	8.00	16.00	1390	225
				20.00	3	70	0.066	10.00	20.00	1110	220
		P	High ally steel *Hochlegierter Stahl*	3.00	3	35	0.010	1.50	3.00	3710	111
				4.00	3	35	0.015	2.00	4.00	2780	125
				5.00	3	35	0.020	2.50	5.00	2220	133
		M	Stainless steel *Rostfreier Stahl*	6.00	3	35	0.024	3.00	6.00	1850	133
				8.00	3	35	0.032	4.00	8.00	1390	133
				10.00	3	35	0.038	5.00	10.00	1110	127
		S	Ti and Ti alloys *Ti-Legierungen* High temperature alloys *Warmfeste Superlegierungen*	12.00	3	35	0.046	6.00	12.00	920	127
				16.00	3	35	0.054	8.00	16.00	690	112
				20.00	3	35	0.066	10.00	20.00	550	109
		K	Cast iron *Guss*	3.00	3	115	0.010	1.50	3.00	12200	366
				4.00	3	115	0.015	2.00	4.00	9150	412
				5.00	3	115	0.020	2.50	5.00	7320	439
				6.00	3	115	0.024	3.00	6.00	6100	439
				8.00	3	115	0.032	4.00	8.00	4570	439
				10.00	3	115	0.038	5.00	10.00	3660	417
				12.00	3	115	0.046	6.00	12.00	3050	421
				16.00	3	115	0.054	8.00	16.00	2280	369
				20.00	3	115	0.066	10.00	20.00	1830	362
		N	Aluminum alloy *Alu-Legierung* Si<=10%	3.00	3	210	0.010	1.50	3.00	22280	668
				4.00	3	210	0.015	2.00	4.00	16710	752
				5.00	3	210	0.020	2.50	5.00	13360	802
				6.00	3	210	0.024	3.00	6.00	11140	802
				8.00	3	210	0.032	4.00	8.00	8350	802
				10.00	3	210	0.038	5.00	10.00	6680	762
				12.00	3	210	0.046	6.00	12.00	5570	769
				16.00	3	210	0.054	8.00	16.00	4170	676
				20.00	3	210	0.066	10.00	20.00	3340	661
			Brass Bronze *Kupfer*	3.00	3	85	0.010	1.50	3.00	9010	270
				4.00	3	85	0.015	2.00	4.00	6760	304
				5.00	3	85	0.020	2.50	5.00	5410	325
				6.00	3	85	0.024	3.00	6.00	4500	324
				8.00	3	85	0.032	4.00	8.00	3380	324
				10.00	3	85	0.038	5.00	10.00	2700	308
				12.00	3	85	0.046	6.00	12.00	2250	311
				16.00	3	85	0.054	8.00	16.00	1690	274
				20.00	3	85	0.066	10.00	20.00	1350	267





- Please start a test cutting with 85% of the Vc or 75% of the f_z, then increase the cutting speed and feed rate.
- Please use high precision and high rigidity clamping system. The oscillation of the tool cannot be over 0.01 mm.
- When $a_p=1*d_1$, f_z =75% as the data in the table

- *Bitte führen Sie einen Testschnitt mit 85% der Vc und 75% des fz durch. Nach erfolgtem Test können Sie die Schnittgeschwindigkeit bzw. die Vorschubwerte entsprechend erhöhen.*
- *Bitte verwenden Sie nur Spannmittel mit einer hohen Genauigkeit und einer hohen Spannkraft. Überprüfen Sie den Rundlauf der Werkzeuge. Sie sollten darauf achten, dass der Rundlauffehler nicht größer als 0.01mm ist.*
- *Bei Fräsoperationen, die mit einer $a_p=1*d_1$ durchgeführt werden, ist f_z um 25% zu reduzieren.*

Recommended cutting data · Empfohlene Schnittdaten

Type *Typ*	Grade *Sorte*		Material *Werkstoffe*	d_1 (mm)	z	Vc (m/min)	f_z (mm/z)	a_p (mm)	a_e (mm)	n (min^{-1})	V_f (mm/min)
5501R304GF	KMG303	P	Steel *Stahl* HRC<25	3.00	4	160	0.010	3.00	0.30	16970	679
5601R304GF	KMG303			4.00	4	160	0.015	4.00	0.40	12730	764
				5.00	4	160	0.020	5.00	0.50	10180	814
				6.00	4	160	0.024	6.00	0.60	8480	814
				8.00	4	160	0.032	8.00	0.80	6360	814
				10.00	4	160	0.038	10.00	1.00	5090	774
				12.00	4	160	0.046	12.00	1.20	4240	780
				16.00	4	160	0.054	16.00	1.60	3180	687
				20.00	4	160	0.066	20.00	2.00	2540	671
		P	Steel, Steel alloy *Stahl, legierter Stahl* HRC=25-38	3.00	4	110	0.010	3.00	0.30	11670	467
				4.00	4	110	0.015	4.00	0.40	8750	525
				5.00	4	110	0.020	5.00	0.50	7000	560
				6.00	4	110	0.024	6.00	0.60	5830	560
				8.00	4	110	0.032	8.00	0.80	4370	559
				10.00	4	110	0.038	10.00	1.00	3500	532
				12.00	4	110	0.046	12.00	1.20	2910	535
				16.00	4	110	0.054	16.00	1.60	2180	471
				20.00	4	110	0.066	20.00	2.00	1750	462
		P	High ally steel *Hochlegierter Stahl*	3.00	4	70	0.010	3.00	0.30	7420	297
				4.00	4	70	0.015	4.00	0.40	5570	334
				5.00	4	70	0.020	5.00	0.50	4450	356
				6.00	4	70	0.024	6.00	0.60	3710	356
				8.00	4	70	0.032	8.00	0.80	2780	356
				10.00	4	70	0.038	10.00	1.00	2220	337
		M	Stainless steel *Rostfreier Stahl*	12.00	4	70	0.046	12.00	1.20	1850	340
				16.00	4	70	0.054	16.00	1.60	1390	300
				20.00	4	70	0.066	20.00	2.00	1110	293
		K	Cast iron *Guss*	3.00	4	130	0.010	3.00	0.30	13790	552
				4.00	4	130	0.015	4.00	0.40	10340	620
				5.00	4	130	0.020	5.00	0.50	8270	662
				6.00	4	130	0.024	6.00	0.60	6890	661
				8.00	4	130	0.032	8.00	0.80	5170	662
				10.00	4	130	0.038	10.00	1.00	4130	628
				12.00	4	130	0.046	12.00	1.20	3440	633
				16.00	4	130	0.054	16.00	1.60	2580	557
				20.00	4	130	0.066	20.00	2.00	2060	544
		S	Ti and Ti alloys *Ti-Legierungen*	3.00	4	80	0.010	3.00	0.30	8480	339
				4.00	4	80	0.015	4.00	0.40	6360	382
				5.00	4	80	0.020	5.00	0.50	5090	407
				6.00	4	80	0.024	6.00	0.60	4240	407
				8.00	4	80	0.032	8.00	0.80	3180	407
				10.00	4	80	0.038	10.00	1.00	2540	386
				12.00	4	80	0.046	12.00	1.20	2120	390
				16.00	4	80	0.054	16.00	1.60	1590	343
				20.00	4	80	0.066	20.00	2.00	1270	335
		S	Ni-High temperature alloys *Ni-Warmfeste Superlegierungen*	3.00	4	40	0.010	3.00	0.30	4240	170
				4.00	4	40	0.015	4.00	0.40	3180	191
				5.00	4	40	0.020	5.00	0.50	2540	203
				6.00	4	40	0.024	6.00	0.60	2120	204
				8.00	4	40	0.032	8.00	0.80	1590	204
				10.00	4	40	0.038	10.00	1.00	1270	193
				12.00	4	40	0.046	12.00	1.20	1060	195
				16.00	4	40	0.054	16.00	1.60	790	171
				20.00	4	40	0.066	20.00	2.00	630	166





- Please start a test cutting with 85% of the Vc or 75% of the f_z, then increase the cutting speed and feed rate.
- Please use high precision and high rigidity clamping system. The oscillation of the tool cannot be over 0.01 mm.
- When a_p=1*d_1, f_z =75% as the data in the table
- Recommended operation: climb milling

- *Bitte führen Sie einen Testschnitt mit 85% der Vc und 75% des fz durch. Nach erfolgtem Test können Sie die Schnittgeschwindigkeit bzw. die Vorschubwerte entsprechend erhöhen.*
- *Bitte verwenden Sie nur Spannmittel mit einer hohen Genauigkeit und einer hohen Spannkraft. Überprüfen Sie den Rundlauf der Werkzeuge. Sie sollten darauf achten, dass der Rundlauffehler nicht größer als 0.01mm ist.*
- *Bei Fräsoperationen, die mit einer a_p=1*d_1 durchgeführt werden, ist f_z um 25% zu reduzieren.*
- *Empfohlene Fräsmethode: Gleichlauffräsen*

Recommended cutting data · Empfohlene Schnittdaten

Type *Typ*	Grade *Sorte*		Material *Werkstoffe*	d_1 (mm)	z	Vc (m/min)	f_z (mm/z)	a_p (mm)	a_e (mm)	n (min^{-1})	V_f (mm/min)
5502R302GM	YK30F	K	Cast iron *Guss*	3.00	2	60	0.010	1.50	3.00	6360	127
				4.00	2	60	0.015	2.00	4.00	4770	143
				5.00	2	60	0.020	2.50	5.00	3810	152
				6.00	2	60	0.024	3.00	6.00	3180	153
				8.00	2	60	0.032	4.00	8.00	2380	152
				10.00	2	60	0.038	5.00	10.00	1900	144
				12.00	2	60	0.046	6.00	12.00	1590	146
				16.00	2	60	0.054	8.00	16.00	1190	129
				20.00	2	60	0.066	10.00	20.00	950	125
		N	Aluminum alloy *Alu-Legierung* Si<=10%	3.00	2	220	0.010	1.50	3.00	23340	467
				4.00	2	220	0.015	2.00	4.00	17500	525
				5.00	2	220	0.020	2.50	5.00	14000	560
				6.00	2	220	0.024	3.00	6.00	11670	560
				8.00	2	220	0.032	4.00	8.00	8750	560
				10.00	2	220	0.038	5.00	10.00	7000	532
				12.00	2	220	0.046	6.00	12.00	5830	536
				16.00	2	220	0.054	8.00	16.00	4370	472
				20.00	2	220	0.066	10.00	20.00	3500	462
			Brass Bronze *Kupfer*	3.00	2	90	0.010	1.50	3.00	9540	191
				4.00	2	90	0.015	2.00	4.00	7160	215
				5.00	2	90	0.020	2.50	5.00	5720	229
				6.00	2	90	0.024	3.00	6.00	4770	229
				8.00	2	90	0.032	4.00	8.00	3580	229
				10.00	2	90	0.038	5.00	10.00	2860	217
				12.00	2	90	0.046	6.00	12.00	2380	219
				16.00	2	90	0.054	8.00	16.00	1790	193
				20.00	2	90	0.066	10.00	20.00	1430	189





- Please start a test cutting with 85% of the Vc or 75% of the fz, then increase the cutting speed and feed rate.
- Please use high precision and high rigidity clamping system. The oscillation of the tool can not be over 0.01 mm.
- When $a_p=1*d_1$, f_z =75% as the data in the table

- Bitte führen Sie einen Testschnitt mit 85% der Vc und 75% des fz durch.
Nach erfolgtem Test können Sie die Schnittgeschwindigkeit bzw. die Vorschubwerte entsprechend erhöhen.
- Bitte verwenden Sie nur Spannmittel mit einer hohen Genauigkeit und einer hohen Spannkraft.
Überprüfen Sie den Rundlauf der Werkzeuge. Sie sollten darauf achten, dass der Rundlauffehler nicht größer als 0.01mm ist.
- Bei Fräsoperationen, die mit einer $a_p=1*d_1$ durchgeführt werden, ist f_z um 25% zu reduzieren.

Recommended cutting data · Empfohlene Schnittdaten

Type *Typ*	Grade *Sorte*		Material *Werkstoffe*	d_1 (mm)	z	Vc (m/min)	f_z (mm/z)	a_p (mm)	a_e (mm)	n (min^{-1})	V_f (mm/min)
5502R302GM	KMG303	P	Steel *Stahl* HRC<25	3.00	2	95	0.010	1.50	3.00	10070	201
5602R302GM	KMG303			4.00	2	95	0.015	2.00	4.00	7550	227
				5.00	2	95	0.020	2.50	5.00	6040	242
				6.00	2	95	0.024	3.00	6.00	5030	241
				8.00	2	95	0.032	4.00	8.00	3770	241
				10.00	2	95	0.038	5.00	10.00	3020	230
				12.00	2	95	0.046	6.00	12.00	2510	231
				16.00	2	95	0.054	8.00	16.00	1880	203
				20.00	2	95	0.066	10.00	20.00	1510	199
		P	Steel, Steel alloy *Stahl, legierter Stahl* HRC=25-38	3.00	2	70	0.010	1.50	3.00	7420	148
				4.00	2	70	0.015	2.00	4.00	5570	167
				5.00	2	70	0.020	2.50	5.00	4450	178
				6.00	2	70	0.024	3.00	6.00	3710	178
				8.00	2	70	0.032	4.00	8.00	2780	178
				10.00	2	70	0.038	5.00	10.00	2220	169
				12.00	2	70	0.046	6.00	12.00	1850	170
				16.00	2	70	0.054	8.00	16.00	1390	150
				20.00	2	70	0.066	10.00	20.00	1110	147
		P	High ally steel *Hochlegierter Stahl*	3.00	2	40	0.010	1.50	3.00	4240	85
				4.00	2	40	0.010	2.00	4.00	3180	64
				5.00	2	40	0.014	2.50	5.00	2540	71
		M	Stainless steel *Rostfreier Stahl*	6.00	2	40	0.017	3.00	6.00	2120	72
				8.00	2	40	0.024	4.00	8.00	1590	76
				10.00	2	40	0.030	5.00	10.00	1270	76
		S	Ti and Ti alloys *Ti-Legierungen*	12.00	2	40	0.036	6.00	12.00	1060	76
				16.00	2	40	0.045	8.00	16.00	790	71
				20.00	2	40	0.057	10.00	20.00	630	72
		K	Cast iron *Guss*	3.00	2	100	0.010	1.50	3.00	10610	212
				4.00	2	100	0.015	2.00	4.00	7950	239
				5.00	2	100	0.020	2.50	5.00	6360	254
				6.00	2	100	0.024	3.00	6.00	5300	254
				8.00	2	100	0.032	4.00	8.00	3970	254
				10.00	2	100	0.038	5.00	10.00	3180	242
				12.00	2	100	0.046	6.00	12.00	2650	244
				16.00	2	100	0.054	8.00	16.00	1980	214
				20.00	2	100	0.066	10.00	20.00	1590	210
		N	Aluminum alloy *Alu-Legierung* Si<=10%	3.00	2	220	0.010	1.50	3.00	23340	467
				4.00	2	220	0.015	2.00	4.00	17500	525
				5.00	2	220	0.020	2.50	5.00	14000	560
				6.00	2	220	0.024	3.00	6.00	11670	560
				8.00	2	220	0.032	4.00	8.00	8750	560
				10.00	2	220	0.038	5.00	10.00	7000	532
				12.00	2	220	0.046	6.00	12.00	5830	536
				16.00	2	220	0.054	8.00	16.00	4370	472
				20.00	2	220	0.066	10.00	20.00	3500	462
		N	Brass Bronze *Kupfer*	3.00	2	90	0.010	1.50	3.00	9540	191
				4.00	2	90	0.015	2.00	4.00	7160	215
				5.00	2	90	0.020	2.50	5.00	5720	229
				6.00	2	90	0.024	3.00	6.00	4770	229
				8.00	2	90	0.032	4.00	8.00	3580	229
				10.00	2	90	0.038	5.00	10.00	2860	217
				12.00	2	90	0.046	6.00	12.00	2380	219
				16.00	2	90	0.054	8.00	16.00	1790	193
				20.00	2	90	0.066	10.00	20.00	1430	189





- Please start a test cutting with 85% of the Vc or 75% of the f_z, then increase the cutting speed and feed rate.
- Please use high precision and high rigidity clamping system. The oscillation of the tool cannot be over 0.01 mm.
- When $a_p=1*d_1$, f_z =75% as the data in the table

- *Bitte führen Sie einen Testschnitt mit 85% der Vc und 75% des fz durch. Nach erfolgtem Test können Sie die Schnittgeschwindigkeit bzw. die Vorschubwerte entsprechend erhöhen.*
- *Bitte verwenden Sie nur Spannmittel mit einer hohen Genauigkeit und einer hohen Spannkraft. Überprüfen Sie den Rundlauf der Werkzeuge. Sie sollten darauf achten, dass der Rundlauffehler nicht größer als 0.01mm ist.*
- *Bei Fräsoperationen, die mit einer $a_p=1*d_1$ durchgeführt werden, ist f_z um 25% zu reduzieren.*

Recommended cutting data · Empfohlene Schnittdaten

Type *Typ*	Grade *Sorte*		Material *Werkstoffe*	d_1 (mm)	z	Vc (m/min)	f_z (mm/z)	a_p (mm)	a_e (mm)	n (min^{-1})	V_f (mm/min)
5502R303GM	KMG303	P	Steel *Stahl* HRC<25	3.00	3	120	0.010	1.50	0.75	12730	382
5602R303GM	KMG303			4.00	3	120	0.015	2.00	1.00	9540	429
5508R454GM	KMG303			5.00	3	120	0.020	2.50	1.25	7630	458
5602R454GM	KMG303			6.00	3	120	0.024	3.00	1.50	6360	458
				8.00	3	120	0.032	4.00	2.00	4770	458
				10.00	3	120	0.038	5.00	2.50	3810	434
				12.00	3	120	0.046	6.00	3.00	3180	439
				16.00	3	120	0.054	8.00	4.00	2380	386
				20.00	3	120	0.066	10.00	5.00	1900	376
		P	Steel, Steel alloy *Stahl, legierter Stahl* HRC=25-38	3.00	3	90	0.010	1.50	0.75	9540	286
				4.00	3	90	0.015	2.00	1.00	7160	322
				5.00	3	90	0.020	2.50	1.25	5720	343
				6.00	3	90	0.024	3.00	1.50	4770	343
				8.00	3	90	0.032	4.00	2.00	3580	344
				10.00	3	90	0.038	5.00	2.50	2860	326
				12.00	3	90	0.046	6.00	3.00	2380	328
				16.00	3	90	0.054	8.00	4.00	1790	290
				20.00	3	90	0.066	10.00	5.00	1430	283
		P	High ally steel *Hochlegierter Stahl*	3.00	3	40	0.010	1.50	0.75	4240	127
				4.00	3	40	0.015	2.00	1.00	3180	143
				5.00	3	40	0.020	2.50	1.25	2540	152
		M	Stainless steel *Rostfreier Stahl*	6.00	3	40	0.024	3.00	1.50	2120	153
				8.00	3	40	0.032	4.00	2.00	1590	153
				10.00	3	40	0.038	5.00	2.50	1270	145
		S	Ti and Ti alloys *Ti-Legierungen*	12.00	3	40	0.046	6.00	3.00	1060	146
				16.00	3	40	0.054	8.00	4.00	790	128
				20.00	3	40	0.066	10.00	5.00	630	125
		K	Cast iron *Guss*	3.00	3	150	0.010	1.50	0.75	15910	477
				4.00	3	150	0.015	2.00	1.00	11930	537
				5.00	3	150	0.022	2.50	1.25	9540	630
				6.00	3	150	0.027	3.00	1.50	7950	644
				8.00	3	150	0.035	4.00	2.00	5960	626
				10.00	3	150	0.044	5.00	2.50	4770	630
				12.00	3	150	0.052	6.00	3.00	3970	619
				16.00	3	150	0.063	8.00	4.00	2980	563
				20.00	3	150	0.080	10.00	5.00	2380	571
		N	Aluminum alloy *Alu-Legierung* Si<=10%	3.00	3	300	0.015	1.50	0.75	31830	1432
				4.00	3	300	0.020	2.00	1.00	23870	1432
				5.00	3	300	0.025	2.50	1.25	19090	1432
				6.00	3	300	0.029	3.00	1.50	15910	1384
				8.00	3	300	0.042	4.00	2.00	11930	1503
				10.00	3	300	0.050	5.00	2.50	9540	1431
				12.00	3	300	0.059	6.00	3.00	7950	1407
				16.00	3	300	0.072	8.00	4.00	5960	1287
				20.00	3	300	0.090	10.00	5.00	4770	1288
		N	Brass Bronze *Kupfer*	3.00	3	150	0.015	1.50	0.75	15910	716
				4.00	3	150	0.020	2.00	1.00	11930	716
				5.00	3	150	0.025	2.50	1.25	9540	716
				6.00	3	150	0.029	3.00	1.50	7950	692
				8.00	3	150	0.042	4.00	2.00	5960	751
				10.00	3	150	0.050	5.00	2.50	4770	716
				12.00	3	150	0.059	6.00	3.00	3970	703
				16.00	3	150	0.072	8.00	4.00	2980	644
				20.00	3	150	0.090	10.00	5.00	2380	643





- Please start a test cutting with 85% of the Vc or 75% of the f_z, then increase the cutting speed and feed rate.
- Please use high precision and high rigidity clamping system. The oscillation of the tool cannot be over 0.01 mm.
- When $a_p=1*d_1$, f_z =75% as the data in the table
- Recommended operation: climb milling

- Bitte führen Sie einen Testschnitt mit 85% der Vc und 75% des fz durch. Nach erfolgtem Test können Sie die Schnittgeschwindigkeit bzw. die Vorschubwerte entsprechend erhöhen.
- Bitte verwenden Sie nur Spannmittel mit einer hohen Genauigkeit und einer hohen Spannkraft. Überprüfen Sie den Rundlauf der Werkzeuge. Sie sollten darauf achten, dass der Rundlauffehler nicht größer als 0.01mm ist.
- Bei Fräsoperationen, die mit einer $a_p=1*d_1$ durchgeführt werden, ist f_z um 25% zu reduzieren.
- Empfohlene Fräsmethode: Gleichlauffräsen

Recommended cutting data · Empfohlene Schnittdaten

Type *Typ*	Grade *Sorte*		Material *Werkstoffe*	d_1 (mm)	z	Vc (m/min)	f_z (mm/z)	a_p (mm)	a_e (mm)	n (min^{-1})	V_f (mm/min)
5502R453GM	KMG405	P	Steel *Stahl* HRC<25	3.00	3	120	0.010	4.50	0.30	12730	382
5602R453GM	KMG405			4.00	3	120	0.015	6.00	0.40	9540	429
				5.00	3	120	0.020	7.50	0.50	7630	458
				6.00	3	120	0.024	9.00	0.60	6360	458
				8.00	3	120	0.032	12.00	0.80	4770	458
				10.00	3	120	0.038	15.00	1.00	3810	434
				12.00	3	120	0.046	18.00	1.20	3180	439
				16.00	3	120	0.054	24.00	1.60	2380	386
				20.00	3	120	0.066	30.00	2.00	1900	376
		P	Steel, Steel alloy *Stahl, legierter Stahl* HRC=25-38	3.00	3	90	0.010	4.50	0.30	9540	286
				4.00	3	90	0.015	6.00	0.40	7160	322
				5.00	3	90	0.020	7.50	0.50	5720	343
				6.00	3	90	0.024	9.00	0.60	4770	343
				8.00	3	90	0.032	12.00	0.80	3580	344
				10.00	3	90	0.038	15.00	1.00	2860	326
				12.00	3	90	0.046	18.00	1.20	2380	328
				16.00	3	90	0.054	24.00	1.60	1790	290
				20.00	3	90	0.066	30.00	2.00	1430	283
		P	High ally steel *Hochlegierter Stahl*	3.00	3	50	0.010	4.50	0.30	5300	159
				4.00	3	50	0.015	6.00	0.40	3970	179
				5.00	3	50	0.020	7.50	0.50	3180	191
		M	Stainless steel *Rostfreier Stahl*	6.00	3	50	0.024	9.00	0.60	2650	191
				8.00	3	50	0.032	12.00	0.80	1980	190
				10.00	3	50	0.038	15.00	1.00	1590	181
		S	Ti and Ti alloys *Ti-Legierungen* High temperature alloys *Warmfeste Superlegierungen*	12.00	3	50	0.046	18.00	1.20	1320	182
				16.00	3	50	0.054	24.00	1.60	990	160
				20.00	3	50	0.066	30.00	2.00	790	156
		K	Cast iron *Guss*	3.00	3	150	0.010	4.50	0.30	15910	477
				4.00	3	150	0.015	6.00	0.40	11930	537
				5.00	3	150	0.020	7.50	0.50	9540	572
				6.00	3	150	0.024	9.00	0.60	7950	572
				8.00	3	150	0.032	12.00	0.80	5960	572
				10.00	3	150	0.038	15.00	1.00	4770	544
				12.00	3	150	0.046	18.00	1.20	3970	548
				16.00	3	150	0.054	24.00	1.60	2980	483
				20.00	3	150	0.066	30.00	2.00	2380	471
		N	Aluminum alloy *Alu-Legierung* Si<=10%	3.00	3	300	0.024	1.50	1.50	31830	2292
				4.00	3	300	0.300	2.00	2.00	23870	21483
				5.00	3	300	0.032	2.50	2.50	19090	1833
				6.00	3	300	0.041	3.00	3.00	15910	1957
				8.00	3	300	0.058	4.00	4.00	11930	2076
				10.00	3	300	0.073	5.00	5.00	9540	2089
				12.00	3	300	0.090	6.00	6.00	7950	2147
				16.00	3	300	0.110	8.00	8.00	5960	1967
				20.00	3	300	0.130	10.00	10.00	4770	1860
		N	Brass Bronze *Kupfer*	3.00	3	150	0.024	1.50	1.50	15910	1146
				4.00	3	150	0.300	2.00	2.00	11930	10737
				5.00	3	150	0.032	2.50	2.50	9540	916
				6.00	3	150	0.041	3.00	3.00	7950	978
				8.00	3	150	0.058	4.00	4.00	5960	1037
				10.00	3	150	0.073	5.00	5.00	4770	1045
				12.00	3	150	0.090	6.00	6.00	3970	1072
				16.00	3	150	0.110	8.00	8.00	2980	983
				20.00	3	150	0.130	10.00	10.00	2380	928





- Please start a test cutting with 85% of the Vc or 75% of the f_z, then increase the cutting speed and feed rate.
- Please use high precision and high rigidity clamping system. The oscillation of the tool cannot be over 0.01 mm.
- When a_p=1*d_1, f_z =75% as the data in the table
- Recommended operation: climb milling

- *Bitte führen Sie einen Testschnitt mit 85% der Vc und 75% des fz durch. Nach erfolgtem Test können Sie die Schnittgeschwindigkeit bzw. die Vorschubwerte entsprechend erhöhen.*
- *Bitte verwenden Sie nur Spannmittel mit einer hohen Genauigkeit und einer hohen Spannkraft. Überprüfen Sie den Rundlauf der Werkzeuge. Sie sollten darauf achten, dass der Rundlauffehler nicht größer als 0.01mm ist.*
- *Bei Fräsoperationen, die mit einer a_p=1*d_1 durchgeführt werden, ist f_z um 25% zu reduzieren.*
- *Empfohlene Fräsmethode: Gleichlauffräsen*

Recommended cutting data · Empfohlene Schnittdaten

Type *Typ*	Grade *Sorte*		Material *Werkstoffe*	d_1 (mm)	z	Vc (m/min)	f_z (mm/z)	a_p (mm)	a_e (mm)	n (min^{-1})	V_f (mm/min)
5502R304GF	KMG303	P	Steel *Stahl* HRC<25	3.00	4	160	0.020	3.00	0.20	16970	1358
5602R304GF	KMG303			4.00	4	160	0.025	4.00	0.20	12730	1273
5508R454GM	KMG303			5.00	4	160	0.028	5.00	0.30	10180	1140
				6.00	4	160	0.036	6.00	0.30	8480	1221
				8.00	4	160	0.052	8.00	0.40	6360	1323
				10.00	4	160	0.065	10.00	0.50	5090	1323
				12.00	4	160	0.079	12.00	0.60	4240	1340
				16.00	4	160	0.095	16.00	0.80	3180	1208
				20.00	4	160	0.110	20.00	1.00	2540	1118
		P	Steel, Steel alloy *Stahl, legierter Stahl* HRC=25-38	3.00	4	120	0.016	3.00	0.20	12730	815
				4.00	4	120	0.020	4.00	0.20	9540	763
				5.00	4	120	0.026	5.00	0.30	7630	794
				6.00	4	120	0.031	6.00	0.30	6360	789
				8.00	4	120	0.042	8.00	0.40	4770	801
				10.00	4	120	0.053	10.00	0.50	3810	808
				12.00	4	120	0.063	12.00	0.60	3180	801
				16.00	4	120	0.079	16.00	0.80	2380	752
				20.00	4	120	0.097	20.00	1.00	1900	737
		P	High ally steel *Hochlegierter Stahl*	3.00	4	70	0.016	3.00	0.20	7420	475
				4.00	4	70	0.020	4.00	0.20	5570	446
				5.00	4	70	0.026	5.00	0.30	4450	463
				6.00	4	70	0.031	6.00	0.30	3710	460
				8.00	4	70	0.042	8.00	0.40	2780	467
		M	Stainless steel *Rostfreier Stahl*	10.00	4	70	0.053	10.00	0.50	2220	471
				12.00	4	70	0.063	12.00	0.60	1850	466
				16.00	4	70	0.079	16.00	0.80	1390	439
				20.00	4	70	0.097	20.00	1.00	1110	431
		K	Cast iron *Guss*	3.00	4	150	0.022	3.00	0.20	15910	1400
				4.00	4	150	0.025	4.00	0.20	11930	1193
				5.00	4	150	0.030	5.00	0.30	9540	1145
				6.00	4	150	0.039	6.00	0.30	7950	1240
				8.00	4	150	0.054	8.00	0.40	5960	1287
				10.00	4	150	0.066	10.00	0.50	4770	1259
				12.00	4	150	0.085	12.00	0.60	3970	1350
				16.00	4	150	0.100	16.00	0.80	2980	1192
				20.00	4	150	0.120	20.00	1.00	2380	1142
		S	Ti and Ti alloys *Ti-Legierungen*	3.00	4	80	0.015	3.00	0.20	8480	509
				4.00	4	80	0.020	4.00	0.20	6360	509
				5.00	4	80	0.025	5.00	0.30	5090	509
				6.00	4	80	0.029	6.00	0.30	4240	492
				8.00	4	80	0.042	8.00	0.40	3180	534
				10.00	4	80	0.050	10.00	0.50	2540	508
				12.00	4	80	0.059	12.00	0.60	2120	500
				16.00	4	80	0.072	16.00	0.80	1590	458
				20.00	4	80	0.090	20.00	1.00	1270	457
		S	Ni-High temperature alloys *Ni-Warmfeste Superlegierungen*	3.00	4	40	0.016	3.00	0.20	4240	271
				4.00	4	40	0.020	4.00	0.20	3180	254
				5.00	4	40	0.026	5.00	0.30	2540	264
				6.00	4	40	0.031	6.00	0.30	2120	263
				8.00	4	40	0.042	8.00	0.40	1590	267
				10.00	4	40	0.053	10.00	0.50	1270	269
				12.00	4	40	0.063	12.00	0.60	1060	267
				16.00	4	40	0.079	16.00	0.80	790	250
				20.00	4	40	0.097	20.00	1.00	630	244





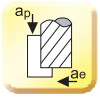
- Please start a test cutting with 85% of the Vc or 75% of the f_z, then increase the cutting speed and feed rate.
- Please use high precision and high rigidity clamping system. The oscillation of the tool cannot be over 0.01 mm.
- When a_p=1*d_1, f_z =75% as the data in the table
- Recommended operation: climb milling

- *Bitte führen Sie einen Testschnitt mit 85% der Vc und 75% des fz durch. Nach erfolgtem Test können Sie die Schnittgeschwindigkeit bzw. die Vorschubwerte entsprechend erhöhen.*
- *Bitte verwenden Sie nur Spannmittel mit einer hohen Genauigkeit und einer hohen Spannkraft. Überprüfen Sie den Rundlauf der Werkzeuge. Sie sollten darauf achten, dass der Rundlauffehler nicht größer als 0.01mm ist.*
- *Bei Fräsoperationen, die mit einer a_p=1*d_1 durchgeführt werden, ist f_z um 25% zu reduzieren.*
- *Empfohlene Fräsmethode: Gleichlauffräsen*

Recommended cutting data · Empfohlene Schnittdaten

Type *Typ*	Grade *Sorte*	Material *Werkstoffe*		d_1 (mm)	z	Vc (m/min)	f_z (mm/z)	a_p (mm)	a_e (mm)	n (min^{-1})	V_f (mm/min)
5589R45MGFR	KMG405	P	Steel *Stahl* HRC<30	6.00	6	130	0.011	15.00	0.30	6890	455
				8.00	6	130	0.016	20.00	0.40	5170	496
				10.00	6	130	0.021	25.00	0.50	4130	520
				12.00	6	130	0.026	30.00	0.60	3440	537
				16.00	8	130	0.032	40.00	0.80	2580	660
				20.00	10	130	0.038	50.00	1.00	2060	783
		P	Steel, steel alloy *Stahl, legierter Stahl* HRC=30-48	6.00	6	90	0.011	15.00	0.30	4770	315
				8.00	6	90	0.016	20.00	0.40	3580	344
				10.00	6	90	0.021	25.00	0.50	2860	360
				12.00	6	90	0.026	30.00	0.60	2380	371
				16.00	8	90	0.032	40.00	0.80	1790	458
				20.00	10	90	0.038	50.00	1.00	1430	543
		P	High alloys steel *Hoch legierter Stahl*	6.00	6	50	0.011	15.00	0.30	2650	175
				8.00	6	50	0.016	20.00	0.40	1980	190
				10.00	6	50	0.021	25.00	0.50	1590	200
				12.00	6	50	0.026	30.00	0.60	1320	206
				16.00	8	50	0.032	40.00	0.80	990	253
				20.00	10	50	0.038	50.00	1.00	790	300
		K	Cast iron *Guss*	6.00	6	100	0.011	15.00	0.30	5300	350
				8.00	6	100	0.016	20.00	0.40	3970	381
				10.00	6	100	0.021	25.00	0.50	3180	401
				12.00	6	100	0.026	30.00	0.60	2650	413
				16.00	8	100	0.032	40.00	0.80	1980	507
				20.00	10	100	0.038	50.00	1.00	1590	604
		H	Hard steel *Gehärteter Stahl* HRC=48-54	6.00	6	60	0.011	15.00	0.30	3180	210
				8.00	6	60	0.016	20.00	0.40	2380	228
				10.00	6	60	0.021	25.00	0.50	1900	239
				12.00	6	60	0.026	30.00	0.60	1590	248
				16.00	8	60	0.032	40.00	0.80	1190	305
				20.00	10	60	0.038	50.00	1.00	950	361





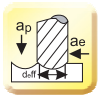
- Please start a test cutting with 85% of the Vc or 75% of the fz, then increase the cutting speed and feed rate.
- Please use high precision and high rigidity clamping system. The oscillation of the tool can not be over 0.01 mm.
- When $a_p=1*d_1$, f_z =50% as the data in the table
- Recommended operation: climb milling

- Bitte führen Sie einen Testschnitt mit 85% der Vc und 75% des fz durch.
Nach erfolgtem Test können Sie die Schnittgeschwindigkeit bzw. die Vorschubwerte entsprechend erhöhen.
- Bitte verwenden Sie nur Spannmittel mit einer hohen Genauigkeit und einer hohen Spannkraft.
Überprüfen Sie den Rundlauf der Werkzeuge. Sie sollten darauf achten, dass der Rundlauffehler nicht größer als 0.01mm ist.
- Bei Fräsoperationen, die mit einer $a_p=1*d_1$ durchgeführt werden, ist f_z um 50% zu reduzieren.
- Empfohlene Fräsmethode: Gleichlauffräsen

Recommended cutting data · Empfohlene Schnittdaten

Type *Typ*	Grade *Sorte*		Material *Werkstoffe*	d_1 (mm)	z	Vc (m/min)	f_z (mm/z)	a_p (mm)	a_e (mm)	d_{eff} (mm)	n (min^{-1})	V_f (mm/min)
5565R302GF	KMG303	P	Steel *Stahl* HRC=24-30	3.00	2	225	0.060	0.09	0.18	1.02		
5665R202GM	KMG303			4.00	2	225	0.080	0.12	0.24	1.36		
				5.00	2	225	0.100	0.15	0.30	1.71		
				6.00	2	225	0.120	0.18	0.36	2.05		
				8.00	2	225	0.120	0.24	0.48	2.73		
				10.00	2	225	0.150	0.30	0.60	3.41		
				12.00	2	225	0.180	0.36	0.72	4.09		
				16.00	2	225	0.160	0.48	0.96	5.46		
			Steel *Stahl* HRC=32-42	3.00	2	200	0.060	0.09	0.18	1.02		
				4.00	2	200	0.080	0.12	0.24	1.36		
				5.00	2	200	0.100	0.15	0.30	1.71		
				6.00	2	200	0.120	0.18	0.36	2.05		
				8.00	2	200	0.120	0.24	0.48	2.73		
				10.00	2	200	0.150	0.30	0.60	3.41		
				12.00	2	200	0.180	0.36	0.72	4.09		
				16.00	2	200	0.160	0.48	0.96	5.46		
			Steel *Stahl* HRC=42-48	3.00	2	180	0.060	0.09	0.18	1.02		
				4.00	2	180	0.080	0.12	0.24	1.36		
				5.00	2	180	0.100	0.15	0.30	1.71		
				6.00	2	180	0.120	0.18	0.36	2.05		
				8.00	2	180	0.120	0.24	0.48	2.73		
				10.00	2	180	0.150	0.30	0.60	3.41		
				12.00	2	180	0.180	0.36	0.72	4.09		
				16.00	2	180	0.160	0.48	0.96	5.46		
		K	Cast iron *Guss*	3.00	2	250	0.060	0.09	0.18	1.02		
				4.00	2	250	0.080	0.12	0.24	1.36		
				5.00	2	250	0.100	0.15	0.30	1.71		
				6.00	2	250	0.120	0.18	0.36	2.05		
				8.00	2	250	0.120	0.24	0.48	2.73		
				10.00	2	250	0.150	0.30	0.60	3.41		
				12.00	2	250	0.180	0.36	0.72	4.09		
				16.00	2	250	0.160	0.48	0.96	5.46		





- Please start a test cutting with 85% of the Vc or 75% of the fz, then increase the cutting speed and feed rate.
- Please use high precision and high rigidity clamping system. The oscillation of the tool can not be over 0.01 mm.

N = 1000Vc / d_{eff} / 3.14159

When the rotating speed of the machine on site cannot reach the maximum rotation speed of the machine used for the calculation of the rotation speed: $V_f = f_z * n * z$ (n:actual rotation of the machine)

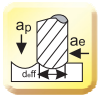
- *Bitte führen Sie einen Testschnitt mit 85% der Vc und 75% des fz durch.*
  Nach erfolgtem Test können Sie die Schnittgeschwindigkeit bzw. die Vorschubwerte entsprechend erhöhen.
- *Bitte verwenden Sie nur Spannmittel mit einer hohen Genauigkeit und einer hohen Spannkraft.*
  Überprüfen Sie den Rundlauf der Werkzeuge. Sie sollten darauf achten, dass der Rundlauffehler nicht größer als 0.01mm ist.

Sollten Sie aufgrund der Maschinendrehzahl nicht in der Lage sein, die angegebenen Drehzahlen einzuhalten, achten Sie darauf, dass Sie die Vf entsprechend anpassen. $V_f = f_z * n * z$ *(n: aktuelle Maschinendrehzahl)*

Recommended cutting data · Empfohlene Schnittdaten

Type *Typ*	Grade *Sorte*		Material *Werkstoffe*	d_1 (mm)	z	Vc (m/min)	f_z (mm/z)	a_p (mm)	a_e (mm)	d_{eff} (mm)	n (min^{-1})	V_f (mm/min)
5566R302GF	KMG303	P	Steel *Stahl* HRC=24-30	3.00	2	215	0.060	0.06	0.18	0.84		
				4.00	2	215	0.080	0.08	0.24	1.12		
				5.00	2	215	0.100	0.10	0.30	1.40		
				6.00	2	215	0.120	0.12	0.36	1.68		
				8.00	2	215	0.120	0.16	0.48	2.24		
				10.00	2	215	0.150	0.20	0.60	2.80		
				12.00	2	215	0.180	0.24	0.72	3.36		
			Steel *Stahl* HRC=32-42	3.00	2	190	0.060	0.06	0.18	0.84		
				4.00	2	190	0.080	0.08	0.24	1.12		
				5.00	2	190	0.100	0.10	0.30	1.40		
				6.00	2	190	0.120	0.12	0.36	1.68		
				8.00	2	190	0.120	0.16	0.48	2.24		
				10.0	2	190	0.150	0.20	0.60	2.80		
				12.00	2	190	0.180	0.24	0.72	3.36		
			Steel *Stahl* HRC=42-48	3.00	2	160	0.060	0.06	0.18	0.84		
				4.00	2	160	0.080	0.08	0.24	1.12		
				5.00	2	160	0.100	0.10	0.30	1.40		
				6.00	2	160	0.120	0.12	0.36	1.68		
				8.00	2	160	0.120	0.16	0.48	2.24		
				10.00	2	160	0.150	0.20	0.60	2.80		
				12.00	2	160	0.180	0.24	0.72	3.36		
		K	Cast iron *Guss*	3.00	2	230	0.060	0.06	0.18	0.84		
				4.00	2	230	0.080	0.08	0.24	1.12		
				5.00	2	230	0.100	0.10	0.30	1.40		
				6.00	2	230	0.120	0.12	0.36	1.68		
				8.00	2	230	0.120	0.16	0.48	2.24		
				10.00	2	230	0.150	0.20	0.60	2.80		
				12.00	2	230	0.180	0.24	0.72	3.36		





- Please start a test cutting with 85% of the Vc or 75% of the fz, then increase the cutting speed and feed rate.
- Please use high precision and high rigidity clamping system. The oscillation of the tool can not be over 0.01 mm.

$N = 1000Vc / d_{eff} / 3.14159$

When the rotating speed of the machine on site cannot reach the maximum rotation speed of the machine used for the calculation of the rotation speed: $V_f = f_z * n * z$ (n:actual rotation of the machine)

- *Bitte führen Sie einen Testschnitt mit 85% der Vc und 75% des fz durch.*
  Nach erfolgtem Test können Sie die Schnittgeschwindigkeit bzw. die Vorschubwerte entsprechend erhöhen.
- *Bitte verwenden Sie nur Spannmittel mit einer hohen Genauigkeit und einer hohen Spannkraft.*
  Überprüfen Sie den Rundlauf der Werkzeuge. Sie sollten darauf achten, dass der Rundlauffehler nicht größer als 0.01mm ist.

Sollten Sie aufgrund der Maschinendrehzahl nicht in der Lage sein, die angegebenen Drehzahlen einzuhalten, achten Sie darauf, dass Sie die Vf entsprechend anpassen. $V_f = f_z * n * z$ *(n: aktuelle Maschinendrehzahl)*

Recommended cutting data · Empfohlene Schnittdaten

Type *Typ*	Grade *Sorte*		Material *Werkstoffe*	d_1 (mm)	z	Vc (m/min)	f_z (mm/z)	a_p (mm)	a_e (mm)	n (min^{-1})	V_f (mm/min)
5502R402NM	YK30F	N	Al	6.00	2	350	0.080	9	1.50	18560	2970
				8.00	2	350	0.100	12	2.00	13920	2784
				10.00	2	350	0.120	15	2.50	11140	2674
				12.00	2	350	0.140	18	3.00	9280	2598
				16.00	2	350	0.180	24	4.00	6960	2506
				20.00	2	350	0.220	30	5.00	5570	2451
			Forged aluminum alloy *Geschmiedete Al-Legierung* Cast aluminum alloy *Al-Gusslegierung* Si<6%	6.00	2	900	0.080	9	1.50	47740	7638
				8.00	2	900	0.100	12	2.00	35800	7160
				10.00	2	900	0.120	15	2.50	28640	6874
				12.00	2	900	0.140	18	3.00	23870	6684
				16.00	2	900	0.180	24	4.00	17900	6444
				20.00	2	900	0.220	30	5.00	14320	6301
			Copper *Kupfer*	6.00	2	550	0.080	9	1.50	29170	4667
				8.00	2	550	0.100	12	2.00	21880	4376
				10.00	2	550	0.120	15	2.50	17500	4200
				12.00	2	550	0.140	18	3.00	14580	4082
				16.00	2	550	0.180	24	4.00	10940	3938
				20.00	2	550	0.220	30	5.00	8750	3850
			Plastic *Kunststoff*	6.00	2	1200	0.080	9	1.50	60000	9600
				8.00	2	1200	0.100	12	2.00	47740	9548
				10.00	2	1200	0.120	15	2.50	38190	9166
				12.00	2	1200	0.140	18	3.00	31830	8912
				16.00	2	1200	0.180	24	4.00	23870	8593
				20.00	2	1200	0.220	30	5.00	19090	8400





- Please start a test cutting with 85% of the Vc or 75% of the fz, then increase the cutting speed and feed rate.
- Please use high precision and high rigidity clamping system. The oscillation of the tool can not be over 0.01 mm.
  N = 1000Vc / d_{eff} / 3.14159
  When the rotating speed of the machine on site cannot reach the maximum rotation speed of the machine used for the calculation of the rotation speed: $V_f = f_z * n * z$ (n:actual rotation of the machine)
- When a_p=1*d_1, f_z =75% as the data in the table

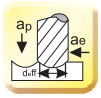
- Bitte führen Sie einen Testschnitt mit 85% der Vc und 75% des fz durch.
Nach erfolgtem Test können Sie die Schnittgeschwindigkeit bzw. die Vorschubwerte entsprechend erhöhen.
- Bitte verwenden Sie nur Spannmittel mit einer hohen Genauigkeit und einer hohen Spannkraft.
Überprüfen Sie den Rundlauf der Werkzeuge. Sie sollten darauf achten, dass der Rundlauffehler nicht größer als 0.01mm ist.

Sollten Sie aufgrund der Maschinendrehzahl nicht in der Lage sein, die angegebenen Drehzahlen einzuhalten, achten Sie darauf, dass Sie die Vf entsprechend anpassen. $V_f = f_z * n * z$ *(n: aktuelle Maschinendrehzahl)*
*- Bei Fräsoperationen, die mit einer a_p=1*d_1 durchgeführt werden, ist f_z um 25% zu reduzieren.*

Recommended cutting data · Empfohlene Schnittdaten

Type *Typ*	Grade *Sorte*		Material *Werkstoffe*	d_1 (mm)	z	Vc (m/min)	f_z (mm/z)	a_p (mm)	a_e (mm)	d_{eff} (mm)	n (min^{-1})	V_f (mm/min)
5565R302NH	YK40F	N	Forged aluminum alloy *Geschmiedete Al-Legierung* Cast aluminum alloy *Al-Gusslegierung* Si<6%	3.00	2	900	0.060	0.30	0.60	1.80		
				4.00	2	900	0.080	0.40	0.80	2.40		
				5.00	2	900	0.100	0.50	1.00	3.00		
				6.00	2	900	0.120	0.60	1.20	3.60		
				8.00	2	900	0.150	0.80	1.60	4.80		
				10.00	2	900	0.140	1.00	2.00	6.00		
				12.00	2	900	0.170	1.20	2.40	7.20		
				16.00	2	900	0.210	1.60	3.20	9.60		
			Copper *Kupfer*	3.00	2	600	0.060	0.30	0.60	1.80		
				4.00	2	600	0.080	0.40	0.80	2.40		
				5.00	2	600	0.100	0.50	1.00	3.00		
				6.00	2	600	0.120	0.60	1.20	3.60		
				8.00	2	600	0.150	0.80	1.60	4.80		
				10.00	2	600	0.140	1.00	2.00	6.00		
				12.00	2	600	0.170	1.20	2.40	7.20		
				16.00	2	600	0.210	1.60	3.20	9.60		
			Plastic *Kunststoff*	3.00	2	1200	0.060	0.30	0.60	1.80		
				4.00	2	1200	0.080	0.40	0.80	2.40		
				5.00	2	1200	0.100	0.50	1.00	3.00		
				6.00	2	1200	0.120	0.60	1.20	3.60		
				8.00	2	1200	0.150	0.80	1.60	4.80		
				10.00	2	1200	0.140	1.00	2.00	6.00		
				12.00	2	1200	0.170	1.20	2.40	7.20		
				16.00	2	1200	0.210	1.60	3.20	9.60		





- Please start a test cutting with 85% of the Vc or 75% of the fz, then increase the cutting speed and feed rate.
- Please use high precision and high rigidity clamping system. The oscillation of the tool can not be over 0.01 mm.

N = 1000Vc / d_{eff} / 3.14159

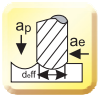
When the rotating speed of the machine on site cannot reach the maximum rotation speed of the machine used for the calculation of the rotation speed: $V_f = f_z * n * z$ (n:actual rotation of the machine)

- *Bitte führen Sie einen Testschnitt mit 85% der Vc und 75% des fz durch.*
  Nach erfolgtem Test können Sie die Schnittgeschwindigkeit bzw. die Vorschubwerte entsprechend erhöhen.
- *Bitte verwenden Sie nur Spannmittel mit einer hohen Genauigkeit und einer hohen Spannkraft.*
  Überprüfen Sie den Rundlauf der Werkzeuge. Sie sollten darauf achten, dass der Rundlauffehler nicht größer als 0.01mm ist.

Sollten Sie aufgrund der Maschinendrehzahl nicht in der Lage sein, die angegebenen Drehzahlen einzuhalten, achten Sie darauf, dass Sie die Vf entsprechend anpassen. $V_f = f_z * n * z$ *(n: aktuelle Maschinendrehzahl)*

Recommended cutting data · Empfohlene Schnittdaten

Type *Typ*	Grade *Sorte*		Material *Werkstoffe*	d_1 (mm)	z	Vc (m/min)	f_z (mm/z)	a_p (mm)	a_e (mm)	d_{eff} (mm)	n (min^{-1})	V_f (mm/min)
5566R302NH	YK40F	N	Forged aluminum alloy *Geschmiedete Al-Legierung* Cast aluminum alloy *Al-Gusslegierung* Si<6%	3.00	2	650	0.060	0.15	0.30	1.31		
				4.00	2	650	0.080	0.20	0.40	1.74		
				5.00	2	650	0.100	0.25	0.50	2.18		
				6.00	2	650	0.090	0.30	0.60	2.62		
				8.00	2	650	0.120	0.40	0.80	3.49		
				10.00	2	650	0.150	0.50	1.00	4.36		
				12.00	2	650	0.120	0.60	1.20	5.23		
				16.00	2	650	0.160	0.80	1.60	6.97		
			Copper *Kupfer*	3.00	2	480	0.060	0.15	0.30	1.31		
				4.00	2	480	0.080	0.20	0.40	1.74		
				5.00	2	480	0.100	0.25	0.50	2.18		
				6.00	2	480	0.090	0.30	0.60	2.62		
				8.00	2	480	0.120	0.40	0.80	3.49		
				10.00	2	480	0.150	0.50	1.00	4.36		
				12.00	2	480	0.120	0.60	1.20	5.23		
				16.00	2	480	0.160	0.80	1.60	6.97		
			Plastic *Kunststoff*	3.00	2	950	0.060	0.15	0.30	1.31		
				4.00	2	950	0.080	0.20	0.40	1.74		
				5.00	2	950	0.100	0.25	0.50	2.18		
				6.00	2	950	0.090	0.30	0.60	2.62		
				8.00	2	950	0.120	0.40	0.80	3.49		
				10.00	2	950	0.150	0.50	1.00	4.36		
				12.00	2	950	0.120	0.60	1.20	5.23		
				16.00	2	950	0.160	0.80	1.60	6.97		



- Please start a test cutting with 85% of the Vc or 75% of the fz, then increase the cutting speed and feed rate.
- Please use high precision and high rigidity clamping system. The oscillation of the tool can not be over 0.01 mm.
  N = 1000Vc / d_{eff} / 3.14159
  When the rotating speed of the machine on site cannot reach the maximum rotation speed of the machine used for the calculation of the rotation speed: $V_f = f_z * n * z$ (n:actual rotation of the machine)

- *Bitte führen Sie einen Testschnitt mit 85% der Vc und 75% des fz durch.*
  Nach erfolgtem Test können Sie die Schnittgeschwindigkeit bzw. die Vorschubwerte entsprechend erhöhen.
- *Bitte verwenden Sie nur Spannmittel mit einer hohen Genauigkeit und einer hohen Spannkraft.*
  Überprüfen Sie den Rundlauf der Werkzeuge. Sie sollten darauf achten, dass der Rundlauffehler nicht größer als 0.01mm ist.

Sollten Sie aufgrund der Maschinendrehzahl nicht in der Lage sein, die angegebenen Drehzahlen einzuhalten, achten Sie darauf, dass Sie die Vf entsprechend anpassen. $V_f = f_z * n * z$ *(n: aktuelle Maschinendrehzahl)*

Recommended cutting data · Empfohlene Schnittdaten

Type *Typ*	Grade *Sorte*	Material *Werkstoffe*		d_1 (mm)	z	Vc (m/min)	f_z (mm/z)	a_p (mm)	a_e (mm)	n (min^{-1})	V_f (mm/min)
5585R302NHR	YK40F	N	Forged aluminum alloy *Geschmiedete Al-Legierung* Cast aluminum alloy *Al-Gusslegierung* Si<6%	6.00	2	900	0.080	6.00	3.00		
				8.00	2	900	0.075	8.00	4.00		
				10.00	2	900	0.125	10.00	5.00		
				12.00	2	900	0.150	12.00	6.00		
				16.00	2	900	0.160	16.00	8.00		
				20.00	2	900	0.230	20.00	10.00		
			Copper *Kupfer*	6.00	2	600	0.080	9.00	3.00		
				8.00	2	600	0.075	12.00	4.00		
				10.00	2	600	0.125	15.00	5.00		
				12.00	2	600	0.150	18.00	6.00		
				16.00	2	600	0.160	24.00	8.00		
				20.00	2	600	0.230	30.00	10.00		
			Plastic *Kunststoff*	6.00	2	1200	0.080	9.00	3.00		
				8.00	2	1200	0.075	12.00	4.00		
				10.00	2	1200	0.125	15.00	5.00		
				12.00	2	1200	0.150	18.00	6.00		
				16.00	2	1200	0.160	24.00	8.00		
				20.00	2	1200	0.230	30.00	10.00		





- Please start a test cutting with 85% of the Vc or 75% of the fz, then increase the cutting speed and feed rate.
- Please use high precision and high rigidity clamping system. The oscillation of the tool can not be over 0.01 mm.

N = 1000Vc / d_{eff} / 3.14159

When the rotating speed of the machine on site cannot reach the maximum rotation speed of the machine used for the calculation of the rotation speed: $V_f = f_z * n * z$ (n:actual rotation of the machine)

- *Bitte führen Sie einen Testschnitt mit 85% der Vc und 75% des fz durch.*
  Nach erfolgtem Test können Sie die Schnittgeschwindigkeit bzw. die Vorschubwerte entsprechend erhöhen.
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  Überprüfen Sie den Rundlauf der Werkzeuge. Sie sollten darauf achten, dass der Rundlauffehler nicht größer als 0.01mm ist.

Sollten Sie aufgrund der Maschinendrehzahl nicht in der Lage sein, die angegebenen Drehzahlen einzuhalten, achten Sie darauf, dass Sie die Vf entsprechend anpassen. $V_f = f_z * n * z$ *(n: aktuelle Maschinendrehzahl)*

Recommended cutting data · Empfohlene Schnittdaten

Type *Typ*	Grade *Sorte*	Material *Werkstoffe*		d_1 (mm)	z	Vc (m/min)	f_z (mm/z)	a_p (mm)	a_e (mm)	n (min^{-1})	V_f (mm/min)
5586R302NHR	YK40F	N	Forged aluminum alloy *Geschmiedete Al-Legierung* Cast aluminum alloy *Al-Gusslegierung* Si<6%	6.00	2	650	0.055	1.50	3.00		
				8.00	2	650	0.070	2.00	4.00		
				10.00	2	650	0.090	2.50	5.00		
				12.00	2	650	0.120	3.00	6.00		
				16.00	2	650	0.160	4.00	8.00		
				20.00	2	650	0.230	5.00	10.00		
			Copper *Kupfer*	6.00	2	480	0.055	1.50	3.00		
				8.00	2	480	0.070	2.00	4.00		
				10.00	2	480	0.090	2.50	5.00		
				12.00	2	480	0.120	3.00	6.00		
				16.00	2	480	0.160	4.00	8.00		
				20.00	2	480	0.230	5.00	10.00		
			Plastic *Kunststoff*	6.00	2	950	0.055	1.50	3.00		
				8.00	2	950	0.070	2.00	4.00		
				10.00	2	950	0.090	2.50	5.00		
				12.00	2	950	0.120	3.00	6.00		
				16.00	2	950	0.160	4.00	8.00		
				20.00	2	950	0.230	5.00	10.00		





- Please start a test cutting with 85% of the Vc or 75% of the fz, then increase the cutting speed and feed rate.
- Please use high precision and high rigidity clamping system. The oscillation of the tool can not be over 0.01 mm.

$N = 1000Vc / d_{eff} / 3.14159$

When the rotating speed of the machine on site cannot reach the maximum rotation speed of the machine used for the calculation of the rotation speed: $V_f = f_z * n * z$ (n:actual rotation of the machine)

- *Bitte führen Sie einen Testschnitt mit 85% der Vc und 75% des fz durch.*
  Nach erfolgtem Test können Sie die Schnittgeschwindigkeit bzw. die Vorschubwerte entsprechend erhöhen.
- *Bitte verwenden Sie nur Spannmittel mit einer hohen Genauigkeit und einer hohen Spannkraft.*
  Überprüfen Sie den Rundlauf der Werkzeuge. Sie sollten darauf achten, dass der Rundlauffehler nicht größer als 0.01mm ist.

Sollten Sie aufgrund der Maschinendrehzahl nicht in der Lage sein, die angegebenen Drehzahlen einzuhalten, achten Sie darauf, dass Sie die Vf entsprechend anpassen. $V_f = f_z * n * z$ *(n: aktuelle Maschinendrehzahl)*

Recommended cutting data · Empfohlene Schnittdaten

Type *Typ*	Grade *Sorte*	Material *Werkstoffe*		d1 (mm)	z	Vc (m/min)	fz (mm/z)	ap (mm)	ae (mm)	deff (mm)	n (min-1)	Vf (mm/min)
5565R302GH	KMG405	P	Steel, steel alloy *Stahl, legierter Stahl* HRC=42-48	3.00	2	220	0.060	0.09	0.18	1.02		
				4.00	2	220	0.080	0.12	0.24	1.36		
				5.00	2	220	0.100	0.15	0.30	1.71		
				6.00	2	220	0.090	0.18	0.36	2.05		
				8.00	2	220	0.120	0.24	0.48	2.73		
				10.00	2	220	0.150	0.30	0.60	3.41		
				12.00	2	220	0.120	0.36	0.72	4.09		
				16.00	2	220	0.120	0.48	0.96	5.46		
		K	Cast iron *Guss*	3.00	2	280	0.060	0.09	0.18	1.02		
				4.00	2	280	0.080	0.12	0.24	1.36		
				5.00	2	280	0.100	0.15	0.30	1.71		
				6.00	2	280	0.090	0.18	0.36	2.05		
				8.00	2	280	0.120	0.24	0.48	2.73		
				10.00	2	280	0.150	0.30	0.60	3.41		
				12.00	2	280	0.120	0.36	0.72	4.09		
				16.00	2	280	0.120	0.48	0.96	5.46		
		H	Steel, steel alloy *Stahl, legierter Stahl* HRC=48-54	3.00	2	180	0.060	0.09	0.18	1.02		
				4.00	2	180	0.080	0.12	0.24	1.36		
				5.00	2	180	0.100	0.15	0.30	1.71		
				6.00	2	180	0.090	0.18	0.36	2.05		
				8.00	2	180	0.120	0.24	0.48	2.73		
				10.00	2	180	0.150	0.30	0.60	3.41		
				12.00	2	180	0.120	0.36	0.72	4.09		
				16.00	2	180	0.120	0.48	0.96	5.46		
			Hard steel *Gehärteter Stahl* HRC>60	3.00	2	80	0.060	0.09	0.18	1.02		
				4.00	2	80	0.080	0.12	0.24	1.36		
				5.00	2	80	0.100	0.15	0.30	1.71		
				6.00	2	80	0.090	0.18	0.36	2.05		
				8.00	2	80	0.120	0.24	0.48	2.73		
				10.00	2	80	0.150	0.30	0.60	3.41		
				12.00	2	80	0.120	0.36	0.72	4.09		
				16.00	2	80	0.120	0.48	0.96	5.46		





- Please start a test cutting with 85% of the Vc or 75% of the fz, then increase the cutting speed and feed rate.
- Please use high precision and high rigidity clamping system. The oscillation of the tool can not be over 0.01 mm.

N = 1000Vc / deff / 3.14159
When the rotating speed of the machine on site cannot reach the maximum rotation speed of the machine used for the calculation of the rotation speed: $V_f = f_z * n * z$ (n:actual rotation of the machine)

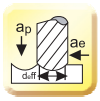
- *Bitte führen Sie einen Testschnitt mit 85% der Vc und 75% des fz durch.*
  Nach erfolgtem Test können Sie die Schnittgeschwindigkeit bzw. die Vorschubwerte entsprechend erhöhen.
- *Bitte verwenden Sie nur Spannmittel mit einer hohen Genauigkeit und einer hohen Spannkraft.*
  Überprüfen Sie den Rundlauf der Werkzeuge. Sie sollten darauf achten, dass der Rundlauffehler nicht größer als 0.01mm ist.

Sollten Sie aufgrund der Maschinendrehzahl nicht in der Lage sein, die angegebenen Drehzahlen einzuhalten, achten Sie darauf, dass Sie die Vf entsprechend anpassen. $V_f = f_z * n * z$ *(n: aktuelle Maschinendrehzahl)*

Recommended cutting data · Empfohlene Schnittdaten

Type *Typ*	Grade *Sorte*		Material *Werkstoffe*	d_1 (mm)	z	Vc (m/min)	f_z (mm/z)	a_p (mm)	a_e (mm)	d_{eff} (mm)	n (min^{-1})	V_f (mm/min)
5566R302GH	KMG405	P	Steel, steel alloy *Stahl, legierter Stahl* HRC=42-48	3.00	2	220	0.060	0.06	0.18	0.84		
				4.00	2	220	0.080	0.08	0.24	1.12		
				5.00	2	220	0.100	0.10	0.30	1.40		
				6.00	2	220	0.090	0.12	0.36	1.68		
				8.00	2	220	0.120	0.16	0.48	2.24		
				10.00	2	220	0.150	0.20	0.60	2.80		
				12.00	2	220	0.120	0.24	0.72	3.36		
		K	Cast iron *Guss*	3.00	2	280	0.060	0.06	0.18	0.84		
				4.00	2	280	0.080	0.08	0.24	1.12		
				5.00	2	280	0.100	0.10	0.30	1.40		
				6.00	2	280	0.090	0.12	0.36	1.68		
				8.00	2	280	0.120	0.16	0.48	2.24		
				10.00	2	280	0.150	0.20	0.60	2.80		
				12.00	2	280	0.120	0.24	0.72	3.36		
		H	Steel, steel alloy *Stahl, legierter Stahl* HRC=48-54	3.00	2	180	0.060	0.06	0.18	0.84		
				4.00	2	180	0.080	0.08	0.24	1.12		
				5.00	2	180	0.100	0.10	0.30	1.40		
				6.00	2	180	0.090	0.12	0.36	1.68		
				8.00	2	180	0.120	0.16	0.48	2.24		
				10.00	2	180	0.150	0.20	0.60	2.80		
				12.00	2	180	0.120	0.24	0.72	3.36		
			Hard steel *Gehärteter Stahl* HRC>60	3.00	2	80	0.060	0.06	0.18	0.84		
				4.00	2	80	0.080	0.08	0.24	1.12		
				5.00	2	80	0.100	0.10	0.30	1.40		
				6.00	2	80	0.090	0.12	0.36	1.68		
				8.00	2	80	0.120	0.16	0.48	2.24		
				10.00	2	80	0.150	0.20	0.60	2.80		
				12.00	2	80	0.120	0.24	0.72	3.36		





- Please start a test cutting with 85% of the Vc or 75% of the fz, then increase the cutting speed and feed rate.
- Please use high precision and high rigidity clamping system. The oscillation of the tool can not be over 0.01 mm.

N = 1000Vc / d_{eff} / 3.14159

When the rotating speed of the machine on site cannot reach the maximum rotation speed of the machine used for the calculation of the rotation speed: $V_f = f_z * n * z$ (n:actual rotation of the machine)

- *Bitte führen Sie einen Testschnitt mit 85% der Vc und 75% des fz durch.*
  Nach erfolgtem Test können Sie die Schnittgeschwindigkeit bzw. die Vorschubwerte entsprechend erhöhen.
- *Bitte verwenden Sie nur Spannmittel mit einer hohen Genauigkeit und einer hohen Spannkraft.*
  Überprüfen Sie den Rundlauf der Werkzeuge. Sie sollten darauf achten, dass der Rundlauffehler nicht größer als 0.01mm ist.

Sollten Sie aufgrund der Maschinendrehzahl nicht in der Lage sein, die angegebenen Drehzahlen einzuhalten, achten Sie darauf, dass Sie die Vf entsprechend anpassen. $V_f = f_z * n * z$ *(n: aktuelle Maschinendrehzahl)*

Recommended cutting data · Empfohlene Schnittdaten

Type *Typ*	Grade *Sorte*		Material *Werkstoffe*	d_1 (mm)	z	Vc (m/min)	f_z (mm/z)	a_p (mm)	a_e (mm)	n (min^{-1})	V_f (mm/min)
5585R304GHR	KMG405	P	Steel, steel alloy *Stahl, legierter Stahl* HRC<=48	6.00	4	170	0.120	0.30	0.80		
				8.00	4	170	0.150	0.40	0.90		
				10.00	4	170	0.140	0.50	1.00		
				12.00	4	170	0.170	0.60	1.10		
				16.00	4	170	0.210	0.80	1.20		
		K	Cast iron *Guss*	6.00	4	250	0.130	0.38	2.00		
				8.00	4	250	0.150	0.50	2.60		
				10.00	4	250	0.170	0.63	3.30		
				12.00	4	250	0.190	0.75	4.00		
				16.00	4	250	0.230	1.00	5.30		
		H	Steel, steel alloy *Stahl, legierter Stahl* HRC=48-52	6.00	4	150	0.120	0.30	0.80		
				8.00	4	150	0.150	0.40	0.90		
				10.00	4	150	0.140	0.50	1.00		
				12.00	4	150	0.170	0.60	1.10		
				16.00	4	150	0.210	0.80	1.20		
			Hard steel *Gehärteter Stahl* HRC=52-60	6.00	4	120	0.120	0.30	0.80		
				8.00	4	120	0.150	0.40	0.90		
				10.00	4	120	0.140	0.50	1.00		
				12.00	4	120	0.170	0.60	1.10		
				16.00	4	120	0.210	0.80	1.20		





- Please start a test cutting with 85% of the Vc or 75% of the fz, then increase the cutting speed and feed rate.
- Please use high precision and high rigidity clamping system. The oscillation of the tool can not be over 0.01 mm.
  N = 1000Vc / d_{eff} / 3.14159
  When the rotating speed of the machine on site cannot reach the maximum rotation speed of the machine used for the calculation of the rotation speed: $V_f = f_z * n * z$ (n:actual rotation of the machine)

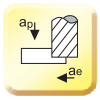
- *Bitte führen Sie einen Testschnitt mit 85% der Vc und 75% des fz durch.*
  Nach erfolgtem Test können Sie die Schnittgeschwindigkeit bzw. die Vorschubwerte entsprechend erhöhen.
- *Bitte verwenden Sie nur Spannmittel mit einer hohen Genauigkeit und einer hohen Spannkraft.*
  Überprüfen Sie den Rundlauf der Werkzeuge. Sie sollten darauf achten, dass der Rundlauffehler nicht größer als 0.01mm ist.

Sollten Sie aufgrund der Maschinendrehzahl nicht in der Lage sein, die angegebenen Drehzahlen einzuhalten, achten Sie darauf, dass Sie die Vf entsprechend anpassen. $V_f = f_z * n * z$ *(n: aktuelle Maschinendrehzahl)*

Recommended cutting data · Empfohlene Schnittdaten

Type *Typ*	Grade *Sorte*	Material *Werkstoffe*		d_1 (mm)	z	Vc (m/min)	f_z (mm/z)	a_p (mm)	a_e (mm)	n (min^{-1})	V_f (mm/min)
5586R304GHR	KMG405	P	Steel, steel alloy *Stahl, legierter Stahl* HRC<=48	6.00	4	170	0.120	0.15	0.80		
				8.00	4	170	0.150	0.20	0.90		
				10.00	4	170	0.140	0.25	1.00		
				12.00	4	170	0.170	0.30	1.10		
				16.00	4	170	0.210	0.40	1.20		
		K	Cast iron *Guss*	6.00	4	250	0.130	0.20	2.00		
				8.00	4	250	0.150	0.26	2.60		
				10.00	4	250	0.170	0.33	3.30		
				12.00	4	250	0.190	0.39	4.00		
				16.00	4	250	0.230	0.52	5.30		
		H	Steel, steel alloy *Stahl, legierter Stahl* HRC=48-52	6.00	4	150	0.120	0.15	0.80		
				8.00	4	150	0.150	0.20	0.90		
				10.00	4	150	0.140	0.25	1.00		
				12.00	4	150	0.170	0.30	1.10		
				16.00	4	150	0.210	0.40	1.20		
			Hard steel *Gehärteter Stahl* HRC=52-60	6.00	4	120	0.120	0.15	0.80		
				8.00	4	120	0.150	0.20	0.90		
				10.00	4	120	0.140	0.25	1.00		
				12.00	4	120	0.170	0.30	1.10		
				16.00	4	120	0.210	0.40	1.20		





- Please start a test cutting with 85% of the Vc or 75% of the fz, then increase the cutting speed and feed rate.
- Please use high precision and high rigidity clamping system. The oscillation of the tool can not be over 0.01 mm.

N = 1000Vc / d_{eff} / 3.14159

When the rotating speed of the machine on site cannot reach the maximum rotation speed of the machine used for the calculation of the rotation speed: $V_f = f_z * n * z$ (n:actual rotation of the machine)

- *Bitte führen Sie einen Testschnitt mit 85% der Vc und 75% des fz durch.*
  Nach erfolgtem Test können Sie die Schnittgeschwindigkeit bzw. die Vorschubwerte entsprechend erhöhen.
- *Bitte verwenden Sie nur Spannmittel mit einer hohen Genauigkeit und einer hohen Spannkraft.*
  Überprüfen Sie den Rundlauf der Werkzeuge. Sie sollten darauf achten, dass der Rundlauffehler nicht größer als 0.01mm ist.

Sollten Sie aufgrund der Maschinendrehzahl nicht in der Lage sein, die angegebenen Drehzahlen einzuhalten, achten Sie darauf, dass Sie die Vf entsprechend anpassen. $V_f = f_z * n * z$ *(n: aktuelle Maschinendrehzahl)*

Recommended cutting data · Empfohlene Schnittdaten

Type *Typ*	Grade *Sorte*	Material *Werkstoffe*		d_1 (mm)	z	Vc (m/min)	f_z (mm/z)	a_p (mm)	a_e (mm)	d_{eff} (mm)	n (min^{-1})	V_f (mm/min)
5565R302HH	KMG405	K	Cast iron *Guss*	3	2	280	0.060	0.09	0.18	1.02		
				4	2	280	0.080	0.12	0.24	1.36		
				5	2	280	0.100	0.15	0.30	1.71		
				6	2	280	0.090	0.18	0.36	2.05		
				8	2	280	0.120	0.24	0.48	2.73		
				10	2	280	0.150	0.30	0.60	3.41		
				12	2	280	0.120	0.36	0.72	4.09		
				16	2	280	0.120	0.48	0.96	5.46		
		H	Hard steel *Gehärteter Stahl* HRC=48-54	3	2	180	0.060	0.09	0.18	1.02		
				4	2	180	0.080	0.12	0.24	1.36		
				5	2	180	0.100	0.15	0.30	1.71		
				6	2	180	0.090	0.18	0.36	2.05		
				8	2	180	0.120	0.24	0.48	2.73		
				10	2	180	0.150	0.30	0.60	3.41		
				12	2	180	0.120	0.36	0.72	4.09		
				16	2	180	0.120	0.48	0.96	5.46		
			Hard steel *Gehärteter Stahl* HRC>60	3	2	80	0.060	0.09	0.18	1.02		
				4	2	80	0.080	0.12	0.24	1.36		
				5	2	80	0.100	0.15	0.30	1.71		
				6	2	80	0.090	0.18	0.36	2.05		
				8	2	80	0.120	0.24	0.48	2.73		
				10	2	80	0.150	0.30	0.60	3.41		
				12	2	80	0.120	0.36	0.72	4.09		
				16	2	80	0.120	0.48	0.96	5.46		





- Please start a test cutting with 85% of the Vc or 75% of the fz, then increase the cutting speed and feed rate.
- Please use high precision and high rigidity clamping system. The oscillation of the tool can not be over 0.01 mm.

$N = 1000Vc / d_{eff} / 3.14159$

When the rotating speed of the machine on site cannot reach the maximum rotation speed of the machine used for the calculation of the rotation speed: $V_f = f_z * n * z$ (n:actual rotation of the machine)

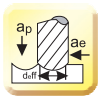
- *Bitte führen Sie einen Testschnitt mit 85% der Vc und 75% des fz durch.*
  Nach erfolgtem Test können Sie die Schnittgeschwindigkeit bzw. die Vorschubwerte entsprechend erhöhen.
- *Bitte verwenden Sie nur Spannmittel mit einer hohen Genauigkeit und einer hohen Spannkraft.*
  Überprüfen Sie den Rundlauf der Werkzeuge. Sie sollten darauf achten, dass der Rundlauffehler nicht größer als 0.01mm ist.

Sollten Sie aufgrund der Maschinendrehzahl nicht in der Lage sein, die angegebenen Drehzahlen einzuhalten, achten Sie darauf, dass Sie die Vf entsprechend anpassen. $V_f = f_z * n * z$ *(n: aktuelle Maschinendrehzahl)*

Recommended cutting data · Empfohlene Schnittdaten

Type *Typ*	Grade *Sorte*	Material *Werkstoffe*		d_1 (mm)	z	Vc (m/min)	f_z (mm/z)	a_p (mm)	a_e (mm)	d_{eff} (mm)	n (min^{-1})	V_f (mm/min)
5566R302HH	KMG405	K	Cast iron *Guss*	3	2	280	0.060	0.06	0.18	0.84		
5502R55MHH	KMG555			4	2	280	0.080	0.08	0.24	1.12		
				5	2	280	0.100	0.10	0.30	1.40		
				6	2	280	0.090	0.12	0.36	1.68		
				8	2	280	0.120	0.16	0.48	2.24		
				10	2	280	0.150	0.20	0.60	2.80		
				12	2	280	0.120	0.24	0.72	3.36		
		H	Hard steel *Gehärteter Stahl* HRC=48-54	3	2	180	0.060	0.06	0.18	0.84		
				4	2	180	0.080	0.08	0.24	1.12		
				5	2	180	0.100	0.10	0.30	1.40		
				6	2	180	0.090	0.12	0.36	1.68		
				8	2	180	0.120	0.16	0.48	2.24		
				10	2	180	0.150	0.20	0.60	2.80		
				12	2	180	0.120	0.24	0.72	3.36		
			Hard steel *Gehärteter Stahl* HRC>60	3	2	80	0.060	0.06	0.18	0.84		
				4	2	80	0.080	0.08	0.24	1.12		
				5	2	80	0.100	0.10	0.30	1.40		
				6	2	80	0.090	0.12	0.36	1.68		
				8	2	80	0.120	0.16	0.48	2.24		
				10	2	80	0.150	0.20	0.60	2.80		
				12	2	80	0.120	0.24	0.72	3.36		





- Please start a test cutting with 85% of the Vc or 75% of the fz, then increase the cutting speed and feed rate.
- Please use high precision and high rigidity clamping system. The oscillation of the tool can not be over 0.01 mm.

N = 1000Vc / d_{eff} / 3.14159

When the rotating speed of the machine on site cannot reach the maximum rotation speed of the machine used for the calculation of the rotation speed: $V_f = f_z * n * z$ (n:actual rotation of the machine)

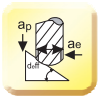
- *Bitte führen Sie einen Testschnitt mit 85% der Vc und 75% des fz durch.*
  Nach erfolgtem Test können Sie die Schnittgeschwindigkeit bzw. die Vorschubwerte entsprechend erhöhen.
- *Bitte verwenden Sie nur Spannmittel mit einer hohen Genauigkeit und einer hohen Spannkraft.*
  Überprüfen Sie den Rundlauf der Werkzeuge. Sie sollten darauf achten, dass der Rundlauffehler nicht größer als 0.01mm ist.

Sollten Sie aufgrund der Maschinendrehzahl nicht in der Lage sein, die angegebenen Drehzahlen einzuhalten, achten Sie darauf, dass Sie die Vf entsprechend anpassen. $V_f = f_z * n * z$ *(n: aktuelle Maschinendrehzahl)*

Recommended cutting data · Empfohlene Schnittdaten

Type *Typ*	Grade *Sorte*		Material *Werkstoffe*	d_1 (mm)	z	Vc (m/min)	f_z (mm/z)	a_p (mm)	a_e (mm)	d_{eff} (mm)	n (min^{-1})	V_f (mm/min)
5566R304HH	KMG405	P	Steel, steel alloy *Stahl, legierter Stahl* HRC=42-48	6.00	4	430	0.090	0.18	0.09	4.59		
				8.00	4	430	0.120	0.24	0.12	6.12		
				10.00	4	430	0.150	0.30	0.15	7.65		
				12.00	4	430	0.120	0.72	0.12	10.22		
		K	Cast iron *Guss*	6.00	4	550	0.090	0.18	0.09	4.59		
				8.00	4	550	0.120	0.24	0.12	6.12		
				10.00	4	550	0.150	0.30	0.15	7.65		
				12.00	4	550	0.120	0.72	0.12	10.22		
		H	Steel, steel alloy *Stahl, legierter Stahl* HRC=48-54	6.00	4	350	0.090	0.18	0.09	4.59		
				8.00	4	350	0.120	0.24	0.12	6.12		
				10.00	4	350	0.150	0.30	0.15	7.65		
				12.00	4	350	0.120	0.72	0.12	10.22		
			Hard steel *Gehärteter Stahl* HRC>60	6.00	4	100	0.090	0.18	0.09	4.59		
				8.00	4	100	0.120	0.24	0.12	6.12		
				10.00	4	100	0.150	0.30	0.15	7.65		
				12.00	4	100	0.120	0.72	0.12	10.22		





- Please start a test cutting with 85% of the Vc or 75% of the fz, then increase the cutting speed and feed rate.
- Please use high precision and high rigidity clamping system. The oscillation of the tool can not be over 0.01 mm.

N = 1000Vc / d_{eff} / 3.14159

When the rotating speed of the machine on site cannot reach the maximum rotation speed of the machine used for the calculation of the rotation speed: $V_f = f_z * n * z$ (n:actual rotation of the machine)

- *Bitte führen Sie einen Testschnitt mit 85% der Vc und 75% des fz durch. Nach erfolgtem Test können Sie die Schnittgeschwindigkeit bzw. die Vorschubwerte entsprechend erhöhen.*
- *Bitte verwenden Sie nur Spannmittel mit einer hohen Genauigkeit und einer hohen Spannkraft. Überprüfen Sie den Rundlauf der Werkzeuge. Sie sollten darauf achten, dass der Rundlauffehler nicht größer als 0.01mm ist.*

Sollten Sie aufgrund der Maschinendrehzahl nicht in der Lage sein, die angegebenen Drehzahlen einzuhalten, achten Sie darauf, dass Sie die Vf entsprechend anpassen. $V_f = f_z * n * z$ *(n: aktuelle Maschinendrehzahl)*

Recommended cutting data · Empfohlene Schnittdaten

Type *Typ*	Grade *Sorte*	Material *Werkstoffe*		d_1 (mm)	z	Vc (m/min)	f_z (mm/z)	a_p (mm)	a_e (mm)	n (min^{-1})	V_f (mm/min)
5502R55MHH	KMG405	P	Steel, steel alloy *Stahl, legierter Stahl* HRC=42-48	3.00	4	150	0.010	4.50	0.10		
				4.00	4	150	0.015	6.00	0.10		
				5.00	5	150	0.020	7.50	0.10		
				6.00	6	150	0.025	9.00	0.10		
				8.00	6	150	0.032	12.00	0.10		
				10.00	6	150	0.039	15.00	0.10		
				12.00	6	150	0.048	18.00	0.10		
				16.00	6	150	0.058	24.00	0.20		
				20.00	8	150	0.073	30.00	0.20		
		H	Steel, steel alloy *Stahl, legierter Stahl* HRC=48-54	3.00	4	80	0.010	4.50	0.10		
				4.00	4	80	0.015	6.00	0.10		
				5.00	5	80	0.020	7.50	0.10		
				6.00	6	80	0.025	9.00	0.10		
				8.00	6	80	0.032	12.00	0.10		
				10.00	6	80	0.039	15.00	0.10		
				12.00	6	80	0.048	18.00	0.10		
				16.00	6	80	0.058	24.00	0.20		
				20.00	8	80	0.073	30.00	0.20		
			Hard steel *Gehärteter Stahl* HRC>60	3.00	4	30	0.010	4.50	0.10		
				4.00	4	30	0.010	6.00	0.10		
				5.00	5	30	0.014	7.50	0.10		
				6.00	6	30	0.017	9.00	0.10		
				8.00	6	30	0.024	12.00	0.10		
				10.00	6	30	0.030	15.00	0.10		
				12.00	6	30	0.036	18.00	0.10		
				16.00	6	30	0.045	24.00	0.20		
				20.00	8	30	0.057	30.00	0.20		





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- Please use high precision and high rigidity clamping system. The oscillation of the tool can not be over 0.01 mm.

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When the rotating speed of the machine on site cannot reach the maximum rotation speed of the machine used for the calculation of the rotation speed: $V_f = f_z * n * z$ (n:actual rotation of the machine)

- *Bitte führen Sie einen Testschnitt mit 85% der Vc und 75% des fz durch.*
  Nach erfolgtem Test können Sie die Schnittgeschwindigkeit bzw. die Vorschubwerte entsprechend erhöhen.
- *Bitte verwenden Sie nur Spannmittel mit einer hohen Genauigkeit und einer hohen Spannkraft.*
  Überprüfen Sie den Rundlauf der Werkzeuge. Sie sollten darauf achten, dass der Rundlauffehler nicht größer als 0.01mm ist.

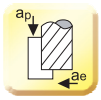
Sollten Sie aufgrund der Maschinendrehzahl nicht in der Lage sein, die angegebenen Drehzahlen einzuhalten, achten Sie darauf, dass Sie die Vf entsprechend anpassen. $V_f = f_z * n * z$ *(n: aktuelle Maschinendrehzahl)*

Recommended cutting data · Empfohlene Schnittdaten

Type *Typ*	Grade *Sorte*	Material *Werkstoffe*		d_1 (mm)	z	r (mm)	Vc (m/min)	f_z (mm/z)	a_p (mm)	a_e (mm)	n (min^{-1})	V_f (mm/min)
5585R554HHR	KMG405	P	Steel, steel alloy *Stahl, legierter Stahl* HRC=40-48	6	4	1.5	150	0.120	0.30	1.5	7950	3816
				8	4	2.0	150	0.150	0.40	4.0	5960	3576
				10	4	2.5	150	0.140	0.50	5.0	4770	2671
				12	4	3.0	150	0.170	0.60	6.0	3970	2700
				16	4	4.0	150	0.210	0.80	8.0	2980	2503
		H	Hard steel *Gehärteter Stahl* HRC=50-54	6	4	1.5	120	0.120	0.30	1.5	6360	3053
				8	4	2.0	120	0.150	0.40	4.0	4770	2862
				10	4	2.5	120	0.140	0.50	5.0	3810	2134
				12	4	3.0	120	0.170	0.60	6.0	3180	2162
				16	4	4.0	120	0.210	0.80	8.0	2380	1999
		H	Hard steel *Gehärteter Stahl* HRC>60	6	4	1.5	50	0.12	0.3	0.6	2653	1273
				8	4	2.0	50	0.15	0.4	0.8	1989	1194
				10	4	2.5	50	0.14	0.5	1.0	1592	891
				12	4	3.0	50	0.17	0.6	1.2	1326	902
				16	4	4.0	50	0.21	0.8	1.6	995	836
		P	Hard steel *Gehärteter Stahl* HRC=40-48	6	4	0.3	100	0.055	6	1.2	5305	1167
				8	4	0.3	100	0.075	8	1.6	3979	1194
				10	4	0.5	100	0.090	10	2.0	3183	1146
				12	4	0.5	100	0.110	12	2.4	2653	1167
				16	4	1.0	100	0.145	16	3.2	1989	1154
		H	Hard steel *Gehärteter Stahl* HRC=50-54	6	4	0.3	50	0.055	6	1.2	2653	584
				8	4	0.3	50	0.075	8	1.6	1989	597
				10	4	0.5	50	0.090	10	2.0	1592	573
				12	4	0.5	50	0.110	12	2.4	1326	584
				16	4	1.0	50	0.145	16	3.2	995	577







- Please start a test cutting with 85% of the Vc or 75% of the fz, then increase the cutting speed and feed rate.
- Please use high precision and high rigidity clamping system. The oscillation of the tool can not be over 0.01 mm.
  N = 1000Vc / d_{eff} / 3.14159
  When the rotating speed of the machine on site cannot reach the maximum rotation speed of the machine used for the calculation of the rotation speed: $V_f = f_z * n * z$ (n:actual rotation of the machine)

- *Bitte führen Sie einen Testschnitt mit 85% der Vc und 75% des fz durch.*
  Nach erfolgtem Test können Sie die Schnittgeschwindigkeit bzw. die Vorschubwerte entsprechend erhöhen.
- *Bitte verwenden Sie nur Spannmittel mit einer hohen Genauigkeit und einer hohen Spannkraft.*
  Überprüfen Sie den Rundlauf der Werkzeuge. Sie sollten darauf achten, dass der Rundlauffehler nicht größer als 0.01mm ist.

Sollten Sie aufgrund der Maschinendrehzahl nicht in der Lage sein, die angegebenen Drehzahlen einzuhalten, achten Sie darauf, dass Sie die Vf entsprechend anpassen. $V_f = f_z * n * z$ *(n: aktuelle Maschinendrehzahl)*

Recommended cutting data · Empfohlene Schnittdaten

Type *Typ*	Grade *Sorte*	Material *Werkstoffe*		d1 (mm)	z	r (mm)	Vc (m/min)	fz (mm/z)	ap (mm)	ae (mm)	n (min-1)	Vf (mm/min)
5586R554HHR	KMG405	P	Steel, steel alloy *Stahl, legierter Stahl* HRC=40-48	6	4	1.5	120	0.120	0.3	1.5	6366	3056
				8	4	2.0	120	0.150	0.4	4.0	4775	2865
				10	4	2.5	120	0.140	0.5	5.0	3820	2139
				12	4	3.0	120	0.170	0.6	6.0	3183	2165
				16	4	4.0	120	0.210	0.8	8.0	2387	2005
		H	Hard steel *Gehärteter Stahl* HRC=50-54	6	4	1.5	100	0.120	0.3	1.5	5305	2546
				8	4	2.0	100	0.150	0.4	4.0	3979	2387
				10	4	2.5	100	0.140	0.5	5.0	3183	1783
				12	4	3.0	100	0.170	0.6	6.0	2653	1804
				16	4	4.0	100	0.210	0.8	8.0	1989	1671
			Hard steel *Gehärteter Stahl* HRC>60	6	4	1.5	40	0.120	0.3	1.5	2122	1019
				8	4	2.0	40	0.150	0.4	4.0	1592	955
				10	4	2.5	40	0.140	0.5	5.0	1273	713
				12	4	3.0	40	0.170	0.6	6.0	1061	722
				16	4	4.0	40	0.210	0.8	8.0	796	668
		P	Hard steel *Gehärteter Stahl* HRC=40-48	6	4	0.3	90	0.055	6	1.2	4775	1050
				8	4	0.3	90	0.075	8	1.6	3581	1074
				10	4	0.5	90	0.090	10	2.0	2865	1031
				12	4	0.5	90	0.110	12	2.4	2387	1050
				16	4	1.0	90	0.145	16	3.2	1790	1038
		H	Hard steel *Gehärteter Stahl* HRC=50-54	6	4	0.3	45	0.055	6	1.2	2387	525
				8	4	0.3	45	0.075	8	1.6	1790	537
				10	4	0.5	45	0.090	10	2.0	1432	516
				12	4	0.5	45	0.110	12	2.4	1194	525
				16	4	1.0	45	0.145	16	3.2	895	519

- Please start a test cutting with 85% of the Vc or 75% of the fz, then increase the cutting speed and feed rate.
- Please use high precision and high rigidity clamping system. The oscillation of the tool can not be over 0.01 mm.
  N = 1000Vc / d_{eff} / 3.14159
  When the rotating speed of the machine on site cannot reach the maximum rotation speed of the machine used for the calculation of the rotation speed: $V_f = f_z * n * z$ (n:actual rotation of the machine)

- *Bitte führen Sie einen Testschnitt mit 85% der Vc und 75% des fz durch.*
  Nach erfolgtem Test können Sie die Schnittgeschwindigkeit bzw. die Vorschubwerte entsprechend erhöhen.
- *Bitte verwenden Sie nur Spannmittel mit einer hohen Genauigkeit und einer hohen Spannkraft.*
  Überprüfen Sie den Rundlauf der Werkzeuge. Sie sollten darauf achten, dass der Rundlauffehler nicht größer als 0.01mm ist.

Sollten Sie aufgrund der Maschinendrehzahl nicht in der Lage sein, die angegebenen Drehzahlen einzuhalten, achten Sie darauf, dass Sie die Vf entsprechend anpassen. $V_f = f_z * n * z$ *(n: aktuelle Maschinendrehzahl)*

Recommended cutting data · Empfohlene Schnittdaten

Type *Typ*	Grade *Sorte*		Material *Werkstoffe*	d_1 (mm)	z	Vc (m/min)	f_z (mm/z)	a_p (mm)	a_e (mm)	n (min^{-1})	V_f (mm/min)
5602R304GR	KMG303	P	Steel *Stahl* HRC<=32	10	4	100	0.040	10	5	3183	509
				12	4	100	0.050	12	6	2653	531
				16	4	100	0.065	16	8	1989	517
				20	4	100	0.080	20	10	1592	509
			Steel,steel alloy *Stahl, legierter Stahl* HRC=32-38	10	4	80	0.035	10	5	2546	357
				12	4	80	0.045	12	6	2122	382
				16	4	80	0.060	16	8	1592	382
				20	4	80	0.070	20	10	1273	357
		K	Cast iron *Guss*	10	4	120	0.045	10	5	3820	688
				12	4	120	0.055	12	6	3183	700
				16	4	120	0.070	16	8	2387	668
				20	4	120	0.090	20	10	1910	688
		S	Ti and Ti alloys *Ti und Ti-Legierung*	10	4	30	0.035	10	5	955	134
				12	4	30	0.045	12	6	796	143
				16	4	30	0.060	16	8	597	143
				20	4	30	0.070	20	10	477	134





- Please start a test cutting with 85% of the Vc or 75% of the fz, then increase the cutting speed and feed rate.
- Please use high precision and high rigidity clamping system. The oscillation of the tool can not be over 0.01 mm.
- When a_p=1*d_1, f_z =75% as the data in the table
- When HRC>=30, reduce the a_p or a_c
- Recommended operation: climb milling

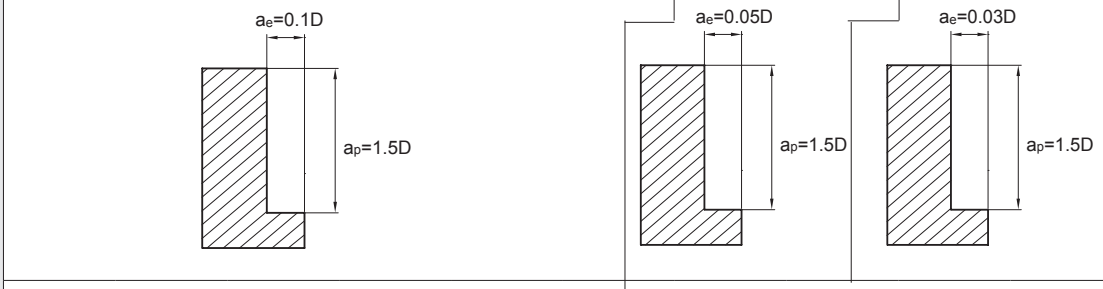
- *Bitte führen Sie einen Testschnitt mit 85% der Vc und 75% des fz durch.*
  Nach erfolgtem Test können Sie die Schnittgeschwindigkeit bzw. die Vorschubwerte entsprechend erhöhen.
- *Bitte verwenden Sie nur Spannmittel mit einer hohen Genauigkeit und einer hohen Spannkraft.*
  Überprüfen Sie den Rundlauf der Werkzeuge. Sie sollten darauf achten, dass der Rundlauffehler nicht größer als 0.01mm ist.
- *Bei Fräsoperationen, die mit einer* a_p=1*d_1 durchgeführt werden, ist f_z um 25% zu reduzieren.
- *Wenn HRC>=30, reduzieren Sie* a_p *oder* a_c
- *Empfohlene Fräsmethode: Gleichlauffräsen*

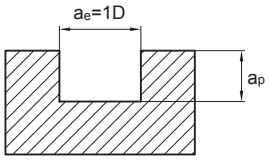
Recommended cutting data · Empfohlene Schnittdaten

PM-2E | PM-2EL

Workpiece material Werkstück -material	Cast iron, Carbon steel, Alloy steel Kohlenstoffstahl Leg. Stahl ~30HRC		Stainless steel · Rostfreier Stahl		Pre-hardened steel, Quenched and tempered steel Vergüteter Stahl ~40HRC		Pre-hardened steel, Quenched and tempered steel Vergüteter Stahl ~50HRC		Hardened steel Gehärteter Stahl ~55HRC	
Diameter Ø Durchmesse (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)
1	20000	200	20000	60	20000	165	20000	120	20000	90
2	15000	320	11150	85	15000	285	13000	180	11140	130
3	14000	545	7500	120	10600	420	8500	330	7430	240
4	10800	560	5500	135	8000	425	6500	335	5570	245
5	8200	585	4500	135	6400	445	5000	355	4460	260
6	7000	600	3700	140	5300	465	4200	360	3710	260
8	5200	595	2800	140	4000	455	3200	365	2785	270
10	4200	585	2200	140	3200	445	2500	350	2230	250
12	3500	585	1850	140	2650	445	2100	350	1855	250
14	3000	545	1600	135	2300	420	1800	330	1590	240
16	2600	545	1400	120	2000	420	1600	330	1390	240
18	2300	535	1250	120	1800	415	1400	325	1240	235
20	2050	535	1100	120	1600	415	1250	325	1115	235

Max. cutting depth
max Schnitttiefes





Milling slot	Nutenfräsen
Ø	Ap
Ø1≤D<Ø3	0.15D
Ø3≤D<Ø6	0.3D
Ø6≤D<Ø20	0.5D

Milling slot	Nutenfräsen
Ø	Ap
Ø1≤D<Ø3	0.1D
Ø3≤D	0.2D

1. The above table shows the standard value of side milling. When slot milling, of rotating speed 50%~70% and feed rate like mentioned above 40%~60%.
2. Please select high precise machine and tool holder.
3. Please use air blow or cutting liquid with high mist retardant property.
4. Down milling is recommended in side milling.
5. Vibration and unusual noise may be generated if the machine rigidity and workpiece fixture stability is low, please reduce the rotating speed and feed rate like mentioned above.
6. Make overhang as short as possible if no interference.

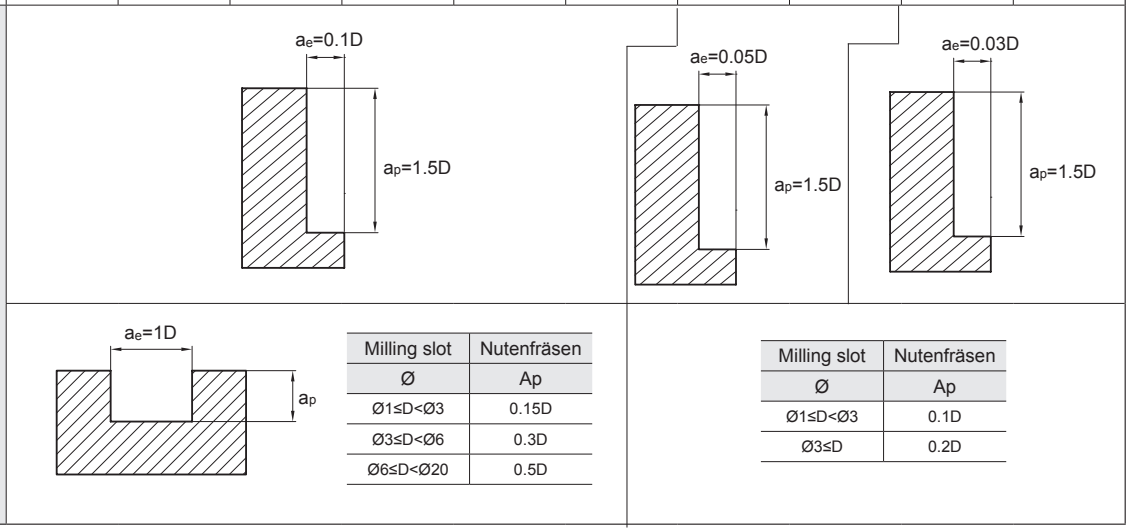
1. Die obige Tabelle zeigt Standard Werte für das Eckfräsen. Bei Nutenfräsen, Schnittgeschwindigkeit auf 50-70% und den Vorschub auf 40-60% reduzieren.
2. Bitte präzise Maschinen und Werkzeughalter verwenden.
3. Bitte Luftkühlung oder Schneidflüssigkeit benutzen.
4. Empfohlene Fräsmethode: Gleichlauffräsen.
5. Bei Vibrationen oder unüblichen Geräuschen reduzieren Sie die Schnittdaten (wie oben empfohlen) entsprechend.
6. Werkzeugauskragung so kurz wie möglich wählen.

Recommended cutting data · Empfohlene Schnittdaten

PM-2F | PM-2FL

Workpiece material Werkstück -material	Cast iron, Carbon steel, Alloy steel Kohlenstoffstahl Leg. Stahl ~30HRC		Stainless steel · Rostfreier Stahl		Pre-hardened steel, Quenched and tempered steel Vergüteter Stahl ~40HRC		Pre-hardened steel, Quenched and tempered steel Vergüteter Stahl ~50HRC		Hardened steel Gehärteter Stahl ~55HRC	
Diameter Ø Durchmesse (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)
1	20000	140	20000	45	20000	115	20000	85	20000	65
2	15000	225	11150	60	15000	200	13000	125	11140	90
3	14000	385	7500	85	10600	295	8500	230	7430	170
4	10800	390	5500	95	8000	300	6500	235	5570	170
5	8200	410	4500	95	6400	315	5000	245	4460	180
6	7000	420	3700	95	5300	325	4200	255	3710	180
8	5200	415	2800	95	4000	320	3200	255	2785	190
10	4200	410	2200	95	3200	315	2500	240	2230	175
12	3500	410	1850	95	2650	315	2100	240	1855	175
14	3000	385	1600	95	2300	295	1800	230	1590	170
16	2600	385	1400	85	2000	295	1600	230	1390	170
18	2300	375	1250	85	1800	290	1400	230	1240	165
20	2050	375	1100	85	1600	290	1250	230	1115	165

Max. cutting depth
max Schnitttiefes



Milling slot	Nutenfräsen
Ø	Ap
Ø1≤D<Ø3	0.15D
Ø3≤D<Ø6	0.3D
Ø6≤D<Ø20	0.5D

Milling slot	Nutenfräsen
Ø	Ap
Ø1≤D<Ø3	0.1D
Ø3≤D	0.2D

1. The above table shows the standard value of side milling. When slot milling, of rotating speed 50%~70% and feed rate like mentioned above 40%~60%.
2. Please select high precise machine and tool holder.
3. Please use air blow or cutting liquid with high mist retardant property.
4. Down milling is recommended in side milling.
5. Vibration and unusual noise may be generated if the machine rigidity and workpiece fixture stability is low, please reduce the rotating speed and feed rate like mentioned above.
6. Make overhang as short as possible if no interference.

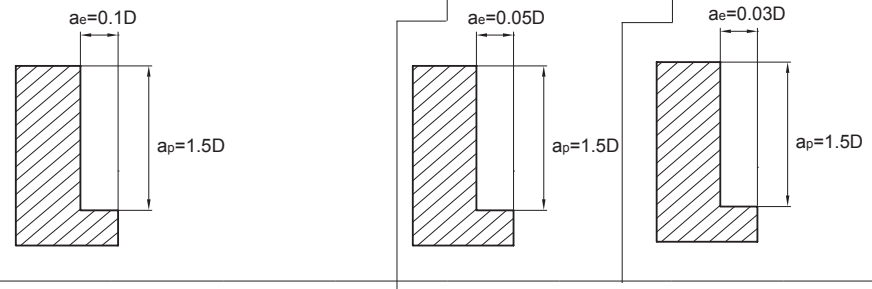
1. Die obige Tabelle zeigt Standard Werte für das Eckfräsen. Bei Nutenfräsen, Schnittgeschwindigkeit auf 50-70% und den Vorschub auf 40-60% reduzieren.
2. Bitte präzise Maschinen und Werkzeughalter verwenden.
3. Bitte Luftkühlung oder Schneidflüssigkeit benutzen.
4. Empfohlene Fräsmethode: Gleichlauffräsen.
5. Bei Vibrationen oder unüblichen Geräuschen reduzieren Sie die Schnittdaten (wie oben empfohlen) entsprechend.
6. Werkzeugauskragung so kurz wie möglich wählen.

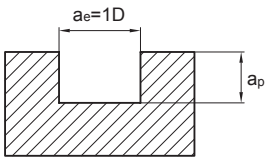
Recommended cutting data · Empfohlene Schnittdaten

PM-4E-G | PM-4EL-G

Workpiece material Werkstück -material	Cast iron, Carbon steel, Alloy steel Kohlenstoffstahl Leg. Stahl ~30HRC		Stainless steel · Rostfreier Stahl		Pre-hardened steel, Quenched and tempered steel Vergüteter Stahl ~40HRC		Pre-hardened steel, Quenched and tempered steel Vergüteter Stahl ~50HRC		Hardened steel Gehärteter Stahl ~55HRC	
Diameter Ø Durchmesse (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)
1	20000	270	20000	95	20000	215	20000	135	20000	120
2	15000	435	11150	110	15000	380	13000	200	11140	175
3	14000	735	7500	135	10600	565	8500	370	7430	325
4	10800	755	5500	140	8000	575	6500	380	5570	335
5	8200	795	4500	140	6400	605	5000	400	4460	350
6	7000	810	3700	145	5300	620	4200	405	3710	350
8	5200	800	2800	145	4000	615	3200	415	2785	365
10	4200	795	2200	145	3200	605	2500	390	2230	340
12	3500	795	1850	145	2650	605	2100	390	1855	340
14	3000	735	1600	140	2300	565	1800	370	1590	325
16	2600	735	1400	135	2000	565	1600	370	1390	325
18	2300	720	1250	115	1800	555	1400	365	1240	315
20	2050	720	1100	115	1600	555	1250	365	1115	315

Max. cutting depth
max Schnitttiefes





Milling slot	Nutenfräsen
Ø	Ap
Ø1≤D<Ø3	0.15D
Ø3≤D<Ø6	0.3D
Ø6≤D<Ø20	0.5D

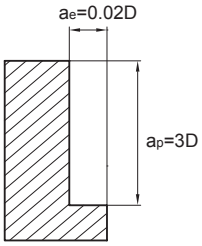
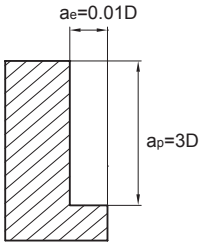
Milling slot	Nutenfräsen
Ø	Ap
Ø1≤D<Ø3	0.1D
Ø3≤D	0.2D

1. The above table shows the standard value of side milling. When slot milling, of rotating speed 50%~70% and feed rate like mentioned above 40%~60%.
2. Please select high precise machine and tool holder.
3. Please use air blow or cutting liquid with high mist retardant property.
4. Down milling is recommended in side milling.
5. Vibration and unusual noise may be generated if the machine rigidity and workpiece fixture stability is low, please reduce the rotating speed and feed rate like mentioned above.
6. Make overhang as short as possible if no interference.

1. Die obige Tabelle zeigt Standard Werte für das Eckfräsen. Bei Nutenfräsen, Schnittgeschwindigkeit auf 50-70% und den Vorschub auf 40-60% reduzieren.
2. Bitte präzise Maschinen und Werkzeughalter verwenden.
3. Bitte Luftkühlung oder Schneidflüssigkeit benutzen.
4. Empfohlene Fräsmethode: Gleichlauffräsen.
5. Bei Vibrationen oder unüblichen Geräuschen reduzieren Sie die Schnittdaten (wie oben empfohlen) entsprechend.
6. Werkzeugauskragung so kurz wie möglich wählen.

Recommended cutting data · Empfohlene Schnittdaten

PM-4EX-G

Workpiece material Werkstück -material	Cast iron, Carbon steel, Alloy steel Kohlenstoffstahl Leg. Stahl ~30HRC		Stainless steel · Rostfreier Stahl		Pre-hardened steel, Quenched and tempered steel Vergüteter Stahl ~40HRC		Pre-hardened steel, Quenched and tempered steel Vergüteter Stahl ~50HRC		Hardened steel Gehärteter Stahl ~55HRC	
Diameter Ø Durchmesse (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)
6	5800	570	2650	85	4250	410	3600	345	3180	305
8	4400	570	2000	85	3180	410	2700	350	2390	310
10	3500	555	1600	85	2550	400	2150	340	1910	300
12	2900	555	1350	85	2120	400	1800	340	1590	300
16	2200	520	1000	80	1590	380	1350	315	1195	280
20	1750	510	800	75	1270	375	1050	310	955	280
Max. cutting depth max Schnitttiefes										

1. Please select high precise machine and tool holder.
2. Please use air blow or MQL(minimum oil mist cooling).
3. Down milling is recommended in side milling.
4. Vibration and unusual noise may be generated if the machine rigidity and workpiece fixture stability is low, please reduce the rotating speed and feed rate like mentioned above.
5. Make overhang as short as possible if no interference.

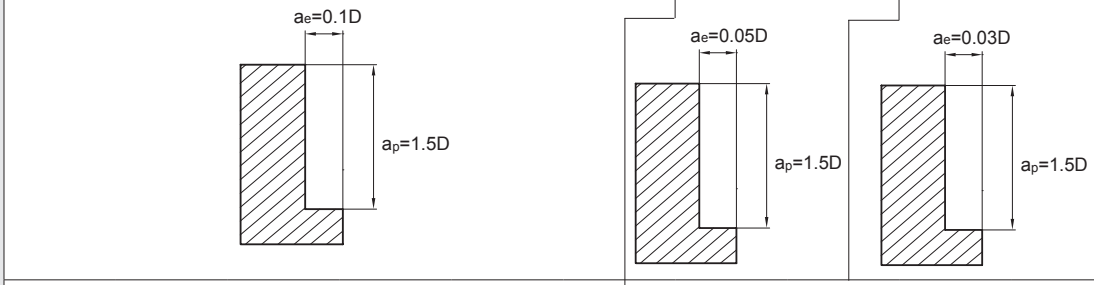
1. Bitte präzise Maschinen und Werkzeughalter verwenden.
2. Als Kühlmittel bitte Luft oder MQL (Minimalmengen) verwenden.
3. Empfohlene Fräsmethode: Gleichlauffräsen.
4. Bei Vibrationen oder unüblichen Geräuschen reduzieren Sie die Schnittdaten (wie oben empfohlen) entsprechend.
5. Werkzeugauskragung so kurz wie möglich wählen.

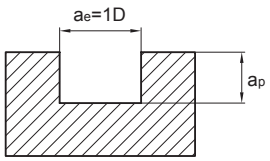
Recommended cutting data · Empfohlene Schnittdaten

PM-4E | PM-4EL

Workpiece material Werkstück -material	Cast iron, Carbon steel, Alloy steel Kohlenstoffstahl Leg. Stahl ~30HRC		Stainless steel · Rostfreier Stahl		Pre-hardened steel, Quenched and tempered steel Vergüteter Stahl ~40HRC		Pre-hardened steel, Quenched and tempered steel Vergüteter Stahl ~50HRC		Hardened steel Gehärteter Stahl ~55HRC	
Diameter Ø Durchmesse (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)
1	20000	300	20000	108	20000	240	20000	180	20000	135
2	15000	480	11150	120	15000	420	13000	270	11140	195
3	14000	815	7500	145	10600	630	8500	495	7430	360
4	10800	840	5500	150	8000	645	6500	505	5570	370
5	8200	875	4500	150	6400	675	5000	530	4460	390
6	7000	900	3700	165	5300	690	4200	540	3710	390
8	5200	890	2800	165	4000	680	3200	555	2785	405
10	4200	875	2200	165	3200	675	2500	525	2230	375
12	3500	875	1850	165	2650	675	2100	525	1855	375
14	3000	815	1600	150	2300	630	1800	495	1590	360
16	2600	815	1400	145	2000	630	1600	495	1390	360
18	2300	805	1250	125	1800	620	1400	485	1240	350
20	2050	805	1100	125	1600	620	1250	485	1115	350

Max. cutting depth
max Schnittiefes





Milling slot	Nutenfräsen
Ø	Ap
Ø1≤D<Ø3	0.15D
Ø3≤D<Ø6	0.3D
Ø6≤D<Ø20	0.5D

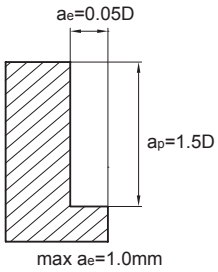
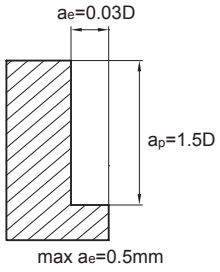
Milling slot	Nutenfräsen
Ø	Ap
Ø1≤D<Ø3	0.1D
Ø3≤D	0.2D

1. The above table shows the standard value of side milling. When slot milling, of rotating speed 50%~70% and feed rate like mentioned above 40%~60%.
2. Please select high precise machine and tool holder.
3. Please use air blow or cutting liquid with high mist retardant property.
4. Down milling is recommended in side milling.
5. Vibration and unusual noise may be generated if the machine rigidity and workpiece fixture stability is low, please reduce the rotating speed and feed rate like mentioned above.
6. Make overhang as short as possible if no interference.

1. Die obige Tabelle zeigt Standard Werte für das Eckfräsen. Bei Nutenfräsen, Schnittgeschwindigkeit auf 50-70% und den Vorschub auf 40 60% reduzieren.
2. Bitte präzise Maschinen und Werkzeughalter verwenden.
3. Bitte Luftkühlung oder Schneidflüssigkeit benutzen.
4. Empfohlene Fräsmethode: Gleichlauffräsen.
5. Bei Vibrationen oder unüblichen Geräuschen reduzieren Sie die Schnittdaten (wie oben empfohlen) entsprechend.
6. Werkzeugauskragung so kurz wie möglich wählen.

Recommended cutting data · Empfohlene Schnittdaten

PM-6E

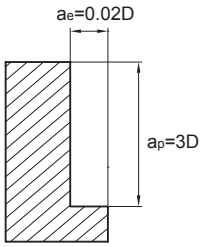
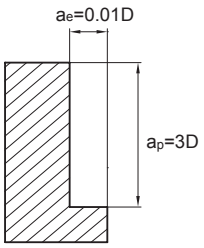
Workpiece material Werkstück -material	Cast iron, Carbon steel, Alloy steel Kohlenstoffstahl Leg. Stahl ~30HRC		Stainless steel · Rostfreier Stahl		Pre-hardened steel, Quenched and tempered steel Vergüteter Stahl ~40HRC		Pre-hardened steel, Quenched and tempered steel Vergüteter Stahl ~50HRC		Hardened steel Gehärteter Stahl ~55HRC	
Diameter Ø Durchmesse (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)
6	7000	1070	3700	195	5300	815	4200	650	3710	470
8	5200	1070	2800	195	4000	815	3200	660	2785	485
10	4200	1035	2200	195	3200	800	2500	630	2230	450
12	3500	1035	1850	195	2650	800	2100	630	1855	450
16	2600	975	1400	180	2000	750	1600	590	1390	435
20	2050	960	1100	150	1600	740	1250	580	1115	420
Max. cutting depth max Schnittiefes										

1. Please select high precise machine and tool holder.
2. Please use air blow or MQL(minimum oil mist cooling).
3. Down milling is recommended in side milling.
4. Vibration and unusual noise may be generated if the machine rigidity and workpiece fixture stability is low, please reduce the rotating speed and feed rate like mentioned above.
5. Make overhang as short as possible if no interference.

1. Bitte präzise Maschinen und Werkzeughalter verwenden.
2. Als Kühlmittel bitte Luft oder MQL (Minimalmengen) verwenden.
3. Empfohlene Fräsmethode: Gleichlauffräsen.
4. Bei Vibrationen oder unüblichen Geräuschen reduzieren Sie die Schnittdaten (wie oben empfohlen) entsprechend.
5. Werkzeugauskragung so kurz wie möglich wählen.

Recommended cutting data · Empfohlene Schnittdaten

PM-6EL

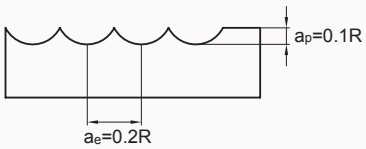
Workpiece material Werkstück -material	Cast iron, Carbon steel, Alloy steel Kohlenstoffstahl Leg. Stahl ~30HRC		Stainless steel · Rostfreier Stahl		Pre-hardened steel, Quenched and tempered steel Vergüteter Stahl ~40HRC		Pre-hardened steel, Quenched and tempered steel Vergüteter Stahl ~50HRC		Hardened steel Gehärteter Stahl ~55HRC	
Diameter Ø Durchmesse (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)
6	5800	900	2650	140	4250	655	3600	555	3180	490
8	4400	900	2000	140	3180	655	2700	560	2390	495
10	3500	875	1600	140	2550	635	2150	530	1910	470
12	2900	875	1350	140	2120	635	1800	530	1590	470
16	2200	825	1000	125	1590	600	1350	500	1195	445
20	1750	810	800	110	1270	590	1050	495	955	440
Max. cutting depth max Schnittiefes										

1. Please select high precise machine and tool holder.
2. Please use air blow or MQL(minimum oil mist cooling).
3. Down milling is recommended in side milling.
4. Vibration and unusual noise may be generated if the machine rigidity and workpiece fixture stability is low, please reduce the rotating speed and feed rate like mentioned above.
5. Make overhang as short as possible if no interference.

1. Bitte präzise Maschinen und Werkzeughalter verwenden.
2. Als Kühlmittel bitte Luft oder MQL (Minimalmengen) verwenden.
3. Empfohlene Fräsmethode: Gleichlauffräsen.
4. Bei Vibrationen oder unüblichen Geräuschen reduzieren Sie die Schnittdaten (wie oben empfohlen) entsprechend.
5. Werkzeugauskragung so kurz wie möglich wählen.

Recommended cutting data · Empfohlene Schnittdaten

PM-2B | PM-2BL | PM-2BFP (normal)

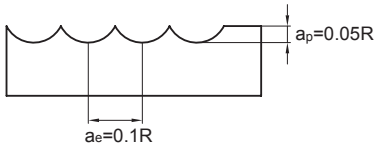
Workpiece material Werkstück -material	Cast iron, Carbon steel, Alloy steel Kohlenstoffstahl Leg. Stahl ~30HRC		Stainless steel · Rostfreier Stahl		Pre-hardened steel, Quenched and tempered steel Vergüteter Stahl ~40HRC		Pre-hardened steel, Quenched and tempered steel Vergüteter Stahl ~50HRC		Hardened steel Gehärteter Stahl ~55HRC	
Diameter Ø Durchmesse (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)
R0.5	40000	960	22300	240	32000	385	25000	330	22280	295
R1.0	24000	1080	11150	275	16000	480	13000	330	11140	295
R1.5	15500	1150	7400	350	10600	545	8500	335	7430	295
R2.0	11500	1150	5550	445	8000	665	6500	450	5570	385
R2.5	9500	1270	4450	445	6400	665	5000	455	4455	405
R3.0	8000	1270	3700	470	5300	700	4200	470	3715	420
R4.0	6000	1575	2750	550	4000	850	3200	535	2785	465
R5.0	4800	1455	2200	520	3200	785	2500	535	2230	465
R6.0	4000	1330	1850	520	2650	740	2100	505	1855	450
R8.0	3000	1270	1350	455	2000	725	1600	455	1395	395
R10.0	2400	1150	1100	445	1600	675	1250	400	1115	360
Max. cutting depth max Schnittiefes										

1. Please select high precise machine and tool holder.
2. Please use air blow or MQL(minimum oil mist cooling).
3. Vibration and unusual noise may be generated if the machine rigidity and workpiece fixture stability is low, please reduce the rotating speed and feed rate like mentioned above.
4. Make overhang as short as possible if no interference.

1. Bitte präzise Maschinen und Werkzeughalter verwenden.
2. Als Kühlmittel bitte Luft oder MQL (Minimalmengen) verwenden.
3. Bei Vibrationen oder unüblichen Geräuschen reduzieren Sie die Schnittdaten (wie oben empfohlen) entsprechend.
4. Werkzeugauskragung so kurz wie möglich wählen.

Recommended cutting data · Empfohlene Schnittdaten

PM-2B | PM-2BL | PM-2BFP (highspeed)

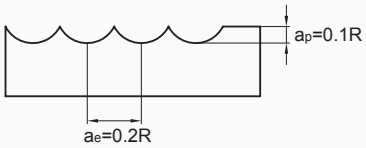
Workpiece material Werkstück -material	Cast iron, Carbon steel, Alloy steel Kohlenstoffstahl Leg. Stahl ~30HRC		Stainless steel · Rostfreier Stahl		Pre-hardened steel, Quenched and tempered steel Vergüteter Stahl ~45HRC		Pre-hardened steel, Quenched and tempered steel Vergüteter Stahl ~50HRC		Hardened steel Gehärteter Stahl ~55HRC	
Diameter Ø Durchmesse (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)
R3.0	15000	4800	11500	2750	9500	2250	7960	1885	6370	1510
R4.0	11500	3650	8950	2100	7150	1700	5970	1420	4775	1135
R5.0	9500	3000	7150	1700	5700	1350	4775	1130	3820	905
R6.0	7950	2500	5950	1400	4750	1100	3980	920	3180	735
R8.0	5950	1900	4450	1050	3550	850	2985	760	2390	610
R10.0	4750	1500	3550	850	2850	680	2390	570	1910	455
Max. cutting depth max Schnittiefes										

1. Please select high precise machine and tool holder.
2. Please use air blow or MQL(minimum oil mist cooling).
3. Vibration and unusual noise may be generated if the machine rigidity and workpiece fixture stability is low, please reduce the rotating speed and feed rate like mentioned above.
4. Make overhang as short as possible if no interference.

1. Bitte präzise Maschinen und Werkzeughalter verwenden.
2. Als Kühlmittel bitte Luft oder MQL (Minimalmengen) verwenden.
3. Bei Vibrationen oder unüblichen Geräuschen reduzieren Sie die Schnittdaten (wie oben empfohlen) entsprechend.
4. Werkzeugauskragung so kurz wie möglich wählen.

Recommended cutting data · Empfohlene Schnittdaten

PM-4B | PM-4BL

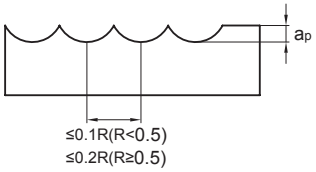
Workpiece material Werkstück -material	Cast iron, Carbon steel, Alloy steel Kohlenstoffstahl Leg. Stahl ~30HRC		Stainless steel · Rostfreier Stahl		Pre-hardened steel, Quenched and tempered steel Vergüteter Stahl ~45HRC		Pre-hardened steel, Quenched and tempered steel Vergüteter Stahl ~50HRC		Hardened steel Gehärteter Stahl ~55HRC	
Diameter Ø Durchmesse (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)
R1.5	15500	2055	7400	625	10600	975	8500	600	7430	525
R2.0	11500	2055	5550	795	8000	1190	6500	800	5570	685
R2.5	9500	2270	4450	795	6400	1190	5000	810	4455	720
R3.0	8000	2270	3700	840	5300	1245	4200	840	3715	745
R4.0	6000	2810	2750	985	4000	1515	3200	950	2785	825
R5.0	4800	2595	2200	925	3200	1405	2500	950	2230	825
R6.0	4000	2375	1850	925	2650	1320	2100	905	1855	800
R8.0	3000	2270	1350	815	2000	1295	1600	810	1395	705
R10.0	2400	2055	1100	795	1600	1200	1250	715	1115	640
Max. cutting depth max Schnittiefes										

1. Please select high precise machine and tool holder.
2. Please use air blow or MQL(minimum oil mist cooling).
3. Vibration and unusual noise may be generated if the machine rigidity and workpiece fixture stability is low, please reduce the rotating speed and feed rate like mentioned above.
4. Make overhang as short as possible if no interference.

1. Bitte präzise Maschinen und Werkzeughalter verwenden.
2. Als Kühlmittel bitte Luft oder MQL (Minimalmengen) verwenden.
3. Bei Vibrationen oder unüblichen Geräuschen reduzieren Sie die Schnittdaten (wie oben empfohlen) entsprechend.
4. Werkzeugauskragung so kurz wie möglich wählen.

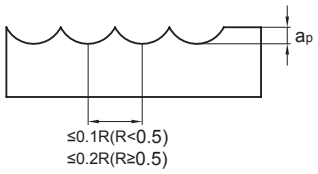
Recommended cutting data · Empfohlene Schnittdaten

PM-2BC

Workpiece material Werkstück -material			Pre-hardened steel, Quenched and tempered steel Vergüteter Stahl ~40HRC			Pre-hardened steel, Quenched and tempered steel Vergüteter Stahl ~50HRC			Hardened steel Gehärteter Stahl ~55HRC		
Diameter Ø Durchmesse (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Nutenfräsen a_p(mm)
R0.25	0.5°	3	30000	300	0.03	30000	270	0.03	30000	240	0.03
		5	30000	250	0.02	30000	225	0.02	30000	200	0.02
	1.0°	3	30000	330	0.03	30000	300	0.03	30000	265	0.03
		5	30000	270	0.02	30000	245	0.02	30000	215	0.02
	1.5°	3	30000	350	0.03	30000	315	0.03	30000	280	0.03
		5	30000	300	0.02	30000	270	0.02	30000	240	0.02
R0.30	0.5°	5	30000	300	0.03	30000	270	0.03	30000	240	0.03
		8	30000	250	0.02	30000	225	0.02	30000	200	0.02
	1.0°	5	30000	350	0.03	30000	315	0.03	30000	280	0.03
		8	30000	300	0.02	30000	270	0.02	30000	240	0.02
		10	30000	270	0.02	30000	245	0.02	30000	215	0.02
		12	30000	250	0.015	30000	225	0.015	30000	200	0.015
		15	30000	250	0.01	30000	225	0.01	30000	200	0.01
	1.5°	8	30000	350	0.03	30000	315	0.03	30000	280	0.03
		15	30000	300	0.01	30000	270	0.01	30000	240	0.01
R0.40	0.5°	8	30000	350	0.05	30000	315	0.05	30000	280	0.05
		12	30000	300	0.04	30000	270	0.04	30000	240	0.04
	1.0°	8	30000	400	0.05	30000	360	0.05	30000	320	0.05
		12	30000	350	0.04	30000	315	0.04	30000	280	0.04
	1.5°	8	30000	450	0.05	30000	405	0.05	30000	360	0.05
		12	30000	400	0.04	30000	360	0.04	30000	320	0.04
R0.50	0.5°	10	22000	450	0.05	22000	405	0.05	22000	360	0.05
		15	22000	400	0.04	22000	360	0.04	22000	320	0.04
		20	22000	370	0.03	22000	335	0.03	22000	295	0.03
		25	22000	350	0.01	22000	315	0.01	22000	280	0.01
		30	22000	320	0.005	22000	290	0.005	22000	255	0.005
	1.0°	10	22000	500	0.05	22000	450	0.05	22000	400	0.05
		15	22000	450	0.04	22000	405	0.04	22000	360	0.04
		20	22000	430	0.02	22000	390	0.02	22000	345	0.02
		25	22000	400	0.015	22000	360	0.015	22000	320	0.015
		30	22000	360	0.01	22000	325	0.01	22000	290	0.01
		35	22000	320	0.005	22000	290	0.005	22000	255	0.005
Max. cutting depth max Schnitttiefes											

Recommended cutting data · Empfohlene Schnittdaten

PM-2BC

Workpiece material Werkstück -material			Pre-hardened steel, Quenched and tempered steel Vergüteter Stahl ~40HRC			Pre-hardened steel, Quenched and tempered steel Vergüteter Stahl ~50HRC			Hardened steel Gehärteter Stahl ~55HRC		
Diameter Ø Durchmesse (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Nutenfräsen a_p(mm)
R1.0	1.5°	20	18000	1000	0.05	18000	900	0.05	18000	800	0.05
		30	18000	900	0.03	18000	810	0.03	18000	720	0.03
		40	18000	750	0.03	18000	675	0.03	18000	600	0.03
	2°	30	18000	900	0.04	18000	810	0.04	18000	720	0.04
		40	18000	850	0.03	18000	765	0.03	18000	680	0.03
	3°	30	18000	1000	0.04	18000	900	0.04	18000	800	0.04
		40	18000	900	0.03	18000	810	0.03	18000	720	0.03
R1.5	0.5°	30	16000	1100	0.1	16000	990	0.1	16000	880	0.1
		40	16000	950	0.06	16000	855	0.06	16000	760	0.06
		50	16000	800	0.03	16000	720	0.03	16000	640	0.03
	1.0°	30	16000	1200	0.1	16000	1080	0.1	16000	960	0.1
		40	16000	1000	0.06	16000	900	0.06	16000	800	0.06
		50	16000	850	0.03	16000	765	0.03	16000	680	0.03
R1.5	1.5°	30	16000	1300	0.1	16000	1170	0.1	16000	1040	0.1
		40	16000	1100	0.06	16000	990	0.06	16000	880	0.06
		50	16000	950	0.03	16000	855	0.03	16000	760	0.03
R2.0	0.5°	60	14000	1100	0.1	14000	990	0.1	14000	880	0.1
	1.0°	60	14000	1100	0.1	14000	990	0.1	14000	880	0.1
Max. cutting depth max Schnitttiefes											

1. Please select high precise machine and tool holder. If vibration and unusual noise occurs please reduce the a_p and check the stability of machine and clamping system.
2. Please use air blow or MQL(minimum oil mist cooling).
3. Please reduce the feed rate when rotating speed is low.
4. The above table shows parameter for ideal condition. Please check your system and adapt the parameter.

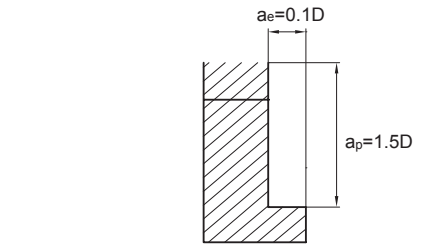
1. Bitte präzise Maschinen und Werkzeughalter verwenden.Bei Vibrationen oder unüblichen Geräuschen reduzieren Sie a_p.
2. Als Kühlmittel bitte Luft oder MQL (Minimalmengen) verwenden.
3. Bitte Vorschub entsprechend reduzieren, wenn die Drehzahlen niedrig ist.
4. Die Angaben in der Tabelle beziehen sich auf ideale Bearbeitungsbedingungen. Bitte ihr System überprüfung und die Werte Gegebenenfalls anpassen.

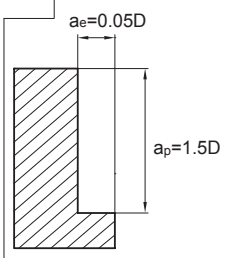
Recommended cutting data · Empfohlene Schnittdaten

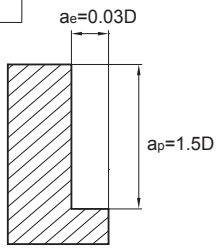
PM-2R

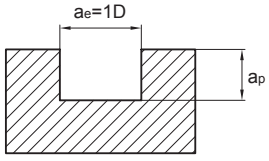
Workpiece material Werkstück -material	Cast iron, Carbon steel, Alloy steel Kohlenstoffstahl Leg. Stahl ~30HRC		Stainless steel · Rostfreier Stahl		Pre-hardened steel, Quenched and tempered steel Vergüteter Stahl ~40HRC		Pre-hardened steel, Quenched and tempered steel Vergüteter Stahl ~50HRC		Hardened steel Gehärteter Stahl ~55HRC	
Diameter Ø Durchmesse (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)
1	20000	240	20000	75	20000	195	20000	145	20000	95
2	15000	385	11150	100	15000	335	13000	215	11140	130
3	14000	655	7500	145	10600	505	8500	395	7430	245
4	10800	675	5500	155	8000	515	6500	405	5570	245
5	8200	695	4500	155	6400	540	5000	425	4460	260
6	7000	720	3700	170	5300	555	4200	435	3710	260
8	5200	720	2800	170	4000	555	3200	440	2785	275
10	4200	695	2200	170	3200	535	2500	420	2230	255
12	3500	695	1850	170	2650	535	2100	420	1855	255

Max. cutting depth
max Schnitttiefe









Milling slot	Nutenfräsen
Ø	Ap
Ø1≤D<Ø3	0.15D
Ø3≤D<Ø6	0.3D
Ø6≤D<Ø20	0.5D

Milling slot	Nutenfräsen
Ø	Ap
Ø1≤D<Ø3	0.1D
Ø3≤D	0.2D

1. The above table shows the standard value of side milling. When slot milling, of rotating speed 50%~70% and feed rate like mentioned above 40%~60%.
2. Please select high precise machine and tool holder.
3. Please use air blow or cutting liquid with high mist retardant property.
4. Down milling is recommended in side milling.
5. Vibration and unusual noise may be generated if the machine rigidity and workpiece fixture stability is low, please reduce the rotating speed and feed rate like mentioned above.
6. Make overhang as short as possible if no interference.

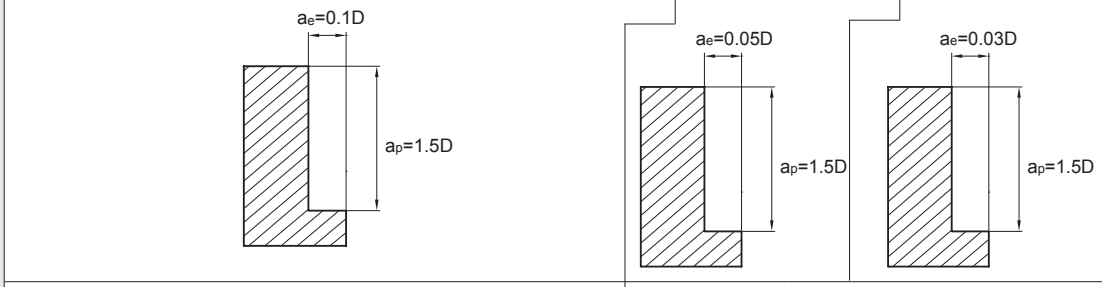
1. Die obige Tabelle zeigt Standard Werte für das Eckfräsen. Bei Nutenfräsen, Schnittgeschwindigkeit auf 50-70% und den Vorschub auf 40-60% reduzieren.
2. Bitte präzise Maschinen und Werkzeughalter verwenden.
3. Bitte Luftkühlung oder Schneidflüssigkeit benutzen.
4. Empfohlene Fräsmethode: Gleichlauffräsen.
5. Bei Vibrationen oder unüblichen Geräuschen reduzieren Sie die Schnittdaten (wie oben empfohlen) entsprechend.
6. Werkzeugauskragung so kurz wie möglich wählen.

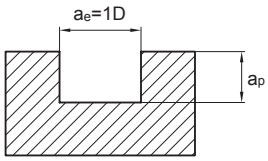
Recommended cutting data · Empfohlene Schnittdaten

PM-4R

Workpiece material Werkstück -material	Cast iron, Carbon steel, Alloy steel Kohlenstoffstahl Leg. Stahl ~30HRC		Stainless steel · Rostfreier Stahl		Pre-hardened steel, Quenched and tempered steel Vergüteter Stahl ~40HRC		Pre-hardened steel, Quenched and tempered steel Vergüteter Stahl ~50HRC		Hardened steel Gehärteter Stahl ~55HRC	
Diameter Ø Durchmesse (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)
3	14000	985	7500	175	10600	755	8500	590	7430	435
4	10800	1010	5500	175	8000	770	6500	600	5570	445
5	8200	1055	4500	175	6400	805	5000	640	4460	470
6	7000	1080	3700	195	5300	830	4200	650	3710	470
8	5200	1070	2800	195	4000	815	3200	660	2785	485
10	4200	1055	2200	195	3200	805	2500	625	2230	450
12	3500	1055	1850	195	2650	805	2100	625	1855	450
16	2600	985	1400	175	2000	755	1600	590	1390	435

Max. cutting depth
max Schnitttiefe





Milling slot	Nutenfräsen
Ø	Ap
Ø1≤D<Ø3	0.15D
Ø3≤D<Ø6	0.3D
Ø6≤D<Ø20	0.5D

Milling slot	Nutenfräsen
Ø	Ap
Ø1≤D<Ø3	0.1D
Ø3≤D	0.2D

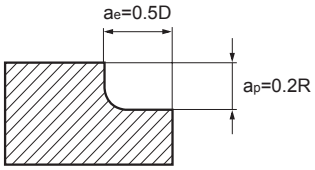
1. The above table shows the standard value of side milling. When slot milling, of rotating speed 50%~70% and feed rate like mentioned above 40%~60%.
2. Please select high precise machine and tool holder.
3. Please use air blow or cutting liquid with high mist retardant property.
4. Down milling is recommended in side milling.
5. Vibration and unusual noise may be generated if the machine rigidity and workpiece fixture stability is low, please reduce the rotating speed and feed rate like mentioned above.
6. Make overhang as short as possible if no interference.

1. Die obige Tabelle zeigt Standard Werte für das Eckfräsen. Bei Nutenfräsen, Schnittgeschwindigkeit auf 50-70% und den Vorschub auf 40-60% reduzieren.
2. Bitte präzise Maschinen und Werkzeughalter verwenden.
3. Bitte Luftkühlung oder Schneidflüssigkeit benutzen.
4. Empfohlene Fräsmethode: Gleichlauffräsen.
5. Bei Vibrationen oder unüblichen Geräuschen reduzieren Sie die Schnittdaten (wie oben empfohlen) entsprechend.
6. Werkzeugauskragung so kurz wie möglich wählen.

Recommended cutting data · Empfohlene Schnittdaten

PM-4H | PM-4HL

Workpiece material Werkstück -material	Cast iron, Carbon steel, Alloy steel Kohlenstoffstahl Leg. Stahl ~30HRC		Quenched and tempered steel Vergüteter Stahl ~40HRC		Quenched and tempered steel Vergüteter Stahl ~45HRC		Quenched and tempered steel Vergüteter Stahl ~50HRC		Quenched and tempered steel Vergüteter Stahl ~55HRC	
Diameter Ø Durchmesse (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)
3.0×R0.8	10500	6250	8500	4500	7450	3900	5300	2600	3200	995
4.0×R1.0	7950	6600	6350	4800	5550	4200	4000	2750	2400	1050
5.0×R1.2	6350	7000	5100	5100	4450	4450	3200	2850	1900	1150
6.0×R1.0 6.0×R1.5	5300	7000	4250	5100	3700	4450	2650	2850	1600	1150
8.0×R1.0 8.0×R2.0	4550	7000	3200	5100	2800	4450	2000	2850	1200	1150
10.0×R1.0 10.0×R2.0	3200	7000	2550	5100	2250	4450	1600	2850	955	1150
12.0×R2.0 12.0×R3.0	2650	7000	2100	5100	1850	4450	1350	2850	795	1150
Max. cutting depth max Schnitttiefe	max a_p=0.5mm						max a_p=0.4mm		max a_p=0.2mm	



1. Please select high precise machine and tool holder.
2. Please use air blow or MQL(minimum oil mist cooling).
3. Down milling is recommended in side milling.
4. Vibration and unusual noise may be generated if the machine rigidity and workpiece fixture stability is low, please reduce the rotating speed and feed rate like mentioned above.
5. Make overhang as short as possible if no interference.
6. For overhang of L/D≤4 please use cutting condition from table above. For bigger overhang see table below.

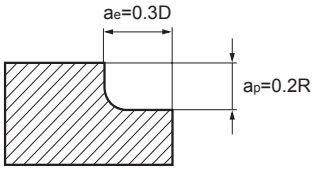
1. Bitte präzise Maschinen und Werkzeughalter verwenden.
2. Als Kühlmittel bitte Luft oder MQL (Minimalmengen) verwenden.
3. Empfohlene Fräsmethode: Gleichlauffräsen.
4. Bei Vibrationen oder unüblichen Geräuschen reduzieren Sie die Schnittdaten (wie oben empfohlen) entsprechend.
5. Werkzeugauskragung so kurz wie möglich wählen.
6. Für Auskraglangen L/D≤4 bitte die Parameter aus der Tabelle oben verwenden. Für L/D>4 siehe Tabelle unten.

L/D	Vc(m/min)	a_e(mm)	fn(mm/min)
L/D≤4	100%	100%	100%
L/D=5	80%~90%	70%~90%	80%~90%
L/D=6	60%~80%	50%~70%	60%~80%

Recommended cutting data · Empfohlene Schnittdaten

PM-4H | PM-4HL

Workpiece material Werkstück -material	Cast iron, Carbon steel, Alloy steel Kohlenstoffstahl Leg. Stahl ~30HRC		Quenched and tempered steel Vergüteter Stahl ~40HRC		Quenched and tempered steel Vergüteter Stahl ~45HRC		Quenched and tempered steel Vergüteter Stahl ~50HRC		Quenched and tempered steel Vergüteter Stahl ~55HRC	
Diameter Ø Durchmesse (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)
3.0×R0.8	21000	12500	21000	12000	16000	8400	16000	7850	10500	3300
4.0×R1.0	16000	13000	16000	12000	12000	9000	12000	8200	7950	3550
5.0×R1.2	12500	14000	12500	12500	9550	9550	9550	8600	6350	3800
6.0×R1.0 6.0×R1.5	10600	14000	10600	12700	7950	9550	7950	8600	5300	3800
8.0×R1.0 8.0×R2.0	7950	14000	7950	12700	5950	9550	5950	8600	4000	3800
10.0×R1.0 10.0×R2.0	6350	14000	6350	12700	4750	9550	4750	8600	3200	3800
12.0×R2.0 12.0×R3.0	5300	14000	5300	12700	4000	9550	4000	8600	2650	3800
Max. cutting depth max Schnittiefe	max a_p=0.4mm						max a_p=0.2mm		max a_p=0.1mm	



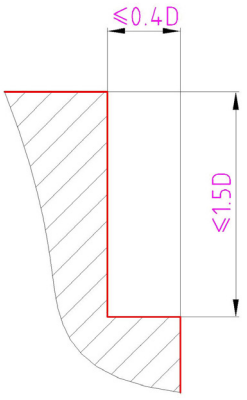
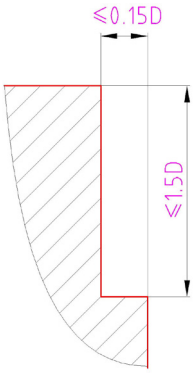
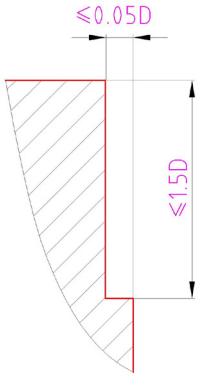
1. Please select high precise machine and tool holder.
2. Please use air blow or MQL(minimum oil mist cooling).
3. Down milling is recommended in side milling.
4. Vibration and unusual noise may be generated if the machine rigidity and workpiece fixture stability is low, please reduce the rotating speed and feed rate like mentioned above.
5. Make overhang as short as possible if no interference.
6. For overhang of L/D≤4 please use cutting condition from table above. For bigger overhang see table below.

1. Bitte präzise Maschinen und Werkzeughalter verwenden.
2. Als Kühlmittel bitte Luft oder MQL (Minimalmengen) verwenden.
3. Empfohlene Fräsmethode: Gleichlauffräsen.
4. Bei Vibrationen oder unüblichen Geräuschen reduzieren Sie die Schnittdaten (wie oben empfohlen) entsprechend.
5. Werkzeugauskragung so kurz wie möglich wählen.
6. Für Auskraglangen L/D≤4 bitte die Parameter aus der Tabelle oben verwenden. Für L/D>4 siehe Tabelle unten.

L/D	Vc(m/min)	a_e(mm)	fn(mm/min)
L/D≤4	100%	100%	100%
L/D=5	60%~80%	60%~80%	60%~80%
L/D=6	40%~60%	40%~60%	40%~60%

Recommended cutting data · Empfohlene Schnittdaten

5501R38414GM | 5502R38414GM | 5602R38414GM

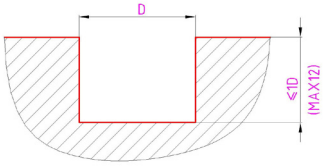
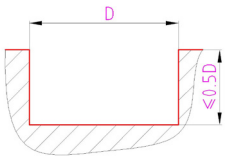
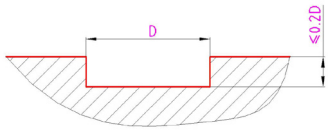
Workpiece material Werkstück -material	Carbon steel, Alloy steel Kohlenstoffstahl Leg. Stahl ~30HRC		Alloy steel,Tool steel, Pre-hardened steel Leg. Stahl, Vergüteter Stahl 30 ~ 45HRC		Austenitic Stainless steel, Titanium alloy Austenitischer rostfreier Stahl, Titan-Legier.		hardened steel Gehärteter Stahl 45 ~ 55 HRC		Heat resist. super alloy Warmfeste Superlegierung.	
Diameter Ø Durchmesse (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)
4	10000	1800	10000	1800	6800	1080	4800	384	2800	224
5	8000	1760	8000	1760	5500	1100	3800	380	2200	220
6	7000	1960	7000	1960	4600	1120	3200	384	1900	228
8	5000	1400	5000	1400	3400	800	2400	384	1400	168
10	4000	1200	4000	1200	2700	680	1900	380	1100	144
12	3500	1040	3500	1040	2300	640	1600	320	900	136
14	3000	1020	3000	1020	2000	560	1400	308	800	120
16	2600	920	2600	920	1700	480	1200	288	700	116
18	2300	840	2300	840	1500	420	1100	308	620	100
20	2100	760	2100	760	1400	440	1000	320	560	96
Max. cutting depth max Schnitttiefe										

1. The above table shows the standard value of side milling.
2. Please select high precise machine and tool holder.
3. Please use air blow or cutting liquid with high mist retardant property.
4. Down milling is recommended in side milling.
5. Vibration and unusual noise may be generated if the machine rigidity and workpiece fixture stability is low, please reduce the rotating speed and feed rate like mentioned above.
6. Make overhang as short as possible if no interference.

1. Die obige Tabelle zeigt Standard Werte für das Eckfräsen.
2. Bitte präzise Maschinen und Werkzeughalter verwenden.
3. Bitte Luftkühlung oder Schneidflüssigkeit benutzen.
4. Empfohlene Fräsmethode: Gleichlauffräsen.
5. Bei Vibrationen oder unüblichen Geräuschen reduzieren Sie die Schnittdaten (wie oben empfohlen) entsprechend.
6. Werkzeugauskragung so kurz wie möglich wählen.

Recommended cutting data · Empfohlene Schnittdaten

5501R38414GM | 5502R38414GM | 5602R38414GM

Workpiece material Werkstück -material	Carbon steel, Alloy steel Kohlenstoffstahl Leg. Stahl ~30HRC		Alloy steel,Tool steel, Pre-hardened steel Leg. Stahl, Vergüteter Stahl 30 ~ 45HRC		Austenitic Stainless steel, Titanium alloy Austenitischer rostfreier Stahl, Titan-Legier.		hardened steel Gehärteter Stahl 45 ~ 55 HRC		Heat resist. super alloy Warmfeste Superlegierung	
Diameter Ø Durchmesse (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)
4	8400	1000	4800	480	4800	480	2100	160	2100	160
5	6700	1080	3800	480	3800	480	1700	140	1700	140
6	5600	1120	3200	520	3200	520	1400	140	1400	140
8	4200	1000	2400	480	2400	480	1000	120	1000	120
10	3300	800	1900	400	1900	400	800	120	800	120
12	2800	720	1600	360	1600	360	700	120	700	120
14	2400	640	1400	320	1400	320	600	96	600	96
16	2100	600	1200	280	1200	280	500	80	500	80
18	1900	520	1100	280	1100	280	500	80	500	80
20	1700	560	1000	240	1000	240	400	80	400	80
Max. cutting depth max Schnittiefe										

1. The above table shows the standard value of slot milling..
2. Please select high precise machine and tool holder.
3. Please use air blow or cutting liquid with high mist retardant property.
4. Down milling is recommended in side milling.
5. Vibration and unusual noise may be generated if the machine rigidity and workpiece fixture stability is low, please reduce the rotating speed and feed rate like mentioned above.
6. Make overhang as short as possible if no interference.

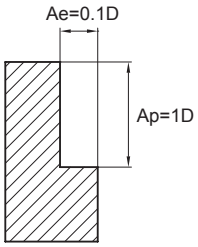
1. Die obige Tabelle zeigt Standard Werte für das Nutenfräsen.
2. Bitte präzise Maschinen und Werkzeughalter verwenden.
3. Bitte Luftkühlung oder Schneidflüssigkeit benutzen.
4. Empfohlene Fräsmethode: Gleichlauffräsen.
5. Bei Vibrationen oder unüblichen Geräuschen reduzieren Sie die Schnittdaten (wie oben empfohlen) entsprechend.
6. Werkzeugauskragung so kurz wie möglich wählen.

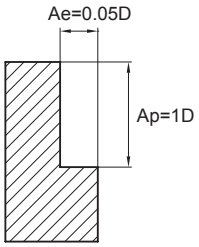
Recommended cutting data · Empfohlene Schnittdaten

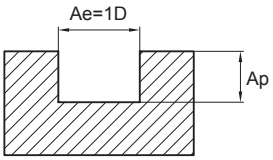
GM-2E | GM-2EL

Workpiece material Werkstück -material	Cast iron, Nodular cast iron Grauguss GGG Grauguss GGG		Carbon steel, Alloy steel Kohlenstoffstahl Leg. Stahl ~750N/mm²		Carbon steel, Alloy steel Kohlenstoffstahl Leg. Stahl ~30HRC		Pre-hardened steel, Quenched and tempered steel Vergüteter Stahl ~40HRC		Stainless steel · Rostfreier Stahl		Pre-hardened steel, Quenched and tempered steel Vergüteter Stahl ~50HRC	
Diameter Ø Durchmesse (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)
1	20000	165	20000	165	20000	135	20000	135	20000	50	20000	100
2	15000	265	15000	265	15000	240	15000	235	11150	70	13000	150
3	14000	455	14000	455	13000	420	10600	350	7500	100	8500	275
4	10800	465	10800	465	10000	430	8000	355	5500	110	6500	280
5	8200	485	8200	485	7600	450	6400	370	4500	110	5000	295
6	7000	500	7000	500	6400	460	5300	385	3700	115	4200	300
8	5200	495	5200	495	4800	455	4000	380	2800	115	3200	305
10	4200	485	4200	485	3800	450	3200	370	2200	115	2500	290
12	3500	485	3500	485	3200	450	2650	370	1850	115	2100	290
14	3000	455	3000	455	2700	420	2300	350	1600	110	1800	275
16	2600	455	2600	455	2400	420	2000	350	1400	100	1600	275
18	2300	445	2300	445	2100	410	1800	345	1250	100	1400	270
20	2050	445	2050	445	1900	410	1600	345	1100	100	1250	270

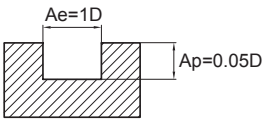
Max. cutting depth
max Schnitttiefe







Milling slot · Nutenfräsen	
Ø	Ap
Ø1≤D<Ø3	0.15D
Ø3≤D	0.3D



1. The above table shows the standard value of side milling. When slot milling, of rotating speed 50%~70% and feed rate like mentioned above 40%~60%.
2. Please select high precise machine and tool holder.
3. Please use air blow or cutting liquid with high mist retardant property.
4. Down milling is recommended in side milling.
5. Vibration and unusual noise may be generated if the machine rigidity and workpiece fixture stability is low, please reduce the rotating speed and feed rate like mentioned above.
6. Make overhang as short as possible if no interference.

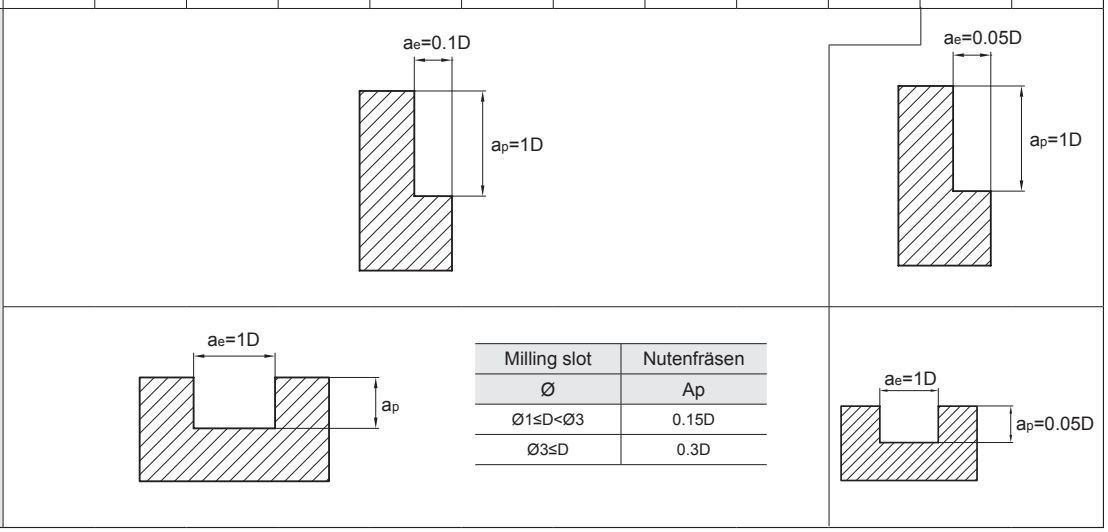
1. Die obige Tabelle zeigt Standard Werte für das Eckfräsen. Bei Nutenfräsen, Schnittgeschwindigkeit auf 50-70% und den Vorschub auf 40-60% reduzieren.
2. Bitte präzise Maschinen und Werkzeughalter verwenden.
3. Bitte Luftkühlung oder Schneidflüssigkeit benutzen.
4. Empfohlene Fräsmethode: Gleichlauffräsen.
5. Bei Vibrationen oder unüblichen Geräuschen reduzieren Sie die Schnittdaten (wie oben empfohlen) entsprechend.
6. Werkzeugauskragung so kurz wie möglich wählen.

Recommended cutting data · Empfohlene Schnittdaten

GM-2F| GM-2FL

Workpiece material Werkstück -material	Cast iron, Nodular cast iron Grauguss GGG Grauguss GGG		Carbon steel, Alloy steel Kohlenstoffstahl Leg. Stahl ~750N/mm²		Carbon steel, Alloy steel Kohlenstoffstahl Leg. Stahl ~30HRC		Pre-hardened steel, Quenched and tempered steel Vergüteter Stahl ~40HRC		Stainless steel · Rostfreier Stahl		Pre-hardened steel, Quenched and tempered steel Vergüteter Stahl ~50HRC	
Diameter Ø Durchmesse (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)
1	20000	115	20000	115	20000	95	20000	95	20000	35	20000	70
2	15000	185	15000	185	15000	170	15000	165	11150	50	13000	105
3	14000	320	14000	320	13000	295	10600	245	7500	70	8500	190
4	10800	325	10800	325	10000	300	8000	250	5500	80	6500	195
5	8200	340	8200	340	7600	315	6400	260	4500	80	5000	205
6	7000	350	7000	350	6400	320	5300	270	3700	80	4200	210
8	5200	345	5200	345	4800	320	4000	265	2800	80	3200	210
10	4200	340	4200	340	3800	315	3200	260	2200	80	2500	200
12	3500	340	3500	340	3200	315	2650	260	1850	80	2100	200
14	3000	320	3000	320	2700	295	2300	245	1600	80	1800	190
16	2600	320	2600	320	2400	295	2000	245	1400	70	1600	190
18	2300	310	2300	310	2100	290	1800	240	1250	70	1400	190
20	2050	310	2050	310	1900	290	1600	240	1100	70	1250	190

Max. cutting depth
max Schnittiefe



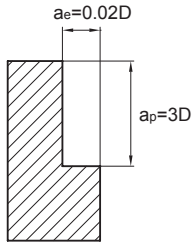
Milling slot	Nutenfräsen
Ø	Ap
Ø1≤D<Ø3	0.15D
Ø3≤D	0.3D

1. The above table shows the standard value of side milling. When slot milling, of rotating speed 50%~70% and feed rate like mentioned above 40%~60%.
2. Please select high precise machine and tool holder.
3. Please use air blow or cutting liquid with high mist retardant property.
4. Down milling is recommended in side milling.
5. Vibration and unusual noise may be generated if the machine rigidity and workpiece fixture stability is low, please reduce the rotating speed and feed rate like mentioned above.
6. Make overhang as short as possible if no interference.

1. Die obige Tabelle zeigt Standard Werte für das Eckfräsen. Bei Nutenfräsen, Schnittgeschwindigkeit auf 50-70% und den Vorschub auf 40-60% reduzieren.
2. Bitte präzise Maschinen und Werkzeughalter verwenden.
3. Bitte Luftkühlung oder Schneidflüssigkeit benutzen.
4. Empfohlene Fräsmethode: Gleichlauffräsen.
5. Bei Vibrationen oder unüblichen Geräuschen reduzieren Sie die Schnittdaten (wie oben empfohlen) entsprechend.
6. Werkzeugauskragung so kurz wie möglich wählen.

Recommended cutting data · Empfohlene Schnittdaten

GM-2EX

Workpiece material Werkstück -material	Cast iron, Nodular cast iron Grauguss GGG Grauguss GGG		Carbon steel, Alloy steel Kohlenstoffstahl Leg. Stahl ~750N/mm²		Carbon steel, Alloy steel Kohlenstoffstahl Leg. Stahl ~30HRC		Pre-hardened steel, Quenched and tempered steel Vergüteter Stahl ~40HRC		Stainless steel · Rostfreier Stahl		Pre-hardened steel, Quenched and tempered steel Vergüteter Stahl ~50HRC	
Diameter Ø Durchmesse (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)
6	5800	375	5800	375	5300	345	4250	275	2650	60	3600	230
8	4400	375	4400	375	4000	345	3180	275	2000	60	2700	235
10	3500	365	3500	365	3200	330	2550	265	1600	60	2150	220
12	2900	365	2900	365	2650	330	2120	265	1350	60	1800	220
16	2200	345	2200	345	2000	315	1590	250	1000	50	1350	210
20	1750	340	1750	340	1600	310	1270	245	800	45	1050	205
Max. cutting depth max Schnitttiefe												

1. Please select high precise machine and tool holder.
2. Please use air blow or cutting liquid with high mist retardant property.
3. Down milling is recommended in side milling.
4. Vibration and unusual noise may be generated if the machine rigidity and workpiece fixture stability is low, please reduce the rotating speed and feed rate like mentioned above.
5. Make overhang as short as possible if no interference.

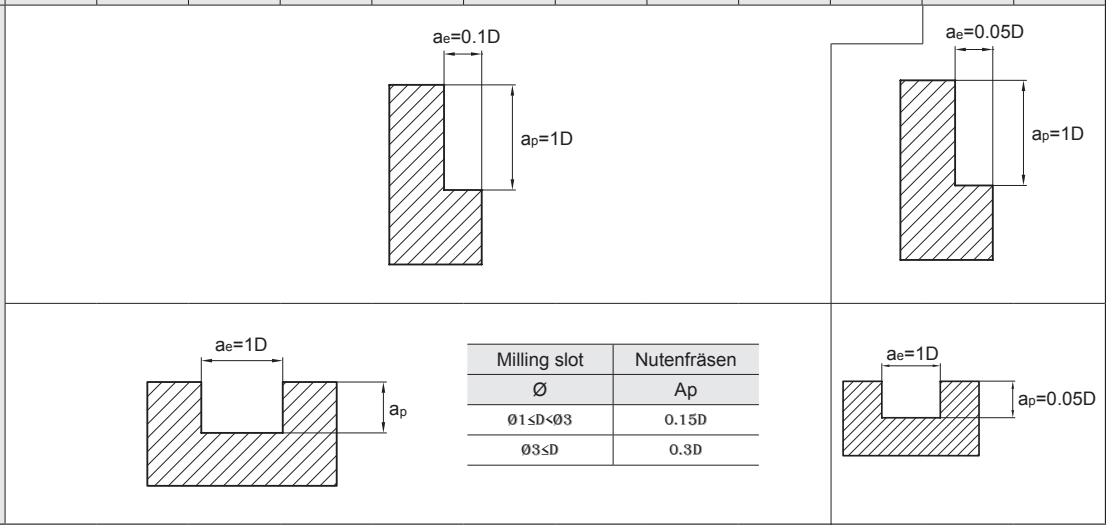
1. Bitte präzise Maschinen und Werkzeughalter verwenden.
2. Bitte Luftkühlung oder Schneidflüssigkeit benutzen.
3. Empfohlene Fräsmethode: Gleichlauffräsen.
4. Bei Vibrationen oder unüblichen Geräuschen reduzieren Sie die Schnittdaten (wie oben empfohlen) entsprechend.
5. Werkzeugauskragung so kurz wie möglich wählen.

Recommended cutting data · Empfohlene Schnittdaten

GM-2EFP

Workpiece material Werkstück -material	Cast iron, Nodular cast iron Grauguss GGG Grauguss GGG		Carbon steel, Alloy steel Kohlenstoffstahl Leg. Stahl ~750N/mm²		Carbon steel, Alloy steel Kohlenstoffstahl Leg. Stahl ~30HRC		Pre-hardened steel, Quenched and tempered steel Vergüteter Stahl ~40HRC		Stainless steel · Rostfreier Stahl		Pre-hardened steel, Quenched and tempered steel Vergüteter Stahl ~50HRC	
Diameter Ø Durchmesse (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)
6	7000	650	7000	650	6400	600	5300	500	3700	150	4200	390
8	5200	645	5200	645	4800	590	4000	495	2800	150	3200	395
10	4200	630	4200	630	3800	585	3200	480	2200	150	2500	380
12	3500	630	3500	630	3200	585	2650	480	1850	150	2100	380
16	2600	590	2600	590	2400	545	2000	455	1400	130	1600	355
20	2050	580	2050	580	1900	530	1600	450	1100	130	1250	350

Max. cutting depth
max Schnitttiefe



Milling slot	Nutenfräsen
Ø	Ap
Ø1≤D<Ø3	0.15D
Ø3≤D	0.3D

1. The above table shows the standard value of side milling. When slot milling, of rotating speed 50%~70% and feed rate like mentioned above 40%~60%.
2. Please select high precise machine and tool holder.
3. Please use air blow or cutting liquid with high mist retardant property.
4. Down milling is recommended in side milling.
5. Vibration and unusual noise may be generated if the machine rigidity and workpiece fixture stability is low, please reduce the rotating speed and feed rate like mentioned above.
6. Make overhang as short as possible if no interference.

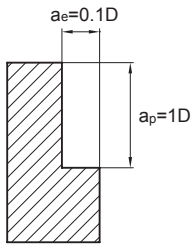
1. Die obige Tabelle zeigt Standard Werte für das Eckfräsen. Bei Nutenfräsen, Schnittgeschwindigkeit auf 50-70% und den Vorschub auf 40-60% reduzieren.
2. Bitte präzise Maschinen und Werkzeughalter verwenden.
3. Bitte Luftkühlung oder Schneidflüssigkeit benutzen.
4. Empfohlene Fräsmethode: Gleichlauffräsen.
5. Bei Vibrationen oder unüblichen Geräuschen reduzieren Sie die Schnittdaten (wie oben empfohlen) entsprechend.
6. Werkzeugauskragung so kurz wie möglich wählen.

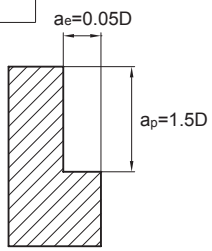
Recommended cutting data · Empfohlene Schnittdaten

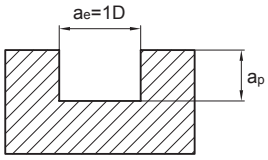
GM-3E | GM-3EL

Workpiece material Werkstück -material	Cast iron, Nodular cast iron Grauguss GGG Grauguss GGG		Carbon steel, Alloy steel Kohlenstoffstahl Leg. Stahl ~750N/mm²		Carbon steel, Alloy steel Kohlenstoffstahl Leg. Stahl ~30HRC		Pre-hardened steel, Quenched and tempered steel Vergüteter Stahl ~40HRC		Stainless steel · Rostfreier Stahl		Pre-hardened steel, Quenched and tempered steel Vergüteter Stahl ~50HRC	
Diameter Ø Durchmesse (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)
1	20000	215	20000	215	20000	175	20000	175	20000	65	20000	130
2	15000	345	15000	345	15000	310	15000	305	11150	90	13000	195
3	14000	590	14000	590	13000	546	10600	455	7500	130	8500	360
4	10800	600	10800	605	10000	560	8000	460	5500	145	6500	365
5	8200	630	8200	630	7600	585	6400	480	4500	145	5000	380
6	7000	650	7000	650	6400	600	5300	500	3700	150	4200	390
8	5200	645	5200	645	4800	590	4000	495	2800	150	3200	400
10	4200	630	4200	630	3800	585	3200	480	2200	150	2500	380
12	3500	630	3500	630	3200	585	2650	480	1850	150	2100	380
14	3000	590	3000	590	2700	545	2300	455	1600	145	1800	360
16	2600	590	2600	590	2400	545	2000	455	1400	130	1600	360
18	2300	580	2300	580	2100	530	1800	450	1250	130	1400	350
20	2050	580	2050	580	1900	530	1600	450	1100	130	1250	350

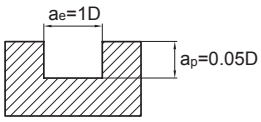
Max. cutting depth
max Schnitttiefe







Milling slot	Nutenfräsen
Ø	Ap
Ø1≤D<Ø3	0.15D
Ø3≤D	0.3D



1. The above table shows the standard value of side milling. When slot milling, of rotating speed 50%~70% and feed rate like mentioned above 40%~60%.
2. Please select high precise machine and tool holder.
3. Please use air blow or cutting liquid with high mist retardant property.
4. Down milling is recommended in side milling.
5. Vibration and unusual noise may be generated if the machine rigidity and workpiece fixture stability is low, please reduce the rotating speed and feed rate like mentioned above.
6. Make overhang as short as possible if no interference.

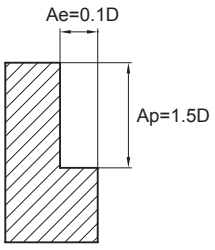
1. Die obige Tabelle zeigt Standard Werte für das Eckfräsen. Bei Nutenfräsen, Schnittgeschwindigkeit auf 50-70% und den Vorschub auf 40-60% reduzieren.
2. Bitte präzise Maschinen und Werkzeughalter verwenden.
3. Bitte Luftkühlung oder Schneidflüssigkeit benutzen.
4. Empfohlene Fräsmethode: Gleichlauffräsen.
5. Bei Vibrationen oder unüblichen Geräuschen reduzieren Sie die Schnittdaten (wie oben empfohlen) entsprechend.
6. Werkzeugauskragung so kurz wie möglich wählen.

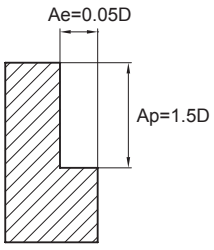
Recommended cutting data · Empfohlene Schnittdaten

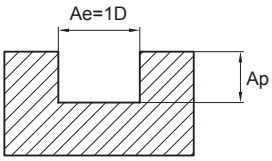
GM-4E-G | GM-4EL-G

Workpiece material Werkstück -material	Cast iron, Nodular cast iron Grauguss GGG		Carbon steel, Alloy steel Kohlenstoffstahl Leg. Stahl ~750N/mm²		Carbon steel, Alloy steel Kohlenstoffstahl Leg. Stahl ~30HRC		Pre-hardened steel, Quenched and tempered steel Vergüteter Stahl ~40HRC		Stainless steel · Rostfreier Stahl		Pre-hardened steel, Quenched and tempered steel Vergüteter Stahl ~50HRC	
Diameter Ø Durchmesse (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)
1	20000	225	20000	225	20000	180	20000	180	20000	80	20000	135
2	15000	360	15000	360	15000	325	15000	315	11150	90	13000	200
3	14000	610	14000	610	13000	570	10600	470	7500	110	8500	370
4	10800	630	10800	630	10000	575	8000	480	5500	115	6500	380
5	8200	660	8200	660	7600	600	6400	505	4500	115	5000	400
6	7000	675	7000	675	6400	620	5300	515	3700	120	4200	405
8	5200	665	5200	665	4800	610	4000	510	2800	120	3200	415
10	4200	660	4200	660	3800	600	3200	505	2200	120	2500	390
12	3500	660	3500	660	3200	600	2650	505	1850	120	2100	390
14	3000	610	3000	610	2700	570	2300	470	1600	115	1800	370
16	2600	610	2600	610	2400	570	2000	470	1400	110	1600	370
18	2300	600	2300	600	2100	560	1800	460	1250	95	1400	365
20	2050	600	2050	600	1900	560	1600	460	1100	95	1250	365

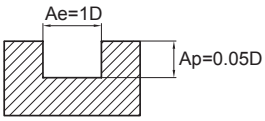
Max. cutting depth
max Schnitttiefe







Milling slot · Nutenfräsen	
Ø	Ap
Ø1≤D<Ø3	0.15D
Ø3≤D	0.3D



1. The above table shows the standard value of side milling. When slot milling, of rotating speed 50%~70% and feed rate like mentioned above 40%~60%.
2. Please select high precise machine and tool holder.
3. Please use air blow or cutting liquid with high mist retardant property.
4. Down milling is recommended in side milling.
5. Vibration and unusual noise may be generated if the machine rigidity and workpiece fixture stability is low, please reduce the rotating speed and feed rate like mentioned above.
6. Make overhang as short as possible if no interference.

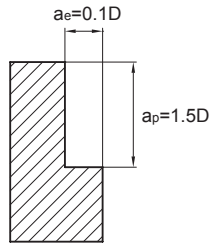
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2. Bitte präzise Maschinen und Werkzeughalter verwenden.
3. Bitte Luftkühlung oder Schneidflüssigkeit benutzen.
4. Empfohlene Fräsmethode: Gleichlauffräsen.
5. Bei Vibrationen oder unüblichen Geräuschen reduzieren Sie die Schnittdaten (wie oben empfohlen) entsprechend.
6. Werkzeugauskragung so kurz wie möglich wählen.

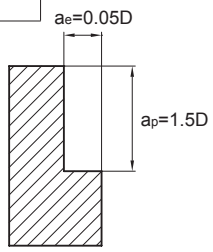
Recommended cutting data · Empfohlene Schnittdaten

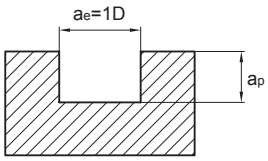
GM-4F-G | GM-4FL-G

Workpiece material Werkstück -material	Cast iron, Nodular cast iron Grauguss GGG Grauguss GGG		Carbon steel, Alloy steel Kohlenstoffstahl Leg. Stahl ~750N/mm²		Carbon steel, Alloy steel Kohlenstoffstahl Leg. Stahl ~30HRC		Pre-hardened steel, Quenched and tempered steel Vergüteter Stahl ~40HRC		Stainless steel · Rostfreier Stahl		Pre-hardened steel, Quenched and tempered steel Vergüteter Stahl ~50HRC	
Diameter Ø Durchmesse (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)
1	20000	160	20000	160	20000	125	20000	125	20000	55	20000	95
2	15000	250	15000	250	15000	230	15000	220	11150	65	13000	140
3	14000	430	14000	430	13000	400	10600	330	7500	80	8500	260
4	10800	440	10800	440	10000	400	8000	335	5500	80	6500	265
5	8200	460	8200	460	7600	420	6400	355	4500	80	5000	280
6	7000	470	7000	470	6400	435	5300	360	3700	85	4200	285
8	5200	465	5200	465	4800	430	4000	360	2800	85	3200	290
10	4200	460	4200	460	3800	420	3200	355	2200	85	2500	275
12	3500	460	3500	460	3200	420	2650	355	1850	80	2100	275
14	3000	430	3000	430	2700	400	2300	330	1600	80	1800	260
16	2600	430	2600	430	2400	400	2000	330	1400	80	1600	260
18	2300	420	2300	420	2100	390	1800	325	1250	70	1400	255
20	2050	420	2050	420	1900	390	1600	325	1100	70	1250	255

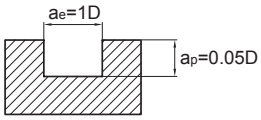
Max. cutting depth
max Schnitttiefe







Milling slot	Nutenfräsen
Ø	Ap
Ø1≤D<Ø3	0.15D
Ø3≤D	0.3D

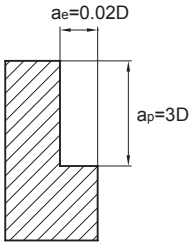


1. The above table shows the standard value of side milling. When slot milling, of rotating speed 50%~70% and feed rate like mentioned above 40%~60%.
2. Please select high precise machine and tool holder.
3. Please use air blow or cutting liquid with high mist retardant property.
4. Down milling is recommended in side milling.
5. Vibration and unusual noise may be generated if the machine rigidity and workpiece fixture stability is low, please reduce the rotating speed and feed rate like mentioned above.
6. Make overhang as short as possible if no interference.

1. Die obige Tabelle zeigt Standard Werte für das Eckfräsen. Bei Nutenfräsen, Schnittgeschwindigkeit auf 50-70% und den Vorschub auf 40-60% reduzieren.
2. Bitte präzise Maschinen und Werkzeughalter verwenden.
3. Bitte Luftkühlung oder Schneidflüssigkeit benutzen.
4. Empfohlene Fräsmethode: Gleichlauffräsen.
5. Bei Vibrationen oder unüblichen Geräuschen reduzieren Sie die Schnittdaten (wie oben empfohlen) entsprechend.
6. Werkzeugauskragung so kurz wie möglich wählen.

Recommended cutting data · Empfohlene Schnittdaten

GM-4EX-G

Workpiece material Werkstück -material	Cast iron, Nodular cast iron Grauguss GGG Grauguss GGG		Carbon steel, Alloy steel Kohlenstoffstahl Leg. Stahl ~750N/mm²		Carbon steel, Alloy steel Kohlenstoffstahl Leg. Stahl ~30HRC		Pre-hardened steel, Quenched and tempered steel Vergüteter Stahl ~40HRC		Stainless steel · Rostfreier Stahl		Pre-hardened steel, Quenched and tempered steel Vergüteter Stahl ~50HRC	
Diameter Ø Durchmesse (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)
6	5800	475	5800	475	5300	430	4250	340	2650	70	3600	290
8	4400	475	4400	475	4000	430	3180	340	2000	70	2700	290
10	3500	460	3500	460	3200	420	2550	330	1600	70	2150	280
12	2900	460	2900	460	2650	420	2120	330	1350	70	1800	280
16	2200	430	2200	430	2000	390	1590	315	1000	65	1350	260
20	1750	430	1750	430	1600	385	1270	310	800	60	1050	255
Max. cutting depth max Schnitttiefe												

1. Please select high precise machine and tool holder.
2. Please use air blow or cutting liquid with high mist retardant property.
3. Down milling is recommended in side milling.
4. Vibration and unusual noise may be generated if the machine rigidity and workpiece fixture stability is low, please reduce the rotating speed and feed rate like mentioned above.
5. Make overhang as short as possible if no interference.

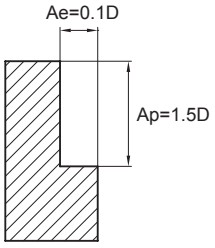
1. Bitte präzise Maschinen und Werkzeughalter verwenden.
2. Bitte Luftkühlung oder Schneidflüssigkeit benutzen.
3. Empfohlene Fräsmethode: Gleichlauffräsen.
4. Bei Vibrationen oder unüblichen Geräuschen reduzieren Sie die Schnittdaten (wie oben empfohlen) entsprechend.
5. Werkzeugauskragung so kurz wie möglich wählen.

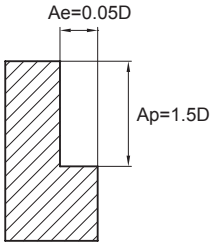
Recommended cutting data · Empfohlene Schnittdaten

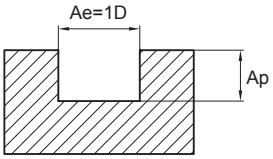
GM-4E | GM-4EL

Workpiece material Werkstück -material	Cast iron, Nodular cast iron Grauguss GGG		Carbon steel, Alloy steel Kohlenstoffstahl Leg. Stahl ~750N/mm²		Carbon steel, Alloy steel Kohlenstoffstahl Leg. Stahl ~30HRC		Pre-hardened steel, Quenched and tempered steel Vergüteter Stahl ~40HRC		Stainless steel · Rostfreier Stahl		Pre-hardened steel, Quenched and tempered steel Vergüteter Stahl ~50HRC	
Diameter Ø Durchmesse (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)
1	20000	250	20000	250	20000	200	20000	200	20000	90	20000	150
2	15000	400	15000	400	15000	360	15000	350	11150	100	13000	225
3	14000	680	14000	680	13000	630	10600	525	7500	120	8500	410
4	10800	700	10800	700	10000	640	8000	535	5500	125	6500	420
5	8200	730	8200	730	7600	670	6400	560	4500	125	5000	440
6	7000	750	7000	750	6400	690	5300	575	3700	135	4200	450
8	5200	740	5200	740	4800	680	4000	565	2800	135	3200	460
10	4200	730	4200	730	3800	670	3200	560	2200	135	2500	435
12	3500	730	3500	730	3200	670	2650	560	1850	135	2100	435
14	3000	680	3000	680	2700	630	2300	525	1600	125	1800	410
16	2600	680	2600	680	2400	630	2000	525	1400	120	1600	410
18	2300	670	2300	670	2100	620	1800	515	1250	105	1400	405
20	2050	670	2050	670	1900	620	1600	515	1100	105	1250	405

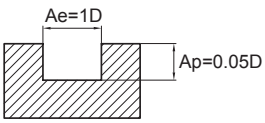
Max. cutting depth
max Schnitttiefe







Milling slot · Nutenfräsen	
Ø	Ap
Ø1≤D<Ø3	0.15D
Ø3≤D	0.3D



1. The above table shows the standard value of side milling. When slot milling, of rotating speed 50%~70% and feed rate like mentioned above 40%~60%.
2. Please select high precise machine and tool holder.
3. Please use air blow or cutting liquid with high mist retardant property.
4. Down milling is recommended in side milling.
5. Vibration and unusual noise may be generated if the machine rigidity and workpiece fixture stability is low, please reduce the rotating speed and feed rate like mentioned above.
6. Make overhang as short as possible if no interference.

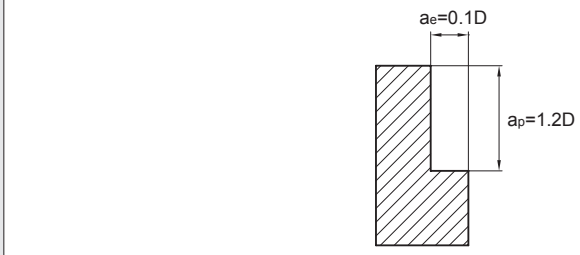
1. Die obige Tabelle zeigt Standard Werte für das Eckfräsen. Bei Nutenfräsen, Schnittgeschwindigkeit auf 50-70% und den Vorschub auf 40-60% reduzieren.
2. Bitte präzise Maschinen und Werkzeughalter verwenden.
3. Bitte Luftkühlung oder Schneidflüssigkeit benutzen.
4. Empfohlene Fräsmethode: Gleichlauffräsen.
5. Bei Vibrationen oder unüblichen Geräuschen reduzieren Sie die Schnittdaten (wie oben empfohlen) entsprechend.
6. Werkzeugauskragung so kurz wie möglich wählen.

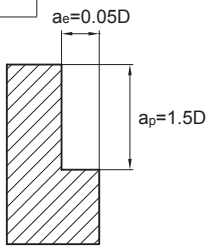
Recommended cutting data · Empfohlene Schnittdaten

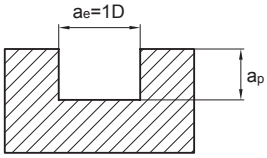
GM-4EFP

Workpiece material Werkstück -material	Cast iron, Nodular cast iron Grauguss GGG		Carbon steel, Alloy steel Kohlenstoffstahl Leg. Stahl ~750N/mm²		Carbon steel, Alloy steel Kohlenstoffstahl Leg. Stahl ~30HRC		Pre-hardened steel, Quenched and tempered steel Vergüteter Stahl ~40HRC		Stainless steel · Rostfreier Stahl		Pre-hardened steel, Quenched and tempered steel Vergüteter Stahl ~50HRC	
Diameter Ø Durchmesse (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)
6	7000	975	7000	975	6400	900	5300	750	3700	175	4200	585
8	5200	960	5200	960	4800	995	4000	735	2800	175	3200	600
10	4200	950	4200	950	3800	970	3200	730	2200	175	2500	565
12	3500	950	3500	950	3200	970	2650	730	1850	175	2100	565
16	2600	885	2600	885	2400	820	2000	680	1400	155	1600	535
20	2050	870	2050	870	1900	805	1600	670	1100	135	1250	525

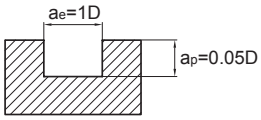
Max. cutting depth
max Schnitttiefe







Milling slot · Nutenfräsen	
Ø	Ap
Ø1≤D<Ø3	0.15D
Ø3≤D	0.3D

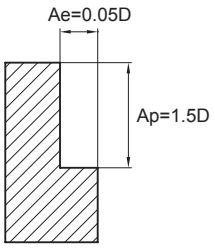


1. The above table shows the standard value of side milling. When slot milling, of rotating speed 50%~70% and feed rate like mentioned above 40%~60%.
2. Please select high precise machine and tool holder.
3. Please use air blow or cutting liquid with high mist retardant property.
4. Down milling is recommended in side milling.
5. Vibration and unusual noise may be generated if the machine rigidity and workpiece fixture stability is low, please reduce the rotating speed and feed rate like mentioned above.
6. Make overhang as short as possible if no interference.

1. Die obige Tabelle zeigt Standard Werte für das Eckfräsen. Bei Nutenfräsen, Schnittgeschwindigkeit auf 50-70% und den Vorschub auf 40-60% reduzieren.
2. Bitte präzise Maschinen und Werkzeughalter verwenden.
3. Bitte Luftkühlung oder Schneidflüssigkeit benutzen.
4. Empfohlene Fräsmethode: Gleichlauffräsen.
5. Bei Vibrationen oder unüblichen Geräuschen reduzieren Sie die Schnittdaten (wie oben empfohlen) entsprechend.
6. Werkzeugauskragung so kurz wie möglich wählen.

Recommended cutting data · Empfohlene Schnittdaten

GM-6E

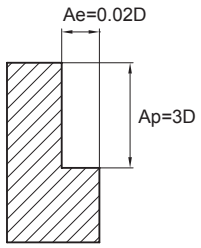
Workpiece material Werkstück -material	Cast iron, Nodular cast iron Grauguss GGG		Carbon steel, Alloy steel Kohlenstoffstahl Leg. Stahl ~750N/mm²		Carbon steel, Alloy steel Kohlenstoffstahl Leg. Stahl ~30HRC		Pre-hardened steel, Quenched and tempered steel Vergüteter Stahl ~40HRC		Stainless steel · Rostfreier Stahl		Pre-hardened steel, Quenched and tempered steel Vergüteter Stahl ~50HRC	
Diameter Ø Durchmesse (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)
6	7000	890	7000	890	6400	820	5300	680	3700	160	4200	540
8	5200	890	5200	890	4800	820	4000	680	2800	160	3200	550
10	4200	860	4200	860	3800	800	3200	665	2200	160	2500	520
12	3500	860	3500	860	3200	800	2650	665	1850	160	2100	520
14	3000	810	3000	810	2700	750	2300	625	1600	150	1800	490
16	2600	810	2600	810	2400	750	2000	625	1400	150	1600	490
18	2300	800	2300	800	2100	740	1800	615	1250	125	1400	485
20	2050	800	2050	800	1900	740	1600	615	1100	125	1250	485
Max. cutting depth max Schnitttiefe												

1. Please select high precise machine and tool holder.
2. Please use air blow or MQL(minimum oil mist cooling).
3. Down milling is recommended in side milling.
4. Vibration and unusual noise may be generated if the machine rigidity and workpiece fixture stability is low, please reduce the rotating speed and feed rate like mentioned above.
5. Make overhang as short as possible if no interference.

1. Bitte präzise Maschinen und Werkzeughalter verwenden.
2. Als Kühlmittel bitte Luft oder MQL (Minimalmengen) verwenden.
3. Empfohlene Fräsmethode: Gleichlauffräsen.
4. Bei Vibrationen oder unüblichen Geräuschen reduzieren Sie die Schnittdaten (wie oben empfohlen) entsprechend.
5. Werkzeugauskragung so kurz wie möglich wählen.

Recommended cutting data · Empfohlene Schnittdaten

GM-6EL

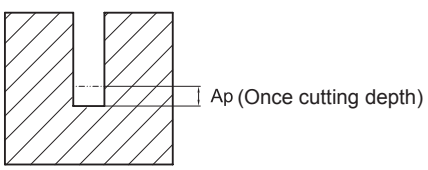
Workpiece material Werkstück -material	Cast iron, Nodular cast iron Grauguss GGG		Carbon steel, Alloy steel Kohlenstoffstahl Leg. Stahl ~750N/mm²		Carbon steel, Alloy steel Kohlenstoffstahl Leg. Stahl ~30HRC		Pre-hardened steel, Quenched and tempered steel Vergüteter Stahl ~40HRC		Stainless steel · Rostfreier Stahl		Pre-hardened steel, Quenched and tempered steel ~50HRC	
Diameter Ø Durchmesse (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)
6	5800	750	5800	750	5300	685	4250	545	2650	115	3600	460
8	4400	750	4400	750	4000	685	3180	545	2000	115	2700	465
10	3500	730	3500	730	3200	665	2550	530	1600	115	2150	440
12	2900	730	2900	730	2650	665	2120	530	1350	115	1800	440
14	2500	685	2500	685	2300	625	1820	500	1150	105	1550	415
16	2200	685	2200	685	2000	625	1590	500	1000	105	1350	415
18	1950	675	1950	675	1800	615	1420	490	900	90	1200	410
20	1750	675	1750	675	1600	615	1270	490	800	90	1050	410
max. cutting depth max Schnitttiefe												

1. Please select high precise machine and tool holder.
2. Please use air blow or MQL(minimum oil mist cooling).
3. Down milling is recommended in side milling.
4. Vibration and unusual noise may be generated if the machine rigidity and workpiece fixture stability is low, please reduce the rotating speed and feed rate like mentioned above.
5. Make overhang as short as possible if no interference.

1. Bitte präzise Maschinen und Werkzeughalter verwenden.
2. Als Kühlmittel bitte Luft oder MQL (Minimalmengen) verwenden.
3. Empfohlene Fräsmethode: Gleichlauffräsen.
4. Bei Vibrationen oder unüblichen Geräuschen reduzieren Sie die Schnittdaten (wie oben empfohlen) entsprechend.
5. Werkzeugauskragung so kurz wie möglich wählen.

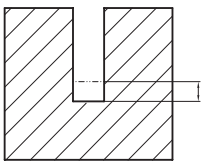
Recommended cutting data · Empfohlene Schnittdaten

GM-2EP

Workpiece material Werkstück-material		Cast iron, Carbon steel, Alloy steel Kohlenstoffstahl Leg. Stahl ~750N/mm²			Carbon steel, Alloy steel Kohlenstoffstahl Leg. Stahl ~30HRC			Pre-hardened steel, Quenched and tempered steel Vergüteter Stahl ~40HRC			Stainless steel Rostfreier Stahll		
Diameter Ø (mm)	Effective length (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Ap (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Ap (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Ap (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Ap (mm)
0.5	4	28000	200	0.023	28000	175	0.021	28000	150	0.018	25000	100	0.014
	6	22000	150	0.007	22000	125	0.006	22000	100	0.005	20000	75	0.004
	8	18000	100	0.005	18000	75	0.005	18000	75	0.004	20000	50	0.003
0.8	4	32000	400	0.057	32000	350	0.053	32000	300	0.044	25000	200	0.035
	6	26000	300	0.036	26000	250	0.034	26000	200	0.028	21000	150	0.022
	8	22000	200	0.026	22000	150	0.024	22000	125	0.020	18000	100	0.016
	10	22000	150	0.01	22000	100	0.01	22000	75	0.008	18000	75	0.006
1.0	4	29000	800	0.08	27000	600	0.08	26000	400	0.07	20000	300	0.05
	6	29000	800	0.07	27000	600	0.07	26000	400	0.06	20000	300	0.04
	8	24000	600	0.05	23000	400	0.04	22000	300	0.04	18000	200	0.03
	10	20000	500	0.03	19000	400	0.03	18000	300	0.03	15000	200	0.02
	12	20000	300	0.02	19000	200	0.02	18000	175	0.02	15000	150	0.01
	14	18000	200	0.015	15000	150	0.01	15000	125	0.01	12000	100	0.008
1.2	6	25000	800	0.09	23000	600	0.08	22000	400	0.07	17000	300	0.05
	8	21000	600	0.07	20000	400	0.07	19000	300	0.05	14000	200	0.04
	10	21000	600	0.06	20000	400	0.05	19000	300	0.04	14000	200	0.03
	12	18000	400	0.04	17000	300	0.04	16000	200	0.03	11000	150	0.02
1.5	6	20000	800	0.15	18000	600	0.14	18000	400	0.11	14000	300	0.09
	8	19000	600	0.11	16000	400	0.10	15000	300	0.08	12000	200	0.07
	10	19000	600	0.09	16000	400	0.08	15000	300	0.06	12000	200	0.05
	12	19000	600	0.07	16000	400	0.06	15000	300	0.05	12000	200	0.04
	14	19000	500	0.06	16000	350	0.05	15000	250	0.04	12000	180	0.03
2.0	6	16000	800	0.34	15000	600	0.31	14000	450	0.26	11000	350	0.21
	8	16000	800	0.29	15000	600	0.26	14000	450	0.22	11000	350	0.18
	10	14000	600	0.26	1300	400	0.24	12000	300	0.20	9000	250	0.16
	12	14000	600	0.14	13000	400	0.13	12000	300	0.11	9000	250	0.09
	14	14000	500	0.10	13000	350	0.11	12000	250	0.09	9000	200	0.07
	16	14000	400	0.08	13000	300	0.08	12000	200	0.07	9000	150	0.06
max. cutting depth max Schnitttiefe		 Ap (Once cutting depth)											

Recommended cutting data · Empfohlene Schnittdaten

GM-2EP

Workpiece material Werkstück-material		Cast iron, Carbon steel, Alloy steel Kohlenstoffstahl Leg. Stahl ~750N/mm²			Carbon steel, Alloy steel Kohlenstoffstahl Leg. Stahl ~30HRC			Pre-hardened steel, Quenched and tempered steel Vergüteter Stahl ~40HRC			Stainless steel Rostfreier Stahl		
Diameter Ø (mm)	Effective length (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Ap (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Ap (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Ap (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Ap (mm)
2.5	8	13000	800	0.42	12000	600	0.39	11000	450	0.33	9000	350	0.26
	10	13000	800	0.36	12000	600	0.33	11000	450	0.28	9000	350	0.22
	12	13000	800	0.24	12000	600	0.23	11000	450	0.19	9000	350	0.15
	14	12000	600	0.18	10000	400	0.17	9000	300	0.14	7000	250	0.11
	16	12000	600	0.13	10000	400	0.12	9000	300	0.09	7000	250	0.08
	18	12000	600	0.11	10000	350	0.10	9000	250	0.07	7000	200	0.07
	20	12000	600	0.09	10000	350	0.08	9000	250	0.05	7000	200	0.05
3.0	6	11000	800	0.42	10000	600	0.39	10000	450	0.32	8000	350	0.27
	8	11000	800	0.39	10000	600	0.36	10000	450	0.30	8000	350	0.24
	10	11000	800	0.31	10000	600	0.29	10000	450	0.24	8000	350	0.19
	12	11000	800	0.29	10000	500	0.27	10000	400	0.22	8000	300	0.16
	14	11000	600	0.27	10000	450	0.25	10000	350	0.20	8000	250	0.15
	16	10000	600	0.22	10000	400	0.20	9000	300	0.17	6000	200	0.13
	18	10000	600	0.16	10000	400	0.14	9000	300	0.12	6000	200	0.10
	20	10000	500	0.12	10000	350	0.10	9000	250	0.08	6000	175	0.07
4.0	12	8000	800	0.42	7000	600	0.38	7000	450	0.32	6000	350	0.26
	16	8000	800	0.39	7000	500	0.35	7000	400	0.30	6000	300	0.24
	20	7000	600	0.34	7000	400	0.30	6000	350	0.27	5000	250	0.20
	25	7000	600	0.30	7000	400	0.27	6000	350	0.24	5000	250	0.15
5.0	16	6000	800	0.49	6000	500	0.45	5000	400	0.38	5000	300	0.30
	25	5000	800	0.45	5000	400	0.42	5000	350	0.35	5000	250	0.25
Max. cutting depth max Schnitttiefe		 Ap (Once cutting depth)											

1. Please select high precise machine and tool holder.
2. Please use air blow or MQL (minimum oil mist cooling).
3. Make overhang as short as possible if no interference.
4. Reduce feed correspondingly when rotating speed is low.

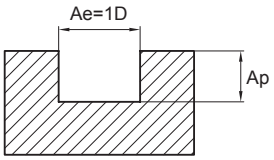
1. Bitte präzise Maschine und Werkzeugaufnahmen wählen
2. Als Kühlmittel bitte Luft oder MQL (Minimalmengen) verwenden.
3. Werkzeugauskragung so kurz wie möglich wählen.
4. Bitte Vorschub entsprechend reduzieren, wenn die Drehzahlen niedrig sind.

Recommended cutting data · Empfohlene Schnittdaten

GM-2ES

Workpiece material Werkstück -material	Cast iron, Nodular cast iron Grauguss GGG		Carbon steel, Alloy steel Kohlenstoffstahl Leg. Stahl ~750N/mm²		Carbon steel, Alloy steel Kohlenstoffstahl Leg. Stahl ~30HRC		Pre-hardened steel, Quenched and tempered steel Vergüteter Stahl ~40HRC		Stainless steel · Rostfreier Stahl	
Diameter Ø Durchmesse (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)
0.3	32000	115	32000	115	32000	115	32000	80	32000	40
0.4	32000	125	32000	125	32000	125	32000	90	27500	50
0.5	32000	125	32000	125	29500	125	25000	90	22000	50
0.6	32000	125	32000	125	24500	125	21000	90	18500	50
0.7	32000	125	32000	125	24500	125	21000	90	18500	50
0.8	24500	125	24500	125	18500	125	15500	90	13500	50
0.9	24500	125	24500	125	18500	125	15500	90	13500	50
1.0	21000	140	25000	165	16800	130	14500	90	10000	50
1.5	13000	140	15000	165	11800	130	10000	90	7000	50
2.0	13000	160	15000	185	11800	145	10000	100	7000	60
2.5	8700	200	10000	240	8200	185	6600	100	4700	60
3.0	8700	235	10000	270	8200	220	6600	100	4700	75

Max. cutting depth
max Schnitttiefe



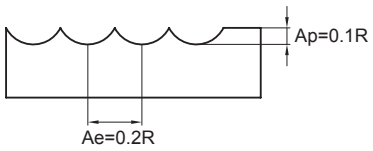
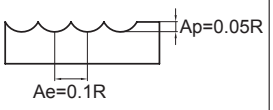
Milling slot · Nutenfräsen	
Tools Diameter	Cutting depth Ap
D<Ø1	0.05D
Ø1≤D≤Ø3	0.15D

1. Please select high precise machine and tool holder.
2. Please use air blow or cutting liquid with high mist retardant property.
3. Vibration and unusual noise may be generated if the machine rigidity and workpiece fixture stability is low, please reduce the rotating speed and feed rate like mentioned above.
4. Make overhang as short as possible if no interference.

1. Bitte präzise Maschine und Werkzeugaufnahmen wählen.
2. Als Kühlmittel bitte Luft oder MQL (Minimalmengen) verwenden..
3. Bei Vibrationen oder unüblichen Geräuschen reduzieren Sie die Schnittdaten (wie oben empfohlen) entsprechend.
4. Werkzeugauskragung so kurz wie möglich wählen.

Recommended cutting data · Empfohlene Schnittdaten

GM-2B | GM-2BL

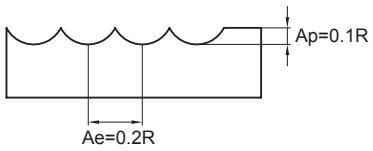
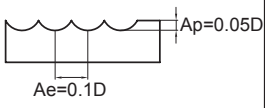
Workpiece material Werkstückstoff	Cast iron, Nodular cast iron Grauguss GGG		Carbon steel, Alloy steel Kohlenstoffstahl Leg. Stahl ~750N/mm²		Carbon steel, Alloy steel Kohlenstoffstahl Leg. Stahl ~30HRC		Pre-hardened steel, Quenched and tempered steel Vergüteter Stahl ~40HRC		Stainless steel · Rostfreier Stahl		Pre-hardened steel, Quenched and tempered steel Vergüteter Stahl ~50HRC	
Diameter Ø Durchmesse (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)
R0.5	40000	800	40000	800	38000	700	32000	320	22300	200	25000	275
R1.0	24000	900	24000	900	19000	760	16000	400	11150	230	13000	275
R1.5	15500	950	15500	950	12750	760	10600	450	7400	290	8500	280
R2.0	11500	950	11500	950	9550	760	8000	550	5550	370	6500	370
R2.5	9500	1050	9500	1050	7650	800	6400	550	4450	370	5000	375
R3.0	8000	1050	8000	1050	6400	800	5300	580	3700	390	4200	390
R4.0	6000	1300	6000	1300	4800	950	4000	700	2750	455	3200	440
R5.0	4800	1200	4800	1200	3800	900	3200	650	2200	430	2500	440
R6.0	4000	1100	4000	1100	3200	840	2650	610	1850	430	2100	420
R8.0	3000	1050	3000	1050	2400	800	2000	600	1350	380	1600	375
R10.0	2400	950	2400	950	1900	680	1600	560	1100	370	1250	330
Max. cutting depth max Schnitttiefe												

1. Please select high precise machine and tool holder.
2. Please use air blow or cutting liquid with high mist retardant property.
3. Vibration and unusual noise may be generated if the machine rigidity and workpiece fixture stability is low, please reduce the rotating speed and feed rate like mentioned above.
4. Make overhang as short as possible if no interference.

1. Bitte präzise Maschine und Werkzeugaufnahmen wählen.
2. Als Kühlmittel bitte Luft oder MQL (Minimalmengen) verwenden..
3. Bei Vibrationen oder unüblichen Geräuschen reduzieren Sie die Schnittdaten (wie oben empfohlen) entsprechend.
4. Werkzeugauskragung so kurz wie möglich wählen.

Recommended cutting data · Empfohlene Schnittdaten

GM-4B | GM-4BL

Workpiece material Werkstückstoff	Cast iron, Nodular cast iron Grauguss GGG		Carbon steel, Alloy steel Kohlenstoffstahl Leg. Stahl ~750N/mm²		Carbon steel, Alloy steel Kohlenstoffstahl Leg. Stahl ~30HRC		Pre-hardened steel, Quenched and tempered steel Vergüteter Stahl ~40HRC		Stainless steel · Rostfreier Stahl		Pre-hardened steel, Quenched and tempered steel Vergüteter Stahl ~50HRC	
Cutting speed Schnittgeschw.	150 m/min		150m/min		120m/min		100m/min		70m/min		80m/min	
Diameter Ø Durchmesse (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)
R1.5	15500	1710	15500	1710	12750	1340	10600	810	7400	520	8500	500
R2.0	11500	1710	11500	1710	9550	1340	8000	990	5550	660	6500	665
R2.5	9500	1890	9500	1890	7650	1440	6400	990	4450	660	5000	675
R3.0	8000	1890	8000	1890	6400	1440	5300	1040	3700	700	4200	700
R4.0	6000	2340	6000	2340	4800	1710	4000	1260	2750	820	3200	790
R5.0	4800	2160	4800	2160	3800	1620	3200	1170	2200	770	2500	790
R6.0	4000	1980	4000	1980	3200	1510	2650	1100	1850	770	2100	755
R8.0	3000	1890	3000	1890	2400	1440	2000	1080	1350	680	1600	675
R10.0	2400	1710	2400	1710	1900	1220	1600	1000	1100	660	1250	595
Max. cutting depth max Schnitttiefe												

1. Please select high precise machine and tool holder.
2. Please use air blow or cutting liquid with high mist retardant property.
3. Vibration and unusual noise may be generated if the machine rigidity and workpiece fixture stability is low, please reduce the rotating speed and feed rate like mentioned above.
4. Make overhang as short as possible if no interference.

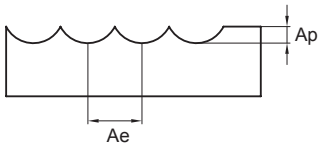
1. Bitte präzise Maschine und Werkzeugaufnahmen wählen.
2. Als Kühlmittel bitte Luft oder MQL (Minimalmengen) verwenden..
3. Bei Vibrationen oder unüblichen Geräuschen reduzieren Sie die Schnittdaten (wie oben empfohlen) entsprechend.
4. Werkzeugauskragung so kurz wie möglich wählen.

Recommended cutting data · Empfohlene Schnittdaten

GM-2BS

Workpiece material Werkstückstoff	Cast iron, Nodular cast iron Grauguss GGG		Carbon steel, Alloy steel Kohlenstoffstahl Leg. Stahl ~750N/mm²		Carbon steel, Alloy steel Kohlenstoffstahl Leg. Stahl ~30HRC		Pre-hardened steel, Quenched and tempered steel Vergüteter Stahl ~40HRC		Stainless steel · Rostfreier Stahl	
Diameter Ø Durchmesse (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)
R0.15	32000	300	32000	300	32000	270	32000	250	32000	150
R0.2	32000	380	32000	380	32000	320	32000	300	32000	175
R0.25	32000	460	32000	460	32000	410	32000	330	32000	205
R0.3	32000	535	32000	535	32000	500	32000	420	32000	265
R0.35	32000	550	32000	550	32000	520	32000	440	32000	270
R0.4	32000	610	32000	610	32000	560	32000	460	27500	285
R0.45	32000	700	32000	700	32000	600	25000	400	27500	285
R0.5	32000	765	32000	765	32000	640	25000	400	22000	285
R1.0	24000	900	24000	900	19000	760	16000	400	11150	230
R1.5	15500	950	15500	950	12750	760	10600	450	7400	290

Max. cutting depth
max Schnitttiefe



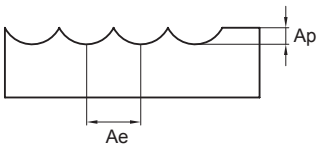
Milling slot · Nutenfräsen		
Ø	Ap	Ae
D<Ø1	0.05R	0.2R
Ø1≤D≤Ø3	0.1R	0.2R

1. Please select high precise machine and tool holder.
2. Please use air blow or cutting liquid with high mist retardant property.
3. Make overhang as short as possible if no interference.
4. Reduce feed correspondingly when rotating speed is low.

1. Bitte präzise Maschine und Werkzeugaufnahmen wählen
2. Als Kühlmittel bitte Luft oder MQL (Minimalmengen) verwenden.
3. Werkzeugauskragung so kurz wie möglich wählen.
4. Bitte Vorschub entsprechend reduzieren, wenn die Drehzahlen niedrig sind.

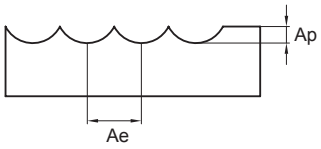
Recommended cutting data · Empfohlene Schnittdaten

GM-2BP | GM-2BFP

Workpiece material Werkstück-material		Cast iron, Carbon steel, Alloy steel Kohlenstoffstahl Leg. Stahl ~750N/mm²				Carbon steel, Alloy steel Kohlenstoffstahl Leg. Stahl ~30HRC				Pre-hardened steel, Quenched and tempered steel Vergüteter Stahl ~40HRC				Stainless steel · Rostfreier Stahl			
Diameter Ø (mm)	Effective length (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Ap (mm)	Ae (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Ap (mm)	Ae (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Ap (mm)	Ae (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Ap (mm)	Ae (mm)
R0.25	4	27000	400	0.02	0.025	27000	380	0.02	0.025	27000	300	0.02	0.025	27000	200	0.02	0.025
	6	21000	200	0.01	0.015	21000	180	0.01	0.015	21000	160	0.01	0.015	21000	150	0.01	0.015
R0.3	4	27000	400	0.03	0.12	27000	380	0.03	0.12	25000	250	0.03	012	24000	200	0.03	0.12
	6	25000	300	0.03	0.12	25000	280	0.03	0.12	20000	150	0.03	0.12	20000	140	0.03	0.12
	8	25000	240	0.03	0.12	25000	225	0.03	0.12	20000	120	0.03	0.12	20000	110	0.03	0.12
R0.4	4	27000	600	0.04	0.16	27000	550	0.04	0.16	23000	450	0.04	0.16	21000	300	0.04	0.16
	6	24000	400	0.04	0.12	24000	360	0.04	0.12	21000	250	0.04	0.12	19000	200	0.04	0.12
	8	22000	300	0.04	0.12	22000	270	0.04	0.12	19000	150	0.04	0.12	19000	140	0.04	0.12
	10	22000	270	0.03	0.09	22000	250	0.03	0.09	19000	135	0.03	0.09	19000	120	0.03	0.09
R0.5	4	28000	600	0.05	0.20	28000	550	0.05	0.20	25000	500	0.05	0.20	21000	300	0.05	0.20
	6	21000	400	0.05	0.20	21000	360	0.05	0.20	19000	300	0.05	0.20	16000	200	0.05	0.2
	8	21000	360	0.05	0.15	21000	320	0.05	0.15	19000	270	0.05	0.15	16000	180	0.05	0.15
	10	18000	300	0.03	0.10	18000	270	0.03	0.10	17000	200	0.03	0.10	14000	150	0.03	0.10
	12	18000	270	0.03	0.10	18000	250	0.03	0.10	17000	180	0.03	0.10	14000	135	0.03	0.10
R0.6	6	20000	600	0.06	0.24	20000	540	0.06	0.24	17000	300	0.06	0.24	14000	200	0.06	0.24
	8	20000	540	0.06	0.24	20000	500	0.06	0.24	17000	270	0.06	0.24	14000	170	0.06	0.24
	12	16000	300	0.06	0.18	16000	270	0.06	0.18	14000	200	0.06	0.18	11000	150	0.06	0.18
	16	16000	270	0.03	0.12	16000	230	0.03	0.12	14000	175	0.03	0.12	11000	135	0.03	0.12
R0.75	8	17000	600	0.08	0.30	17000	540	0.08	0.30	15000	300	0.08	0.30	12000	250	0.08	0.30
	12	17000	540	0.06	0.24	17000	500	0.06	0.24	15000	275	0.06	0.24	12000	225	0.06	0.24
	16	13000	300	0.04	0.16	13000	275	0.04	0.16	12000	200	0.04	0.16	9500	150	0.04	0.16
R1.0	6	16500	800	0.10	0.40	16500	750	0.10	0.40	16500	560	0.10	0.40	13500	450	0.10	0.40
	8	16500	800	0.10	0.32	16500	750	0.10	0.32	16500	560	0.10	0.32	13500	450	0.10	0.32
	10	14000	630	0.08	0.30	14000	600	0.08	0.30	13000	450	0.08	0.30	10000	270	0.08	0.30
	12	14000	630	0.06	0.30	14000	600	0.06	0.30	13000	450	0.06	0.30	10000	270	0.06	0.30
	16	14000	550	0.06	0.24	14000	530	0.06	0.24	13000	400	0.06	0.24	10000	270	0.06	0.24
	20	11000	360	0.06	0.16	11000	330	0.06	0.16	10000	225	0.06	0.16	8000	175	0.06	0.16
Max. cutting depth max Schnitttiefe																	

Recommended cutting data · Empfohlene Schnittdaten

GM-2BP | GM-2BFP

Workpiece material Werkstück-material		Cast iron, Carbon steel, Alloy steel Kohlenstoffstahl Leg. Stahl ~750N/mm²				Carbon steel, Alloy steel Kohlenstoffstahl Leg. Stahl ~30HRC				Pre-hardened steel, Quenched and tempered steel Vergüteter Stahl ~40HRC				Stainless steel · Rostfreier Stahl			
Diameter Ø (mm)	Effective length (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Ap (mm)	Ae (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Ap (mm)	Ae (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Ap (mm)	Ae (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Ap (mm)	Ae (mm)
R1.25	**8**	14000	800	0.10	0.32	14000	750	0.10	0.32	14000	560	0.10	0.32	12500	450	0.10	0.32
	12	13000	630	0.06	0.30	13000	600	0.06	0.30	12000	450	0.06	0.30	10000	270	0.06	0.30
	16	13000	550	0.06	0.24	13000	530	0.06	0.24	12000	400	0.06	0.24	10000	270	0.06	0.24
	20	10000	360	0.06	0.16	10000	330	0.06	0.16	8000	225	0.06	0.16	7000	175	0.06	0.16
R1.5	8	12000	800	0.20	0.40	12000	720	0.20	0.40	9500	600	0.20	0.40	7500	400	0.20	0.40
	10	12000	800	0.15	0.40	12000	720	0.15	0.40	9500	600	0.15	0.40	7500	400	0.15	0.40
	12	12000	720	0.15	0.40	12000	650	0.15	0.40	9500	540	0.15	0.40	7500	360	0.15	0.40
	16	10000	600	0.15	0.40	10000	540	0.15	0.40	8500	300	0.15	0.40	6500	250	0.15	0.40
	20	10000	600	0.10	0.32	10000	540	0.10	0.32	8500	300	0.10	0.32	6500	250	0.10	0.32
R2.0	10	9000	800	0.20	0.80	9000	720	0.20	0.80	7500	600	0.20	0.80	6000	400	0.20	0.80
	16	9000	800	0.20	0.60	9000	720	0.20	0.60	7500	600	0.20	0.60	6000	400	0.20	0.60
	20	7000	600	0.20	0.40	7000	540	0.20	0.40	6000	400	0.20	0.40	5000	250	0.20	0.40
	25	7000	600	0.15	0.40	7000	540	0.15	0.40	6000	400	0.15	0.40	5000	250	0.15	0.40
R2.5	16	7000	600	0.25	1.00	7000	540	0.25	0.10	6500	500	0.25	1.0	5000	400	0.25	1.00
	25	6000	500	0.25	1.00	6000	450	0.25	1.00	5000	500	0.25	1.00	4000	250	0.25	1.00
Max. cutting depth max Schnitttiefe																	

1. Please select high precise machine and tool holder.
2. Please use air blow or cutting liquid with high mist retardant property.
3. Make overhang as short as possible if no interference.
4. Reduce feed correspondingly when rotating speed is low.

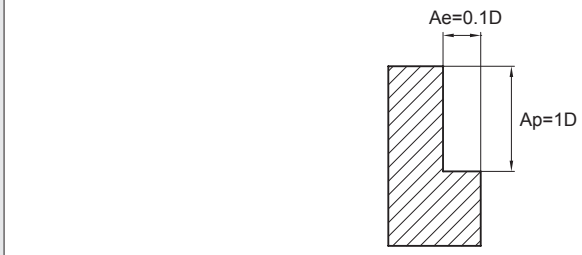
1. Bitte präzise Maschine und Werkzeugaufnahmen wählen
2. Als Kühlmittel bitte Luft oder MQL (Minimalmengen) verwenden.
3. Werkzeugauskragung so kurz wie möglich halten.
4. Bitte Vorschub entsprechend reduzieren, wenn die Drehzahlen niedrig sind.

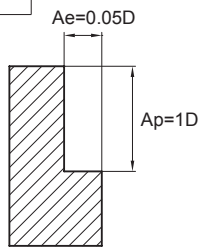
Recommended cutting data · Empfohlene Schnittdaten

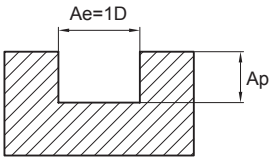
GM-2R

Workpiece material Werkstück-material	Cast iron, Nodular cast iron Grauguss GGG		Carbon steel, Alloy steel Kohlenstoffstahl Leg. Stahl ~750N/mm²		Carbon steel, Alloy steel Kohlenstoffstahl Leg. Stahl ~30HRC		Pre-hardened steel, Quenched and tempered steel Vergüteter Stahl ~40HRC		Stainless steel · Rostfreier Stahl		Pre-hardened steel, Quenched and tempered steel Vergüteter Stahl ~50HRC	
Diameter Ø Durchmesse (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)
1	20000	200	20000	200	20000	160	20000	160	20000	60	20000	120
2	15000	320	15000	320	15000	290	15000	280	11150	84	13000	180
3	14000	545	14000	545	13000	510	10600	420	7500	120	8500	330
4	10800	560	10800	560	10000	520	8000	430	5500	130	6500	335
5	8200	580	8200	580	7600	540	6400	450	4500	130	5000	355
6	7000	600	7000	600	6400	550	5300	460	3700	140	4200	360
8	5200	600	5200	600	4800	550	4000	460	2800	140	3200	365
10	4200	580	4200	580	3800	540	3200	445	2200	140	2500	350
12	3500	580	3500	580	3200	540	2650	445	1850	140	2100	350

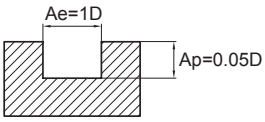
Max. cutting depth
max Schnitttiefe







Milling slot · Nutenfräsen	
Ø	Ap
Ø1≤D<Ø3	0.15D
Ø3≤D	0.3D



1. The above table shows the standard value of side milling. When slot milling, of rotating speed 50%~70% and feed rate like mentioned above 40%~60%.
2. Please select high precise machine and tool holder.
3. Please use air blow or cutting liquid with high mist retardant property.
4. Down milling is recommended in side milling.
5. Vibration and unusual noise may be generated if the machine rigidity and workpiece fixture stability is low, please reduce the rotating speed and feed rate like mentioned above.
6. Make overhang as short as possible if no interference.

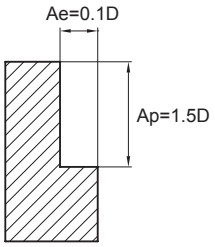
1. Die obige Tabelle zeigt Standard Werte für das Eckfräsen. Bei Nutenfräsen, Schnittgeschwindigkeit auf 50-70% und den Vorschub auf 40-60% reduzieren.
2. Bitte präzise Maschinen und Werkzeughalter verwenden.
3. Bitte Luftkühlung oder Schneidflüssigkeit benutzen.
4. Empfohlene Fräsmethode: Gleichlauffräsen.
5. Bei Vibrationen oder unüblichen Geräuschen reduzieren Sie die Schnittdaten (wie oben empfohlen) entsprechend.
6. Werkzeugauskragung so kurz wie möglich wählen.

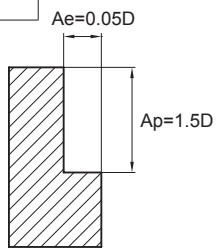
Recommended cutting data · Empfohlene Schnittdaten

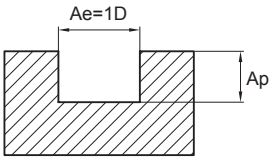
GM-4R | GM-4RL

Workpiece material Werkstück-material	Cast iron, Nodular cast iron Grauguss GGG		Carbon steel, Alloy steel Kohlenstoffstahl Leg. Stahl ~750N/mm²		Carbon steel, Alloy steel Kohlenstoffstahl Leg. Stahl ~30HRC		Pre-hardened steel, Quenched and tempered steel Vergüteter Stahl ~40HRC		Stainless steel · Rostfreier Stahl		Pre-hardened steel, Quenched and tempered steel Vergüteter Stahl ~50HRC	
Diameter Ø Durchmesse (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)
3	14000	820	14000	820	13000	755	10600	630	7500	145	8500	490
4	10800	840	10800	840	10000	770	8000	640	5500	145	6500	500
5	8200	880	8200	880	7600	810	6400	670	4500	145	5000	530
6	7000	900	7000	900	6400	830	5300	690	3700	160	4200	540
8	5200	890	5200	890	4800	815	4000	680	2800	160	3200	550
10	4200	880	4200	880	3800	810	3200	670	2200	160	2500	520
12	3500	880	3500	880	3200	810	2650	670	1850	160	2100	520
16	2600	680	2600	680	2400	630	2000	525	1400	120	1600	490

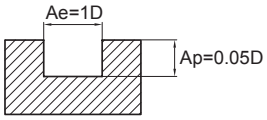
Max. cutting depth max Schnitttiefe







Milling slot · Nutenfräsen	
Ø	Ap
Ø1≤D<Ø3	0.15D
Ø3≤D	0.3D

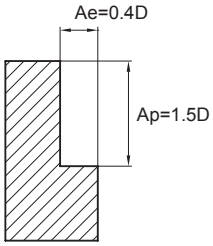
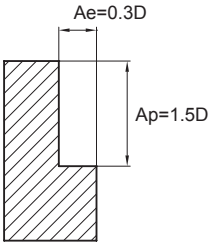


1. The above table shows the standard value of side milling. When slot milling, of rotating speed 50%~70% and feed rate like mentioned above 40%~60%.
2. Please select high precise machine and tool holder.
3. Please use air blow or cutting liquid with high mist retardant property.
4. Down milling is recommended in side milling.
5. Vibration and unusual noise may be generated if the machine rigidity and workpiece fixture stability is low, please reduce the rotating speed and feed rate like mentioned above.
6. Make overhang as short as possible if no interference.

1. Die obige Tabelle zeigt Standard Werte für das Eckfräsen. Bei Nutenfräsen, Schnittgeschwindigkeit auf 50-70% und den Vorschub auf 40-60% reduzieren.
2. Bitte präzise Maschinen und Werkzeughalter verwenden.
3. Bitte Luftkühlung oder Schneidflüssigkeit benutzen.
4. Empfohlene Fräsmethode: Gleichlauffräsen.
5. Bei Vibrationen oder unüblichen Geräuschen reduzieren Sie die Schnittdaten (wie oben empfohlen) entsprechend.
6. Werkzeugauskragung so kurz wie möglich wählen.

Recommended cutting data · Empfohlene Schnittdaten

GM-4W side milling

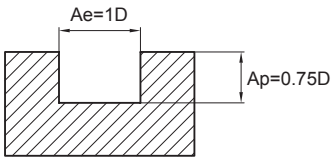
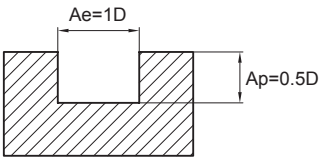
Workpiece material Werkstück-material	Cast iron, Nodular cast iron Grauguss GGG		Carbon steel, Alloy steel Kohlenstoffstahl Leg. Stahl ~750N/mm²		Carbon steel, Alloy steel Kohlenstoffstahl Leg. Stahl ~30HRC		Pre-hardened steel, Quenched and tempered steel Vergüteter Stahl ~40HRC		Stainless steel · Rostfreier Stahl	
Diameter Ø Durchmesse (mm)	Rotating Drehzahl (min^{-1})	Feed(mm/min)	Rotating Drehzahl (min^{-1})	Feed(mm/min)	Rotating Drehzahl (min^{-1})	Feed(mm/min)	Rotating Drehzahl (min^{-1})	Feed(mm/min)	Rotating Drehzahl (min^{-1})	Feed(mm/min)
6	6350	760	5300	640	4500	360	3450	280	2650	210
7	5460	760	4550	640	3650	360	3000	280	2250	310
8	4750	760	4000	640	3400	410	2650	310	2000	240
9	4250	760	3540	640	2850	410	2300	310	1750	240
10	3800	760	3200	640	2700	430	2050	330	1600	260
11	3470	760	2900	640	2400	430	1850	330	1450	260
12	3200	770	2250	650	1950	470	1500	360	1150	280
16	2400	770	2000	640	1700	480	1300	360	1000	280
20	1900	760	1600	610	1350	470	1050	350	800	260
Max. cutting depth max Schnitttiefe										

1. Please select high precise machine and tool holder.
2. Please use air blow or cutting liquid with high mist retardant property.
3. Down milling is recommended in side milling.
4. Vibration and unusual noise may be generated if the machine rigidity and workpiece fixture stability is low, please reduce the rotating speed and feed rate like mentioned above.
5. Make overhang as short as possible if no interference.

1. Bitte präzise Maschinen und Werkzeughalter verwenden.
2. Bitte Luftkühlung oder Schneidflüssigkeit benutzen.
3. Empfohlene Fräsmethode: Gleichlauffräsen.
4. Bei Vibrationen oder unüblichen Geräuschen reduzieren Sie die Schnittdaten (wie oben empfohlen) entsprechend.
5. Werkzeugauskragung so kurz wie möglich wählen.

Recommended cutting data · Empfohlene Schnittdaten

GM-4W slot milling

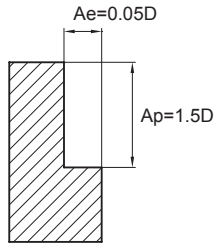
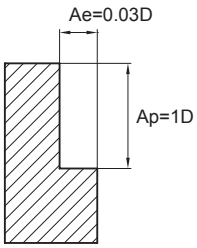
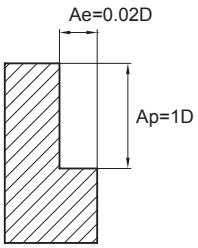
Workpiece material Werkstück-material	Cast iron, Nodular cast iron Grauguss GGG		Carbon steel, Alloy steel Kohlenstoffstahl Leg. Stahl ~750N/mm²		Carbon steel, Alloy steel Kohlenstoffstahl Leg. Stahl ~30HRC		Pre-hardened steel, Quenched and tempered steel Vergüteter Stahl ~40HRC		Stainless steel · Rostfreier Stahl	
Cutting speed Schnittgeschw.	80~120 m/min		70~100m/min		60~90m/min		40~70m/min		30~60m/min	
Diameter Ø Durchmesse (mm)	Rotating Drehzahl (min^{-1})	Feed(mm/min)	Rotating Drehzahl (min^{-1})	Feed(mm/min)	Rotating Drehzahl (min^{-1})	Feed(mm/min)	Rotating Drehzahl (min^{-1})	Feed(mm/min)	Rotating Drehzahl (min^{-1})	Feed(mm/min)
6	5300	640	4500	540	3700	300	2900	230	2400	190
7	4500	630	3800	540	3200	300	2500	230	2050	190
8	4000	640	3400	540	2800	340	2200	260	1800	220
9	3500	630	3000	540	2450	340	1950	260	1600	220
10	3200	640	2700	540	2250	360	1750	280	1450	230
11	3000	630	2450	540	2050	360	1600	280	1300	230
12	2650	640	2250	540	1850	370	1450	290	1200	240
16	2000	640	1700	540	1400	390	1100	310	900	250
20	1600	640	1350	510	1100	390	900	300	700	230
Max. cutting depth max Schnitttiefe	 Maximum Ap=12mm									

1. Please select high precise machine and tool holder.
2. Please use air blow or cutting liquid with high mist retardant property.
3. Vibration and unusual noise may be generated if the machine rigidity and workpiece fixture stability is low, please reduce the rotating speed and feed rate like mentioned above.
4. Make overhang as short as possible if no interference.

1. Bitte präzise Maschine und Werkzeugaufnahmen wählen.
2. Bitte Luftkühlung oder Schneidflüssigkeit benutzen.
3. Bei Vibrationen oder unüblichen Geräuschen reduzieren Sie die Schnittdaten (wie oben empfohlen) entsprechend.
4. Werkzeugauskragung so kurz wie möglich wählen.

Recommended cutting data · Empfohlene Schnittdaten

HM-2E

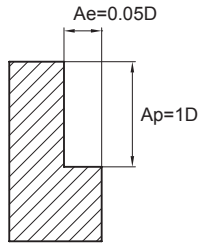
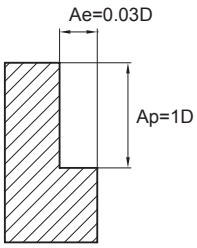
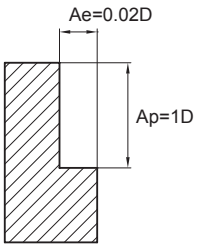
Workpiece material Werkstück-material	Pre-hardened steel, Hardened steel Vergüteter Stahl, Gehärteter Stahl 40~50HRC		Hardened steel Gehärteter Stahl 50~60HRC		Hardened steel Gehärteter Stahl 60~68HRC	
Diameter Ø Durchmesse (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)
1	40000	160	40000	160	32000	130
2	40000	400	24000	240	16000	160
3	32000	510	16000	255	11000	175
4	24000	625	12000	310	8000	210
5	19000	685	9500	340	6400	230
6	16000	770	8000	385	5300	255
8	12000	770	6000	385	4000	255
10	9600	770	4800	385	3200	255
12	8000	800	4000	400	2700	270
14	6800	680	3400	340	2300	230
16	6000	600	3000	300	2000	200
18	5300	530	2700	270	1800	180
20	4800	480	2400	240	1600	160
Max. cutting depth max Schnitttiefe	 Maximum Ae=1.0mm		 Maximum Ae=0.5mm		 Maximum Ae=0.3mm	

1. Please select machine and holder with high precision and rigidity.
2. Vibration and unusual noise may be generated if the machine rigidity and workpiece fixture stability is low, please reduce the rotating speed and feed rate like mentioned above.
3. Please use air blow or MQL(minimum oil mist cooling).
4. Down milling is recommended in side milling.
5. Make overhang as short as possible if no interference.

1. Bitte präzise Maschinen und Werkzeughalter verwenden.
2. Bei Vibrationen oder unüblichen Geräuschen reduzieren Sie die Schnittdaten (wie oben empfohlen) entsprechend.
3. Bitte Luftkühlung oder MQL (Minimalmengen) benutzen.
4. Empfohlene Fräsmethode: Gleichlauffräsen.
5. Werkzeugauskragung so kurz wie möglich wählen.

Recommended cutting data · Empfohlene Schnittdaten

HM-2EFP

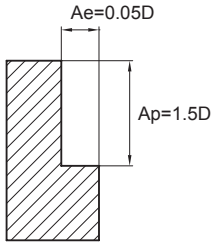
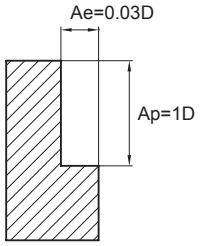
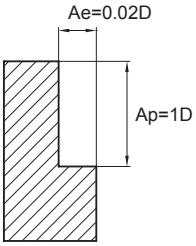
Workpiece material Werkstück-material	Pre-hardened steel, Hardened steel Vergüteter Stahl, Gehärteter Stahl 40~50HRC		Hardened steel Gehärteter Stahl 50~60HRC		Hardened steel Gehärteter Stahl 60~68HRC	
Diameter Ø Durchmesse (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)
6	16000	1155	8000	460	5300	305
8	12000	1155	6000	460	4000	305
10	9600	1155	4800	460	3200	305
12	8000	1200	4000	480	2700	325
16	6000	900	3000	360	2000	240
20	4800	720	2400	285	1600	195
Max. cutting depth max Schnitttiefe	 Maximum Ae=1.0mm		 Maximum Ae=0.5mm		 Maximum Ae=0.3mm	

1. Please select machine and holder with high precision and rigidity.
2. Vibration and unusual noise may be generated if the machine rigidity and workpiece fixture stability is low, please reduce the rotating speed and feed rate like mentioned above.
3. Please use air blow or MQL(minimum oil mist cooling).
4. Down milling is recommended in side milling.
5. Make overhang as short as possible if no interference.

1. Bitte präzise Maschinen und Werkzeughalter verwenden.
2. Bei Vibrationen oder unüblichen Geräuschen reduzieren Sie die Schnittdaten (wie oben empfohlen) entsprechend.
3. Bitte Luftkühlung oder MQL (Minimalmengen) benutzen.
4. Empfohlene Fräsmethode: Gleichlauffräsen.
5. Werkzeugauskragung so kurz wie möglich wählen.

Recommended cutting data · Empfohlene Schnittdaten

HM-4E | HM-4EL

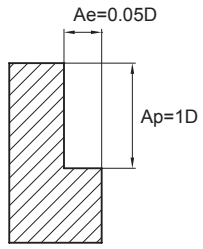
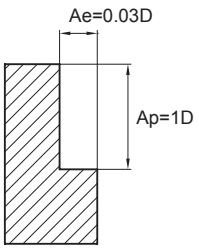
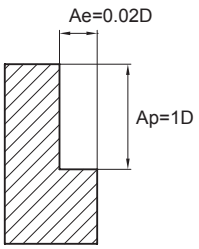
Workpiece material Werkstück-material	Pre-hardened steel, Hardened steel Vergüteter Stahl, Gehärteter Stahl 40~50HRC		Hardened steel Gehärteter Stahl 50~60HRC		Hardened steel Gehärteter Stahl 60~68HRC	
Diameter Ø Durchmesse (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)
1	40000	320	40000	320	32000	260
2	40000	800	24000	480	16000	320
3	32000	1020	16000	510	11000	350
4	24000	1250	12000	620	8000	420
5	19000	1360	9500	680	6400	460
6	16000	1540	8000	770	5300	510
8	12000	1540	6000	770	4000	510
10	9600	1540	4800	770	3200	510
12	8000	1600	4000	800	2700	540
14	6800	1340	3400	680	2300	460
16	6000	1200	3000	600	2000	400
18	5300	1060	2700	530	1800	360
20	4800	960	2400	480	1600	320
Max. cutting depth max Schnitttiefe	 Maximum Ae=1.0mm		 Maximum Ae=0.5mm		 Maximum Ae=0.3mm	

1.Please select machine and holder with high precision and rigidity.
2.Vibration and unusual noise may be generated if the machine rigidity and workpiece fixture stability is low, please reduce the rotating speed and feed rate like mentioned above.
3.Please use air blow or MQL(minimum oil mist cooling).
4.Down milling is recommended in side milling.
5.Make overhang as short as possible if no interference.

1. Bitte präzise Maschinen und Werkzeughalter verwenden.
2. Bei Vibrationen oder unüblichen Geräuschen reduzieren Sie die Schnittdaten (wie oben empfohlen) entsprechend.
3. Bitte Luftkühlung oder MQL (Minimalmengen) benutzen.
4. Empfohlene Fräsmethode: Gleichlauffräsen.
5. Werkzeugauskragung so kurz wie möglich wählen.

Recommended cutting data · Empfohlene Schnittdaten

HM-4EFP

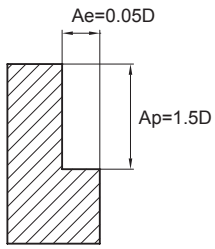
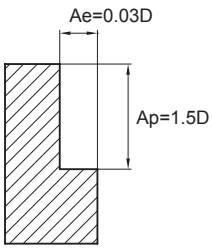
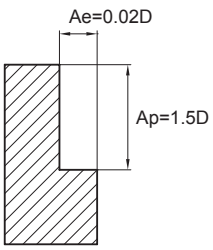
Workpiece material Werkstück-material	Pre-hardened steel, Hardened steel Vergüteter Stahl, Gehärteter Stahl 40~50HRC		Hardened steel Gehärteter Stahl 50~60HRC		Hardened steel Gehärteter Stahl 60~68HRC	
Diameter Ø Durchmesse (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)
6	16000	1730	8000	920	5300	610
8	12000	1730	6000	920	4000	610
10	9600	1730	4800	920	3200	610
12	8000	1800	4000	960	2700	650
16	6000	1350	3000	720	2000	480
20	4800	1080	2400	570	1600	390
Max. cutting depth max Schnitttiefe	 Maximum Ae=1.0mm		 Maximum Ae=0.5mm		 Maximum Ae=0.3mm	

1. Please select machine and holder with high precision and rigidity.
2. Vibration and unusual noise may be generated if the machine rigidity and workpiece fixture stability is low, please reduce the rotating speed and feed rate like mentioned above.
3. Please use air blow or MQL(minimum oil mist cooling).
4. Down milling is recommended in side milling.
5. Make overhang as short as possible if no interference.

1. Bitte präzise Maschinen und Werkzeughalter verwenden.
2. Bei Vibrationen oder unüblichen Geräuschen reduzieren Sie die Schnittdaten (wie oben empfohlen) entsprechend.
3. Bitte Luftkühlung oder MQL (Minimalmengen) benutzen.
4. Empfohlene Fräsmethode: Gleichlauffräsen.
5. Werkzeugauskragung so kurz wie möglich wählen.

Recommended cutting data · Empfohlene Schnittdaten

HM-6E

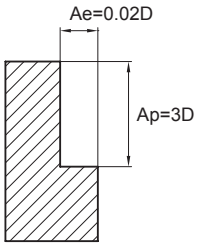
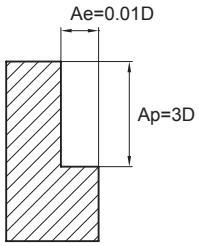
Workpiece material Werkstückstoff	Pre-hardened steel, Hardened steel Vergüteter Stahl, Gehärteter Stahl 40~50HRC		Hardened steel Gehärteter Stahl 50~60HRC		Hardened steel Gehärteter Stahl 60~68HRC	
Cutting speed Schnittgeschw.	300m/min		150m/min		100m/min	
Diameter Ø Durchmesse (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)
6	16000	1850	8000	925	5300	610
8	12000	1850	6000	925	4000	610
10	9600	1850	4800	925	3200	610
12	8000	1920	4000	960	2700	650
14	6800	1600	3400	815	2300	550
16	6000	1440	3000	720	2000	480
18	5300	1270	2700	635	1800	430
20	4800	1150	2400	575	1600	385
Max. cutting depth max Schnitttiefe	 Maximum Ae=1.0mm		 Maximum Ae=0.5mm		 Maximum Ae=0.3mm	

1. Please select machine and holder with high precision and rigidity.
2. Vibration and unusual noise may be generated if the machine rigidity and workpiece fixture stability is low, please reduce the rotating speed and feed rate like mentioned above.
3. Please use air blow or MQL(minimum oil mist cooling).
4. Down milling is recommended in side milling.
5. Make overhang as short as possible if no interference.

1. Bitte präzise Maschinen und Werkzeughalter verwenden.
2. Bei Vibrationen oder unüblichen Geräuschen reduzieren Sie die Schnittdaten (wie oben empfohlen) entsprechend.
3. Bitte Luftkühlung oder MQL (Minimalmengen) benutzen.
4. Empfohlene Fräsmethode: Gleichlauffräsen.
5. Werkzeugauskragung so kurz wie möglich wählen.

Recommended cutting data · Empfohlene Schnittdaten

HM-6EL

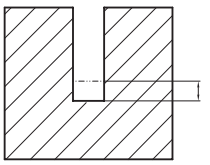
Workpiece material Werkstückstoff	Pre-hardened steel, Hardened steel Vergüteter Stahl, Gehärteter Stahl 40~50HRC		Hardened steel Gehärteter Stahl 50~60HRC		Hardened steel Gehärteter Stahl 60~68HRC	
Cutting speed Schnittgeschw.	300m/min		150m/min		100m/min	
Diameter Ø Durchmesse (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)
6	16000	1300	8000	650	5300	430
8	12000	1300	6000	650	4000	430
10	9600	1300	4800	650	3200	430
12	8000	1350	4000	670	2700	460
14	6800	1150	3400	570	2300	380
16	6000	1000	3000	500	2000	340
18	5300	890	2700	450	1800	300
20	4800	800	2400	400	1600	270
Max. cutting depth max Schnitttiefe	 Maximum Ae=0.3mm					

1. Please select machine and holder with high precision and rigidity.
2. Vibration and unusual noise may be generated if the machine rigidity and workpiece fixture stability is low, please reduce the rotating speed and feed rate like mentioned above.
3. Please use air blow or MQL(minimum oil mist cooling).
4. Down milling is recommended in side milling.
5. Make overhang as short as possible if no interference.

1. Bitte präzise Maschinen und Werkzeughalter verwenden.
2. Bei Vibrationen oder unüblichen Geräuschen reduzieren Sie die Schnittdaten (wie oben empfohlen) entsprechend.
3. Bitte Luftkühlung oder MQL (Minimalmengen) benutzen.
4. Empfohlene Fräsmethode: Gleichlauffräsen.
5. Werkzeugauskragung so kurz wie möglich wählen.

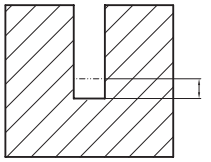
Recommended cutting data · Empfohlene Schnittdaten

HM-2EP

Workpiece material Werkstückstoff		Pre-hardened steel, Hardened steel Vergüteter Stahl, Gehärteter Stahl 40~50HRC			Hardened steel Gehärteter Stahl 50~60HRC		
Diameter Ø (mm)	Effective length (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Ap (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Ap (mm)
0.5	**4**	21000	100	0.009	17000	50	0.009
	6	20000	75	0.006	1500	35	0.007
	8	20000	50	0.002	1500	20	0.003
0.8	**4**	20000	200	0.022	14000	100	0.011
	6	18000	150	0.014	14000	75	0.009
	8	18000	100	0.01	14000	50	0.006
	10	18000	75	0.007	14000	30	0.004
1.0	**4**	17000	400	0.035	12000	100	0.016
	6	17000	400	0.03	12000	100	0.014
	8	15000	300	0.02	10000	75	0.01
	10	15000	250	0.015	10000	50	0.008
	12	12000	150	0.01	10000	50	0.006
	14	12000	100	0.007	10000	30	0.004
1.2	**6**	14000	400	0.03	10000	100	0.017
	8	12000	300	0.03	10000	100	0.014
	10	12000	300	0.02	10000	75	0.01
	12	10000	200	0.01	10000	50	0.00
1.5	**6**	12000	400	0.06	8000	200	0.028
	8	10000	300	0.04	7000	150	0.021
	10	10000	300	0.03	7000	150	0.017
	12	10000	300	0.025	7000	100	0.01
	14	10000	250	0.02	7000	75	0.005
2.0	**6**	9000	400	0.13	6000	300	0.07
	8	9000	400	0.11	6000	300	0.06
	10	7000	300	0.10	6000	200	0.05
	12	7000	300	0.06	6000	200	0.03
	14	7000	250	0.04	6000	150	0.015
	16	7000	200	0.02	6000	100	0.008
Max. cutting depth max Schnitttiefe		 Ap (per cut/ pro Schnitt)					

Recommended cutting data · Empfohlene Schnittdaten

HM-2EP

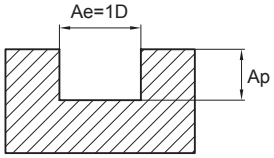
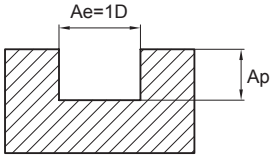
Workpiece material Werkstückstoff		Pre-hardened steel, Hardened steel Vergüteter Stahl, Gehärteter Stahl 40~50HRC			Hardened steel Gehärteter Stahl 50~60HRC		
Diameter Ø (mm)	Effective length (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Ap (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Ap (mm)
2.5	8	8000	400	0.16	5000	300	0.08
	10	8000	400	0.14	5000	300	0.07
	12	8000	400	0.09	5000	300	0.05
	14	6000	300	0.07	5000	200	0.03
	16	6000	300	0.05	5000	200	0.025
	18	6000	300	0.04	5000	150	0.02
	20	6000	300	0.02	5000	100	0.01
3.0	6	7000	400	0.18	5000	300	0.10
	8	7000	400	0.15	5000	300	0.08
	10	7000	400	0.12	5000	300	0.06
	12	7000	400	0.10	5000	300	0.05
	14	6000	300	0.08	5000	200	0.04
	16	6000	300	0.06	5000	200	0.03
	18	6000	300	0.05	5000	200	0.025
	20	6000	250	0.04	5000	150	0.01
4.0	12	4500	400	0.16	4000	300	0.08
	16	4500	400	0.14	4000	300	0.06
	20	4500	300	0.10	4000	300	0.04
	25	4500	300	0.08	4000	300	0.03
5.0	16	4000	400	0.19	3000	300	0.09
	25	4000	400	0.15	3000	300	0.06
Max. cutting depth max Schnitttiefe		 Ap (per cut/ pro Schnitt)					

1. Please select high precise machine and tool holder.
2. Please use air blow or cutting liquid with high mist retardant property.
3. Vibration and unusual noise may be generated if the machine rigidity and workpiece fixture stability is low, please reduce the rotating speed and feed rate like mentioned above.
4. Make overhang as short as possible if no interference.

1. Bitte präzise Maschine und Werkzeugaufnahmen wählen.
2. Bitte Luftkühlung oder Schneidflüssigkeit benutzen.
3. Bei Vibrationen oder unüblichen Geräuschen reduzieren Sie die Schnittdaten entsprechend.
4. Werkzeugauskragung so kurz wie möglich wählen.

Recommended cutting data · Empfohlene Schnittdaten

HM-2ES

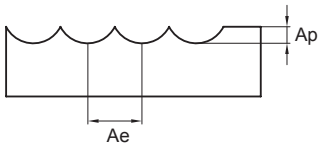
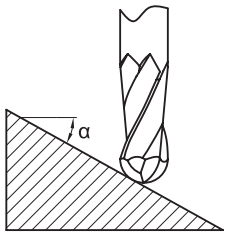
Workpiece material Werkstück-material	Pre-hardened steel, Hardened steel Vergüteter Stahl, Gehärteter Stahl 40~50HRC		Hardened steel Gehärteter Stahl 50~60HRC	
Diameter Ø Durchmesse (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)
0.3	32000	150	25000	120
0.4	32000	200	25000	160
0.5	21000	400	17000	300
0.6	21000	480	17000	380
0.7	20000	520	14000	360
0.8	20000	560	14000	400
0.9	17000	560	12000	400
1.0	17000	640	12000	450
1.5	12000	800	8000	530
2.0	9000	800	6000	500
2.5	8000	720	5000	420
3.0	7000	640	5000	450
Max. cutting depth max Schnitttiefe	 Milling slot · Nutenfräsen: Ø / Ap — D<Ø1: 0.02D; Ø1≤D≤Ø3: 0.05D		 Milling slot · Nutenfräsen: Ø / Ap — D<Ø1: 0.01D; Ø1≤D≤Ø3: 0.02D	

1. Please select high precise machine and tool holder.
2. Please use air blow or cutting liquid with high mist retardant property.
3. Make overhang as short as possible if no interference.
4. Reduce feed correspondingly when rotating speed is low.

1. Bitte präzise Maschine und Werkzeugaufnahmen wählen
2. Bitte Luftkühlung oder MQL (Minimalmenge) benutzen.
3. Empfohlene Fräsmethode: Gleichlauffräsen.
4. Bitte Vorschub entsprechend reduzieren, wenn die Drehzahlen niedrig sind.

Recommended cutting data · Empfohlene Schnittdaten

HM-2B | HM-2BL | HM-2BFP

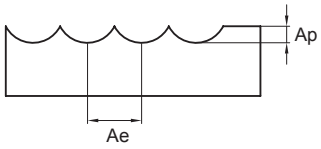
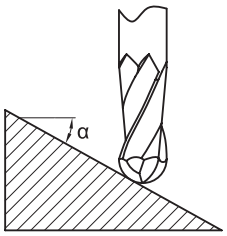
Workpiece material Werkstückstoff	Pre-hardened steel, Hardened steel Vergüteter Stahl, Gehärteter Stahl 40~50HRC				Hardened steel Gehärteter Stahl 50~60HRC				Hardened steel Gehärteter Stahl 60~68HRC			
Radius of ball nose (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Ap (mm)	Ae (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Ap (mm)	Ae (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Ap (mm)	Ae (mm)
R0.5	40000	1900	0.01	0.05	36000	1500	0.01	0.05	32000	1400	0.01	0.05
R1.0	33000	3100	0.02	0.075	26000	2100	0.02	0.075	24000	2000	0.02	0.075
R1.5	29000	4100	0.03	0.1	23000	2900	0.03	0.1	21000	2600	0.03	0.1
R2.0	22000	3900	0.04	0.15	17000	2500	0.04	0.15	15500	2100	0.04	0.15
R2.5	17500	3500	0.05	0.15	13500	2200	0.05	0.15	13000	2000	0.05	0.15
R3.0	15000	3100	0.06	0.2	11500	1700	0.06	0.2	10500	1500	0.06	0.2
R4.0	11000	2500	0.08	0.25	8600	1600	0.08	0.25	8000	1400	0.08	0.25
R5.0	9000	2000	0.1	0.3	7000	1400	0.1	0.3	6000	1200	0.1	0.3
R6.0	7500	1800	0.1	0.35	5700	1300	0.1	0.35	5300	1200	0.1	0.35
R8.0	5500	1800	0.1	0.4	4300	1300	0.1	0.4	4000	1200	0.1	0.4
R10.0	4500	1800	0.1	0.5	3500	1300	0.1	0.5	3200	1200	0.1	0.5
Max. cutting depth max Schnitttiefe												

1. Please select machine and holder with high precision and rigidity.
2. Above table shows the standard for operations with a low change of machining load, such as Contour machining.Vibration and unusual noise may be generated if the machine rigidity and workpiece fixture stability is low, please reduce the rotating speed and feed stated above correspondingly.
3. Please use air blow or MQL (minimum oil mist cooling).
4. When inclination angle α is more than 15°, please reduce rotating speed and feed to 50%~80% of the above conditions.
5. Make overhang as short as possible if no interference.

1. Bitte präzise Maschine und Werkzeugaufnahmen wählen.
2. Schnittdatenempfehlung der obigen Tabelle sind für das Profilfräsen ausgelegt (leicht reduziert). Bei Vibrationen oder unüblichen Geräuschen reduzieren Sie die Schnittdaten entsprechend.
3. Bitte Luftkühlung oder MQL (Minimalmenge) benutzen.
4. Wenn der Neigungswinkel α mehr als 15° beträgt, bitte die Schnittgeschwindigkeit und den Vorschub auf 50-80% der obigen Schnittdaten reduzieren.
5. Empfohlene Fräsmethode: Gleichlauffräsen.

Recommended cutting data · Empfohlene Schnittdaten

HM-4B | HM-4BL

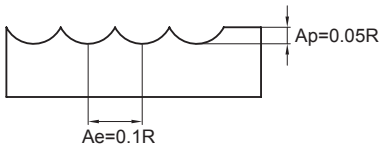
Workpiece material Werkstückstoff	Pre-hardened steel, Hardened steel Vergüteter Stahl, Gehärteter Stahl 40~50HRC				Hardened steel Gehärteter Stahl 50~60HRC				Hardened steel Gehärteter Stahl 60~68HRC			
Radius of ball nose (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Ap (mm)	Ae (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Ap (mm)	Ae (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Ap (mm)	Ae (mm)
R1.5	29000	6560	0.03	0.1	22800	4560	0.03	0.1	21100	4240	0.03	0.1
R2.0	22000	6250	0.04	0.15	17100	4000	0.04	0.15	15800	3520	0.04	0.15
R2.5	17400	5600	0.05	0.15	13600	3520	0.05	0.15	12700	3200	0.05	0.15
R3.0	14500	5000	0.06	0.2	11400	3000	0.06	0.2	10600	2500	0.06	0.2
R4.0	10900	4200	0.08	0.25	8550	2500	0.08	0.25	7950	2250	0.08	0.25
R5.0	8700	3500	0.1	0.3	6850	2200	0.1	0.3	6350	2000	0.1	0.3
R6.0	7250	3000	0.1	0.35	5700	2000	0.1	0.35	5300	1900	0.1	0.35
R8.0	5450	3000	0.1	0.4	4280	2000	0.1	0.4	4000	1900	0.1	0.4
R10.0	4350	3000	0.1	0.5	3425	2000	0.1	0.5	3200	1900	0.1	0.5
Max. cutting depth max Schnitttiefe												

1. Please select machine and holder with high precision and rigidity.
2. Above table shows the standard for operations with a low change of machining load, such as Contour machining.Vibration and unusual noise may be generated if the machine rigidity and workpiece fixture stability is low, please reduce the rotating speed and feed stated above correspondingly.
3. Please use air blow or MQL(minimum oil mist cooling).
4. When inclination angle α is more than 15°, please reduce rotating speed and feed to 50%~80% of the above conditions.
5. Make overhang as short as possible if no interference.

1. Bitte präzise Maschinen und Werkzeughalter verwenden.
2. Schnittdatenempfehlung der obigen Tabelle sind für das Profilfräsen ausgelegt (leicht reduziert). Bei Vibrationen oder unüblichen Geräuschen reduzieren Sie die Schnittdaten entsprechend.
3. Bitte Luftkühlung oder MQL (Minimalmengen) benutzen
4. Wenn der Neigungswinkel α mehr als 15° beträgt, bitte die Schnittgeschwindigkeit und den Vorschub auf 50-80% der obigen Schnittdaten reduzieren.
5. Werkzeugauskragung so kurz wie möglich wählen.

Recommended cutting data · Empfohlene Schnittdaten

HM-2BS

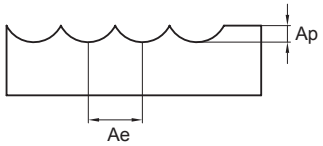
Workpiece material Werkstück-material	Pre-hardened steel, Hardened steel Vergüteter Stahl, Gehärteter Stahl 40~50HRC		Hardened steel Gehärteter Stahl 50~60HRC	
Diameter Ø Durchmesse (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)
R0.15	25000	135	25000	115
R0.2	25000	140	25000	120
R0.25	25000	150	25000	130
R0.3	25000	175	24000	150
R0.35	25000	190	24000	150
R0.4	24000	210	18000	140
R0.45	21000	210	15000	140
R0.5	19000	210	14000	140
R1.0	9500	210	7200	140
R1.5	6400	210	4800	140
Max. cutting depth max Schnitttiefe				

1. Please select high precise machine and tool holder.
2. Please use air blow or cutting liquid with high mist retardant property.
3. Make overhang as short as possible if no interference.
4. Reduce Feed correspondingly when rotating speed is low.

1. Bitte präzise Maschine und Werkzeugaufnahmen wählen
2. Bitte Luftkühlung oder MQL (Minimalmengen) benutzen.
3. Werkzeugauskragung so kurz wie möglich wählen.
4. Bitte Vorschub entsprechend reduzieren, wenn die Drehzahlen niedrig sind.

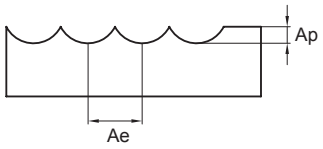
Recommended cutting data · Empfohlene Schnittdaten

HM-2BP

Workpiece material Werkstückstoff		Pre-hardened steel, Hardened steel Vergüteter Stahl, Gehärteter Stahl 40~50HRC				Hardened steel Gehärteter Stahl 50~60HRC			
Diameter Ø (mm)	Effective length (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Ap (mm)	Ae (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Ap (mm)	Ae (mm)
R0.25	**4**	27000	200	0.01	0.01	27000	100	0.01	0.01
	6	20000	150	0.005	0.01	20000	75	0.005	0.005
R0.3	**4**	24000	200	0.03	0.06	17000	150	0.02	0.04
	6	20000	150	0.02	0.03	17000	150	0.01	0.02
	8	20000	120	0.02	0.03	17000	120	0.01	0.02
R0.4	**4**	21000	300	0.04	0.08	14500	200	0.03	0.08
	6	19000	200	0.02	0.04	12000	150	0.02	0.04
	8	17000	150	0.02	0.04	12000	100	0.02	0.04
	10	17000	135	0.02	0.03	12000	75	0.01	0.02
R0.5	**4**	21000	300	0.05	0.10	14500	200	0.05	0.10
	6	16000	200	0.05	0.10	11500	150	0.05	0.10
	8	16000	180	0.03	0.05	11500	135	0.03	0.05
	10	14000	150	0.01	0.03	9800	100	0.01	0.03
	12	14000	135	0.01	0.03	9800	75	0.01	0.03
R0.6	**6**	14000	200	0.06	0.12	9500	175	0.06	0.12
	8	14000	180	0.06	0.12	9500	150	0.06	0.12
	12	11000	150	0.04	0.06	7500	100	0.03	0.06
	16	11000	135	0.02	0.04	7500	75	0.02	0.03
R0.75	**8**	12000	250	0.08	0.15	8000	200	0.08	0.15
	12	12000	225	0.06	0.15	8000	175	0.06	0.15
	16	9500	150	0.01	0.05	6500	100	0.01	0.03
R1.0	**6**	13500	400	0.10	0.20	7500	225	0.10	0.20
	8	13500	400	0.10	0.16	7500	225	0.10	0.16
	10	10000	275	0.08	0.16	5500	175	0.08	0.16
	12	10000	275	0.06	0.16	5500	175	0.06	0.16
	16	10000	250	0.02	0.10	5500	150	0.02	0.10
	20	8000	175	0.02	0.05	5500	125	0.01	0.05
Max. cutting depth max Schnitttiefe									

Recommended cutting data · Empfohlene Schnittdaten

HM-2BP

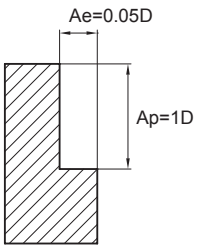
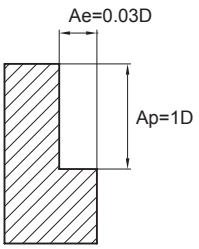
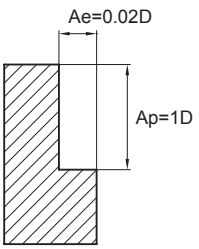
Workpiece material Werkstückstoff		Pre-hardened steel, Hardened steel Vergüteter Stahl, Gehärteter Stahl 40~50HRC				Hardened steel Gehärteter Stahl 50~60HRC			
Diameter Ø (mm)	Effective length (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Ap (mm)	Ae (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Ap (mm)	Ae (mm)
R1.25	**8**	12500	400	0.10	0.16	7000	225	0.10	0.16
	12	9000	275	0.06	0.16	5000	175	0.06	0.16
	16	9000	250	0.02	0.10	5000	150	0.02	0.10
	20	5500	175	0.02	0.05	5000	125	0.01	0.05
R1.5	8	7500	400	0.15	0.30	4000	200	0.15	0.30
	10	7500	400	0.10	0.30	4000	200	0.10	0.30
	12	7500	360	0.10	0.30	4000	180	0.10	0.30
	16	6500	250	0.05	0.20	3000	150	0.05	0.20
	20	6500	250	0.02	0.10	3000	150	0.02	0.05
R2.0	10	6000	400	0.20	0.40	3000	200	0.20	0.40
	16	6000	400	0.10	0.32	3000	200	0.20	0.20
	20	5000	250	0.10	0.20	2500	100	0.10	0.20
	25	5000	250	0.10	0.20	2500	100	0.10	0.10
R2.5	16	5000	400	0.25	0.50	3000	200	0.2	0.2
	25	4000	250	0.25	0.50	3000	100	0.20	0.2
Max. cutting depth max Schnitttiefe									

1. Please select high precise machine and tool holder.
2. Please use air blow or cutting liquid with high mist retardant property.
3. Make overhang as short as possible if no interference.
4. Reduce Feed correspondingly when rotating speed is low.

1. Bitte präzise Maschine und Werkzeugaufnahmen wählen
2. Bitte Luftkühlung oder MQL (Minimalmengen) benutzen.
3. Werkzeugauskragung so kurz wie möglich wählen.
4. Bitte Vorschub entsprechend reduzieren, wenn die Drehzahlen niedrig sind.

Recommended cutting data · Empfohlene Schnittdaten

HM-4R | HM-4RP | HM-4RF

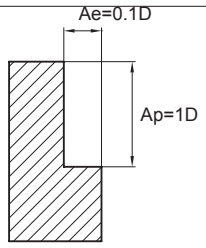
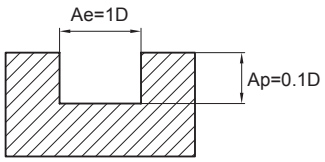
Workpiece material Werkstückstoff	Pre-hardened steel, Hardened steel Vergüteter Stahl, Gehärteter Stahl 40~50HRC		Hardened steel Gehärteter Stahl 50~60HRC		Hardened steel Gehärteter Stahl 60~68HRC	
Cutting speed Schnittgeschw.	300m/min		150m/min		100m/min	
Diameter Ø Durchmesse (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)
3	32000	1225	16000	610	11000	420
4	24000	1500	12000	745	8000	500
5	19000	1630	9500	815	6400	550
6	16000	1850	8000	925	5300	610
8	12000	1850	6000	925	4000	610
10	9600	1850	4800	925	3200	610
12	8000	1920	4000	960	2700	648
16	6000	1440	3000	720	2000	480
Max. cutting depth max Schnitttiefe	 Maximum Ae=1.0mm		 Maximum Ae=0.5mm		 Maximum Ae=0.3mm	

1. Please select machine and holder with high precision and rigidity.
2. Vibration and unusual noise may be generated if the machine rigidity and workpiece fixture stability is low, please reduce the rotating speed and feed stated above correspondingly.
3. Please use air blow or MQL(minimum oil mist cooling).
4. Down milling is recommended in side milling.
5. Make overhang as short as possible if no interference.

1. Bitte Maschine und Werkzeugaufnahme mit hoher Präzission und Stabilität wählen.
2. Bei Vibrationen oder unüblichen Geräuschen reduzieren Sie die Schnittdaten entsprechend.
3. Als Kühlmittel bitte Luft oder MQL (Minimalmengen) verwenden.
4. Fräsmethode zum Eckfräsen: Gleichlauffräsen.
5. Die Werkzeugauskragung so kurz wie möglich wählen.

Recommended cutting data · Empfohlene Schnittdaten

NM-2E

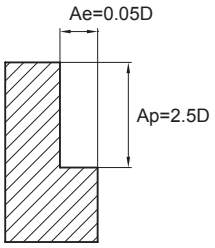
Workpiece material Werkstück-material	Copper/Copper alloy Kupfer/ Kupferlegierung	
Diameter Ø Durchmesse (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)
1	40000	1800
2	30000	2500
3	20000	2300
4	15000	2000
5	12000	1500
6	10000	1400
8	8000	1000
10	6500	900
12	5500	850
Max. cutting depth max Schnitttiefe	 Maximum Ae=1.0mm	 Maximum Ap=1.0mm

1. The above table shows the reference value of side milling. The Feed in slot milling is recommended 70% of reference value stated above.
2. Please select high rigid and precise machine and tool holder. Vibration and unusual noise may be generated if the machine rigidity and workpiece fixture stability is low, please reduce the rotating speed and feed stated above correspondingly.
3. It is possible to increase the rotating speed and Feed correspondingly if the cutting depth is small.
4. Please use water-soluble cutting liquid.
5. Down milling is recommended in side milling.
6. Make overhang as short as possible if no interference.

1. Die obige Tabelle zeigt die Referenz Schnittdaten für das Eckfräsen.
   Für das Nutenfräsen die obigen Schnittdaten um 30 % reduzieren.
2. Bitte präzise Maschinen und Werkzeughalter verwenden. Bei Vibrationen oder unüblichen Geräuschen reduzieren Sie die Schnittdaten entsprechend.
3. Schnittdaten bei kleinen Schnitttiefen erhöhen.
4. Bitte wasserlösliche Kühlmittel verwenden.
5. Fräsmethode zum Eckfräsen: Gleichlauffräsen.
6. Die Werkzeugauskragung so kurz wie möglich wählen.

Recommended cutting data · Empfohlene Schnittdaten

NM-4E

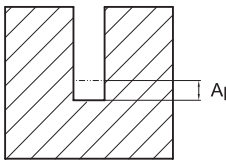
Workpiece material Werkstück-material	Copper/Copper alloy Kupfer/ Kupferlegierung	
Diameter Ø Durchmesse (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)
3	10600	250
4	8000	300
5	6500	400
6	5300	400
8	4000	450
10	3500	450
12	3000	450
Max. cutting depth max Schnitttiefe	 Maximum Ap=0.5mm	

1. Please select high rigid and precise machine and tool holder. Vibration and unusual noise may be generated if the machine rigidity and workpiece fixture stability is low, please reduce the rotating speed and feed stated above correspondingly.
2. It is possible to increase the rotating speed and feed correspondingly if the cutting depth is small.
3. Please use water-soluble cutting liquid.
4. Down milling is recommended in side milling.
5. Make overhang as short as possible if no interference.

1. Bitte Maschine und Werkzeugaufnahme mit hoher Präzission und Stabilität wählen. Bei Vibrationen oder unüblichen Geräuschen reduzieren Sie die Schnittdaten entsprechend.
2. Schnittdaten bei kleinen Schnitttiefen erhöhen.
3. Bitte wasserlösliche Kühlmittel verwenden.
4. Fräsmethode zum Eckfräsen: Gleichlauffräsen.
5. Die Werkzeugauskragung so kurz wie möglich wählen.

Recommended cutting data · Empfohlene Schnittdaten

NM-2EP

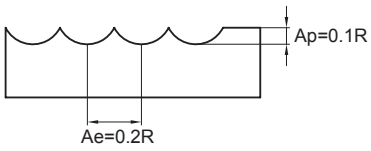
Workpiece material Werkstückstoff		Copper/Copper alloy Kupfer/ Kupferlegierung		
Diameter Ø (mm)	Effective length (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Ap (mm)
0.5	**4**	40000	800	0.004
	6	40000	700	0.002
	8	40000	500	0.001
0.8	**4**	40000	1000	0.02
	6	40000	1000	0.015
	8	40000	800	0.01
	10	40000	600	0.005
1.0	**4**	40000	1800	0.04
	6	40000	1500	0.04
	8	40000	1500	0.03
	10	30000	1000	0.02
	12	30000	800	0.015
	14	30000	600	0.01
1.5	**8**	40000	2000	0.09
	16	20000	1000	0.03
2.0	**6**	40000	2400	0.18
	8	40000	2200	0.15
	10	40000	2000	0.12
	12	30000	1500	0.10
	14	30000	1200	0.08
	16	30000	1000	0.06
2.5	**10**	40000	2500	0.15
	20	20000	1000	0.08
3.0	**10**	20000	2500	0.20
	20	20000	2000	0.12
4.0	**16**	15000	1800	0.25
	25	15000	1200	0.15
5.0	**16**	12000	2000	0.40
	25	12000	1500	0.35
Max. cutting depth max Schnitttiefe		 Ap (per cut/ pro Schnitt)		

1. Please select high precise machine and tool holder.
2. Please use water-soluble cutting liquid.
3. Make overhang as short as possible if no interference.

1. Bitte Maschine und Werkzeugaufnahme mit hoher Präzission und Stabilität wählen.
2. Bitte wasserlösliche Kühlmittel verwenden.
3. Die Werkzeugauskragung so kurz wie möglich wählen.

Recommended cutting data · Empfohlene Schnittdaten

NM-2B

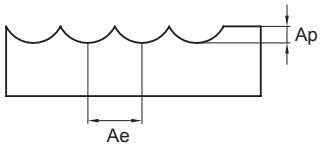
Workpiece material Werkstück-material	Copper/Copper alloy Kupfer/ Kupferlegierung	
Diameter Ø Durchmesse (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)
R0.5	40000	900
R0.75	32000	800
R1.0	24000	870
R1.25	19000	800
R1.5	16000	850
R1.75	14000	850
R2.0	12000	900
R2.5	9600	900
R3.0	8000	1200
R4.0	7000	1500
R5.0	4800	1300
R6.0	4000	1200
Max. cutting depth max Schnitttiefe		

1. Please select high rigid and precise machine and tool holder. Vibration and unusual noise may be generated if the machine rigidity and workpiece fixture stability is low, please reduce the rotating speed and feed stated above correspondingly.
2. It is possible to increase the rotating speed and feed correspondingly if the cutting depth is small.
3. Please use water-soluble cutting liquid.
4. Make overhang as short as possible if no interference.

1. Bitte Maschine und Werkzeugaufnahme mit hoher Präzission und Stabilität wählen. Bei Vibrationen oder unüblichen Geräuschen reduzieren Sie die Schnittdaten (wie oben empfohlen) entsprechend.
2. Schnittdaten bei kleinen Schnitttiefen erhöhen.
3. Bitte wasserlösliche Kühlmittel verwenden.
4. Die Werkzeugauskragung so kurz wie möglich wählen.

Recommended cutting data · Empfohlene Schnittdaten

NM-2BP

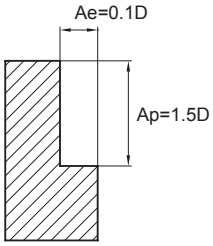
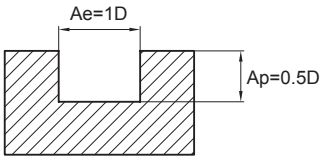
Workpiece material Werkstückstoff		Copper/Copper alloy Kupfer/ Kupferlegierung			
Diameter Ø (mm)	Effective length (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Ap (mm)	Ae (mm)
R0.25	**4**	40000	750	0.01	0.025
	6	36000	500	0.008	0.02
R0.3	**4**	40000	900	0.012	0.03
	6	40000	750	0.010	0.02
	8	30000	400	0.008	0.01
R0.4	**4**	40000	1050	0.016	0.04
	6	40000	800	0.012	0.03
	8	40000	500	0.01	0.02
	10	30000	400	0.008	0.01
R0.5	**4**	40000	1050	0.02	0.05
	6	40000	800	0.016	0.04
	8	40000	500	0.014	0.03
	10	33000	400	0.012	0.02
	12	35000	300	0.010	0.010
R0.75	**8**	40000	900	0.03	0.075
	16	20000	400	0.015	0.04
R1.0	**6**	40000	1100	0.04	0.10
	8	40000	900	0.034	0.08
	10	40000	750	0.028	0.065
	12	40000	500	0.022	0.05
	16	30000	400	0.018	0.04
	20	20000	300	0.012	0.03
R1.5	**10**	40000	1100	0.06	0.15
	20	32000	600	0.03	0.08
R2.0	**10**	32000	1100	0.08	0.20
	16	32000	900	0.06	0.16
	20	32000	600	0.04	0.12
	25	20000	400	0.02	0.08
R2.5	**16**	25000	1250	0.10	0.25
	25	20000	900	0.06	0.12
Max. cutting depth max Schnitttiefe					

1. Please select high precise machine and tool holder.
2. Please use water-soluble cutting liquid.
3. Make overhang as short as possible if no interference.

1. Bitte Maschine und Werkzeugaufnahme mit hoher Präzission und Stabilität wählen.
2. Bitte wasserlösliche Kühlmittel verwenden.
3. Die Werkzeugauskragung so kurz wie möglich wählen.

Recommended cutting data · Empfohlene Schnittdaten

AL-2E | AL-2EL

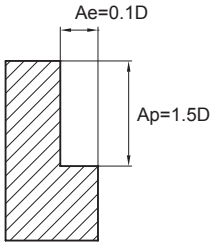
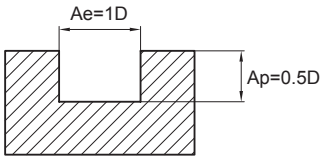
Workpiece material Werkstück-material	Aluminum alloy Alu Legierungen		Silicon aluminium alloySi≤10% Silizium Alu Legierungen Si≤10%	
Diameter Ø Durchmesse (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)
1	40000	650	40000	500
2	40000	950	32000	750
3	26500	1500	21000	1100
4	20000	1600	16000	1250
5	16000	1500	13000	1100
6	13000	1250	10600	1000
8	10000	1400	8000	1100
10	8000	1600	6500	1250
12	6600	1650	5300	1300
14	5700	1700	4600	1350
16	5000	1700	4000	1350
18	4400	1700	3500	1350
20	4000	1700	3200	1350
Max. cutting depth max Schnitttiefe				

1. The above table shows the reference value of side milling. The Feed in slot milling is recommended 70% of reference value stated above.
2. Please select high rigid and precise machine and tool holder. Vibration and unusual noise may be generated if the machine rigidity and workpiece fixture stability is low, please reduce the rotating speed and feed stated above correspondingly.
3. It is possible to increase the rotating speed and feed correspondingly if the cutting depth is small.
4. Please use water-soluble cutting liquid.
5. Down milling is recommended in side milling.
6. Make overhang as short as possible if no interference.

1. Die obige Tabelle zeigt die Referenz Schnittdaten für das Eckfräsen.
   Für das Nutenfräsen die obigen Schnittdaten auf 70 % reduzieren.
2. Bitte präzise Maschinen und Werkzeughalter verwenden. Bei Vibrationen oder unüblichen Geräuschen reduzieren Sie die Schnittdaten (wie oben empfohlen) entsprechend.
3. Schnittdaten bei kleinen Schnitttiefen erhöhen.
4. Bitte wasserlösliche Kühlmittel verwenden.
5. Fräsmethode zum Eckfräsen: Gleichlauffräsen.
6. Die Werkzeugauskragung so kurz wie möglich wählen.

Recommended cutting data · Empfohlene Schnittdaten

AL-3E | AL-3EL

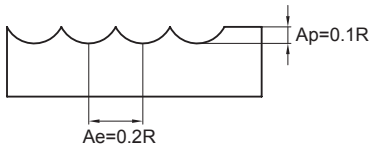
Workpiece material Werkstück-material	Aluminum alloy Alu Legierungen		Silicon aluminium alloySi≤10% Silizium Alu Legierungen Si≤10%	
Diameter Ø Durchmesse (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)
1	40000	800	40000	600
2	40000	1200	32000	900
3	26500	1800	21000	1300
4	20000	2000	16000	1500
5	16000	1750	13000	1300
6	13000	1500	10600	1200
8	10000	1650	8000	1300
10	8000	1900	6500	1500
12	6600	1950	5300	1550
14	5700	2000	4600	1600
16	5000	2000	4000	1600
18	4400	2000	3500	1600
20	4000	2000	3200	1600
Max. cutting depth max Schnitttiefe				

1. The above table shows the reference value of side milling. The feed in slot milling is recommended 70% of reference value stated above.
2. Please select high rigid and precise machine and tool holder. Vibration and unusual noise may be generated if the machine rigidity and workpiece fixture stability is low, please reduce the rotating speed and feed stated above correspondingly.
3. It is possible to increase the rotating speed and feed correspondingly if the cutting depth is small.
4. Please use water-soluble cutting liquid.
5. Down milling is recommended in side milling.
6. Make overhang as short as possible if no interference.

1. Die obige Tabelle zeigt die Referenz Schnittdaten für das Eckfräsen.
   Für das Nutenfräsen die obigen Schnittdaten um 30 % reduzieren.
2. Bitte Maschine und Werkzeugaufnahme mit hoher Präzission und Stabilität wählen. Bei Vibrationen oder unüblichen Geräuschen reduzieren Sie die Schnittdaten (wie oben empfohlen) entsprechend.
3. Schnittdaten bei kleinen Schnitttiefen erhöhen.
4. Bitte wasserlösliche Kühlmittel verwenden.
5. Fräsmethode zum Eckfräsen: Gleichlauffräsen.
6. Die Werkzeugauskragung so kurz wie möglich wählen.

Recommended cutting data · Empfohlene Schnittdaten

AL-2B

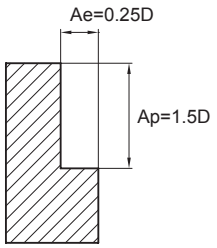
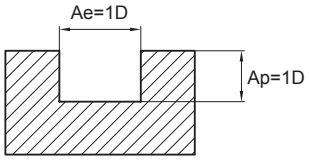
Workpiece material Werkstück-material	Aluminum alloy Alu Legierungen		Silicon aluminium alloySi≤10% Silizium Alu Legierungen Si≤10%	
Diameter Ø Durchmesse (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)
R1.0	40000	2000	32000	1600
R1.5	26500	1950	21000	1550
R2.0	20000	1950	16000	1550
R2.5	16000	1950	13000	1550
R3.0	13000	2000	10600	1600
R4.0	10000	2450	8000	2000
R5.0	8000	2200	6500	1750
R6.0	6600	2050	5300	1650
Max. cutting depth max Schnitttiefe				

1. Please select high rigid and precise machine and tool holder. Vibration and unusual noise may be generated if the machine rigidity and workpiece fixture stability is low, please reduce the rotating speed and feed stated above correspondingly.
2. It is possible to increase the rotating speed and feed correspondingly if the cutting depth is small.
3. Please use water-soluble cutting liquid.
4. Make overhang as short as possible if no interference.

1. Bitte Maschine und Werkzeugaufnahme mit hoher Präzission und Stabilität wählen. Bei Vibrationen oder unüblichen Geräuschen reduzieren Sie die Schnittdaten (wie oben empfohlen) entsprechend.
2. Schnittdaten bei kleinen Schnitttiefen erhöhen.
3. Bitte wasserlösliche Kühlmittel verwenden.
4. Die Werkzeugauskragung so kurz wie möglich wählen.

Recommended cutting data · Empfohlene Schnittdaten

AL-3W

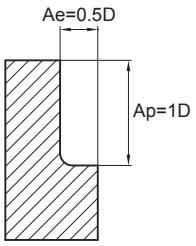
Workpiece material Werkstückstoff	Aluminum alloy Alu Legierungen		Silicon aluminium alloySi≤10% Silizium Alu Legierungen Si≤10%	
Cutting speed Schnittgeschw.	250m/min		200m/min	
Diameter Ø Durchmesse (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)
6	13000	3000	10600	1900
8	10000	3000	8000	1900
10	8000	2900	6500	1850
12	6600	2700	5300	1700
14	5700	2600	4600	1650
16	5000	2550	4000	1600
18	4400	2500	3500	1550
20	4000	2400	3200	1500
Max. cutting depth max Schnitttiefe				

1. The above table shows the reference value of side milling. When milling slot, rotating speed is around 70% of standard value, Feed is around 50% of standard value.
2. Please select high rigid and precise machine and tool holder. Vibration and unusual noise may be generated if the machine rigidity and workpiece fixture stability is low, please reduce the rotating speed and feed stated above correspondingly.
3. It is possible to increase the rotating speed and feed correspondingly if the cutting depth is small.
4. Please use water-soluble cutting liquid.
5. Down milling is recommended in side milling.
6. Make overhang as short as possible if no interference.

1. Die obige Tabelle zeigt die Referenz Schnittdaten für das Eckfräsen.
   Für das Nutenfräsen die obigen Schnittdaten auf 70 % reduzieren.
2. Bitte präzise Maschinen und Werkzeughalter verwenden. Bei Vibrationen oder unüblichen Geräuschen reduzieren Sie die Schnittdaten (wie oben empfohlen) entsprechend.
3. Schnittdaten bei kleinen Schnitttiefen erhöhen.
4. Bitte wasserlösliche Kühlmittel verwenden.
5. Fräsmethode zum Eckfräsen: Gleichlauffräsen.
6. Die Werkzeugauskragung so kurz wie möglich wählen.

Recommended cutting data · Empfohlene Schnittdaten

AL-2R-AIR

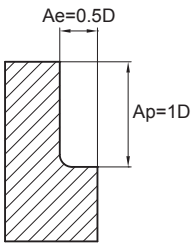
Workpiece material Werkstückstoff	Aluminum alloy Alu Legierungen		Silicon aluminium alloySi≤10% Silizium Alu Legierungen Si≤10%	
Cutting speed Schnittgeschw.	500~800m/min		500~800m/min	
Diameter Ø Durchmesse (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)
6	35000	3500	35000	3500
8	26000	3800	26000	3800
10	21000	4000	21000	4000
12	18000	4300	18000	4300
16	15000	4800	15000	4800
20	12000	5500	12000	5500
Max. cutting depth max Schnitttiefe				

1. The cutting parameters above are applied for high speed machining Al alloy.
2. Please use cutting liquid or strong air blow to remove chips.
3. Sparks generated during machining process or heat caused by tool breakage may cause burning or fire. Please be careful of fireproof.
4. Dynamic balance test must be done before machining.

1. Obige Schnittdaten sind Hochgeschwindigkeits-Schnittdaten für die Bearbeitung von Alu Legierungen.
2. Bitte Kühlschmiermittel oder Luft mit hohem Druck zur Spanabfuhr benutzen.
3. Während der Bearbeitung können durch Funken Feuer entstehen. Bitte Vorkehrungen treffen.
4. Dynamische Auswuchtvorschriften beachten.

Recommended cutting data · Empfohlene Schnittdaten

AL-2RL-AIR

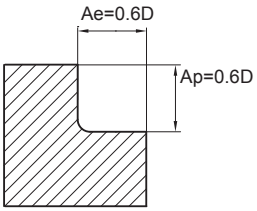
Workpiece material Werkstückstoff	Aluminum alloy Alu Legierungen		Silicon aluminium alloySi≤10% Silizium Alu Legierungen Si≤10%	
Cutting speed Schnittgeschw.	500~800m/min		500~800m/min	
Diameter Ø Durchmesse (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)
6	30000	3000	30000	3000
8	24000	3200	24000	3200
10	20000	3500	20000	3500
12	16000	3800	16000	3800
16	12000	4000	12000	4000
20	10000	4600	10000	4600
Max. cutting depth max Schnitttiefe				

1. The cutting parameters above are applied for high speed machining Al alloy.
2. Please use cutting liquid or strong air blow to remove chips.
3. Sparks generated during machining process or heat caused by tool breakage may cause burning or fire. Please be careful of fireproof.
4. Dynamic balance test must be done before machining.

1. Obige Schnittdaten sind Hochgeschwindigkeits-Schnittdaten für die Bearbeitung von Alu Legierungen.
2. Bitte Kühlschmiermittel oder Luft mit hohem Druck zur Spanabfuhr benutzen.
3. Während der Bearbeitung können durch Funken Feuer entstehen. Bitte Vorkehrungen treffen.
4. Dynamische Auswuchtvorschriften beachten.

Recommended cutting data · Empfohlene Schnittdaten

AL-3R-AIR

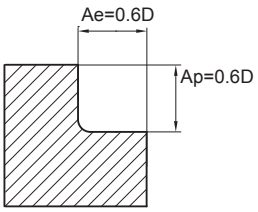
Workpiece material Werkstückstoff	Aluminum alloy Alu Legierungen		Silicon aluminium alloySi≤10% Silizium Alu Legierungen Si≤10%	
Cutting speed Schnittgeschw.	800~1200m/min		800~1200m/min	
Diameter Ø Durchmesse (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)
12	25000	6000	25000	6000
16	20000	6400	20000	6400
20	15000	7000	15000	7000
Max. cutting depth max Schnitttiefe				

1. The cutting parameters above are applied for high speed machining Al alloy.
2. Please use cutting liquid or strong air blow to remove chips.
3. Sparks generated during machining process or heat caused by tool breakage may cause burning or fire. Please be careful of fireproof.
4. Dynamic balance test must be done before machining.

1. Obige Schnittdaten sind Hochgeschwindigkeits-Schnittdaten für die Bearbeitung von Alu Legierungen.
2. Bitte Kühlschmiermittel oder Luft mit hohem Druck zur Spanabfuhr benutzen.
3. Während der Bearbeitung können durch Funken Feuer entstehen. Bitte Vorkehrungen treffen.
4. Dynamische Auswuchtvorschriften beachten.

Recommended cutting data · Empfohlene Schnittdaten

AL-3RL-AIR

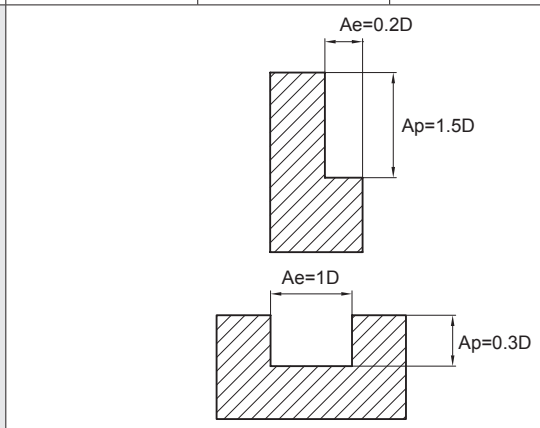
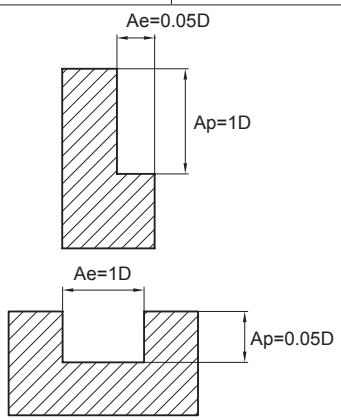
Workpiece material Werkstückstoff	Aluminum alloy Alu Legierungen		Silicon aluminium alloySi≤10% Silizium Alu Legierungen Si≤10%	
Cutting speed Schnittgeschw.	800~1200m/min		800~1200m/min	
Diameter Ø Durchmesse (mm)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)
12	22000	5300	22000	5300
16	18000	5700	18000	5700
20	13000	6000	13000	6000
Max. cutting depth max Schnitttiefe				

1. The cutting parameters above are applied for high speed machining Al alloy.
2. Please use cutting liquid or strong air blow to remove chips.
3. Sparks generated during machining process or heat caused by tool breakage may cause burning or fire. Please be careful of fireproof.
4. Dynamic balance test must be done before machining.

1. Obige Schnittdaten sind Hochgeschwindigkeits-Schnittdaten für die Bearbeitung von Alu Legierungen.
2. Bitte Kühlschmiermittel oder Luft mit hohem Druck zur Spanabfuhr benutzen.
3. Während der Bearbeitung können durch Funken Feuer entstehen. Bitte Vorkehrungen treffen.
4. Dynamische Auswuchtvorschriften beachten.

Recommended cutting data · Empfohlene Schnittdaten

VSM-4E

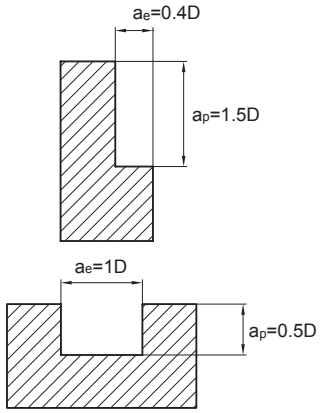
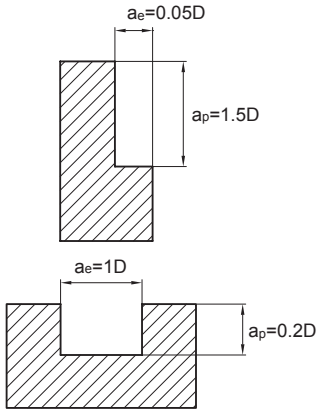
Workpiece material Werkstück-material	Carbon steel/Alloy steel Kohlenstoff Stahl/ legierter Stahl		Stainless steel · Rostfreier Stahl		Heat resist. alloy/ Warmfeste Leg. Titanium alloy/ Titan-Legier.	
Diameter Ø Durchmesse (mm)	Rotating Drehzahl (min^{-1})	Feed (mm/min)	Rotating Drehzahl (min^{-1})	Feed (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)
4	6400	1200	3700	590	2350	180
5	5800	1300	3000	600	1900	190
6	5300	1500	2700	640	1900	220
8	3900	1100	2000	480	1400	170
10	3100	930	1600	400	1100	150
12	2600	780	1300	360	950	140
16	1900	680	1000	280	720	120
20	1500	540	800	260	570	95
Max. cutting depth max Schnitttiefe						

1. The above table shows the standard value of side milling. When slot milling , rotating speed is around 80%~100% of standard value, Feed is around 60%~80% of standard value.
2. Recommend using non water-soluble cutting liquid when machining stainless steel and Heat resist. alloy Warmfeste Leg..
3. Please select high rigid and precise machine and tool holder.
4. Adjust rotating speed and feed according to cutting depth and machine rigidity.
5. Down milling is recommended in side milling.
6. Make overhang as short as possible if no interference.

1. Die obige Tabelle zeigt Standart Schnittwerte für das Eckfräsen, beim Nutenfräsen die Schnittgeschwindigkeit auf ca. 80% und den Vorschub auf 60%-80% reduzieren.
2. Nicht wasserlösliche Kühlschmiermittel verwenden.
3. Bitte Maschine und Werkzeugaufnahme mit hoher Präzission und Stabilität wählen.
4. Schnittgeschwindigkeit und Vorschub der Schnitttiefe und Maschinenstabilität anpassen.
5. Fräsmethode zum Eckfräsen: Gleichlauffräsen.
6. Die Werkzeugauskragung so kurz wie möglich wählen.

Recommended cutting data · Empfohlene Schnittdaten

VSM-4R | VSM-4RFP

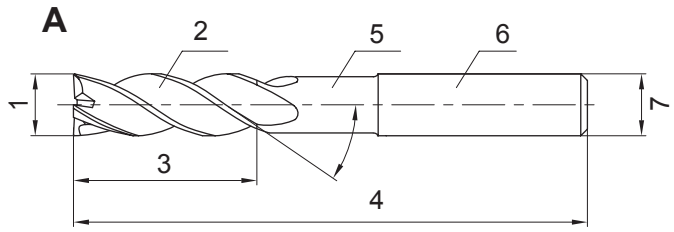
Workpiece material Werkstück-material	Carbon steel/Alloy steel Kohlenstoff Stahl/ legierter Stahl		Stainless steel · Rostfreier Stahl		Heat resist. alloy/ Warmfeste Leg. Titanium alloy/ Titan-Legier.	
Diameter Ø Durchmesse (mm)	Rotating Drehzahl (min^{-1})	Feed (mm/min)	Rotating Drehzahl (min^{-1})	Feed (mm/min)	Rotating Drehzahl (min^{-1})	Feed Vorschub (mm/min)
6	5300	900	2700	240	2470	145
8	3900	840	2000	255	1820	155
10	3100	770	1600	255	1430	155
12	2600	720	1300	205	1235	135
16	1900	625	1000	180	935	110
Max. cutting depth max Schnitttiefe						

1. The above table shows the standard value of side milling. When slot milling, rotating speed is around 80%~100% of standard value, feed is around 60%~80% of standard value.
2. Recommend using water-insoluble cutting liquid when machining stainless steel and Heat resist. alloy Warmfeste Leg.
3. Please select high rigid and precise machine and tool holder.
4. Adjust rotating speed and feed according to cutting depth and machine rigidity.
5. Down milling is recommended in side milling.
6. Make overhang as short as possible if no interference.
7. For overhang of L/D≤4 please use cutting condition from table above. If L/D>4, please reduce the cutting speed and feed rate about 70%.

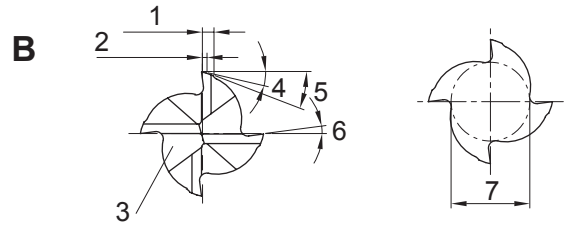
1. Die obige Tabelle zeigt Standart Schnittwerte für das Eckfräsen, beim Nutenfräsen die Schnittgeschwindigkeit auf ca. 80% und den Vorschub auf 60%-80% reduzieren.
2. Nicht wasserlösliche Kühlschmiermittel verwenden.
3. Bitte Maschine und Werkzeugaufnahme mit hoher Präzission und Stabilität wählen.
4. Schnittgeschwindigkeit und Vorschub der Schnitttiefe und Maschinenstabilität anpassen.
5. Fräsmethode zum Eckfräsen: Gleichlauffräsen.
6. Die Werkzeugauskragung so kurz wie möglich wählen.
7. Für Werkzeugauskragung L/D≤4 bitte die Parameter aus der Tabelle oben verwenden. Bei L/D>4 , bitte die Schnittgeschwindichkeit und den Vorschub auf 70% reduzieren.

NOTIZEN:

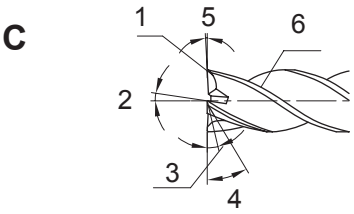
Parts terminology of end mill · Terminologie von VHM Fräsern



A 1) Cutting edge diameter / Schneiddurchmesser
2) Chip pocket/ Spanraum
3) Length of cutting edge/ Schneidenlänge
4) Overall length/ Gesamtlänge
5) Neck/ Hals
6) Shank/ Schaft
7) Shank diameter/ Schaftdurchmesser

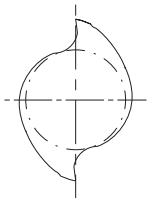
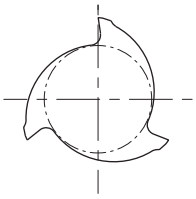
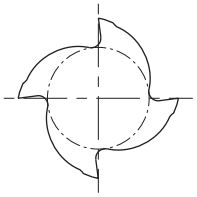


B 1) Land width/ Fasenbreite, Hauptschneide
2) Relief land width/ Fasenbreite, Durchmesser
3) Gash/ Freischliff, stirnseitig
4) Radial primary relief angle/ Primärer radial Freiwinkel
5) Radial secondary relief angle/ Sekundärer radial Freiwinkel
6) Radial rake angle/ Radial Spanwinkel
(7) Wep thickness – Kerndurchmesser



C 1) Corner/ Schneidecke
2) Axial rake angle/ axialer Spanwinkel
3) Axial primary relief angle/ axialer primärer Freiwinkel
4) Axial secondary relief angle/ axialer sekundärer Freiwinkel
5) Lead angle/ Neigungswinkel
6) Peripheral cutting edge/ Peripherie Schneidkante

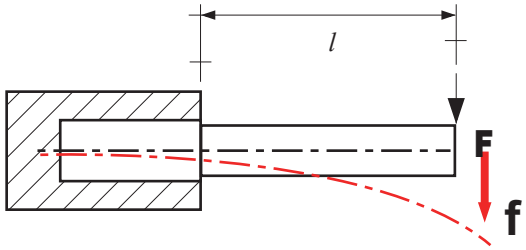
Teeth, chip pocket and tool rigidity · Zähne, Spanraum und Stabilität

Teeth · Zähne		2 Flutes · Schneiden	3 Flutes · Schneiden	4 Flutes · Schneiden
Profile of cross section Schnittdarstellung				
Proportion of cross section Anteil Schnittdarstellung		54%	56%	60%
Features Merkmal	Advantages Vorteile	• Large chip pocket • Good chip removal • Große Spankammer • Gute Spanabfuhr	• Good chip removal • Perfect surface finish • Gute Spanabfuhr • Gute Oberflächengüte	• Good rigidity • Perfect surface finish • Gute Steifigkeit • Gute Oberflächengüte
Application Anwendung		1. Slot machining 2. Side face machining 3. Hole machining 1. Nutenfräsen 2. Eckfräsen 3. Bohrungsbearbeitung	1. Slot machining 2. Side face machining 3. For finishing 1. Nutenfräsen 2. Eckfräsen 3. Schlichtbearbeitung	1.Shallow slot machining 2.Side face machining 3.For finishing 1.Nutenfräsen (flach) 2.Eckfräsen 3.Schlichtbearbeitung

Length of cutting edge (overhang) and cutting diameter
Länge der Schneidenauskragung und Schneidendurchmesser

The shorter the overhang, the stronger the rigidity. Thus isn´t easy to generate. Bend and vibration in the cutting process may accrue. Length (overhang) increases by 1 time, the Deflection degree (f) will be 8 times of the former one.

Je kürzer die Werkzeugauskragung, um so stabiler ist die Bearbeitungssituation.
Während der Bearbeitung können Werkzeugdurchbiegungen und Vibrationen entstehen.
Bei Vergrößerung der Auskragung um 100% wird der Deflektionsgrad (Ablenkung) um das 8-fache erhöht.

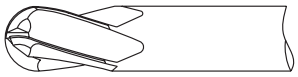
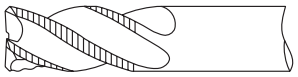
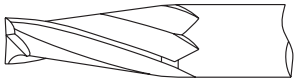


$$f = \frac{F \cdot l^3}{3 \cdot E \cdot I} = \frac{F \cdot l^3 \cdot 64}{3 \cdot E \cdot d^4 \cdot \pi}$$

Reduce the overhang by 20%, the Deflection degree (f) will decrease by 50%
Increase the diameter by 20%, the Deflection degree (f) will decrease by 50%

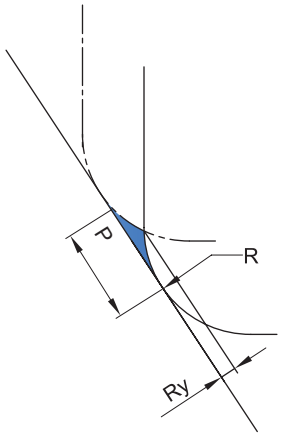
Bei Reduzierung der Auskragung um 20 % reduziert sich der Deflektionsgrad (Ablenkung) um 50 %.
Bei Vergrößerung des Werkzeugdurchmessers um 20 % reduziert sich der Deflektionsgrad (Ablenkung) um 50 %.

Typical geometries of end mills · Typische Geometrien von Schaftfräsern

Type · Typ	Geometry · Ausführung
end mill Schaftfräser	
R end mill Radiuseckfräser	
Ball nose end mill Kugelkopffräser	
Roughing end mill Schruppfräser	
Tapered end mill Konusfräser	

Technical information · Technische Informationen

Feed rate selecting table in profile machining for ball nose and R end mills
Vorschubwerte für das Formfräsen mit Kugelkopffräsern und Radiuseckfräsern



$$Ry=R\times\{1-\cos[\arcsin(fr/2R)]\}$$

Ry: Theoretical value of surface roughness
P: Feed rate
R: Ball nose radius or corner radius

Ry: Theoretische Werte der Oberflächenqualität.
P: Vorschub
R: Kugelkopf- oder Radiusfräser

R \ Ry	Feed rate P · Vorschub									
	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
0.5	0.003	0.010	0.023	0.042	0.067	0.100				
1.0	0.001	0.005	0.011	0.020	0.032	0.046	0.063	0.083	0.107	
1.5	0.001	0.003	0.008	0.013	0.021	0.030	0.041	0.054	0.069	0.086
2.0	0.001	0.003	0.006	0.010	0.015	0.023	0.031	0.040	0.051	0.064
2.5	0.001	0.002	0.005	0.008	0.013	0.018	0.025	0.032	0.041	0.051
3.0		0.001	0.004	0.007	0.010	0.015	0.020	0.027	0.034	0.042
4.0		0.001	0.003	0.005	0.008	0.011	0.015	0.020	0.025	0.031
5.0		0.001	0.002	0.004	0.006	0.009	0.012	0.016	0.020	0.025
6.0			0.002	0.003	0.005	0.008	0.010	0.013	0.017	0.021
8.0			0.001	0.003	0.004	0.006	0.008	0.010	0.013	0.016
10.0			0.001	0.002	0.003	0.005	0.006	0.008	0.010	0.013
12.5			0.001	0.002	0.003	0.004	0.005	0.006	0.008	0.010

R \ Ry	Feed rate P · Vorschub									
	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
0.5										
1.0										
1.5	0.104									
2.0	0.077	0.092	0.109							
2.5	0.061	0.073	0.086	0.100						
3.0	0.051	0.061	0.071	0.083	0.095	0.109				
4.0	0.038	0.045	0.053	0.062	0.071	0.081	0.091	0.103		
5.0	0.030	0.036	0.042	0.049	0.057	0.064	0.073	0.082	0.091	0.101
6.0	0.025	0.030	0.035	0.041	0.047	0.054	0.061	0.068	0.076	0.084
8.0	0.019	0.023	0.026	0.031	0.035	0.040	0.045	0.051	0.057	0.063
10.0	0.015	0.018	0.021	0.025	0.028	0.032	0.036	0.041	0.045	0.050
12.5	0.012	0.014	0.017	0.020	0.023	0.026	0.029	0.032	0.036	0.040

NOTIZEN:

Non-standard · Sonderwerkzeuge

Name: Fax: Tel: E-MAIL:	ZCC·CT Heltorfer Straße 12 40472 Düsseldorf Germany Fax: +49-(0)211-989240-111 E-Mail:info@zccct-europe.com

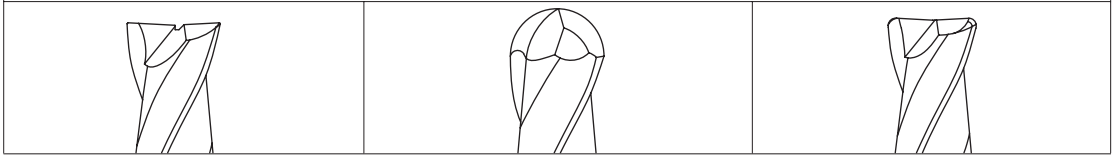
Workpiece material · Werkstückstoff

Carbon steel	Alloy steel Legierter Stahl	Hardened steel · gehärteter Stahl				Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg.	Aluminum Alu.	Aluminum alloy Alu. Leg. Si%=	Titanium alloy Titan Leg.	Heat resist. alloy Warmfest Leg.
		~40HRC	~50HRC	~60HRC	~68HRC							

Series				
GM	HM	NM	AL	SM

Diameter Ø	Ø0.3～20.0mm
Edges Nr. Schneidenanzahl	

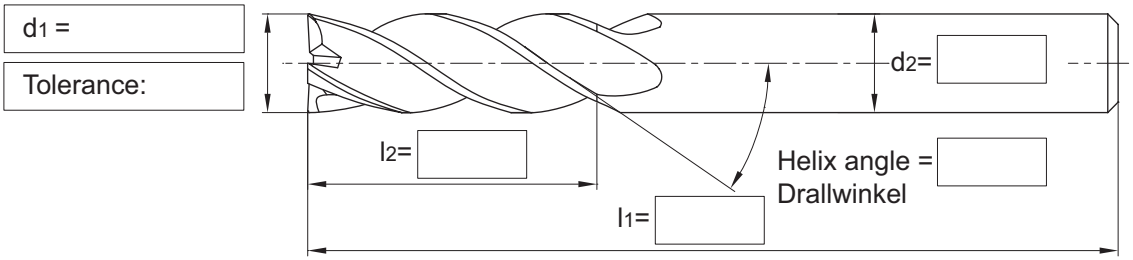
Typ · Type



☐ Flat end milling
Eckfräsen

☐ Ball end milling
Kugelfräsen

☐ Round arc milling
Radiuseckfräsen



Remarks:
Bemerkungen:

Order quantity: piece
Auftragsmenge: Stück

Expected delivery date:
Ewartetes Lieferdatum:

Date · Datum:

Confirmation · Unterschrift:

Non-standard · Sonderwerkzeuge

Name:

Fax:

Tel:

E-MAIL:

ZCC·CT
Heltorfer Straße 12
40472 düsseldorf Germany
Fax: +49-(0)211-989240-111
E-Mail:info@zccct-europe.com

Workpiece material · Werkstückstoff

Carbon steel	Alloy steel Legierter Stahl	Hardened steel · gehärteter Stahl				Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg.	Aluminum Alu.	Aluminum alloy Alu. Leg. Si%=	Titanium alloy Titan Leg.	Heat resist. alloy Warmfest Leg.
		~40HRC	~50HRC	~60HRC	~68HRC							

Diameter Ø	Ø0.2～25.0mm
Edges Nr. Schneidenanzahl	
End edge over center: Schneide über Mitte	☐ Yes ☐ No

Coating Beschichtung	
Yes	☐
No	☐

	Holder Type Aufnahmetyp
DIN6535	☐ Form HA
	☐ Form HB
	☐ Common straight holder Normal Rundschaft
	Special shape Spezial Ausführung

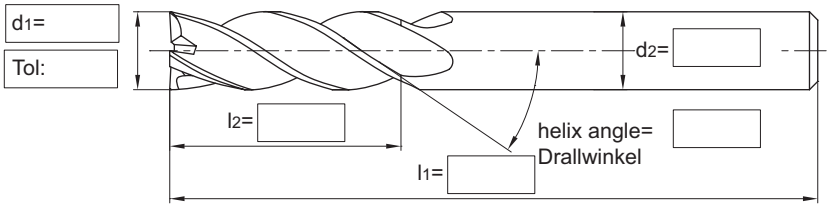
Cutter Information · Fräser Informationen

Typ · Type



Machining method · Bearbeitungen





Remarks:
Bemerkungen:

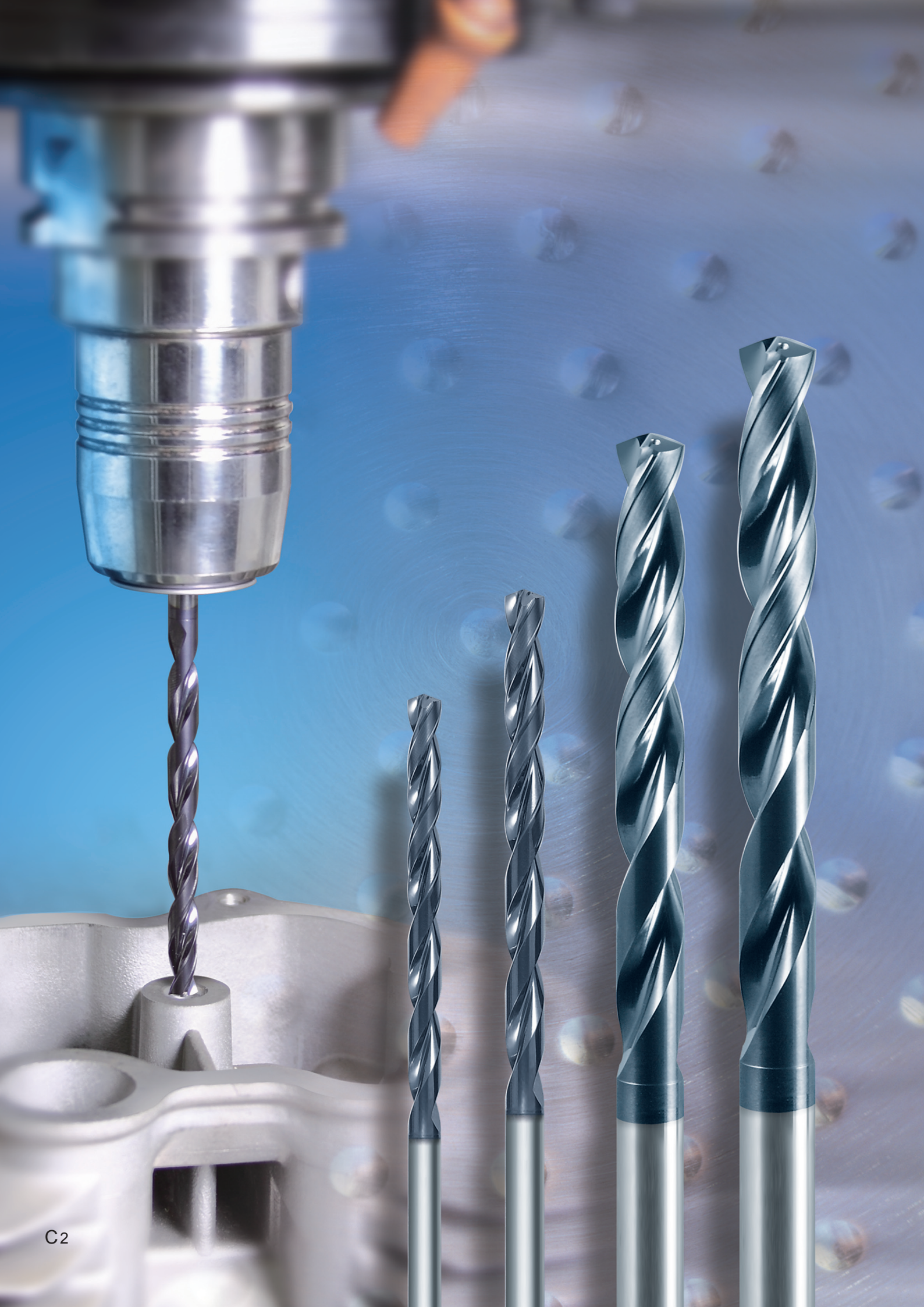
Order quantity: piece
Auftragsmenge: Stück

Expected delivery date:
Ewartetes Lieferdatum:

Date · Datum:

Confirmation · Unterschrift:









Drilling tools
Bohrwerkzeuge

• **Drills**	**C7-C138**	• **Bohrer**
Solid carbide drills	C10-C121	VHM Bohrer
Indexable drills	C123-C138	Wendeschneidplattenbohrer
• **Reamers**	**C139-C150**	• **Reibahlen**
Solid carbide reamers	C140-C150	VHM Reibahlen
• **Threading tools**	**C152-C162**	• **Gewindewerkzeuge**
Solid carbide threading tools	C155-C158	VHM Gewindebohrer
Solid carbide threading mills	C159	VHM Gewindefräser

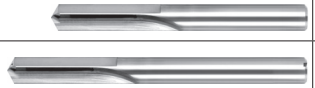
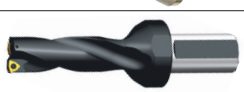
NOTIZEN:

Drilling · Bohren

Drilling tools · Bohrwerkzeuge

Drilling tools overview	**C8**	**Bohrwerkzeuge Übersicht**
Solid carbide drills	**C9-C121**	**VHM Bohrer**
Grade introduction for solid carbide drills	C9	Sortenbeschreibung für VHM Bohrer
Solid carbide drills code key	C10	ISO Kennzeichnung für VHM Bohrer
Recommended cutting datas for solid carbide drills	C94-C107	Empfohlene Schnittdaten für VHM Bohrer
Technical information for solid carbide drills	**C109-C115**	**Technische Information für VHM Bohrer**
Non-standard tailor-made guide	C117-C121	Bestellformular für Sonderwerkzeuge
Indexable drills	**C123-C138**	**Wendeschneidplattenbohrer**
Indexable drills Code Key	C123	ISO Kennzeich. von Wendeplattenbohrern
Indexable drills overview	C124-C129	Wendenplattenbohrer Übersicht
Drilling inserts Code Key	C130-C131	ISO Kennzeichnung für Bohrwendeplatten
Technical information for drills	**C136-C137**	**Technische Informationen für WSP-Bohrer**
Recommended cutting data for drills	C138	Empfohlene Schnittdaten für WSP-Bohrer

Drilling tools overview · Bohrer Übersicht

Machining Bearbeitung	Typ of drill Bohrertyp	Type · Typ	L/D	Shape of drills Bohrerausführung	Cooling mode Kühlmittel	Ø	material · Material P: Carbon steel Kohlenstoff Stahl	P: Alloy steel Legierter Stahl	M: Stainless steel · Rostfreier Stahl	K: Cast iron Grauguss	N: Non-ferrous metal NE-Metalle	S: Heat resistant alloy Warmfeste Legier.	H: Hardened steel Gehärteter Stahl	Page · Seite: Specification Spezifikation	Page · Seite: Cutting data Schnittdaten
General machining Allgemeine Bearbeitung	Twist drill Spiralbohrer	**1534SU03**	**3xD**		External Extern	Ø2-Ø20	✓	✓	✓	✓				C12-C50	C94-C96
		1534SU03C	**3xD**		Internal Intern	Ø3-Ø20	✓	✓	✓	✓					
		1634SU03C	**3xD**		Internal Intern	Ø3-Ø20	✓	✓	✓	✓					
		1734SU03C	**3xD**		Internal Intern	Ø3-Ø20	✓	✓	✓	✓					
		1536SU05	**5xD**		External Extern	Ø2-Ø20	✓	✓	✓	✓					
		1536SU05C	**5xD**		Internal Intern	Ø3-Ø20	✓	✓	✓	✓					
		1636SU05C	**5xD**		Internal Intern	Ø3-Ø20	✓	✓	✓	✓					
		1736SU05C	**5xD**		Internal Intern	Ø3-Ø20	✓	✓	✓	✓					
		1538SU08C	**8xD**		Internal Intern	Ø3-Ø18	✓	✓	✓	✓					
	Deep drill Tiefbohrer	**1588SL12C**	**12xD**		Internal Intern	Ø3-Ø21	✓	✓	✓	✓		✓		C54-C60	C98
		1588SL20C	**20xD**		Internal Intern	Ø3-Ø21	✓	✓	✓	✓		✓		C54-C60	C98
		1588SL30C	**30xD**		Internal Intern	Ø3-Ø21	✓	✓	✓	✓		✓		C54-C60	C98
	Pilot drills Pilotbohrer	**1534SP03C**	**3xD**		Internal Intern	Ø3.03-Ø20.03	✓	✓	✓	✓		✓		C61-C64	C99
	Step drill Stufenbohrer	**1557SU03**	**3xD**		External Extern	M4-M16	✓	✓	✓	✓		✓		C51	C97
Carbon steel alloy steel Kohlenstoff Stahl Legierter Stahl	Twist drill Spiralbohrer	**1534ST03C**	**3xD**		Internal Intern	Ø3-Ø20	✓	✓	✓			✓		C66-C77	C101
		1536ST05C	**5xD**		Internal Intern	Ø3-Ø20	✓	✓	✓			✓			
		1736ST05C	**5xD**		Internal Intern	Ø3-Ø20	✓	✓	✓			✓			
high hardness steel Gehärteter Stahl	Twist drill Spiralbohrer	**1534SH03**	**3xD**		External Extern	Ø3-Ø16							✓	C79	C102
For aluminum, cast iron Für Aluminium, Gusseisen	Twist drill Spiralbohrer	**1105SC03**	**3xD**		External Extern	Ø2-Ø16				✓	✓			C80-C83	C103
		1101SC05	**5xD**		External Extern	Ø2-Ø16				✓	✓				
	Three-lips drill Dreilippenb.	**1165PA03**	**3xD**		External Extern	Ø3-Ø20				✓	✓	✓		C84-C86	C104
	Three-lips drill Dreilippenb.	**1165PC03**	**3xD**		External Extern	Ø3-Ø20				✓				C87-C89	C105
	Straight flute drill Gerade genuteter Bohrer	**1576PC05**	**5xD**		External Extern	Ø4-Ø20				✓	✓			C90-C92	C105-C106
		1576PC05C	**5xD**		Internal Intern	Ø4-Ø20				✓	✓				
		1579PC15C	**15xD**		Internal Intern	Ø5-Ø14				✓	✓				
	Centering drill Zentrierbohrer	**1143SC90**			External Extern	Ø5-Ø20				✓	✓			C93	C107
		1143SC120			External Extern	Ø5-Ø20				✓	✓				
Indexable drills series WSP-Bohrer	Indexable drills WSP-Bohrer	**ZTD03/04**	**3xD 4xD**		Internal Intern	Ø17-Ø50	✓	✓	✓	✓				C126-C127	C136 C138
		ZD03	**3xD**		Internal Intern	Ø16-Ø58	✓	✓	✓	✓				C128-C129	

✓ = Very suitable · Sehr empfohlen
✓ = Suitable · Empfohlen

Grade introduction for solid carbide drills
Hartmetallsorten für VHM-Bohrer

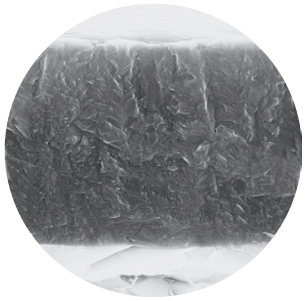
Coated Grade KDG303
Beschichtete Sorte

It is a combination of ultra-fine carbide substrate and Nano nc-TiAlN coating. It is a universal grade for machining of carbon steel, alloy steel (HRC<=48), cast iron and stainless steel. Suitable for the machining of Ni based high-temperature alloys at normal cutting speed.

Eine Kombination von Ultrafeinkorn-Hartmetall und Nano nc-TiAlN PVD-Beschichtung. Universelle Anwendung zur Bearbeitung von unlegiertem Stahl, legiertem Stahl (HRC<=48), Guss, rostfreiem Stahl und Ni-basierten, warmfesten Superlegierungen bei normaler Schnittgeschwindigkeit.

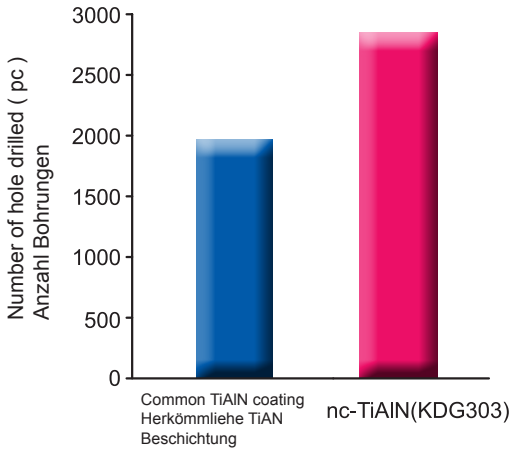


Common TiAlN coating
normale TiAlN Beschichtung



nc-TiAlN coating
nc-TiAlN Beschichtung

Application of nc-TiAlN coating in drilling Anwendungsbeispiel von nc-TiAlN	
Tool Type · Typ	1534SU03C-1200
Size · Durchmesser	Ø12mm
Workpiece material Werkstückstoff	42CrMo (32HRC)
Cutting speed Schnittgeschw.	100m/min
Rotating speed Umdreh. pro min	2652r/min
Feed rate per revolution Vorschub pro Umdrehung	0.25mm/r
Feed speed · Vorschub	663mm/min
Drilling depth · Bohrtiefe	36mm
Cooling system Kühlungssystem	Water-soluble liquid (Internal) Emulsion (Intere Zuführung)
Machine · Maschine	Mikron UCP 1000



Uncoated grades
Unbeschichtete Sorten

YK20F

It is an ultra-fine carbide grade with good wear resistance suitable for drilling and reaming of cast iron and nonferrous metals.

Ultrafeinkorn-Hartmetall mit guter Verschleiß-festigkeit.
Geeignet zum Bohren und Reiben von Guss und NE-Metallen.

YK30F

It is an ultra-fine carbide grade with good wear-resistance. A universal grade for drilling.

Ultrafeinkorn-Hartmetall mit guter Verschleißfestigkeit. Universelle Sorte zum Bohren.

Solid carbide drills Code Key · ISO Kennzeichnung für VHM-Bohrer

Description Bezeichnung	
Code	Description · Beschreibung
1	DIN338
2	DIN1897
3	QJ/ZZQ(TO)01.001.002
4	DIN6537K
5	DIN6537K
6	DIN6537K
7	ZZC-C in QJ/ZZQ(TO)01.001.002
8	ZZC-D in QJ/ZZQ(TO)01.001.002
9	ZZC-E in QJ/ZZQ(TO)01.001.002

Application Anwendung	
Code	Description · Beschreibung
SU	Twist drill for general universal machining Spiralbohrer für die allg. Bearbeitung
SL	Twist drill for deep drilling Spiralbohrer für Tiefbohren
SP	Pilot drills Pilotbohrer
ST	Twist drill for soft steel, stainless steel Spiralbohrer für weiche Stähle und rostfr. Stahl
SH	Twist drill for high hardness steel Spiralbohrer für gehärteten Stahl
SC	Twist drill for aluminum, cast iron Spiralbohrer für Alu und Grauguss
PA	Three-lips drill for aluminum, cast iron 3-Lippenbohrer für Alu-leg., Grauguss
PC	Straight flute drill for aluminum, cast iron gerade genuteter Bohrer für Alu, Grauguss

Type of tools Werkzeugtyp	
Code	Description · Beschreibung
1	Drills · Bohrer

Mode of cooling Art der Kühlung	
Code	Description · Beschreibung
C	Internal Coolant Innere Kühlmittelzufuhr

1 5 3 6 SU 05 C -0850

Type of shank · Schaftausführung	
Code	Description · Beschreibung
1	Straight shank Zylinderschaftausführung
2	Square head Straight shank DIN 10 4-Kant-Schaft DIN 10
3	Double flattened Straight shank DIN1809 2-Flächen-Zylinderschaft DIN1809
5	Straight shank DIN6535HA Zylinderschaft DIN6535HA
7	Whistle notch shank DIN6535HE Whistle-Notch-Schaft DIN6535HE
9	Tapered shank MK-Schaft

Type of drill · Bohrertyp	
Code	Description · Beschreibung
0	Twist drill Spiralbohrer
3	Multiple functions twist drill Universalspiralbohrer
4	Centering drill Zentrierbohrer
5	Step drill Stufenbohrer
6	Three-lips drill 3-Schneidenbohrer
7	Straight flute drill Bohrer mit geraden Nuten

Specification · Bezeichnung	
Code	Description · Beschreibung
0850	Nominal cutting diameter of stepless drill Bohrerdurchmesser: 8,5mm
M6	Step drill for standard pitch Gewindebohrer Standardsteigungen
M8×1	Step drill for fine pitch Gewindebohrer mit Feingewinde

Identification of drilling depth and point angle · max. Bohrtiefe			
If the tool is not a centering drill, it indicate the drilling depth Ist das Werkzeug kein Zentrierbohr. wird die Bohrtiefe angegeben.		If the tool is a centering drill, it indicate the point angle Ist das Werkzeug kein Zentrierbohr. wird der Spitzenwinkel angegeben.	
Code	Description · Beschreibung	Code	Description · Beschreibung
03	(2~3) d	90	Centering drill with 90° point angle NC-Anbohrer mit 90° Winkel
05	(4~5) d		
08	(7~8) d	120	Centering drill with 120° point angle NC-Anbohrer mit 120° Winkel
15	(15) d		

SU series twist drill · Spiralbohrer Serie

General machining
Allgemeine Bearbeitung

SU Universal series · Universalausführung

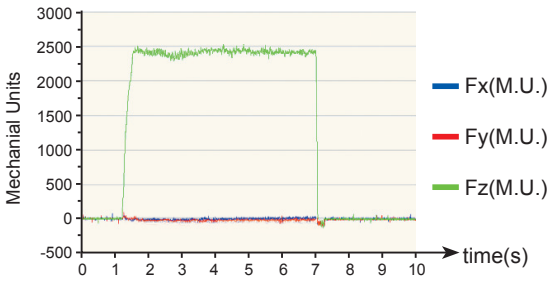
The optimized chip-breaker, shape of the cutting edge and a proper change of the rake angle combined with a TiAlN nano coating for a wider application field. It is for the drilling of work piece materials of P(steel), M(stainless steel) and K(cast iron) with high performance.

Eine optimierte Schneidengeometrie in Verbindung mit einer Nano TiAlN-Beschichtung ermöglicht eine Hochleistungsbearbeitung beim Bohren in allgemeinen Stahlwerkstoffen, rostfreien Werkstoffen und Guss.



Specially designed drill point makes cutting smooth.

Spezielle Geometrie für weichen Schnitt

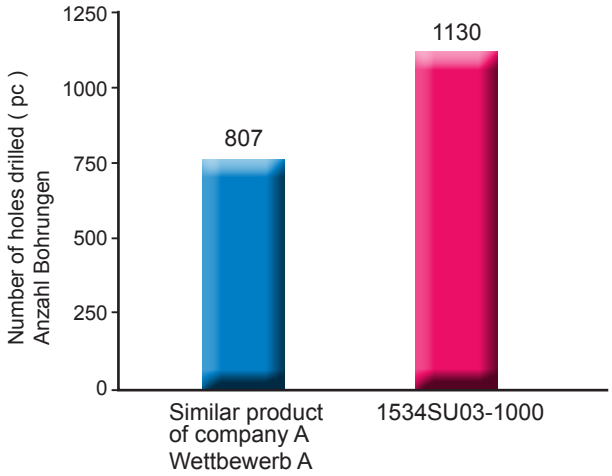


Cutting force chart of SU series

Diameter of drill · Bohrer:: Ø 12 mm
Work piece material · Werkstoff: 40Cr
Hardness · Härte : HB280
Cutting speed · Schnittgeschwindig.: 90m/min
Feed rate · Vorschub: 715mm/min
Depth of drilling · Bohrtiefe: 40 mm
Cooling system: Emulsion (Internal) cooling
Kühlung: innere Kühlmittelzufuhr

SU series twist drills comparison with company A's similar product
Anwendungsbeispiel der SU Serie Spiralbohrer mit vergleichbarem Produkt

Tool Type · Typ: 1534SU03-1000
Size · Durchmesser: Ø10mm
Workpiece material ·Werkstückstoff: 42CrMo(35HRC)
Cutting speed· Schnittgeschw.: 100m/min
Rotating speed · Umdreh. pro min: 3200r/min
Feed rate per revolution
Vorschub pro Umdrehung: 0.20mm/r
Feed speed · Vorschub: 640mm/min
Drilling depth · Bohrtiefe: 30mm(L/D=3)
Cooling system · Kühlsystem:
water soluble liquid (External) · Emulsion (Extern)
Machine · Maschine: Mikron UCP 1000



SU series · SU Serie

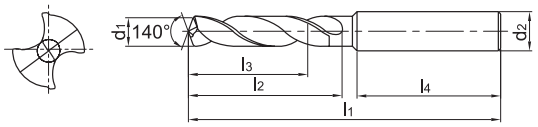
General machining · Allgemeine Bearbeitung



External Coolant
Externe Kühlung

Straight shank
Zylinderschaft

DIN 6535 HA

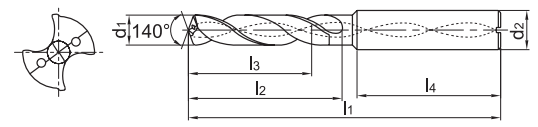




Internal Coolant
Interne Kühlung

Straight shank
Zylinderschaft

DIN 6535 HA

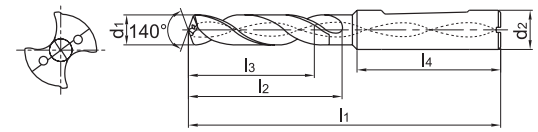




Internal Coolant
Interne Kühlung

Weldon
shank · Schaft

DIN 6535 HB

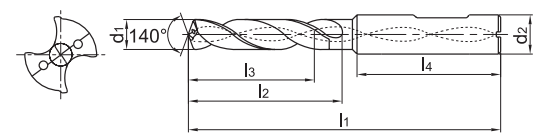




Internal Coolant
Interne Kühlung

Whistle notch
shank · Schaft

DIN 6535 HE



- For high efficient drilling of P(steel), M (stainless steel) and K(cast iron) with high performance.
- Waveform cutting edges achieve outstanding sharpness and strength, promoting chip removal.
- Hocheffizientes Bohren von allgemeinen Stahlwerkstoffen, rostfreien Werkstoffen und Guss.
- Wellenförmige Schneidkante mit hoher Schneidenschärfe, Stabilität und guter Spanabfuhr.

Drill diameter Bohrer Ø $d_1(m_7)$	Drilling depth Bohrtiefe (L/d1)	Cooling mode Kühlmittel.	Shank Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen					Grade Sorte
					Shankdiameter Ø Schaftdurchmesser	Overall length Gesamtlänge	Flute length Nutenlänge	effective drill. length Effektive Nutzlänge	Shank length Schaftlänge	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
2.0	3	External Extern	Straight shank Zylinder-schaft	**1534SU03-0200**	6	62	20	14	36	●
	5			**1536SU05-0200**	6	66	28	23	36	●
2.1	3			**1534SU03-0210**	6	62	20	14	36	●
	5			**1536SU05-0210**	6	66	28	23	36	●
2.2	3			**1534SU03-0220**	6	62	20	14	36	●
	5			**1536SU05-0220**	6	66	28	23	36	●
2.3	3			**1534SU03-0230**	6	62	20	14	36	●
	5			**1536SU05-0230**	6	66	28	23	36	●
2.4	3			**1534SU03-0240**	6	62	20	14	36	●
	5			**1536SU05-0240**	6	66	28	23	36	●
2.5	3			**1534SU03-0250**	6	62	20	14	36	●
	5			**1536SU05-0250**	6	66	28	23	36	●
2.6	3			**1534SU03-0260**	6	62	20	14	36	●
	5			**1536SU05-0260**	6	66	28	23	36	●
2.7	3			**1534SU03-0270**	6	62	20	14	36	●
	5			**1536SU05-0270**	6	66	28	23	36	●
2.8	3			**1534SU03-0280**	6	62	20	14	36	●
	5			**1536SU05-0280**	6	66	28	23	36	●
2.9	3			**1534SU03-0290**	6	62	20	14	36	●
	5			**1536SU05-0290**	6	66	28	23	36	●
3.0	3			**1534SU03-0300**	6	62	20	14	36	●
	5			**1536SU05-0300**	6	66	28	23	36	●
	3	Internal Intern		**1534SU03C-0300**	6	62	20	14	36	●
	5			**1536SU05C-0300**	6	66	28	23	36	●
	3		Weldon shank/Schaft	**1634SU03C-0300**	6	62	20	14	36	○
	5			**1636SU05C-0300**	6	62	20	14	36	○
	3		Whistle notch shank/Schaft	**1734SU03C-0300**	6	66	28	23	36	●
	5			**1736SU05C-0300**	6	66	28	23	36	●
	8		straight shank Zylinderschaft	**1538SU08C-0300**	6	72	34	29	36	●

● ex Stock Lager ○ on demand · auf Anfrage

Drill diameter Bohrer Ø $d_1(m_7)$	Drilling depth Bohrtiefe (L/d1)	Cooling mode Kühlmittel.	Shank Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen					Grade Sorte
					Shankdiameter Ø Schaftdurchmesser	Overall length Gesamtlänge	Flute length Nutenlänge	effective drill. length Effektive Nutzlänge	Shank length Schaftlänge	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
3.1	3	External Extern	Straight shank	1534SU03-0310	6	62	20	14	36	●
	5			1536SU05-0310	6	66	28	23	36	●
	3	Internal Intern	Zylinder-schaft	1534SU03C-0310	6	62	20	14	36	●
	5			1536SU05C-0310	6	66	28	23	36	●
	3		Weldon shank/Schaft	1634SU05C-0310	6	62	20	14	36	○
	5			1636SU05C-0310	6	66	28	23	36	○
	3		Whistle notch shank/Schaft	1734SU03C-0310	6	62	20	14	36	●
	5			1736SU05C-0310	6	66	28	23	36	●
	8		Straight shank Zylinder-schaft	1538SU08C-0310	6	72	34	29	36	●
3.2	3	External Extern		1534SU03-0320	6	62	20	14	36	●
	5			1536SU05-0320	6	66	28	23	36	●
	3	Internal Intern		1534SU03C-0320	6	62	20	14	36	●
	5			1536SU05C-0320	6	66	28	23	36	●
	3		Weldon shank/Schaft	1634SU03C-0320	6	62	20	14	36	○
	5			1636SU05C-0320	6	66	28	23	36	○
	3		Whistle notch shank/Schaft	1734SU03C-0320	6	62	20	14	36	●
	5			1736SU05C-0320	6	66	28	23	36	●
	8		Straight shank Zylinder-schaft	1538SU08C-0320	6	72	34	29	36	●
3.25	3	External Extern		1534SU03-0325	6	62	20	14	36	●
	5			1536SU05-0325	6	66	28	23	36	●
	3	Internal Intern		1534SU03C-0325	6	62	20	14	36	●
	5			1536SU05C-0325	6	66	28	23	36	●
	3		Weldon shank/Schaft	1634SU03C-0325	6	62	20	14	36	○
	5			1636SU05C-0325	6	66	28	23	36	○
	3		Whistle notch shank/Schaft	1734SU03C-0325	6	62	20	14	36	●
	5			1736SU05C-0325	6	66	28	23	36	●
3.3	3	External Extern	Straight shank Zylinder-schaft	1534SU03-0330	6	62	20	14	36	●
	5			1536SU05-0330	6	66	28	23	36	●
	3	Internal Intern		1534SU03C-0330	6	62	20	14	36	●
	5			1536SU05C-0330	6	66	28	23	36	●
	3		Weldon shank/Schaft	1634SU03C-0330	6	62	20	14	36	○
	5			1636SU05C-0330	6	66	28	23	36	○
	3		Whistle notch shank/Schaft	1734SU03C-0330	6	62	20	14	36	●
	5			1736SU05C-0330	6	66	28	23	36	●
	8		straight shank Zylinderschaft	1538SU08C-0330	6	72	34	29	36	●

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

Grade Sorte	Workpiece material · Werkstückstoff										
	Carbon steel Kohlenstoff Stahl HB≤180	Alloy steel Legierter Stahl	Hardened steel · Gehärteter Stahl			Stainless steel Rostfreier Stahl	Cast iron, Grauguss	Nodular cast iron GGG	Aluminum alloy Alu leg.	Copper alloy Kupfer leg.	Heat resist. alloy Warmfest. leg.
			~40HRC	~50HRC	~60HRC						
KDG303	✔	✔	✔			✔	✔	✔			

Code key C 10
ISO Kennzeichen
Cutting data 94-107
Schnittdaten
Technical Information C109-115
Technische Information
Non-standart tailor made C 117-121
Bestellformular für Sonderwerkzeuge

SU series · SU Serie

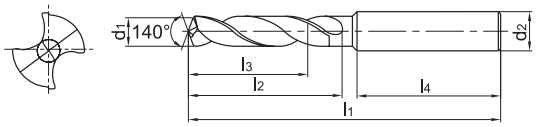
General machining · Allgemeine Bearbeitung



External Coolant
Externe Kühlung

Straight shank
Zylinderschaft

DIN 6535 HA

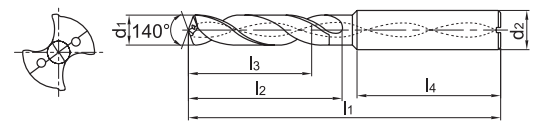




Internal Coolant
Interne Kühlung

Straight shank
Zylinderschaft

DIN 6535 HA

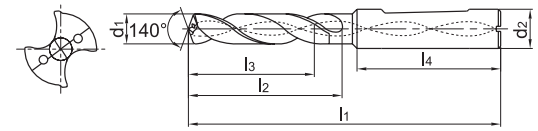




Internal Coolant
Interne Kühlung

Weldon shank · Schaft

DIN 6535 HB

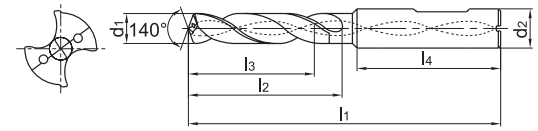




Internal Coolant
Interne Kühlung

Whistle notch shank · Schaft

DIN 6535 HE



- For high efficient drilling of P(steel), M (stainless steel) and K(cast iron) with high performance.
- Waveform cutting edges achieve outstanding sharpness and strength, promoting chip removal.
- Hocheffizientes Bohren von allgemeinen Stahlwerkstoffen, rostfreien Werkstoffen und Guss.
- Wellenförmige Schneidkante mit hoher Schneidenschärfe, Stabilität und guter Spanabfuhr.

Drill diameter Bohrer Ø $d_1(m_7)$	Drilling depth Bohrtiefe (L/d1)	Cooling mode Kühlmittel.	Shank Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen					Grade Sorte
					Shankdiameter Ø Schaftdurchmesser	Overall length Gesamtlänge	Flute length Nutenlänge	effective drill. length Effektive Nutzlänge	Shank length Schaftlänge	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
3.4	3	External Extern	Straight shank Zylinder-schaft	1534SU03-0340	6	62	20	14	36	●
	5			1536SU05-0340	6	66	28	23	36	●
	3	Internal Intern		1534SU03C-0340	6	62	20	14	36	●
	5			1536SU05C-0340	6	66	28	23	36	●
	3		Weldon shank/Schaft	1634SU03C-0340	6	62	20	14	36	○
	5			1636SU05C-0340	6	66	28	23	36	○
	3		Whistle notch shank/Schaft	1734SU03C-0340	6	62	20	14	36	●
	5			1736SU05C-0340	6	66	28	23	36	●
	8		Straight shank Zylinder-schaft	1538SU08C-0340	6	72	34	29	36	●
3.5	3	External Extern		1534SU03-0350	6	62	20	14	36	●
	5			1536SU05-0350	6	66	28	23	36	●
	3	Internal Intern		1534SU03C-0350	6	62	20	14	36	●
	5			1536SU05C-0350	6	66	28	23	36	●
	3		Weldon shank/Schaft	1634SU03C-0350	6	62	20	14	36	○
	5			1636SU05C-0350	6	66	28	23	36	○
	3		Whistle notch shank/Schaft	1734SU03C-0350	6	62	20	14	36	●
	5			1736SU05C-0350	6	66	28	23	36	●
	8		Straight shank Zylinder-schaft	1538SU08C-0350	6	72	34	29	36	●
3.6	3	External Extern		1534SU03-0360	6	62	20	14	36	●
	5			1536SU05-0360	6	66	28	23	36	●
	3	Internal Intern		1534SU03C-0360	6	62	20	14	36	●
	5			1536SU05C-0360	6	66	28	23	36	●
	3		Weldon shank/Schaft	1634SU03C-0360	6	62	20	14	36	○
	5			1636SU05C-0360	6	66	28	23	36	○
	3		Whistle notch shank/Schaft	1734SU03C-0360	6	62	20	14	36	●
	5			1736SU05C-0360	6	66	28	23	36	●
	8		straight shank Zylinderschaft	1538SU08C-0360	6	72	34	29	36	●

Drill diameter Bohrer Ø $d_1(m_7)$	Drilling depth Bohrtiefe (L/d1)	Cooling mode Kühlmittel.	Shank Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen					Grade Sorte
					Shankdiameter Ø Schaftdurchmesser	Overall length Gesamtlänge	Flute length Nutenlänge	effective drill. length Effektive Nutzlänge	Shank length Schaftlänge	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
3.7	3	External Extern	Straight shank Zylinder-schaft	1534SU03-0370	6	62	20	14	36	●
	5			1536SU05-0370	6	66	28	23	36	●
	3	Internal Intern		1534SU03C-0370	6	62	20	14	36	●
	5			1536SU05C-0370	6	66	28	23	36	●
	3		Weldon shank/Schaft	1634SU03C-0370	6	62	20	14	36	○
	5			1636SU05C-0370	6	66	28	23	36	○
	3		Whistle notch shank/Schaft	1734SU03C-0370	6	62	20	14	36	●
	5			1736SU05C-0370	6	66	28	23	36	●
	8		Straight shank Zylinder-schaft	1538SU08C-0370	6	72	34	29	36	●
3.8	3	External Extern		1534SU03-0380	6	66	24	17	36	●
	5			1536SU05-0380	6	74	36	29	36	●
	3	Internal Intern		1534SU03C-0380	6	66	24	17	36	●
	5			1536SU05C-0380	6	74	36	29	36	●
	3		Weldon shank/Schaft	1634SU03C-0380	6	66	24	17	36	○
	5			1636SU05C-0380	6	74	36	29	36	○
	3		Whistle notch shank/Schaft	1734SU03C-0380	6	66	24	17	36	●
	5			1736SU05C-0380	6	74	36	29	36	●
	8		Straight shank Zylinder-schaft	1538SU08C-0380	6	81	43	36	36	●
3.9	3	External Extern		1534SU03-0390	6	66	24	17	36	●
	5			1536SU05-0390	6	74	36	29	36	●
	3	Internal Intern		1534SU03C-0390	6	66	24	17	36	●
	5			1536SU05C-0390	6	74	36	29	36	●
	3		Weldon shank/Schaft	1634SU03C-0390	6	66	24	17	36	○
	5			1636SU05C-0390	6	74	36	29	36	○
	3		Whistle notch shank/Schaft	1734SU03C-0390	6	66	24	17	36	●
	5			1736SU05C-0390	6	74	36	29	36	●
	8		Straight shank Zylinder-schaft	1538SU08C-0390	6	81	43	36	36	●
4.0	3	External Extern		1534SU03-0400	6	66	24	17	36	●
	5			1536SU05-0400	6	74	36	29	36	●
	3	Internal Intern		1534SU03C-0400	6	66	24	17	36	●
	5			1536SU05C-0400	6	74	36	29	36	●
	3		Weldon shank/Schaft	1634SU03C-0400	6	66	24	17	36	○
	5			1636SU05C-0400	6	74	36	29	36	○
	3		Whistle notch shank/Schaft	1734SU03C-0400	6	66	24	17	36	●
	5			1736SU05C-0400	6	74	36	29	36	●
	8		straight shank Zylinderschaft	1538SU08C-0400	6	81	43	36	36	●

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

Grade Sorte	Workpiece material · Werkstückstoff										
	Carbon steel Kohlenstoff Stahl HB≤180	Alloy steel Legierter Stahl	Hardened steel · Gehärteter Stahl			Stainless steel Rostfreier Stahl	Cast iron, Grauguss	Nodular cast iron GGG	Aluminum alloy Alu leg.	Copper alloy Kupfer leg.	Heat resist. alloy Warmfest. leg.
			~40HRC	~50HRC	~60HRC						
KDG303	✔	✔	✔			✔	✔	✔			

Code key C 10
ISO Kennzeichen
Cutting data 94-107
Schnittdaten
Technical Information C109-115
Technische Information
Non-standart tailor made C 117-121
Bestellformular für Sonderwerkzeuge

SU series · SU Serie

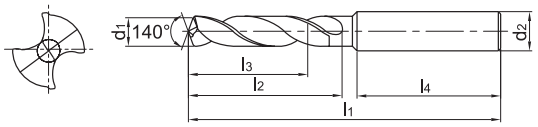
General machining · Allgemeine Bearbeitung



External Coolant
Externe Kühlung

Straight shank
Zylinderschaft

DIN 6535 HA

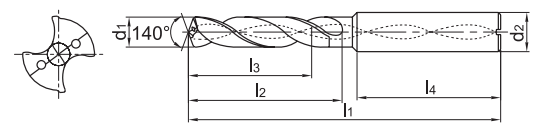




Internal Coolant
Interne Kühlung

Straight shank
Zylinderschaft

DIN 6535 HA

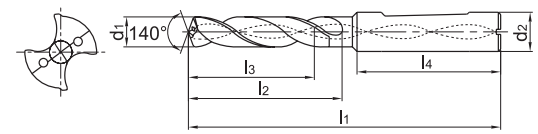




Internal Coolant
Interne Kühlung

Weldon shank · Schaft

DIN 6535 HB

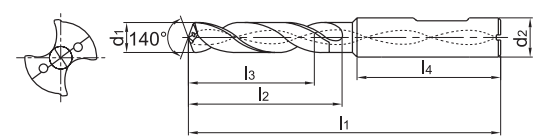




Internal Coolant
Interne Kühlung

Whistle notch shank · Schaft

DIN 6535 HE



- For high efficient drilling of P(steel), M (stainless steel) and K(cast iron) with high performance.
- Waveform cutting edges achieve outstanding sharpness and strength, promoting chip removal.
- Hocheffizientes Bohren von allgemeinen Stahlwerkstoffen, rostfreien Werkstoffen und Guss.
- Wellenförmige Schneidkante mit hoher Schneidenschärfe, Stabilität und guter Spanabfuhr.

Drill diameter Bohrer Ø $d_1(m_7)$	Drilling depth Bohrtiefe (L/d1)	Cooling mode Kühlmittel.	Shank Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen					Grade Sorte
					Shankdiameter Ø Schaftdurchmesser	Overall length Gesamtlänge	Flute length Nutenlänge	effective drill. length Effektive Nutzlänge	Shank length Schaftlänge	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
4.1	3	External Extern	Straight shank Zylinder-schaft	**1534SU03-0410**	6	66	24	17	36	●
	5			**1536SU05-0410**	6	74	36	29	36	●
	3	Internal Intern		**1534SU03C-0410**	6	66	24	17	36	●
	5			**1536SU05C-0410**	6	74	36	29	36	●
	3		Weldon shank/Schaft	**1634SU03C-0410**	6	66	24	17	36	○
	5			**1636SU05C-0410**	6	74	36	29	36	○
	3		Whistle notch shank/Schaft	**1734SU03C-0410**	6	66	24	17	36	●
	5			**1736SU05C-0410**	6	74	36	29	36	●
	8		Straight shank Zylinder-schaft	**1538SU08C-0410**	6	81	43	36	36	●
4.2	3	External Extern		**1534SU03-0420**	6	66	24	17	36	●
	5			**1536SU05-0420**	6	74	36	29	36	●
	3	Internal Intern		**1534SU03C-0420**	6	66	24	17	36	●
	5			**1536SU05C-0420**	6	74	36	29	36	●
	3		Weldon shank/Schaft	**1634SU03C-0420**	6	66	24	17	36	○
	5			**1636SU05C-0420**	6	74	36	29	36	○
	3		Whistle notch shank/Schaft	**1734SU03C-0420**	6	66	24	17	36	●
	5			**1736SU05C-0420**	6	74	36	29	36	●
	8		Straight shank Zylinder-schaft	**1538SU08C-0420**	6	81	43	36	36	●
4.3	3	External Extern		**1534SU03-0430**	6	66	24	17	36	●
	5			**1536SU05-0430**	6	74	36	29	36	●
	3	Internal Intern		**1534SU03C-0430**	6	66	24	17	36	●
	5			**1536SU05C-0430**	6	74	36	29	36	●
	3		Weldon shank/Schaft	**1634SU03C-0430**	6	66	24	17	36	○
	5			**1636SU05C-0430**	6	74	36	29	36	○
	3		Whistle notch shank/Schaft	**1734SU03C-0430**	6	66	24	17	36	●
	5			**1736SU05C-0430**	6	74	36	29	36	●
	8		straight shank Zylinderschaft	**1538SU08C-0430**	6	81	43	36	36	●

Drill diameter Bohrer Ø $d_1(m_7)$	Drilling depth Bohrtiefe (L/d1)	Cooling mode Kühlmittel.	Shank Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen					Grade Sorte
					Shankdiameter Ø Schaftdurchmesser	Overall length Gesamtlänge	Flute length Nutenlänge	effective drill. length Effektive Nutzlänge	Shank length Schaftlänge	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
4.4	3	External Extern	Straight shank	**1534SU03-0440**	6	66	24	17	36	●
	5			**1536SU05-0440**	6	74	36	29	36	●
	3	Internal Intern	Zylinder-schaft	**1534SU03C-0440**	6	66	24	17	36	●
	5			**1536SU05C-0440**	6	74	36	29	36	●
	3		Weldon shank/Schaft	**1634SU03C-0440**	6	66	24	17	36	○
	5			**1636SU05C-0440**	6	74	36	29	36	○
	3		Whistle notch shank/Schaft	**1734SU03C-0440**	6	66	24	17	36	●
	5			**1736SU05C-0440**	6	74	36	29	36	●
	8		Straight shank Zylinder-schaft	**1538SU08C-0440**	6	81	43	36	36	●
4.5	3	External Extern		**1534SU03-0450**	6	66	24	17	36	●
	5			**1536SU05-0450**	6	74	36	29	36	●
	3	Internal Intern		**1534SU03C-0450**	6	66	24	17	36	●
	5			**1536SU05C-0450**	6	74	36	29	36	●
	3		Weldon shank/Schaft	**1634SU03C-0450**	6	66	24	17	36	○
	5			**1636SU05C-0450**	6	74	36	29	36	○
	3		Whistle notch shank/Schaft	**1734SU03C-0450**	6	66	24	17	36	●
	5			**1736SU05C-0450**	6	74	36	29	36	●
	8		Straight shank Zylinder-schaft	**1538SU08C-0450**	6	81	43	36	36	●
4.6	3	External Extern		**1534SU03-0460**	6	66	24	17	36	●
	5			**1536SU05-0460**	6	74	36	29	36	●
	3	Internal Intern		**1534SU03C-0460**	6	66	24	17	36	●
	5			**1536SU05C-0460**	6	74	36	29	36	●
	3		Weldon shank/Schaft	**1634SU03C-0460**	6	66	24	17	36	○
	5			**1636SU05C-0460**	6	74	36	29	36	○
	3		Whistle notch shank/Schaft	**1734SU03C-0460**	6	66	24	17	36	●
	5			**1736SU05C-0460**	6	74	36	29	36	●
	8		Straight shank Zylinder-schaft	**1538SU08C-0460**	6	81	43	36	36	●
4.65	3	External Extern		**1534SU03-0465**	6	66	24	17	36	●
	5			**1536SU05-0465**	6	74	36	29	36	●
	3	Internal Intern		**1534SU03C-0465**	6	66	24	17	36	●
	5			**1536SU05C-0465**	6	74	36	29	36	●
	3		Weldon shank/Schaft	**1634SU03C-0465**	6	66	24	17	36	○
	5			**1636SU05C-0465**	6	74	36	29	36	○
	3		Whistle notch shank/Schaft	**1734SU03C-0465**	6	66	24	17	36	●
	5			**1736SU05C-0465**	6	74	36	29	36	●

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

Material Overview · Material Übersicht

Grade Sorte	Workpiece material · Werkstückstoff										
	Carbon steel Kohlenstoff Stahl HB≤180	Alloy steel Legierter Stahl	Hardened steel · Gehärteter Stahl			Stainless steel Rostfreier Stahl	Cast iron, Grauguss	Nodular cast iron GGG	Aluminum alloy Alu leg.	Copper alloy Kupfer leg.	Heat resist. alloy Warmfest. leg.
			~40HRC	~50HRC	~60HRC						
KDG303	✔	✔	✔			✔	✔	✔			

Code key C 10
ISO Kennzeichen
Cutting data 94-107
Schnittdaten
Technical Information C109-115
Technische Information
Non-standart tailor made C 117-121
Bestellformular für Sonderwerkzeuge

SU series · SU Serie

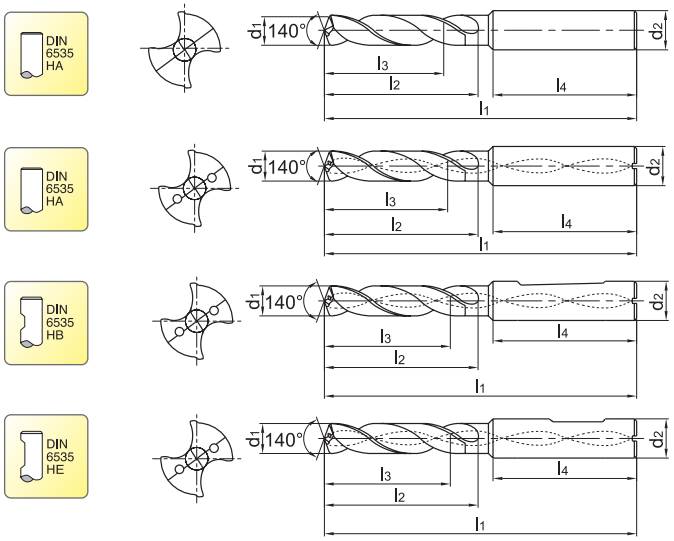
General machining · Allgemeine Bearbeitung


External Coolant
Externe Kühlung
Straight shank
Zylinderschaft


Internal Coolant
Interne Kühlung
Straight shank
Zylinderschaft


Internal Coolant
Interne Kühlung
Weldon
shank · Schaft


Internal Coolant
Interne Kühlung
Whistle notch
shank · Schaft



- For high efficient drilling of P(steel), M (stainless steel) and K(cast iron) with high performance.
- Waveform cutting edges achieve outstanding sharpness and strength, promoting chip removal.
- Hocheffizientes Bohren von allgemeinen Stahlwerkstoffen, rostfreien Werkstoffen und Guss.
- Wellenförmige Schneidkante mit hoher Schneidenschärfe, Stabilität und guter Spanabfuhr.

Drill diameter Bohrer Ø $d_1(m_7)$	Drilling depth Bohrtiefe (L/d1)	Cooling mode Kühlmittel.	Shank Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen					Grade Sorte
					Shankdiameter Ø Schaftdurchmesser	Overall length Gesamtlänge	Flute length Nutenlänge	effective drill. length Effektive Nutzlänge	Shank length Schaftlänge	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
4.7	3	External Extern	Straight shank Zylinder-schaft	1534SU03-0470	6	66	24	17	36	●
	5			1536SU05-0470	6	74	36	29	36	●
	3	Internal Intern		1534SU03C-0470	6	66	24	17	36	●
	5			1536SU05C-0470	6	74	36	29	36	●
	3		Weldon shank/Schaft	1634SU03C-0470	6	66	24	17	36	○
	5			1636SU05C-0470	6	74	36	29	36	○
	3		Whistle notch shank/Schaft	1734SU03C-0470	6	66	24	17	36	●
	5			1736SU05C-0470	6	74	36	29	36	●
	8		Straight shank Zylinder-schaft	1538SU08C-0470	6	81	43	36	36	●
4.8	3	External Extern		1534SU03-0480	6	66	28	20	36	●
	5			1536SU05-0480	6	82	44	35	36	●
	3	Internal Intern		1534SU03C-0480	6	66	28	20	36	●
	5			1536SU05C-0480	6	82	44	35	36	●
	3		Weldon shank/Schaft	1634SU03C-0480	6	66	28	20	36	○
	5			1636SU05C-0480	6	82	44	35	36	○
	3		Whistle notch shank/Schaft	1734SU03C-0480	6	66	28	20	36	●
	5			1736SU05C-0480	6	82	44	35	36	●
	8		Straight shank Zylinder-schaft	1538SU08C-0480	6	95	57	48	36	●
4.9	3	External Extern		1534SU03-0490	6	66	28	20	36	●
	5			1536SU05-0490	6	82	44	35	36	●
	3	Internal Intern		1534SU03C-0490	6	66	28	20	36	●
	5			1536SU05C-0490	6	82	44	35	36	●
	3		Weldon shank/Schaft	1634SU03C-0490	6	66	28	20	36	○
	5			1636SU05C-0490	6	82	44	35	36	○
	3		Whistle notch shank/Schaft	1734SU03C-0490	6	66	28	20	36	●
	5			1736SU05C-0490	6	82	44	35	36	●
	8		straight shank Zylinderschaft	1538SU08C-0490	6	95	57	48	36	●

Drill diameter Bohrer Ø $d_1(m_7)$	Drilling depth Bohrtiefe (L/d1)	Cooling mode Kühlmittel.	Shank Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen					Grade Sorte
					Shankdiameter Ø Schaftdurchmesser	Overall length Gesamtlänge	Flute length Nutenlänge	effective drill. length Effektive Nutzlänge	Shank length Schaftlänge	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
5.0	3	External Extern	Straight shank	**1534SU03-0500**	6	66	28	20	36	●
	5			**1536SU05-0500**	6	82	44	35	36	●
	3	Internal Intern	Zylinder-schaft	**1534SU03C-0500**	6	66	28	20	36	●
	5			**1536SU05C-0500**	6	82	44	35	36	●
	3		Weldon shank/Schaft	**1634SU03C-0500**	6	66	28	20	36	○
	5			**1636SU05C-0500**	6	82	44	35	36	○
	3		Whistle notch shank/Schaft	**1734SU03C-0500**	6	66	28	20	36	●
	5			**1736SU05C-0500**	6	82	44	35	36	●
	8		Straight shank Zylinder-schaft	**1538SU08C-0500**	6	95	57	48	36	●
5.1	3	External Extern		**1534SU03-0510**	6	66	28	20	36	●
	5			**1536SU05-0510**	6	82	44	35	36	●
	3	Internal Intern		**1534SU03C-0510**	6	66	28	20	36	●
	5			**1536SU05C-0510**	6	82	44	35	36	●
	3		Weldon shank/Schaft	**1634SU03C-0510**	6	66	28	20	36	○
	5			**1636SU05C-0510**	6	82	44	35	36	○
	3		Whistle notch shank/Schaft	**1734SU03C-0510**	6	66	28	20	36	●
	5			**1736SU05C-0510**	6	82	44	35	36	●
	8		Straight shank Zylinder-schaft	**1538SU08C-0510**	6	95	57	48	36	●
5.2	3	External Extern		**1534SU03-0520**	6	66	28	20	36	●
	5			**1536SU05-0520**	6	82	44	35	36	●
	3	Internal Intern		**1534SU03C-0520**	6	66	28	20	36	●
	5			**1536SU05C-0520**	6	82	44	35	36	●
	3		Weldon shank/Schaft	**1634SU03C-0520**	6	66	28	20	36	○
	5			**1636SU05C-0520**	6	82	44	35	36	○
	3		Whistle notch shank/Schaft	**1734SU03C-0520**	6	66	28	20	36	●
	5			**1736SU05C-0520**	6	82	44	35	36	●
	8		Straight shank Zylinder-schaft	**1538SU08C-0520**	6	95	57	48	36	●
5.3	3	External Extern		**1534SU03-0530**	6	66	28	20	36	●
	5			**1536SU05-0530**	6	82	44	35	36	●
	3	Internal Intern		**1534SU03C-0530**	6	66	28	20	36	●
	5			**1536SU05C-0530**	6	82	44	35	36	●
	3		Weldon shank/Schaft	**1634SU03C-0530**	6	66	28	20	36	○
	5			**1636SU05C-0530**	6	82	44	35	36	○
	3		Whistle notch shank/Schaft	**1734SU03C-0530**	6	66	28	20	36	●
	5			**1736SU05C-0530**	6	82	44	35	36	●
	8		straight shank Zylinderschaft	**1538SU08C-0530**	6	95	57	48	36	●

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
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Grade Sorte	Workpiece material · Werkstückstoff										
	Carbon steel Kohlenstoff Stahl HB≤180	Alloy steel Legierter Stahl	Hardened steel · Gehärteter Stahl			Stainless steel Rostfreier Stahl	Cast iron, Grauguss	Nodular cast iron GGG	Aluminum alloy Alu leg.	Copper alloy Kupfer leg.	Heat resist. alloy Warmfest. leg.
			~40HRC	~50HRC	~60HRC						
KDG303	✔	✔	✔			✔	✔	✔			

Code key C 10
ISO Kennzeichen
Cutting data 94-107
Schnittdaten
Technical Information C109-115
Technische Information
Non-standart tailor made C 117-121
Bestellformular für Sonderwerkzeuge

SU series · SU Serie

General machining · Allgemeine Bearbeitung



External Coolant
Externe Kühlung

Straight shank
Zylinderschaft



Internal Coolant
Interne Kühlung

Straight shank
Zylinderschaft



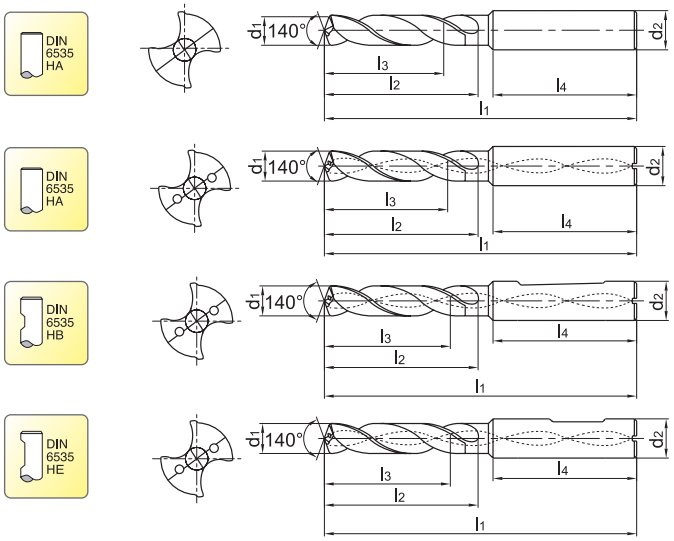
Internal Coolant
Interne Kühlung

Weldon
shank · Schaft



Internal Coolant
Interne Kühlung

Whistle notch
shank · Schaft



- For high efficient drilling of P(steel), M (stainless steel) and K(cast iron) with high performance.
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Drill diameter Bohrer Ø $d_1(m_7)$	Drilling depth Bohrtiefe (L/d1)	Cooling mode Kühlmittel.	Shank Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen					Grade Sorte
					Shankdiameter Ø Schaftdurchmesser	Overall length Gesamtlänge	Flute length Nutenlänge	effective drill. length Effektive Nutzlänge	Shank length Schaftlänge	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
5.4	3	External Extern	Straight shank	1534SU03-0540	6	66	28	20	36	●
	5			1536SU05-0540	6	82	44	35	36	●
	3	Internal Intern	Zylinder-schaft	1534SU03C-0540	6	66	28	20	36	●
	5			1536SU05C-0540	6	82	44	35	36	●
	3		Weldon shank/Schaft	1634SU03C-0540	6	66	28	20	36	○
	5			1636SU05C-0540	6	82	44	35	36	○
	3		Whistle notch shank/Schaft	1734SU03C-0540	6	66	28	20	36	●
	5			1736SU05C-0540	6	82	44	35	36	●
	8		Straight shank Zylinder-schaft	1538SU08C-0540	6	95	57	48	36	●
5.5	3	External Extern		1534SU03-0550	6	66	28	20	36	●
	5			1536SU05-0550	6	82	44	35	36	●
	3	Internal Intern		1534SU03C-0550	6	66	28	20	36	●
	5			1536SU05C-0550	6	82	44	35	36	●
	3		Weldon shank/Schaft	1634SU03C-0550	6	66	28	20	36	○
	5			1636SU05C-0550	6	82	44	35	36	○
	3		Whistle notch shank/Schaft	1734SU03C-0550	6	66	28	20	36	●
	5			1736SU05C-0550	6	82	44	35	36	●
	8		Straight shank Zylinder-schaft	1538SU08C-0550	6	95	57	48	36	●
5.55	3	External Extern		1534SU03-0555	6	66	28	20	36	●
	5			1536SU05-0555	6	82	44	35	36	●
	3	Internal Intern		1534SU03C-0555	6	66	28	20	36	●
	5			1536SU05C-0555	6	82	44	35	36	●
	3		Weldon shank/Schaft	1634SU03C-0555	6	66	28	20	36	○
	5			1636SU05C-0555	6	82	44	35	36	○
	3		Whistle notch shank/Schaft	1734SU03C-0555	6	66	28	20	36	●
	5			1736SU05C-0555	6	82	44	35	36	●

Drill diameter Bohrer Ø $d_1(m_7)$	Drilling depth Bohrtiefe (L/d1)	Cooling mode Kühlmittel.	Shank Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen					Grade Sorte
					Shankdiameter Ø Schaftdurchmesser	Overall length Gesamtlänge	Flute length Nutenlänge	effective drill. length Effektive Nutzlänge	Shank length Schaftlänge	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
5.6	3	External Extern	Straight shank Zylinder-schaft	**1534SU03-0560**	6	66	28	20	36	●
	5			**1536SU05-0560**	6	82	44	35	36	●
	3	Internal Intern		**1534SU03C-0560**	6	66	28	20	36	●
	5			**1536SU05C-0560**	6	82	44	35	36	●
	3		Weldon shank/Schaft	**1634SU03C-0560**	6	66	28	20	36	○
	5			**1636SU05C-0560**	6	82	44	35	36	○
	3		Whistle notch shank/Schaft	**1734SU03C-0560**	6	66	28	20	36	●
	5			**1736SU05C-0560**	6	82	44	35	36	●
	8		Straight shank Zylinder-schaft	**1538SU08C-0560**	6	95	57	48	36	●
5.7	3	External Extern		**1534SU03-0570**	6	66	28	20	36	●
	5			**1536SU05-0570**	6	82	44	35	36	●
	3	Internal Intern		**1534SU03C-0570**	6	66	28	20	36	●
	5			**1536SU05C-0570**	6	82	44	35	36	●
	3		Weldon shank/Schaft	**1634SU03C-0570**	6	66	28	20	36	○
	5			**1636SU05C-0570**	6	82	44	35	36	○
	3		Whistle notch shank/Schaft	**1734SU03C-0570**	6	66	28	20	36	●
	5			**1736SU05C-0570**	6	82	44	35	36	●
	8		Straight shank Zylinder-schaft	**1538SU08C-0570**	6	95	57	48	36	●
5.8	3	External Extern		**1534SU03-0580**	6	66	28	20	36	●
	5			**1536SU05-0580**	6	82	44	35	36	●
	3	Internal Intern		**1534SU03C-0580**	6	66	28	20	36	●
	5			**1536SU05C-0580**	6	82	44	35	36	●
	3		Weldon shank/Schaft	**1634SU03C-0580**	6	66	28	20	36	○
	5			**1636SU05C-0580**	6	82	44	35	36	○
	3		Whistle notch shank/Schaft	**1734SU03C-0580**	6	66	28	20	36	●
	5			**1736SU05C-0580**	6	82	44	35	36	●
	8		Straight shank Zylinder-schaft	**1538SU08C-0580**	6	95	57	48	36	●
5.9	3	External Extern		**1534SU03-0590**	6	66	28	20	36	●
	5			**1536SU05-0590**	6	82	44	35	36	●
	3	Internal Intern		**1534SU03C-0590**	6	66	28	20	36	●
	5			**1536SU05C-0590**	6	82	44	35	36	●
	3		Weldon shank/Schaft	**1634SU03C-0590**	6	66	28	20	36	○
	5			**1636SU05C-0590**	6	82	44	35	36	○
	3		Whistle notch shank/Schaft	**1734SU03C-0590**	6	66	28	20	36	●
	5			**1736SU05C-0590**	6	82	44	35	36	●
	8		straight shank Zylinderschaft	**1538SU08C-0590**	6	95	57	48	36	●

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

Grade Sorte	Workpiece material · Werkstückstoff										
	Carbon steel Kohlenstoff Stahl HB≤180	Alloy steel Legierter Stahl	Hardened steel · Gehärteter Stahl			Stainless steel Rostfreier Stahl	Cast iron, Grauguss	Nodular cast iron GGG	Aluminum alloy Alu leg.	Copper alloy Kupfer leg.	Heat resist. alloy Warmfest. leg.
			~40HRC	~50HRC	~60HRC						
KDG303	✔	✔	✔			✔	✔	✔			

Code key C 10
ISO Kennzeichen
Cutting data 94-107
Schnittdaten
Technical Information C109-115
Technische Information
Non-standart tailor made C 117-121
Bestellformular für Sonderwerkzeuge

SU series · SU Serie

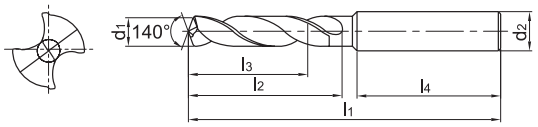
General machining · Allgemeine Bearbeitung



External Coolant
Externe Kühlung

Straight shank
Zylinderschaft

DIN 6535 HA

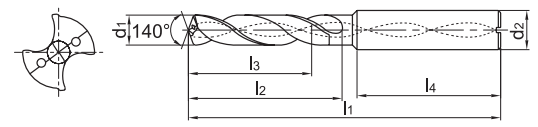




Internal Coolant
Interne Kühlung

Straight shank
Zylinderschaft

DIN 6535 HA

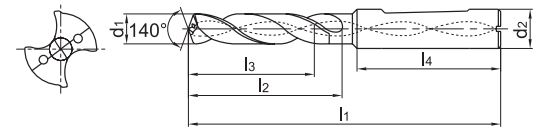




Internal Coolant
Interne Kühlung

Weldon shank · Schaft

DIN 6535 HB

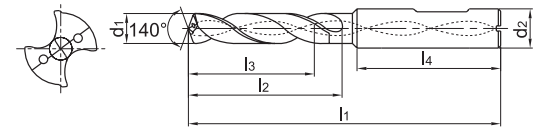




Internal Coolant
Interne Kühlung

Whistle notch shank · Schaft

DIN 6535 HE



- For high efficient drilling of P(steel), M (stainless steel) and K(cast iron) with high performance.
- Waveform cutting edges achieve outstanding sharpness and strength, promoting chip removal.
- Hocheffizientes Bohren von allgemeinen Stahlwerkstoffen, rostfreien Werkstoffen und Guss.
- Wellenförmige Schneidkante mit hoher Schneidenschärfe, Stabilität und guter Spanabfuhr.

Drill diameter Bohrer Ø $d_1(m_7)$	Drilling depth Bohrtiefe (L/d1)	Cooling mode Kühlmittel.	Shank Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen					Grade Sorte
					Shankdiameter Ø Schaftdurchmesser	Overall length Gesamtlänge	Flute length Nutenlänge	effective drill. length Effektive Nutzlänge	Shank length Schaftlänge	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
6.0	3	External Extern	Straight shank Zylinder-schaft	1534SU03-0600	6	66	28	20	36	●
	5			1536SU05-0600	6	82	44	35	36	●
	3	Internal Intern		1534SU03C-0600	6	66	28	20	36	●
	5			1536SU05C-0600	6	82	44	35	36	●
	3		Weldon shank/Schaft	1634SU03C-0600	6	66	28	20	36	○
	5			1636SU05C-0600	6	82	44	35	36	○
	3		Whistle notch shank/Schaft	1734SU03C-0600	6	66	28	20	36	●
	5			1736SU05C-0600	6	82	44	35	36	●
	8		Straight shank Zylinder-schaft	1538SU08C-0600	6	95	57	48	36	●
6.1	3	External Extern		1534SU03-0610	8	79	34	24	36	●
	5			1536SU05-0610	8	91	53	43	36	●
	3	Internal Intern		1534SU03C-0610	8	79	34	24	36	●
	5			1536SU05C-0610	8	91	53	43	36	●
	3		Weldon shank/Schaft	1634SU03C-0610	8	79	34	24	36	○
	5			1636SU05C-0610	8	91	53	43	36	○
	3		Whistle notch shank/Schaft	1734SU03C-0610	8	79	34	24	36	●
	5			1736SU05C-0610	8	91	53	43	36	●
	8		Straight shank Zylinder-schaft	1538SU08C-0610	8	114	76	66	36	●
6.2	3	External Extern		1534SU03-0620	8	79	34	24	36	●
	5			1536SU05-0620	8	91	53	43	36	●
	3	Internal Intern		1534SU03C-0620	8	79	34	24	36	●
	5			1536SU05C-0620	8	91	53	43	36	●
	3		Weldon shank/Schaft	1634SU03C-0620	8	79	34	24	36	○
	5			1636SU05C-0620	8	91	53	43	36	○
	3		Whistle notch shank/Schaft	1734SU03C-0620	8	79	34	24	36	●
	5			1736SU05C-0620	8	91	53	43	36	●
	8		straight shank Zylinderschaft	1538SU08C-0620	8	114	76	66	36	●

Drill diameter Bohrer Ø $d_1(m_7)$	Drilling depth Bohrtiefe (L/d1)	Cooling mode Kühlmittel.	Shank Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen					Grade Sorte
					Shankdiameter Ø Schaftdurchmesser	Overall length Gesamtlänge	Flute length Nutenlänge	effective drill. length Effektive Nutzlänge	Shank length Schaftlänge	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
6.3	3	External Extern	Straight shank	**1534SU03-0630**	8	79	34	24	36	●
	5			**1536SU05-0630**	8	91	53	43	36	●
	3	Internal Intern	Zylinder-schaft	**1534SU03C-0630**	8	79	34	24	36	●
	5			**1536SU05C-0630**	8	91	53	43	36	●
	3		Weldon shank/Schaft	**1634SU03C-0630**	8	79	34	24	36	○
	5			**1636SU05C-0630**	8	91	53	43	36	○
	3		Whistle notch shank/Schaft	**1734SU03C-0630**	8	79	34	24	36	●
	5			**1736SU05C-0630**	8	91	53	43	36	●
	8		Straight shank Zylinder-schaft	**1538SU08C-0630**	8	114	76	66	36	●
6.4	3	External Extern		**1534SU03-0640**	8	79	34	24	36	●
	5			**1536SU05-0640**	8	91	53	43	36	●
	3	Internal Intern		**1534SU03C-0640**	8	79	34	24	36	●
	5			**1536SU05C-0640**	8	91	53	43	36	●
	3		Weldon shank/Schaft	**1634SU03C-0640**	8	79	34	24	36	○
	5			**1636SU05C-0640**	8	91	53	43	36	○
	3		Whistle notch shank/Schaft	**1734SU03C-0640**	8	79	34	24	36	●
	5			**1736SU05C-0640**	8	91	53	43	36	●
	8		Straight shank Zylinder-schaft	**1538SU08C-0640**	8	114	76	66	36	●
6.5	3	External Extern		**1534SU03-0650**	8	79	34	24	36	●
	5			**1536SU05-0650**	8	91	53	43	36	●
	3	Internal Intern		**1534SU03C-0650**	8	79	34	24	36	●
	5			**1536SU05C-0650**	8	91	53	43	36	●
	3		Weldon shank/Schaft	**1634SU03C-0650**	8	79	34	24	36	○
	5			**1636SU05C-0650**	8	91	53	43	36	○
	3		Whistle notch shank/Schaft	**1734SU03C-0650**	8	79	34	24	36	●
	5			**1736SU05C-0650**	8	91	53	43	36	●
	8		Straight shank Zylinder-schaft	**1538SU08C-0650**	8	114	76	66	36	●
6.6	3	External Extern		**1534SU03-0660**	8	79	34	24	36	●
	5			**1536SU05-0660**	8	91	53	43	36	●
	3	Internal Intern		**1534SU03C-0660**	8	79	34	24	36	●
	5			**1536SU05C-0660**	8	91	53	43	36	●
	3		Weldon shank/Schaft	**1634SU03C-0660**	8	79	34	24	36	○
	3			**1636SU05C-0660**	8	91	53	43	36	○
	5		Whistle notch shank/Schaft	**1734SU03C-0660**	8	79	34	24	36	●
	5			**1736SU05C-0660**	8	91	53	43	36	●
	8		straight shank Zylinderschaft	**1538SU08C-0660**	8	114	76	66	36	●

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

Grade Sorte	Workpiece material · Werkstückstoff										
	Carbon steel Kohlenstoff Stahl HB≤180	Alloy steel Legierter Stahl	Hardened steel · Gehärteter Stahl			Stainless steel Rostfreier Stahl	Cast iron, Grauguss	Nodular cast iron GGG	Aluminum alloy Alu leg.	Copper alloy Kupfer leg.	Heat resist. alloy Warmfest. leg.
			~40HRC	~50HRC	~60HRC						
KDG303	✔	✔	✔			✔	✔	✔			

Code key C 10
ISO Kennzeichen
Cutting data 94-107
Schnittdaten
Technical Information C109-115
Technische Information
Non-standart tailor made C 117-121
Bestellformular für Sonderwerkzeuge

SU series · SU Serie

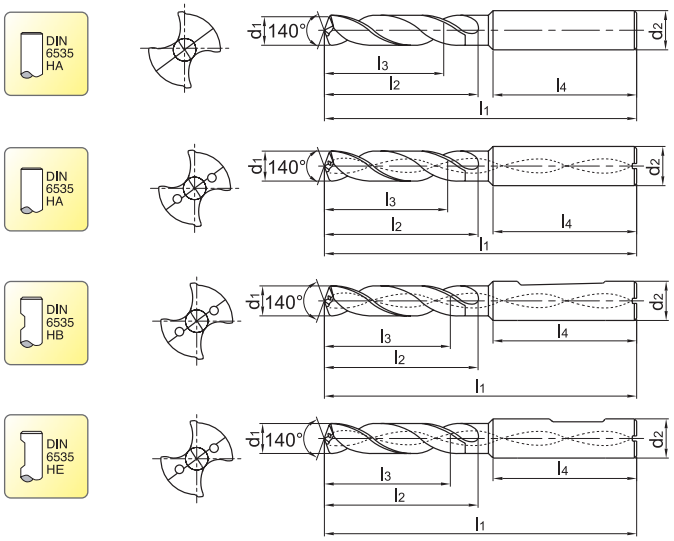
General machining · Allgemeine Bearbeitung


External Coolant
Externe Kühlung
Straight shank
Zylinderschaft


Internal Coolant
Interne Kühlung
Straight shank
Zylinderschaft


Internal Coolant
Interne Kühlung
Weldon
shank · Schaft


Internal Coolant
Interne Kühlung
Whistle notch
shank · Schaft



- For high efficient drilling of P(steel), M (stainless steel) and K(cast iron) with high performance.
- Waveform cutting edges achieve outstanding sharpness and strength, promoting chip removal.
- Hocheffizientes Bohren von allgemeinen Stahlwerkstoffen, rostfreien Werkstoffen und Guss.
- Wellenförmige Schneidkante mit hoher Schneidenschärfe, Stabilität und guter Spanabfuhr.

Drill diameter Bohrer Ø $d_1(m_7)$	Drilling depth Bohrtiefe (L/d1)	Cooling mode Kühlmittel.	Shank Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen					Grade Sorte
					Shankdiameter Ø Schaftdurchmesser	Overall length Gesamtlänge	Flute length Nutenlänge	effective drill. length Effektive Nutzlänge	Shank length Schaftlänge	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
6.7	3	External Extern	Straight shank	1534SU03-0670	8	79	34	24	36	●
	5			1536SU05-0670	8	91	53	43	36	●
	3	Internal Intern	Zylinder-schaft	1534SU03C-0670	8	79	34	24	36	●
	5			1536SU05C-0670	8	91	53	43	36	●
	3		Weldon shank/Schaft	1634SU03C-0670	8	79	34	24	36	○
	5			1636SU05C-0670	8	91	53	43	36	○
	3		Whistle notch shank/Schaft	1734SU03C-0670	8	79	34	24	36	●
	5			1736SU05C-0670	8	91	53	43	36	●
	8		Straight shank Zylinder-schaft	1538SU08C-0670	8	114	76	66	36	●
6.75	3	External Extern		1534SU03-0675	8	79	34	24	36	●
	5			1536SU05-0675	8	91	53	43	36	●
	3	Internal Intern		1534SU03C-0675	8	79	34	24	36	●
	5			1536SU05C-0675	8	91	53	43	36	●
	3		Weldon shank/Schaft	1634SU03C-0675	8	79	34	24	36	○
	5			1636SU05C-0675	8	91	53	43	36	○
	3		Whistle notch shank/Schaft	1734SU03C-0675	8	79	34	24	36	●
	5			1736SU05C-0675	8	91	53	43	36	●
6.8	3	External Extern	Straight shank Zylinder-schaft	1534SU03-0680	8	79	34	24	36	●
	5			1536SU05-0680	8	91	53	43	36	●
	3	Internal Intern		1534SU03C-0680	8	79	34	24	36	●
	5			1536SU05C-0680	8	91	53	43	36	●
	3		Weldon shank/Schaft	1634SU03C-0680	8	79	34	24	36	○
	5			1636SU05C-0680	8	91	53	43	36	○
	3		Whistle notch shank/Schaft	1734SU03C-0680	8	79	34	24	36	●
	5			1736SU05C-0680	8	91	53	43	36	●
	8		straight shank Zylinderschaft	1538SU08C-0680	8	114	76	66	36	●

Drill diameter Bohrer Ø $d_1(m_7)$	Drilling depth Bohrtiefe (L/d1)	Cooling mode Kühlmittel.	Shank Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen					Grade Sorte
					Shankdiameter Ø Schaftdurchmesser	Overall length Gesamtlänge	Flute length Nutenlänge	effective drill. length Effektive Nutzlänge	Shank length Schaftlänge	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
6.9	3	External Extern	Straight shank Zylinder-schaft	**1534SU03-0690**	8	79	34	24	36	●
	5			**1536SU05-0690**	8	91	53	43	36	●
	3	Internal Intern		**1534SU03C-0690**	8	79	34	24	36	●
	5			**1536SU05C-0690**	8	91	53	43	36	●
	3		Weldon shank/Schaft	**1634SU03C-0690**	8	79	34	24	36	○
	5			**1636SU05C-0690**	8	91	53	43	36	○
	3		Whistle notch shank/Schaft	**1734SU03C-0690**	8	79	34	24	36	●
	5			**1736SU05C-0690**	8	91	53	43	36	●
	8		Straight shank Zylinder-schaft	**1538SU08C-0690**	8	114	76	66	36	●
7.0	3	External Extern		**1534SU03-0700**	8	79	34	24	36	●
	5			**1536SU05-0700**	8	91	53	43	36	●
	3	Internal Intern		**1534SU03C-0700**	8	79	34	24	36	●
	5			**1536SU05C-0700**	8	91	53	43	36	●
	3		Weldon shank/Schaft	**1634SU03C-0700**	8	79	34	24	36	○
	5			**1636SU05C-0700**	8	91	53	43	36	○
	3		Whistle notch shank/Schaft	**1734SU03C-0700**	8	79	34	24	36	●
	5			**1736SU05C-0700**	8	91	53	43	36	●
	8		Straight shank Zylinder-schaft	**1538SU08C-0700**	8	116	76	66	36	●
7.1	3	External Extern		**1534SU03-0710**	8	79	41	29	36	●
	5			**1536SU05-0710**	8	91	53	43	36	●
	3	Internal Intern		**1534SU03C-0710**	8	79	41	29	36	●
	5			**1536SU05C-0710**	8	91	53	43	36	●
	3		Weldon shank/Schaft	**1634SU03C-0710**	8	79	41	29	36	○
	5			**1636SU05C-0710**	8	91	53	43	36	○
	3		Whistle notch shank/Schaft	**1734SU03C-0710**	8	79	41	29	36	●
	5			**1736SU05C-0710**	8	91	53	43	36	●
	8		Straight shank Zylinder-schaft	**1538SU08C-0710**	8	116	76	66	36	●
7.2	3	External Extern		**1534SU03-0720**	8	79	41	29	36	●
	5			**1536SU05-0720**	8	91	53	43	36	●
	3	Internal Intern		**1534SU03C-0720**	8	79	41	29	36	●
	5			**1536SU05C-0720**	8	91	53	43	36	●
	3		Weldon shank/Schaft	**1634SU03C-0720**	8	79	41	29	36	○
	5			**1636SU05C-0720**	8	91	53	43	36	○
	3		Whistle notch shank/Schaft	**1734SU03C-0720**	8	79	41	29	36	●
	5			**1736SU05C-0720**	8	91	53	43	36	●
	8		straight shank Zylinderschaft	**1538SU08C-0720**	8	116	76	66	36	●

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

Grade Sorte	Workpiece material · Werkstückstoff										
	Carbon steel Kohlenstoff Stahl HB≤180	Alloy steel Legierter Stahl	Hardened steel · Gehärteter Stahl			Stainless steel Rostfreier Stahl	Cast iron, Grauguss	Nodular cast iron GGG	Aluminum alloy Alu leg.	Copper alloy Kupfer leg.	Heat resist. alloy Warmfest. leg.
			~40HRC	~50HRC	~60HRC						
KDG303	✔	✔	✔			✔	✔	✔			

Code key C 10
ISO Kennzeichen
Cutting data 94-107
Schnittdaten
Technical Information C109-115
Technische Information
Non-standart tailor made C 117-121
Bestellformular für Sonderwerkzeuge

SU series · SU Serie

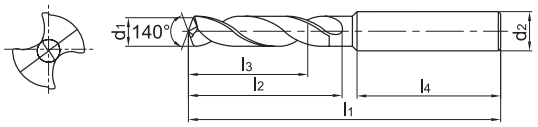
General machining · Allgemeine Bearbeitung



External Coolant
Externe Kühlung

Straight shank
Zylinderschaft

DIN 6535 HA

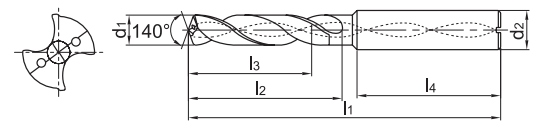




Internal Coolant
Interne Kühlung

Straight shank
Zylinderschaft

DIN 6535 HA

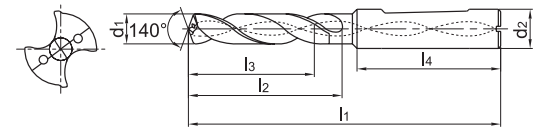




Internal Coolant
Interne Kühlung

Weldon shank · Schaft

DIN 6535 HB

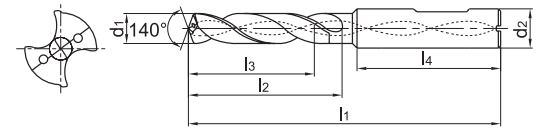




Internal Coolant
Interne Kühlung

Whistle notch shank · Schaft

DIN 6535 HE



- For high efficient drilling of P(steel), M (stainless steel) and K(cast iron) with high performance.
- Waveform cutting edges achieve outstanding sharpness and strength, promoting chip removal.
- Hocheffizientes Bohren von allgemeinen Stahlwerkstoffen, rostfreien Werkstoffen und Guss.
- Wellenförmige Schneidkante mit hoher Schneidenschärfe, Stabilität und guter Spanabfuhr.

Drill diameter Bohrer Ø $d_1(m_7)$	Drilling depth Bohrtiefe (L/d1)	Cooling mode Kühlmittel.	Shank Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen					Grade Sorte
					Shankdiameter Ø Schaftdurchmesser	Overall length Gesamtlänge	Flute length Nutenlänge	effective drill. length Effektive Nutzlänge	Shank length Schaftlänge	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
7.3	3	External Extern	Straight shank	1534SU03-0730	8	79	41	29	36	●
	5		Zylinder-schaft	1536SU05-0730	8	91	53	43	36	●
	3	Internal Intern		1534SU03C-0730	8	79	41	29	36	●
	5			1536SU05C-0730	8	91	53	43	36	●
	3		Weldon shank/Schaft	1634SU03C-0730	8	79	41	29	36	○
	5			1636SU05C-0730	8	91	53	43	36	○
	3		Whistle notch shank/Schaft	1734SU03C-0730	8	79	41	29	36	●
	5			1736SU05C-0730	8	91	53	43	36	●
	8		Straight shank Zylinder-schaft	1538SU08C-0730	8	116	76	66	36	●
7.4	3	External Extern		1534SU03-0740	8	79	41	29	36	●
	5			1536SU05-0740	8	91	53	43	36	●
	3	Internal Intern		1534SU03C-0740	8	79	41	29	36	●
	5			1536SU05C-0740	8	91	53	43	36	●
	3		Weldon shank/Schaft	1634SU03C-0740	8	79	41	29	36	○
	5			1636SU05C-0740	8	91	53	43	36	○
	3		Whistle notch shank/Schaft	1734SU03C-0740	8	79	41	29	36	●
	5			1736SU05C-0740	8	91	53	43	36	●
	8		Straight shank Zylinder-schaft	1538SU08C-0740	8	116	76	66	36	●
7.5	3	External Extern		1534SU03-0750	8	79	41	29	36	●
	5			1536SU05-0750	8	91	53	43	36	●
	3	Internal Intern		1534SU03C-0750	8	79	41	29	36	●
	5			1536SU05C-0750	8	91	53	43	36	●
	3		Weldon shank/Schaft	1634SU03C-0750	8	79	41	29	36	○
	5			1636SU05C-0750	8	91	53	43	36	○
	3		Whistle notch shank/Schaft	1734SU03C-0750	8	79	41	29	36	●
	5			1736SU05C-0750	8	91	53	43	36	●
	8		straight shank Zylinderschaft	1538SU08C-0750	8	116	76	66	36	●

 ● ex Stock Lager ○ on demand · auf Anfrage

Drill diameter Bohrer Ø $d_1(m_7)$	Drilling depth Bohrtiefe (L/d1)	Cooling mode Kühlmittel.	Shank Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen					Grade Sorte
					Shankdiameter Ø Schaftdurchmesser	Overall length Gesamtlänge	Flute length Nutenlänge	effective drill. length Effektive Nutzlänge	Shank length Schaftlänge	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
7.6	3	External Extern	Straight shank Zylinder-schaft	1534SU03-0760	8	79	41	29	36	●
	5			1536SU05-0760	8	91	53	43	36	●
	3	Internal Intern		1534SU03C-0760	8	79	41	29	36	●
	5			1536SU05C-0760	8	91	53	43	36	●
	3		Weldon shank/Schaft	1634SU03C-0760	8	79	41	29	36	○
	5			1636SU05C-0760	8	91	53	43	36	○
	3		Whistle notch shank/Schaft	1734SU03C-0760	8	79	41	29	36	●
	5			1736SU05C-0760	8	91	53	43	36	●
	8		Straight shank Zylinder-schaft	1538SU08C-0760	8	116	76	66	36	●
7.7	3	External Extern		1534SU03-0770	8	79	41	29	36	●
	5			1536SU05-0770	8	91	53	43	36	●
	3	Internal Intern		1534SU03C-0770	8	79	41	29	36	●
	5			1536SU05C-0770	8	91	53	43	36	●
	3		Weldon shank/Schaft	1634SU03C-0770	8	79	41	29	36	○
	5			1636SU05C-0770	8	91	53	43	36	○
	3		Whistle notch shank/Schaft	1734SU03C-0770	8	79	41	29	36	●
	5			1736SU05C-0770	8	91	53	43	36	●
	8		Straight shank Zylinder-schaft	1538SU08C-0770	8	116	76	66	36	●
7.8	3	External Extern		1534SU03-0780	8	79	41	29	36	●
	5			1536SU05-0780	8	91	53	43	36	●
	3	Internal Intern		1534SU03C-0780	8	79	41	29	36	●
	5			1536SU05C-0780	8	91	53	43	36	●
	3		Weldon shank/Schaft	1634SU03C-0780	8	79	41	29	36	○
	5			1636SU05C-0780	8	91	53	43	36	○
	3		Whistle notch shank/Schaft	1734SU03C-0780	8	79	41	29	36	●
	5			1736SU05C-0780	8	91	53	43	36	●
	8		Straight shank Zylinder-schaft	1538SU08C-0780	8	116	76	66	36	●
7.9	3	External Extern		1534SU03-0790	8	79	41	29	36	●
	5			1536SU05-0790	8	91	53	43	36	●
	3	Internal Intern		1534SU03C-0790	8	79	41	29	36	●
	5			1536SU05C-0790	8	91	53	43	36	●
	3		Weldon shank/Schaft	1634SU03C-0790	8	79	41	29	36	○
	5			1636SU05C-0790	8	91	53	43	36	○
	3		Whistle notch shank/Schaft	1734SU03C-0790	8	79	41	29	36	●
	5			1736SU05C-0790	8	91	53	43	36	●
	8		straight shank Zylinderschaft	1538SU08C-0790	8	116	76	66	36	●

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

Grade Sorte	Workpiece material · Werkstückstoff										
	Carbon steel Kohlenstoff Stahl HB≤180	Alloy steel Legierter Stahl	Hardened steel · Gehärteter Stahl			Stainless steel Rostfreier Stahl	Cast iron, Grauguss	Nodular cast iron GGG	Aluminum alloy Alu leg.	Copper alloy Kupfer leg.	Heat resist. alloy Warmfest. leg.
			~40HRC	~50HRC	~60HRC						
KDG303	✔	✔	✔			✔	✔	✔			

Code key C 10
ISO Kennzeichen
Cutting data 94-107
Schnittdaten
Technical Information C109-115
Technische Information
Non-standart tailor made C 117-121
Bestellformular für Sonderwerkzeuge

SU series · SU Serie

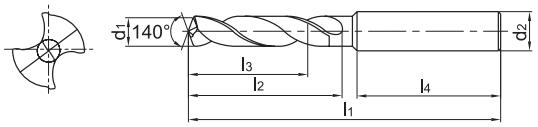
General machining · Allgemeine Bearbeitung



External Coolant
Externe Kühlung

Straight shank
Zylinderschaft

DIN 6535 HA

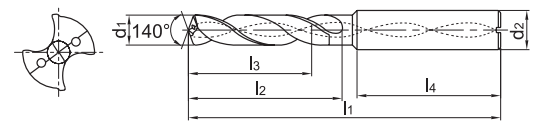




Internal Coolant
Interne Kühlung

Straight shank
Zylinderschaft

DIN 6535 HA

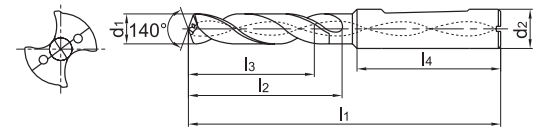




Internal Coolant
Interne Kühlung

Weldon shank · Schaft

DIN 6535 HB

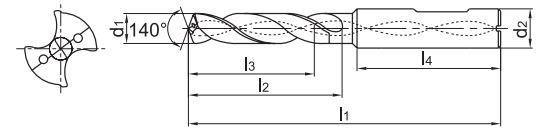




Internal Coolant
Interne Kühlung

Whistle notch shank · Schaft

DIN 6535 HE



- For high efficient drilling of P(steel), M (stainless steel) and K(cast iron) with high performance.
- Waveform cutting edges achieve outstanding sharpness and strength, promoting chip removal.
- Hocheffizientes Bohren von allgemeinen Stahlwerkstoffen, rostfreien Werkstoffen und Guss.
- Wellenförmige Schneidkante mit hoher Schneidenschärfe, Stabilität und guter Spanabfuhr.

Drill diameter Bohrer Ø $d_1(m_7)$	Drilling depth Bohrtiefe (L/d1)	Cooling mode Kühlmittel.	Shank Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen					Grade Sorte
					Shankdiameter Ø Schaftdurchmesser	Overall length Gesamtlänge	Flute length Nutenlänge	effective drill. length Effektive Nutzlänge	Shank length Schaftlänge	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
8.0	3	External Extern	Straight shank	1534SU03-0800	8	79	41	29	36	●
	5			1536SU05-0800	8	91	53	43	36	●
	3	Internal Intern	Zylinder-schaft	1534SU03C-0800	8	79	41	29	36	●
	5			1536SU05C-0800	8	91	53	43	36	●
	3		Weldon shank/Schaft	1634SU03C-0800	8	79	41	29	36	○
	5			1636SU05C-0800	8	91	53	43	36	○
	3		Whistle notch shank/Schaft	1734SU03C-0800	8	79	41	29	36	●
	5			1736SU05C-0800	8	91	53	43	36	●
	8		Straight shank Zylinder-schaft	1538SU08C-0800	8	116	76	66	36	●
8.1	3	External Extern		1534SU03-0810	10	89	47	35	40	●
	5			1536SU05-0810	10	103	61	49	40	●
	3	Internal Intern		1534SU03C-0810	10	89	47	35	40	●
	5			1536SU05C-0810	10	103	61	49	40	●
	3		Weldon shank/Schaft	1634SU03C-0810	10	89	47	35	40	○
	5			1636SU05C-0810	10	103	61	49	40	○
	3		Whistle notch shank/Schaft	1734SU03C-0810	10	89	47	35	40	●
	5			1736SU05C-0810	10	103	61	49	40	●
	8		Straight shank Zylinder-schaft	1538SU08C-0810	10	142	95	83	40	●
8.2	3	External Extern		1534SU03-0820	10	89	47	35	40	●
	5			1536SU05-0820	10	103	61	49	40	●
	3	Internal Intern		1534SU03C-0820	10	89	47	35	40	●
	5			1536SU05C-0820	10	103	61	49	40	●
	3		Weldon shank/Schaft	1634SU03C-0820	10	89	47	35	40	○
	5			1636SU05C-0820	10	103	61	49	40	○
	3		Whistle notch shank/Schaft	1734SU03C-0820	10	89	47	35	40	●
	5			1736SU05C-0820	10	103	61	49	40	●
	8		straight shank Zylinderschaft	1538SU08C-0820	10	142	95	83	40	●

 ● ex Stock Lager ○ on demand · auf Anfrage

Drill diameter Bohrer Ø $d_1(m_7)$	Drilling depth Bohrtiefe (L/d1)	Cooling mode Kühlmittel.	Shank Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen					Grade Sorte
					Shankdiameter Ø Schaftdurchmesser	Overall length Gesamtlänge	Flute length Nutenlänge	effective drill. length Effektive Nutzlänge	Shank length Schaftlänge	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
8.3	3	External Extern	Straight shank	**1534SU03-0830**	10	89	47	35	40	●
	5			**1536SU05-0830**	10	103	61	49	40	●
	3	Internal Intern	Zylinder-schaft	**1534SU03C-0830**	10	89	47	35	40	●
	5			**1536SU05C-0830**	10	103	61	49	40	●
	3		Weldon shank/Schaft	**1634SU03C-0830**	10	89	47	35	40	○
	5			**1636SU05C-0830**	10	103	61	49	40	○
	3		Whistle notch shank/Schaft	**1734SU03C-0830**	10	89	47	35	40	●
	5			**1736SU05C-0830**	10	103	61	49	40	●
	8		Straight shank Zylinder-schaft	**1538SU08C-0830**	10	142	95	83	40	●
8.4	3	External Extern		**1534SU03-0840**	10	89	47	35	40	●
	5			**1536SU05-0840**	10	103	61	49	40	●
	3	Internal Intern		**1534SU03C-0840**	10	89	47	35	40	●
	5			**1536SU05C-0840**	10	103	61	49	40	●
	3		Weldon shank/Schaft	**1634SU03C-0840**	10	89	47	35	40	○
	5			**1636SU05C-0840**	10	103	61	49	40	○
	3		Whistle notch shank/Schaft	**1734SU03C-0840**	10	89	47	35	40	●
	5			**1736SU05C-0840**	10	103	61	49	40	●
	8		Straight shank Zylinder-schaft	**1538SU08C-0840**	10	142	95	83	40	●
8.5	3	External Extern		**1534SU03-0850**	10	89	47	35	40	●
	5			**1536SU05-0850**	10	103	61	49	40	●
	3	Internal Intern		**1534SU03C-0850**	10	89	47	35	40	●
	5			**1536SU05C-0850**	10	103	61	49	40	●
	3		Weldon shank/Schaft	**1634SU03C-0850**	10	89	47	35	40	○
	5			**1636SU05C-0850**	10	103	61	49	40	○
	3		Whistle notch shank/Schaft	**1734SU03C-0850**	10	89	47	35	40	●
	5			**1736SU05C-0850**	10	103	61	49	40	●
	8		Straight shank Zylinder-schaft	**1538SU08C-0850**	10	142	95	83	40	●
8.6	3	External Extern		**1534SU03-0860**	10	89	47	35	40	●
	5			**1536SU05-0860**	10	103	61	49	40	●
	3	Internal Intern		**1534SU03C-0860**	10	89	47	35	40	●
	5			**1536SU05C-0860**	10	103	61	49	40	●
	3		Weldon shank/Schaft	**1634SU03C-0860**	10	89	47	35	40	○
	5			**1636SU05C-0860**	10	103	61	49	40	○
	3		Whistle notch shank/Schaft	**1734SU03C-0860**	10	89	47	35	40	●
	5			**1736SU05C-0860**	10	103	61	49	40	●
	8		straight shank Zylinderschaft	**1538SU08C-0860**	10	142	95	83	40	●

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

Grade Sorte	Workpiece material · Werkstückstoff										
	Carbon steel Kohlenstoff Stahl HB≤180	Alloy steel Legierter Stahl	Hardened steel · Gehärteter Stahl			Stainless steel Rostfreier Stahl	Cast iron, Grauguss	Nodular cast iron GGG	Aluminum alloy Alu leg.	Copper alloy Kupfer leg.	Heat resist. alloy Warmfest. leg.
			~40HRC	~50HRC	~60HRC						
KDG303	✔	✔	✔			✔	✔	✔			

Code key C 10
ISO Kennzeichen
Cutting data 94-107
Schnittdaten
Technical Information C109-115
Technische Information
Non-standart tailor made C 117-121
Bestellformular für Sonderwerkzeuge

SU series · SU Serie

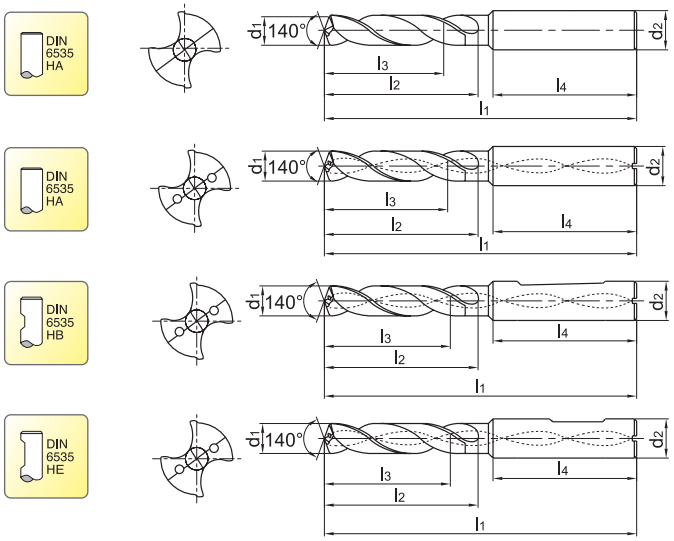
General machining · Allgemeine Bearbeitung


External Coolant
Externe Kühlung
Straight shank
Zylinderschaft


Internal Coolant
Interne Kühlung
Straight shank
Zylinderschaft


Internal Coolant
Interne Kühlung
Weldon
shank · Schaft


Internal Coolant
Interne Kühlung
Whistle notch
shank · Schaft



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Drill diameter Bohrer Ø $d_1(m_7)$	Drilling depth Bohrtiefe (L/d1)	Cooling mode Kühlmittel.	Shank Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen					Grade Sorte
					Shankdiameter Ø Schaftdurchmesser	Overall length Gesamtlänge	Flute length Nutenlänge	effective drill. length Effektive Nutzlänge	Shank length Schaftlänge	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
8.7	3	External Extern	Straight shank Zylinder-schaft	1534SU03-0870	10	89	47	35	40	●
	5			1536SU05-0870	10	103	61	49	40	●
	3	Internal Intern		1534SU03C-0870	10	89	47	35	40	●
	5			1536SU05C-0870	10	103	61	49	40	●
	3		Weldon shank/Schaft	1634SU03C-0870	10	89	47	35	40	○
	5			1636SU05C-0870	10	103	61	49	40	○
	3		Whistle notch shank/Schaft	1734SU03C-0870	10	89	47	35	40	●
	5			1736SU05C-0870	10	103	61	49	40	●
	8		Straight shank Zylinder-schaft	1538SU08C-0870	10	142	95	83	40	●
8.8	3	External Extern		1534SU03-0880	10	89	47	35	40	●
	5			1536SU05-0880	10	103	61	49	40	●
	3	Internal Intern		1534SU03C-0880	10	89	47	35	40	●
	5			1536SU05C-0880	10	103	61	49	40	●
	3		Weldon shank/Schaft	1634SU03C-0880	10	89	47	35	40	○
	5			1636SU05C-0880	10	103	61	49	40	○
	3		Whistle notch shank/Schaft	1734SU03C-0880	10	89	47	35	40	●
	5			1736SU05C-0880	10	103	61	49	40	●
	8		Straight shank Zylinder-schaft	1538SU08C-0880	10	142	95	83	40	●
8.9	3	External Extern		1534SU03-0890	10	89	47	35	40	●
	5			1536SU05-0890	10	103	61	49	40	●
	3	Internal Intern		1534SU03C-0890	10	89	47	35	40	●
	5			1536SU05C-0890	10	103	61	49	40	●
	3		Weldon shank/Schaft	1634SU03C-0890	10	89	47	35	40	○
	5			1636SU05C-0890	10	103	61	49	40	○
	3		Whistle notch shank/Schaft	1734SU03C-0890	10	89	47	35	40	●
	5			1736SU05C-0890	10	103	61	49	40	●
	8		straight shank Zylinderschaft	1538SU08C-0890	10	142	95	83	40	●

Drill diameter Bohrer Ø $d_1(m_7)$	Drilling depth Bohrtiefe (L/d1)	Cooling mode Kühlmittel.	Shank Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen					Grade Sorte
					Shankdiameter Ø Schaftdurchmesser	Overall length Gesamtlänge	Flute length Nutenlänge	effective drill. length Effektive Nutzlänge	Shank length Schaftlänge	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
9.0	3	External Extern	Straight shank	**1534SU03-0900**	10	89	47	35	40	●
	5			**1536SU05-0900**	10	103	61	49	40	●
	3	Internal Intern	Zylinder-schaft	**1534SU03C-0900**	10	89	47	35	40	●
	5			**1536SU05C-0900**	10	103	61	49	40	●
	3		Weldon shank/Schaft	**1634SU03C-0900**	10	89	47	35	40	○
	5			**1636SU05C-0900**	10	103	61	49	40	○
	3		Whistle notch shank/Schaft	**1734SU03C-0900**	10	89	47	35	40	●
	5			**1736SU05C-0900**	10	103	61	49	40	●
	8		Straight shank Zylinder-schaft	**1538SU08C-0900**	10	142	95	83	40	●
9.1	3	External Extern		**1534SU03-0910**	10	89	47	35	40	●
	5			**1536SU05-0910**	10	103	61	49	40	●
	3	Internal Intern		**1534SU03C-0910**	10	89	47	35	40	●
	5			**1536SU05C-0910**	10	103	61	49	40	●
	3		Weldon shank/Schaft	**1634SU03C-0910**	10	89	47	35	40	○
	5			**1636SU05C-0910**	10	103	61	49	40	○
	3		Whistle notch shank/Schaft	**1734SU03C-0910**	10	89	47	35	40	●
	5			**1736SU05C-0910**	10	103	61	49	40	●
	8		Straight shank Zylinder-schaft	**1538SU08C-0910**	10	142	95	83	40	●
9.2	3	External Extern		**1534SU03-0920**	10	89	47	35	40	●
	5			**1536SU05-0920**	10	103	61	49	40	●
	3	Internal Intern		**1534SU03C-0920**	10	89	47	35	40	●
	5			**1536SU05C-0920**	10	103	61	49	40	●
	3		Weldon shank/Schaft	**1634SU03C-0920**	10	89	47	35	40	○
	5			**1636SU05C-0920**	10	103	61	49	40	○
	3		Whistle notch shank/Schaft	**1734SU03C-0920**	10	89	47	35	40	●
	5			**1736SU05C-0920**	10	103	61	49	40	●
	8		Straight shank Zylinder-schaft	**1538SU08C-0920**	10	142	95	83	40	●
9.3	3	External Extern		**1534SU03-0930**	10	89	47	35	40	●
	5			**1536SU05-0930**	10	103	61	49	40	●
	3	Internal Intern		**1534SU03C-0930**	10	89	47	35	40	●
	5			**1536SU05C-0930**	10	103	61	49	40	●
	3		Weldon shank/Schaft	**1634SU03C-0930**	10	89	47	35	40	○
	5			**1636SU05C-0930**	10	103	61	49	40	○
	3		Whistle notch shank/Schaft	**1734SU03C-0930**	10	89	47	35	40	●
	5			**1736SU05C-0930**	10	103	61	49	40	●
	8		straight shank Zylinderschaft	**1538SU08C-0930**	10	142	95	83	40	●

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

Material Overview · Material Übersicht

Grade Sorte	Workpiece material · Werkstückstoff										
	Carbon steel Kohlenstoff Stahl HB≤180	Alloy steel Legierter Stahl	Hardened steel · Gehärteter Stahl			Stainless steel Rostfreier Stahl	Cast iron, Grauguss	Nodular cast iron GGG	Aluminum alloy Alu leg.	Copper alloy Kupfer leg.	Heat resist. alloy Warmfest. leg.
			~40HRC	~50HRC	~60HRC						
KDG303	✔	✔	✔			✔	✔	✔			

Code key C 10
ISO Kennzeichen
Cutting data 94-107
Schnittdaten
Technical Information C109-115
Technische Information
Non-standart tailor made C 117-121
Bestellformular für Sonderwerkzeuge

SU series · SU Serie

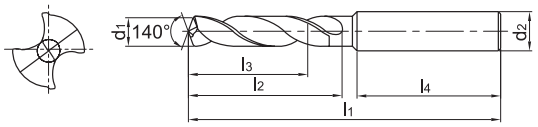
General machining · Allgemeine Bearbeitung



External Coolant
Externe Kühlung

Straight shank
Zylinderschaft

DIN 6535 HA

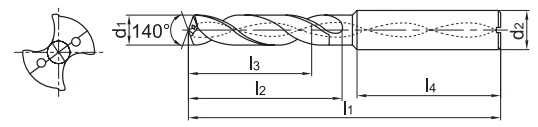




Internal Coolant
Interne Kühlung

Straight shank
Zylinderschaft

DIN 6535 HA

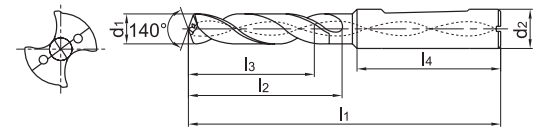




Internal Coolant
Interne Kühlung

Weldon shank · Schaft

DIN 6535 HB

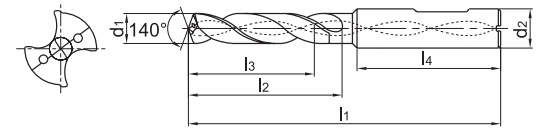




Internal Coolant
Interne Kühlung

Whistle notch shank · Schaft

DIN 6535 HE



- For high efficient drilling of P(steel), M (stainless steel) and K(cast iron) with high performance.
- Waveform cutting edges achieve outstanding sharpness and strength, promoting chip removal.
- Hocheffizientes Bohren von allgemeinen Stahlwerkstoffen, rostfreien Werkstoffen und Guss.
- Wellenförmige Schneidkante mit hoher Schneidenschärfe, Stabilität und guter Spanabfuhr.

Drill diameter Bohrer Ø $d_1(m_7)$	Drilling depth Bohrtiefe (L/d1)	Cooling mode Kühlmittel.	Shank Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen					Grade Sorte
					Shankdiameter Ø Schaftdurchmesser	Overall length Gesamtlänge	Flute length Nutenlänge	effective drill. length Effektive Nutzlänge	Shank length Schaftlänge	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
9.4	3	External Extern	Straight shank	**1534SU03-0940**	10	89	47	35	40	●
	5		Zylinder-schaft	**1536SU05-0940**	10	103	61	49	40	●
	3	Internal Intern		**1534SU03C-0940**	10	89	47	35	40	●
	5			**1536SU05C-0940**	10	103	61	49	40	●
	3		Weldon shank/Schaft	**1634SU03C-0940**	10	89	47	35	40	○
	5			**1636SU05C-0940**	10	103	61	49	40	○
	3		Whistle notch shank/Schaft	**1734SU03C-0940**	10	89	47	35	40	●
	5			**1736SU05C-0940**	10	103	61	49	40	●
	8		Straight shank Zylinder-schaft	**1538SU08C-0940**	10	142	95	83	40	●
9.5	3	External Extern		**1534SU03-0950**	10	89	47	35	40	●
	5			**1536SU05-0950**	10	103	61	49	40	●
	3	Internal Intern		**1534SU03C-0950**	10	89	47	35	40	●
	5			**1536SU05C-0950**	10	103	61	49	40	●
	3		Weldon shank/Schaft	**1634SU03C-0950**	10	89	47	35	40	○
	5			**1636SU05C-0950**	10	103	61	49	40	○
	3		Whistle notch shank/Schaft	**1734SU03C-0950**	10	89	47	35	40	●
	5			**1736SU05C-0950**	10	103	61	49	40	●
	8		Straight shank Zylinder-schaft	**1538SU08C-0950**	10	142	95	83	40	●
9.6	3	External Extern		**1534SU03-0960**	10	89	47	35	40	●
	5			**1536SU05-0960**	10	103	61	49	40	●
	3	Internal Intern		**1534SU03C-0960**	10	89	47	35	40	●
	5			**1536SU05C-0960**	10	103	61	49	40	●
	3		Weldon shank/Schaft	**1634SU03C-0960**	10	89	47	35	40	○
	5			**1636SU05C-0960**	10	103	61	49	40	○
	3		Whistle notch shank/Schaft	**1734SU03C-0960**	10	89	47	35	40	●
	5			**1736SU05C-0960**	10	103	61	49	40	●
	8		straight shank Zylinderschaft	**1538SU08C-0960**	10	142	95	83	40	●

Drill diameter Bohrer Ø $d_1(m_7)$	Drilling depth Bohrtiefe (L/d1)	Cooling mode Kühlmittel.	Shank Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen					Grade Sorte
					Shankdiameter Ø Schaftdurchmesser	Overall length Gesamtlänge	Flute length Nutenlänge	effective drill. length Effektive Nutzlänge	Shank length Schaftlänge	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
9.7	3	External Extern	Straight shank	**1534SU03-0970**	10	89	47	35	40	●
	5			**1536SU05-0970**	10	103	61	49	40	●
	3	Internal Intern	Zylinder-schaft	**1534SU03C-0970**	10	89	47	35	40	●
	5			**1536SU05C-0970**	10	103	61	49	40	●
	3		Weldon shank/Schaft	**1634SU03C-0970**	10	89	47	35	40	○
	5			**1636SU05C-0970**	10	103	61	49	40	○
	3		Whistle notch shank/Schaft	**1734SU03C-0970**	10	89	47	35	40	●
	5			**1736SU05C-0970**	10	103	61	49	40	●
	8		Straight shank Zylinder-schaft	**1538SU08C-0970**	10	142	95	83	40	●
9.8	3	External Extern		**1534SU03-0980**	10	89	47	35	40	●
	5			**1536SU05-0980**	10	103	61	49	40	●
	3	Internal Intern		**1534SU03C-0980**	10	89	47	35	40	●
	5			**1536SU05C-0980**	10	103	61	49	40	●
	3		Weldon shank/Schaft	**1634SU03C-0980**	10	89	47	35	40	○
	5			**1636SU05C-0980**	10	103	61	49	40	○
	3		Whistle notch shank/Schaft	**1734SU03C-0980**	10	89	47	35	40	●
	5			**1736SU05C-0980**	10	103	61	49	40	●
	8		Straight shank Zylinder-schaft	**1538SU08C-0980**	10	142	95	83	40	●
9.9	3	External Extern		**1534SU03-0990**	10	89	47	35	40	●
	5			**1536SU05-0990**	10	103	61	49	40	●
	3	Internal Intern		**1534SU03C-0990**	10	89	47	35	40	●
	5			**1536SU05C-0990**	10	103	61	49	40	●
	3		Weldon shank/Schaft	**1634SU03C-0990**	10	89	47	35	40	○
	5			**1636SU05C-0990**	10	103	61	49	40	○
	3		Whistle notch shank/Schaft	**1734SU03C-0990**	10	89	47	35	40	●
	5			**1736SU05C-0990**	10	103	61	49	40	●
	8		Straight shank Zylinder-schaft	**1538SU08C-0990**	10	142	95	83	40	●
10.0	3	External Extern		**1534SU03-1000**	10	89	47	35	40	●
	5			**1536SU05-1000**	10	103	61	49	40	●
	3	Internal Intern		**1534SU03C-1000**	10	89	47	35	40	●
	5			**1536SU05C-1000**	10	103	61	49	40	●
	3		Weldon shank/Schaft	**1634SU03C-1000**	10	89	47	35	40	○
	5			**1636SU05C-1000**	10	103	61	49	40	○
	3		Whistle notch shank/Schaft	**1734SU03C-1000**	10	89	47	35	40	●
	5			**1736SU05C-1000**	10	103	61	49	40	●
	8		straight shank Zylinderschaft	**1538SU08C-1000**	10	142	95	83	40	●

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

Grade Sorte	Workpiece material · Werkstückstoff										
	Carbon steel Kohlenstoff Stahl HB≤180	Alloy steel Legierter Stahl	Hardened steel · Gehärteter Stahl			Stainless steel Rostfreier Stahl	Cast iron, Grauguss	Nodular cast iron GGG	Aluminum alloy Alu leg.	Copper alloy Kupfer leg.	Heat resist. alloy Warmfest. leg.
			~40HRC	~50HRC	~60HRC						
KDG303	✔	✔	✔			✔	✔	✔			

Code key C 10
ISO Kennzeichen
Cutting data 94-107
Schnittdaten
Technical Information C109-115
Technische Information
Non-standart tailor made C 117-121
Bestellformular für Sonderwerkzeuge

SU series · SU Serie

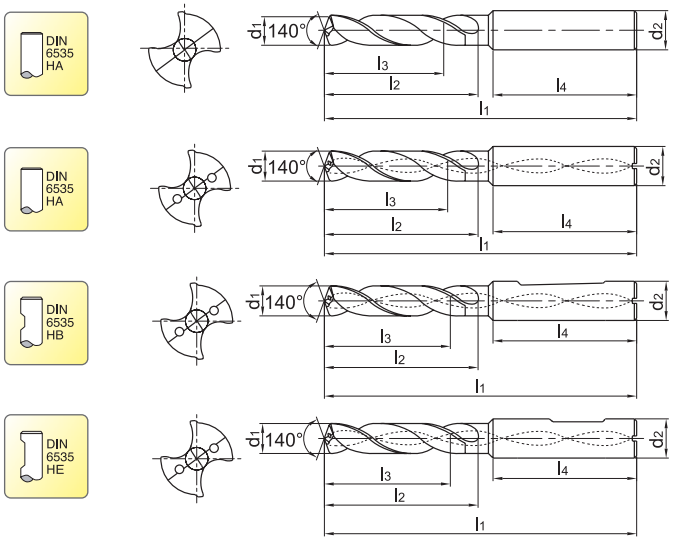
General machining · Allgemeine Bearbeitung


External Coolant
Externe Kühlung
Straight shank
Zylinderschaft


Internal Coolant
Interne Kühlung
Straight shank
Zylinderschaft


Internal Coolant
Interne Kühlung
Weldon
shank · Schaft


Internal Coolant
Interne Kühlung
Whistle notch
shank · Schaft



- For high efficient drilling of P(steel), M (stainless steel) and K(cast iron) with high performance.
- Waveform cutting edges achieve outstanding sharpness and strength, promoting chip removal.
- Hocheffizientes Bohren von allgemeinen Stahlwerkstoffen, rostfreien Werkstoffen und Guss.
- Wellenförmige Schneidkante mit hoher Schneidenschärfe, Stabilität und guter Spanabfuhr.

Drill diameter Bohrer Ø $d_1(m_7)$	Drilling depth Bohrtiefe (L/d1)	Cooling mode Kühlmittel.	Shank Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen					Grade Sorte
					Shankdiameter Ø Schaftdurchmesser	Overall length Gesamtlänge	Flute length Nutenlänge	effective drill. length Effektive Nutzlänge	Shank length Schaftlänge	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
10.1	3	External Extern	Straight shank	**1534SU03-1010**	12	102	55	40	45	●
	5			**1536SU05-1010**	12	118	71	56	45	●
	3	Internal Intern	Zylinder-schaft	**1534SU03C-1010**	12	102	55	40	45	●
	5			**1536SU05C-1010**	12	118	71	56	45	●
	3		Weldon shank/Schaft	**1634SU03C-1010**	12	102	55	40	45	○
	5			**1636SU05C-1010**	12	118	71	56	45	○
	3		Whistle notch shank/Schaft	**1734SU03C-1010**	12	102	55	40	45	●
	5			**1736SU05C-1010**	12	118	71	56	45	●
	8		Straight shank Zylinder-schaft	**1538SU08C-1010**	12	162	114	99	45	●
10.2	3	External Extern		**1534SU03-1020**	12	102	55	40	45	●
	5			**1536SU05-1020**	12	118	71	56	45	●
	3	Internal Intern		**1534SU03C-1020**	12	102	55	40	45	●
	5			**1536SU05C-1020**	12	118	71	56	45	●
	3		Weldon shank/Schaft	**1634SU03C-1020**	12	102	55	40	45	○
	5			**1636SU05C-1020**	12	118	71	56	45	○
	3		Whistle notch shank/Schaft	**1734SU03C-1020**	12	102	55	40	45	●
	5			**1736SU05C-1020**	12	118	71	56	45	●
	8		Straight shank Zylinder-schaft	**1538SU08C-1020**	12	162	114	99	45	●
10.25	3	External Extern		**1534SU03-1025**	12	102	55	40	45	●
	5			**1536SU05-1025**	12	118	71	56	45	●
	3	Internal Intern		**1534SU03C-1025**	12	102	55	40	45	●
	5			**1536SU05C-1025**	12	118	71	56	45	●
	3		Weldon shank/Schaft	**1634SU03C-1025**	12	102	55	40	45	○
	5			**1636SU05C-1025**	12	118	71	56	45	○
	3		Whistle notch shank/Schaft	**1734SU03C-1025**	12	102	55	40	45	●
	5			**1736SU05C-1025**	12	118	71	56	45	●

Drill diameter Bohrer Ø $d_1(m_7)$	Drilling depth Bohrtiefe (L/d1)	Cooling mode Kühlmittel.	Shank Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen					Grade Sorte
					Shankdiameter Ø Schaftdurchmesser	Overall length Gesamtlänge	Flute length Nutenlänge	effective drill. length Effektive Nutzlänge	Shank length Schaftlänge	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
10.3	3	External Extern	Straight shank	**1534SU03-1030**	12	102	55	40	45	●
	5			**1536SU05-1030**	12	118	71	56	45	●
	3	Internal Intern	Zylinder-schaft	**1534SU03C-1030**	12	102	55	40	45	●
	5			**1536SU05C-1030**	12	118	71	56	45	●
	3		Weldon shank/Schaft	**1634SU03C-1030**	12	102	55	40	45	○
	5			**1636SU05C-1030**	12	118	71	56	45	○
	3		Whistle notch shank/Schaft	**1734SU03C-1030**	12	102	55	40	45	●
	5			**1736SU05C-1030**	12	118	71	56	45	●
	8		Straight shank Zylinder-schaft	**1538SU08C-1030**	12	162	114	99	45	●
10.4	3	External Extern		**1534SU03-1040**	12	102	55	40	45	●
	5			**1536SU05-1040**	12	118	71	56	45	●
	3	Internal Intern		**1534SU03C-1040**	12	102	55	40	45	●
	5			**1536SU05C-1040**	12	118	71	56	45	●
	3		Weldon shank/Schaft	**1634SU03C-1040**	12	102	55	40	45	○
	5			**1636SU05C-1040**	12	118	71	56	45	○
	3		Whistle notch shank/Schaft	**1734SU03C-1040**	12	102	55	40	45	●
	5			**1736SU05C-1040**	12	118	71	56	45	●
	8		Straight shank Zylinder-schaft	**1538SU08C-1040**	12	162	114	99	45	●
10.5	3	External Extern		**1534SU03-1050**	12	102	55	40	45	●
	5			**1536SU05-1050**	12	118	71	56	45	●
	3	Internal Intern		**1534SU03C-1050**	12	102	55	40	45	●
	5			**1536SU05C-1050**	12	118	71	56	45	●
	3		Weldon shank/Schaft	**1634SU03C-1050**	12	102	55	40	45	●
	5			**1636SU05C-1050**	12	118	71	56	45	●
	3		Whistle notch shank/Schaft	**1734SU03C-1050**	12	102	55	40	45	●
	5			**1736SU05C-1050**	12	118	71	56	45	●
	8		Straight shank Zylinder-schaft	**1538SU08C-1050**	12	162	114	99	45	●
10.6	3	External Extern		**1534SU03-1060**	12	102	55	40	45	●
	5			**1536SU05-1060**	12	118	71	56	45	●
	3	Internal Intern		**1534SU03C-1060**	12	102	55	40	45	●
	5			**1536SU05C-1060**	12	118	71	56	45	●
	3		Weldon shank/Schaft	**1634SU03C-1060**	12	102	55	40	45	○
	5			**1636SU05C-1060**	12	118	71	56	45	○
	3		Whistle notch shank/Schaft	**1734SU03C-1060**	12	102	55	40	45	●
	5			**1736SU05C-1060**	12	118	71	56	45	●
	8		straight shank Zylinderschaft	**1538SU08C-1060**	12	162	114	99	45	●

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

Grade Sorte	Workpiece material · Werkstückstoff										
	Carbon steel Kohlenstoff Stahl HB≤180	Alloy steel Legierter Stahl	Hardened steel · Gehärteter Stahl			Stainless steel Rostfreier Stahl	Cast iron, Grauguss	Nodular cast iron GGG	Aluminum alloy Alu leg.	Copper alloy Kupfer leg.	Heat resist. alloy Warmfest. leg.
			~40HRC	~50HRC	~60HRC						
KDG303	✔	✔	✔			✔	✔	✔			

Code key C 10
ISO Kennzeichen
Cutting data 94-107
Schnittdaten
Technical Information C109-115
Technische Information
Non-standart tailor made C 117-121
Bestellformular für Sonderwerkzeuge

SU series · SU Serie

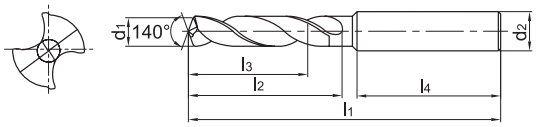
General machining · Allgemeine Bearbeitung



External Coolant
Externe Kühlung

Straight shank
Zylinderschaft

DIN 6535 HA

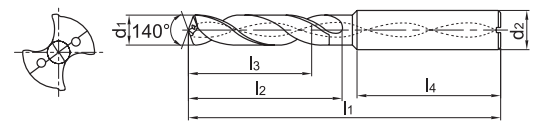




Internal Coolant
Interne Kühlung

Straight shank
Zylinderschaft

DIN 6535 HA

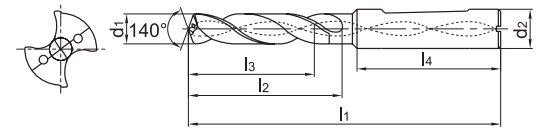




Internal Coolant
Interne Kühlung

Weldon shank · Schaft

DIN 6535 HB

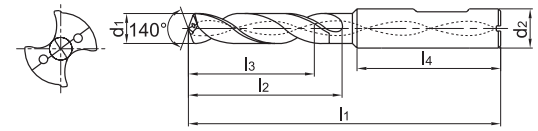




Internal Coolant
Interne Kühlung

Whistle notch shank · Schaft

DIN 6535 HE



- For high efficient drilling of P(steel), M (stainless steel) and K(cast iron) with high performance.
- Waveform cutting edges achieve outstanding sharpness and strength, promoting chip removal.
- Hocheffizientes Bohren von allgemeinen Stahlwerkstoffen, rostfreien Werkstoffen und Guss.
- Wellenförmige Schneidkante mit hoher Schneidenschärfe, Stabilität und guter Spanabfuhr.

Drill diameter Bohrer Ø $d_1(m_7)$	Drilling depth Bohrtiefe (L/d1)	Cooling mode Kühlmittel.	Shank Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen					Grade Sorte
					Shankdiameter Ø Schaftdurchmesser	Overall length Gesamtlänge	Flute length Nutenlänge	effective drill. length Effektive Nutzlänge	Shank length Schaftlänge	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
10.7	3	External Extern	Straight shank	**1534SU03-1070**	12	102	55	40	45	●
	5		Zylinder-schaft	**1536SU05-1070**	12	118	71	56	45	●
	3	Internal Intern		**1534SU03C-1070**	12	102	55	40	45	●
	5			**1536SU05C-1070**	12	118	71	56	45	●
	3		Weldon shank/Schaft	**1634SU03C-1070**	12	102	55	40	45	○
	5			**1636SU05C-1070**	12	118	71	56	45	○
	3		Whistle notch shank/Schaft	**1734SU03C-1070**	12	102	55	40	45	●
	5			**1736SU05C-1070**	12	118	71	56	45	●
	8		Straight shank Zylinder-schaft	**1538SU08C-1070**	12	162	114	99	45	●
10.8	3	External Extern		**1534SU03-1080**	12	102	55	40	45	●
	5			**1536SU05-1080**	12	118	71	56	45	●
	3	Internal Intern		**1534SU03C-1080**	12	102	55	40	45	●
	5			**1536SU05C-1080**	12	118	71	56	45	●
	3		Weldon shank/Schaft	**1634SU03C-1080**	12	102	55	40	45	○
	5			**1636SU05C-1080**	12	118	71	56	45	○
	3		Whistle notch shank/Schaft	**1734SU03C-1080**	12	102	55	40	45	●
	5			**1736SU05C-1080**	12	118	71	56	45	●
	8		Straight shank Zylinder-schaft	**1538SU08C-1080**	12	162	114	99	45	●
10.9	3	External Extern		**1534SU03-1090**	12	102	55	40	45	●
	5			**1536SU05-1090**	12	118	71	56	45	●
	3	Internal Intern		**1534SU03C-1090**	12	102	55	40	45	●
	5			**1536SU05C-1090**	12	118	71	56	45	●
	3		Weldon shank/Schaft	**1634SU03C-1090**	12	102	55	40	45	○
	5			**1636SU05C-1090**	12	118	71	56	45	○
	3		Whistle notch shank/Schaft	**1734SU03C-1090**	12	102	55	40	45	●
	5			**1736SU05C-1090**	12	118	71	56	45	●
	8		straight shank Zylinderschaft	**1538SU08C-1090**	12	162	114	99	45	●

Drill diameter Bohrer Ø $d_1(m_7)$	Drilling depth Bohrtiefe (L/d1)	Cooling mode Kühlmittel.	Shank Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen					Grade Sorte
					Shankdiameter Ø Schaftdurchmesser	Overall length Gesamtlänge	Flute length Nutenlänge	effective drill. length Effektive Nutzlänge	Shank length Schaftlänge	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
11.0	3	External Extern	Straight shank Zylinder-schaft	**1534SU03-1100**	12	102	55	40	45	●
	5			**1536SU05-1100**	12	118	71	56	45	●
	3	Internal Intern		**1534SU03C-1100**	12	102	55	40	45	●
	5			**1536SU05C-1100**	12	118	71	56	45	●
	3		Weldon shank/Schaft	**1634SU03C-1100**	12	102	55	40	45	○
	5			**1636SU05C-1100**	12	118	71	56	45	○
	3		Whistle notch shank/Schaft	**1734SU03C-1100**	12	102	55	40	45	●
	5			**1736SU05C-1100**	12	118	71	56	45	●
	8		Straight shank Zylinder-schaft	**1538SU08C-1100**	12	162	114	99	45	●
11.1	3	External Extern		**1534SU03-1110**	12	102	55	40	45	●
	5			**1536SU05-1110**	12	118	71	56	45	●
	3	Internal Intern		**1534SU03C-1110**	12	102	55	40	45	●
	5			**1536SU05C-1110**	12	118	71	56	45	●
	3		Weldon shank/Schaft	**1634SU03C-1110**	12	102	55	40	45	○
	5			**1636SU05C-1110**	12	118	71	56	45	○
	3		Whistle notch shank/Schaft	**1734SU03C-1110**	12	102	55	40	45	●
	5			**1736SU05C-1110**	12	118	71	56	45	●
	8		Straight shank Zylinder-schaft	**1538SU08C-1110**	12	162	114	99	45	●
11.2	3	External Extern		**1534SU03-1120**	12	102	55	40	45	●
	5			**1536SU05-1120**	12	118	71	56	45	●
	3	Internal Intern		**1534SU03C-1120**	12	102	55	40	45	●
	5			**1536SU05C-1120**	12	118	71	56	45	●
	3		Weldon shank/Schaft	**1634SU03C-1120**	12	102	55	40	45	○
	5			**1636SU05C-1120**	12	118	71	56	45	○
	3		Whistle notch shank/Schaft	**1734SU03C-1120**	12	102	55	40	45	●
	5			**1736SU05C-1120**	12	118	71	56	45	●
	8		Straight shank Zylinder-schaft	**1538SU08C-1120**	12	162	114	99	45	●
11.3	3	External Extern		**1534SU03-1130**	12	102	55	40	45	●
	5			**1536SU05-1130**	12	118	71	56	45	●
	3	Internal Intern		**1534SU03C-1130**	12	102	55	40	45	●
	5			**1536SU05C-1130**	12	118	71	56	45	●
	3		Weldon shank/Schaft	**1634SU03C-1130**	12	102	55	40	45	○
	5			**1636SU05C-1130**	12	118	71	56	45	○
	3		Whistle notch shank/Schaft	**1734SU03C-1130**	12	102	55	40	45	●
	5			**1736SU05C-1130**	12	118	71	56	45	●
	8		straight shank Zylinderschaft	**1538SU08C-1130**	12	162	114	99	45	●

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

Material Overview · Material Übersicht

Grade Sorte	Workpiece material · Werkstückstoff										
	Carbon steel Kohlenstoff Stahl HB≤180	Alloy steel Legierter Stahl	Hardened steel · Gehärteter Stahl			Stainless steel Rostfreier Stahl	Cast iron, Grauguss	Nodular cast iron GGG	Aluminum alloy Alu leg.	Copper alloy Kupfer leg.	Heat resist. alloy Warmfest. leg.
			~40HRC	~50HRC	~60HRC						
KDG303	✔	✔	✔			✔	✔	✔			

Code key C 10
ISO Kennzeichen
Cutting data 94-107
Schnittdaten
Technical Information C109-115
Technische Information
Non-standart tailor made C 117-121
Bestellformular für Sonderwerkzeuge

SU series · SU Serie

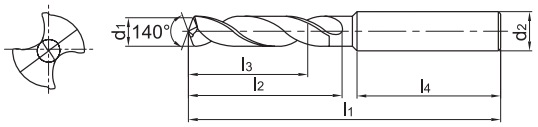
General machining · Allgemeine Bearbeitung



External Coolant
Externe Kühlung

Straight shank
Zylinderschaft

DIN 6535 HA

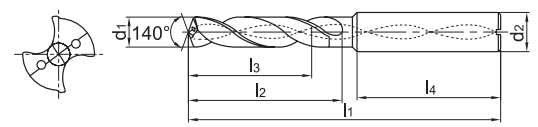




Internal Coolant
Interne Kühlung

Straight shank
Zylinderschaft

DIN 6535 HA

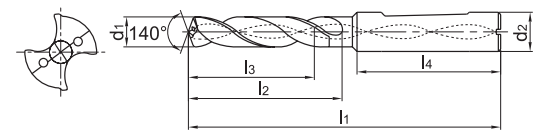




Internal Coolant
Interne Kühlung

Weldon shank · Schaft

DIN 6535 HB

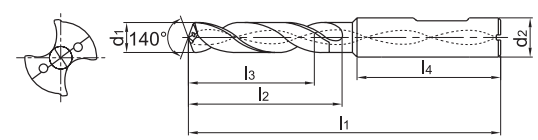




Internal Coolant
Interne Kühlung

Whistle notch shank · Schaft

DIN 6535 HE



- For high efficient drilling of P(steel), M (stainless steel) and K(cast iron) with high performance.
- Waveform cutting edges achieve outstanding sharpness and strength, promoting chip removal.
- Hocheffizientes Bohren von allgemeinen Stahlwerkstoffen, rostfreien Werkstoffen und Guss.
- Wellenförmige Schneidkante mit hoher Schneidenschärfe, Stabilität und guter Spanabfuhr.

Drill diameter Bohrer Ø $d_1(m_7)$	Drilling depth Bohrtiefe (L/d1)	Cooling mode Kühlmittel.	Shank Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen					Grade Sorte
					Shankdiameter Ø Schaftdurchmesser	Overall length Gesamtlänge	Flute length Nutenlänge	effective drill. length Effektive Nutzlänge	Shank length Schaftlänge	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
11.4	3	External Extern	Straight shank Zylinder-schaft	1534SU03-1140	12	102	55	40	45	●
	5			1536SU05-1140	12	118	71	56	45	●
	3	Internal Intern		1534SU03C-1140	12	102	55	40	45	●
	5			1536SU05C-1140	12	118	71	56	45	●
	3		Weldon shank/Schaft	1634SU03C-1140	12	102	55	40	45	○
	5			1636SU05C-1140	12	118	71	56	45	○
	3		Whistle notch shank/Schaft	1734SU03C-1140	12	102	55	40	45	●
	5			1736SU05C-1140	12	118	71	56	45	●
	8		Straight shank Zylinder-schaft	1538SU08C-1140	12	162	114	99	45	●
11.5	3	External Extern		1534SU03-1150	12	102	55	40	45	●
	5			1536SU05-1150	12	118	71	56	45	●
	3	Internal Intern		1534SU03C-1150	12	102	55	40	45	●
	5			1536SU05C-1150	12	118	71	56	45	●
	3		Weldon shank/Schaft	1634SU03C-1150	12	102	55	40	45	○
	5			1636SU05C-1150	12	118	71	56	45	○
	3		Whistle notch shank/Schaft	1734SU03C-1150	12	102	55	40	45	●
	5			1736SU05C-1150	12	118	71	56	45	●
	8		Straight shank Zylinder-schaft	1538SU08C-1150	12	162	114	99	45	●
11.6	3	External Extern		1534SU03-1160	12	102	55	40	45	●
	5			1536SU05-1160	12	118	71	56	45	●
	3	Internal Intern		1534SU03C-1160	12	102	55	40	45	●
	5			1536SU05C-1160	12	118	71	56	45	●
	3		Weldon shank/Schaft	1634SU03C-1160	12	102	55	40	45	○
	5			1636SU05C-1160	12	118	71	56	45	○
	3		Whistle notch shank/Schaft	1734SU03C-1160	12	102	55	40	45	●
	5			1736SU05C-1160	12	118	71	56	45	●
	8		straight shank Zylinderschaft	1538SU08C-1160	12	162	114	99	45	●

Drill diameter Bohrer Ø $d_1(m_7)$	Drilling depth Bohrtiefe (L/d1)	Cooling mode Kühlmittel.	Shank Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen					Grade Sorte
					Shankdiameter Ø Schaftdurchmesser	Overall length Gesamtlänge	Flute length Nutenlänge	effective drill. length Effektive Nutzlänge	Shank length Schaftlänge	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
11.7	3	External Extern	Straight shank	**1534SU03-1170**	12	102	55	40	45	●
	5			**1536SU05-1170**	12	118	71	56	45	●
	3	Internal Intern	Zylinder-schaft	**1534SU03C-1170**	12	102	55	40	45	●
	5			**1536SU05C-1170**	12	118	71	56	45	●
	3		Weldon shank/Schaft	**1634SU03C-1170**	12	102	55	40	45	○
	5			**1636SU05C-1170**	12	118	71	56	45	○
	3		Whistle notch shank/Schaft	**1734SU03C-1170**	12	102	55	40	45	●
	5			**1736SU05C-1170**	12	118	71	56	45	●
	8		Straight shank Zylinder-schaft	**1538SU08C-1170**	12	162	114	99	45	●
11.8	3	External Extern		**1534SU03-1180**	12	102	55	40	45	●
	5			**1536SU05-1180**	12	118	71	56	45	●
	3	Internal Intern		**1534SU03C-1180**	12	102	55	40	45	●
	5			**1536SU05C-1180**	12	118	71	56	45	●
	3		Weldon shank/Schaft	**1634SU03C-1180**	12	102	55	40	45	○
	5			**1636SU05C-1180**	12	118	71	56	45	○
	3		Whistle notch shank/Schaft	**1734SU03C-1180**	12	102	55	40	45	●
	5			**1736SU05C-1180**	12	118	71	56	45	●
	8		Straight shank Zylinder-schaft	**1538SU08C-1180**	12	162	114	99	45	●
11.9	3	External Extern		**1534SU03-1190**	12	102	55	40	45	●
	5			**1536SU05-1190**	12	118	71	56	45	●
	3	Internal Intern		**1534SU03C-1190**	12	102	55	40	45	●
	5			**1536SU05C-1190**	12	118	71	56	45	●
	3		Weldon shank/Schaft	**1634SU03C-1190**	12	102	55	40	45	○
	5			**1636SU05C-1190**	12	118	71	56	45	○
	3		Whistle notch shank/Schaft	**1734SU03C-1190**	12	102	55	40	45	●
	5			**1736SU05C-1190**	12	118	71	56	45	●
	8		Straight shank Zylinder-schaft	**1538SU08C-1190**	12	162	114	99	45	●
12.0	3	External Extern		**1534SU03-1200**	12	102	55	40	45	●
	5			**1536SU05-1200**	12	118	71	56	45	●
	3	Internal Intern		**1534SU03C-1200**	12	102	55	40	45	●
	5			**1536SU05C-1200**	12	118	71	56	45	●
	3		Weldon shank/Schaft	**1634SU03C-1200**	12	102	55	40	45	○
	5			**1636SU05C-1200**	12	118	71	56	45	○
	3		Whistle notch shank/Schaft	**1734SU03C-1200**	12	102	55	40	45	●
	5			**1736SU05C-1200**	12	118	71	56	45	●
	8		straight shank Zylinderschaft	**1538SU08C-1200**	12	162	114	99	45	●

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

Grade Sorte	Workpiece material · Werkstückstoff										
	Carbon steel Kohlenstoff Stahl HB≤180	Alloy steel Legierter Stahl	Hardened steel · Gehärteter Stahl			Stainless steel Rostfreier Stahl	Cast iron, Grauguss	Nodular cast iron GGG	Aluminum alloy Alu leg.	Copper alloy Kupfer leg.	Heat resist. alloy Warmfest. leg.
			~40HRC	~50HRC	~60HRC						
KDG303	✔	✔	✔			✔	✔	✔			

Code key C 10
ISO Kennzeichen
Cutting data 94-107
Schnittdaten
Technical Information C109-115
Technische Information
Non-standart tailor made C 117-121
Bestellformular für Sonderwerkzeuge

SU series · SU Serie

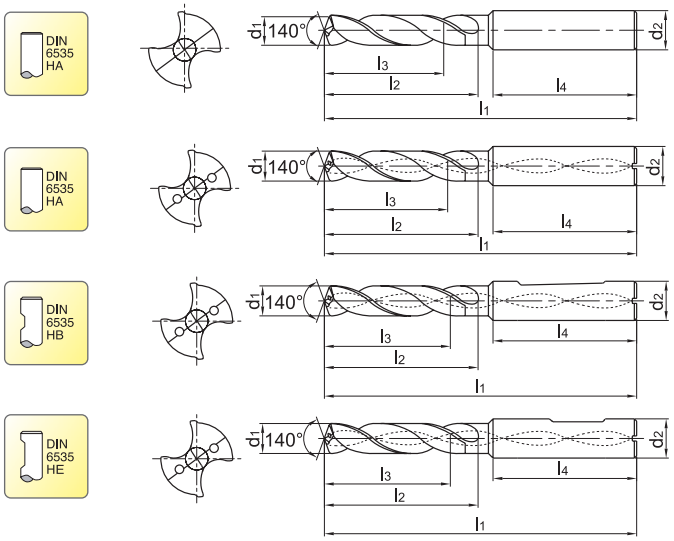
General machining · Allgemeine Bearbeitung


External Coolant
Externe Kühlung
Straight shank
Zylinderschaft


Internal Coolant
Interne Kühlung
Straight shank
Zylinderschaft


Internal Coolant
Interne Kühlung
Weldon
shank · Schaft


Internal Coolant
Interne Kühlung
Whistle notch
shank · Schaft



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Drill diameter Bohrer Ø $d_1(m_7)$	Drilling depth Bohrtiefe (L/d1)	Cooling mode Kühlmittel.	Shank Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen					Grade Sorte
					Shankdiameter Ø Schaftdurchmesser	Overall length Gesamtlänge	Flute length Nutenlänge	effective drill. length Effektive Nutzlänge	Shank length Schaftlänge	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
12.1	3	External Extern	Straight shank	**1534SU03-1210**	14	107	60	43	45	●
	5			**1536SU05-1210**	14	124	77	60	45	●
	3	Internal Intern	Zylinder-schaft	**1534SU03C-1210**	14	107	60	43	45	●
	5			**1536SU05C-1210**	14	124	77	60	45	●
	3		Weldon shank/Schaft	**1634SU03C-1210**	14	107	60	43	45	○
	5			**1636SU05C-1210**	14	124	77	60	45	○
	3		Whistle notch shank/Schaft	**1734SU03C-1210**	14	107	60	43	45	●
	5			**1736SU05C-1210**	14	124	77	60	45	●
12.2	3	External Extern	Straight shank	**1534SU03-1220**	14	107	60	43	45	●
	5			**1536SU05-1220**	14	124	77	60	45	●
	3	Internal Intern	Zylinder-schaft	**1534SU03C-1220**	14	107	60	43	45	●
	5			**1536SU05C-1220**	14	124	77	60	45	●
	3		Weldon shank/Schaft	**1634SU03C-1220**	14	107	60	43	45	○
	5			**1636SU05C-1220**	14	124	77	60	45	○
	3		Whistle notch shank/Schaft	**1734SU03C-1220**	14	107	60	43	45	●
	5			**1736SU05C-1220**	14	124	77	60	45	●
12.25	3	External Extern	Straight shank	**1534SU03-1225**	14	107	60	43	45	●
	5			**1536SU05-1225**	14	124	77	60	45	●
	3	Internal Intern	Zylinder-schaft	**1534SU03C-1225**	14	107	60	43	45	●
	5			**1536SU05C-1225**	14	124	77	60	45	●
	3		Weldon shank/Schaft	**1634SU03C-1225**	14	107	60	43	45	○
	5			**1636SU05C-1225**	14	124	77	60	45	○
	3		Whistle notch shank/Schaft	**1734SU03C-1225**	14	107	60	43	45	●
	5			**1736SU05C-1225**	14	124	77	60	45	●

Drill diameter Bohrer Ø $d_1(m_7)$	Drilling depth Bohrtiefe (L/d1)	Cooling mode Kühlmittel.	Shank Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen					Grade Sorte
					Shankdiameter Ø Schaftdurchmesser	Overall length Gesamtlänge	Flute length Nutenlänge	effective drill. length Effektive Nutzlänge	Shank length Schaftlänge	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
12.3	3	External Extern	Straight shank	**1534SU03-1230**	14	107	60	43	45	●
	5			**1536SU05-1230**	14	124	77	60	45	●
	3	Internal Intern	Zylinder-schaft	**1534SU03C-1230**	14	107	60	43	45	●
	5			**1536SU05C-1230**	14	124	77	60	45	●
	3		Weldon shank/Schaft	**1634SU03C-1230**	14	107	60	43	45	○
	5			**1636SU05C-1230**	14	124	77	60	45	○
	3		Whistle notch shank/Schaft	**1734SU03C-1230**	14	107	60	43	45	●
	5			**1736SU05C-1230**	14	124	77	60	45	●
12.5	3	External Extern	Straight shank	**1534SU03-1250**	14	107	60	43	45	●
	5			**1536SU05-1250**	14	124	77	60	45	●
	3	Internal Intern	Zylinder-schaft	**1534SU03C-1250**	14	107	60	43	45	●
	5			**1536SU05C-1250**	14	124	77	60	45	●
	3		Weldon shank/Schaft	**1634SU03C-1250**	14	107	60	43	45	○
	5			**1636SU05C-1250**	14	124	77	60	45	○
	3		Whistle notch shank/Schaft	**1734SU03C-1250**	14	107	60	43	45	●
	5			**1736SU05C-1250**	14	124	77	60	45	●
	8		Straight shank Zylinder-schaft	**1538SU08C-1250**	14	178	133	116	45	●
12.7	3	External Extern		**1534SU03-1270**	14	107	60	43	45	●
	5			**1536SU05-1270**	14	124	77	60	45	●
12.7	3	Internal Intern		**1534SU03C-1270**	14	107	60	43	45	●
	5			**1536SU05C-1270**	14	124	77	60	45	●
	3		Weldon shank/Schaft	**1634SU03C-1270**	14	107	60	43	45	○
	5			**1636SU05C-1270**	14	124	77	60	45	○
	3		Whistle notch shank/Schaft	**1734SU03C-1270**	14	107	60	43	45	●
	5			**1736SU05C-1270**	14	124	77	60	45	●
	8		Straight shank Zylinder-schaft	**1538SU08C-1270**	14	178	133	116	45	●
12.75	3	External Extern		**1534SU03-1275**	14	107	60	43	45	●
	5			**1536SU05-1275**	14	124	77	60	45	●
	3	Internal Intern		**1534SU03C-1275**	14	107	60	43	45	●
	5			**1536SU05C-1275**	14	124	77	60	45	●
	3		Weldon shank/Schaft	**1634SU03C-1275**	14	107	60	43	45	○
	5			**1636SU05C-1275**	14	124	77	60	45	○
	3		Whistle notch shank/Schaft	**1734SU03C-1275**	14	107	60	43	45	●
	5			**1736SU05C-1275**	14	124	77	60	45	●

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

Grade Sorte	Workpiece material · Werkstückstoff										
	Carbon steel Kohlenstoff Stahl HB≤180	Alloy steel Legierter Stahl	Hardened steel · Gehärteter Stahl			Stainless steel Rostfreier Stahl	Cast iron, Grauguss	Nodular cast iron GGG	Aluminum alloy Alu leg.	Copper alloy Kupfer leg.	Heat resist. alloy Warmfest. leg.
			~40HRC	~50HRC	~60HRC						
KDG303	✔	✔	✔			✔	✔	✔			

Code key C 10
ISO Kennzeichen
Cutting data 94-107
Schnittdaten
Technical Information C109-115
Technische Information
Non-standart tailor made C 117-121
Bestellformular für Sonderwerkzeuge

SU series · SU Serie

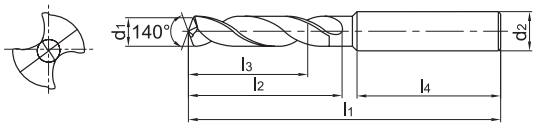
General machining · Allgemeine Bearbeitung



External Coolant
Externe Kühlung

Straight shank
Zylinderschaft

DIN 6535 HA

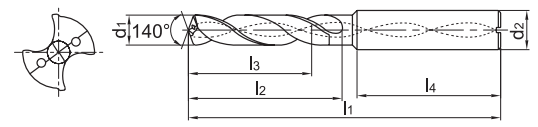




Internal Coolant
Interne Kühlung

Straight shank
Zylinderschaft

DIN 6535 HA

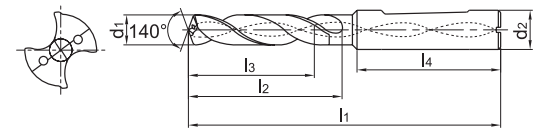




Internal Coolant
Interne Kühlung

Weldon shank · Schaft

DIN 6535 HB

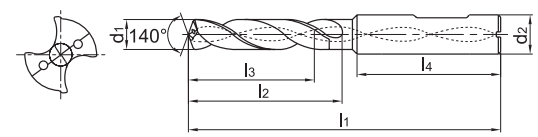




Internal Coolant
Interne Kühlung

Whistle notch shank · Schaft

DIN 6535 HE



- For high efficient drilling of P(steel), M (stainless steel) and K(cast iron) with high performance.
- Waveform cutting edges achieve outstanding sharpness and strength, promoting chip removal.
- Hocheffizientes Bohren von allgemeinen Stahlwerkstoffen, rostfreien Werkstoffen und Guss.
- Wellenförmige Schneidkante mit hoher Schneidenschärfe, Stabilität und guter Spanabfuhr.

Drill diameter Bohrer Ø $d_1(m_7)$	Drilling depth Bohrtiefe (L/d1)	Cooling mode Kühlmittel.	Shank Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen					Grade Sorte
					Shankdiameter Ø Schaftdurchmesser	Overall length Gesamtlänge	Flute length Nutenlänge	effective drill. length Effektive Nutzlänge	Shank length Schaftlänge	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
12.8	3	External Extern	Straight shank Zylinder-schaft	**1534SU03-1280**	14	107	60	43	45	●
	5			**1536SU05-1280**	14	124	77	60	45	●
	3	Internal Intern		**1534SU03C-1280**	14	107	60	43	45	●
	5			**1536SU05C-1280**	14	124	77	60	45	●
	3		Weldon shank/Schaft	**1634SU03C-1280**	14	107	60	43	45	○
	5			**1636SU05C-1280**	14	124	77	60	45	○
	3		Whistle notch shank/Schaft	**1734SU03C-1280**	14	107	60	43	45	●
	5			**1736SU05C-1280**	14	124	77	60	45	●
	8		Straight shank Zylinder-schaft	**1538SU08C-1280**	14	178	133	116	45	●
13.0	3	External Extern		**1534SU03-1300**	14	107	60	43	45	●
	5			**1536SU05-1300**	14	124	77	60	45	●
	3	Internal Intern		**1534SU03C-1300**	14	107	60	43	45	●
	5			**1536SU05C-1300**	14	124	77	60	45	●
	3		Weldon shank/Schaft	**1634SU03C-1300**	14	107	60	43	45	○
	5			**1636SU05C-1300**	14	124	77	60	45	○
	3		Whistle notch shank/Schaft	**1734SU03C-1300**	14	107	60	43	45	●
	5			**1736SU05C-1300**	14	124	77	60	45	●
	8		Straight shank Zylinder-schaft	**1538SU08C-1300**	14	178	133	116	45	●
13.1	3	External Extern		**1534SU03-1310**	14	107	60	43	45	●
	5			**1536SU05-1310**	14	124	77	60	45	●
	3	Internal Intern		**1534SU03C-1310**	14	107	60	43	45	●
	5			**1536SU05C-1310**	14	124	77	60	45	●
	3		Weldon shank/Schaft	**1634SU03C-1310**	14	107	60	43	45	○
	5			**1636SU05C-1310**	14	124	77	60	45	○
	3		Whistle notch shank/Schaft	**1734SU03C-1310**	14	107	60	43	45	●
	5			**1736SU05C-1310**	14	124	77	60	45	●

Drill diameter Bohrer Ø $d_1(m_7)$	Drilling depth Bohrtiefe (L/d1)	Cooling mode Kühlmittel.	Shank Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen					Grade Sorte
					Shankdiameter Ø Schaftdurchmesser	Overall length Gesamtlänge	Flute length Nutenlänge	effective drill. length Effektive Nutzlänge	Shank length Schaftlänge	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
13.5	3	External Extern	Straight shank	**1534SU03-1350**	14	107	60	43	45	●
	5			**1536SU05-1350**	14	124	77	60	45	●
	3	Internal Intern	Zylinder-schaft	**1534SU03C-1350**	14	107	60	43	45	●
	5			**1536SU05C-1350**	14	124	77	60	45	●
	3		Weldon shank/Schaft	**1634SU03C-1350**	14	107	60	43	45	○
	5			**1636SU05C-1350**	14	124	77	60	45	○
	3		Whistle notch shank/Schaft	**1734SU03C-1350**	14	107	60	43	45	●
	5			**1736SU05C-1350**	14	124	77	60	45	●
	8		Straight shank Zylinder-schaft	**1538SU08C-1350**	14	178	133	116	45	●
13.8	3	External Extern		**1534SU03-1380**	14	107	60	43	45	●
	5			**1536SU05-1380**	14	124	77	60	45	●
	3	Internal Intern		**1534SU03C-1380**	14	107	60	43	45	●
	5			**1536SU05C-1380**	14	124	77	60	45	●
	3		Weldon shank/Schaft	**1634SU03C-1380**	14	107	60	43	45	○
	5			**1636SU05C-1380**	14	124	77	60	45	○
	3		Whistle notch shank/Schaft	**1734SU03C-1380**	14	107	60	43	45	●
	5			**1736SU05C-1380**	14	124	77	60	45	●
14.0	3	External Extern	Straight shank Zylinder-schaft	**1534SU03-1400**	14	107	60	43	45	●
	5			**1536SU05-1400**	14	124	77	60	45	●
	3	Internal Intern		**1534SU03C-1400**	14	107	60	43	45	●
	5			**1536SU05C-1400**	14	124	77	60	45	●
	3		Weldon shank/Schaft	**1634SU03C-1400**	14	107	60	43	45	○
	5			**1636SU05C-1400**	14	124	77	60	45	○
	3		Whistle notch shank/Schaft	**1734SU03C-1400**	14	107	60	43	45	●
	5			**1736SU05C-1400**	14	124	77	60	45	●
	8		Straight shank Zylinder-schaft	**1538SU08C-1400**	14	178	133	116	45	●
14.2	3	External Extern		**1534SU03-1420**	14	107	60	43	45	●
	5			**1536SU05-1420**	14	124	77	60	45	●
	3	Internal Intern		**1534SU03C-1420**	14	107	60	43	45	●
	5			**1536SU05C-1420**	14	124	77	60	45	●
	3		Weldon shank/Schaft	**1634SU03C-1420**	14	107	60	43	45	○
	5			**1636SU05C-1420**	14	124	77	60	45	○
	3		Whistle notch shank/Schaft	**1734SU03C-1420**	14	107	60	43	45	●
	5			**1736SU05C-1420**	14	124	77	60	45	●

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

Grade Sorte	Workpiece material · Werkstückstoff										
	Carbon steel Kohlenstoff Stahl HB≤180	Alloy steel Legierter Stahl	Hardened steel · Gehärteter Stahl			Stainless steel Rostfreier Stahl	Cast iron, Grauguss	Nodular cast iron GGG	Aluminum alloy Alu leg.	Copper alloy Kupfer leg.	Heat resist. alloy Warmfest. leg.
			~40HRC	~50HRC	~60HRC						
KDG303	✔	✔	✔			✔	✔	✔			

Code key C 10
ISO Kennzeichen
Cutting data 94-107
Schnittdaten
Technical Information C109-115
Technische Information
Non-standart tailor made C 117-121
Bestellformular für Sonderwerkzeuge

SU series · SU Serie

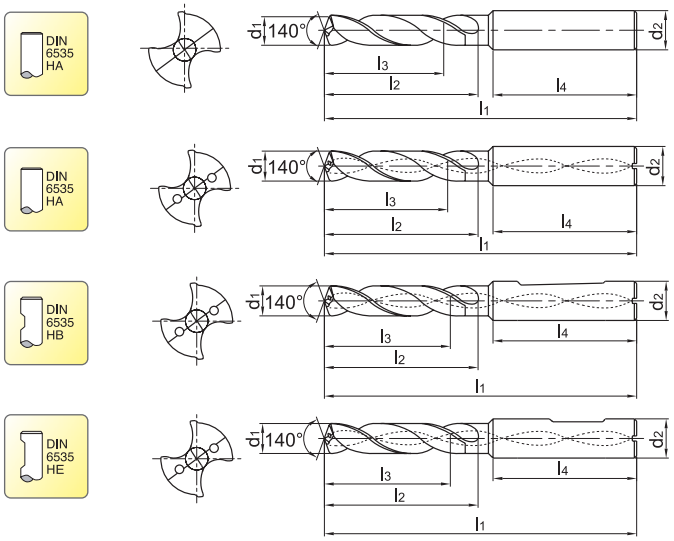
General machining · Allgemeine Bearbeitung


External Coolant
Externe Kühlung
Straight shank
Zylinderschaft


Internal Coolant
Interne Kühlung
Straight shank
Zylinderschaft


Internal Coolant
Interne Kühlung
Weldon
shank · Schaft


Internal Coolant
Interne Kühlung
Whistle notch
shank · Schaft



- For high efficient drilling of P(steel), M (stainless steel) and K(cast iron) with high performance.
- Waveform cutting edges achieve outstanding sharpness and strength, promoting chip removal.
- Hocheffizientes Bohren von allgemeinen Stahlwerkstoffen, rostfreien Werkstoffen und Guss.
- Wellenförmige Schneidkante mit hoher Schneidenschärfe, Stabilität und guter Spanabfuhr.

Drill diameter Bohrer Ø $d_1(m_7)$	Drilling depth Bohrtiefe (L/d1)	Cooling mode Kühlmittel.	Shank Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen					Grade Sorte
					Shankdiameter Ø Schaftdurchmesser	Overall length Gesamtlänge	Flute length Nutenlänge	effective drill. length Effektive Nutzlänge	Shank length Schaftlänge	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
14.25	3	External Extern	Straight shank	**1534SU03-1425**	16	115	65	45	48	●
	5			**1536SU05-1425**	16	133	83	63	48	●
	3	Internal Intern	Zylinder-schaft	**1534SU03C-1425**	16	115	65	45	48	●
	5			**1536SU05C-1425**	16	133	83	63	48	●
	3		Weldon shank/Schaft	**1634SU03C-1425**	16	115	65	45	48	○
	5			**1636SU05C-1425**	16	133	83	63	48	○
	3		Whistle notch shank/Schaft	**1734SU03C-1425**	16	115	65	45	48	●
	5			**1736SU05C-1425**	16	133	83	63	48	●
14.3	3	External Extern	Straight shank	**1534SU03-1430**	16	115	65	45	48	●
	5			**1536SU05-1430**	16	133	83	63	48	●
	3	Internal Intern	Zylinder-schaft	**1534SU03C-1430**	16	115	65	45	48	●
	5			**1536SU05C-1430**	16	133	83	63	48	●
	3		Weldon shank/Schaft	**1634SU03C-1430**	16	115	65	45	48	○
	5			**1636SU05C-1430**	16	133	83	63	48	○
	3		Whistle notch shank/Schaft	**1734SU03C-1430**	16	115	65	45	48	●
	5			**1736SU05C-1430**	16	133	83	63	48	●
14.5	3	External Extern	Straight shank	**1534SU03-1450**	16	115	65	45	48	●
	5			**1536SU05-1450**	16	133	83	63	48	●
	3	Internal Intern	Zylinder-schaft	**1534SU03C-1450**	16	115	65	45	48	●
	5			**1536SU05C-1450**	16	133	83	63	48	●
	3		Weldon shank/Schaft	**1634SU03C-1450**	16	115	65	45	48	○
	5			**1636SU05C-1450**	16	133	83	63	48	○
	3		Whistle notch shank/Schaft	**1734SU03C-1450**	16	115	65	45	48	●
	5			**1736SU05C-1450**	16	133	83	63	48	●
	8		straight shank Zylinderschaft	**1538SU08C-1450**	16	204	152	132	48	●

Drill diameter Bohrer Ø $d_1(m_7)$	Drilling depth Bohrtiefe (L/d1)	Cooling mode Kühlmittel.	Shank Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen					Grade Sorte
					Shankdiameter Ø Schaftdurchmesser	Overall length Gesamtlänge	Flute length Nutenlänge	effective drill. length Effektive Nutzlänge	Shank length Schaftlänge	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
14.75	3	External Extern	Straight shank	**1534SU03-1475**	16	115	65	45	48	●
	5			**1536SU05-1475**	16	133	83	63	48	●
	3	Internal Intern	Zylinder-schaft	**1534SU03C-1475**	16	115	65	45	48	●
	5			**1536SU05C-1475**	16	133	83	63	48	●
	3		Weldon shank/Schaft	**1634SU03C-1475**	16	115	65	45	48	○
	5			**1636SU05C-1475**	16	133	83	63	48	○
	3		Whistle notch shank/Schaft	**1734SU03C-1475**	16	115	65	45	48	●
	5			**1736SU05C-1475**	16	133	83	63	48	●
14.8	3	External Extern	Straight shank	**1534SU03-1480**	16	115	65	45	48	●
	5			**1536SU05-1480**	16	133	83	63	48	●
	3	Internal Intern	Zylinder-schaft	**1534SU03C-1480**	16	115	65	45	48	●
	5			**1536SU05C-1480**	16	133	83	63	48	●
	3		Weldon shank/Schaft	**1634SU03C-1480**	16	115	65	45	48	○
	5			**1636SU05C-1480**	16	133	83	63	48	○
	3		Whistle notch shank/Schaft	**1734SU03C-1480**	16	115	65	45	48	●
	5			**1736SU05C-1480**	16	133	83	63	48	●
	8		Zylinder-schaft	**1538SU08C-1480**	16	204	152	132	48	●
15.0	3	External Extern	Straight shank	**1534SU03-1500**	16	115	65	45	48	●
	5			**1536SU05-1500**	16	133	83	63	48	●
	3	Internal Intern	Zylinder-schaft	**1534SU03C-1500**	16	115	65	45	48	●
	5			**1536SU05C-1500**	16	133	83	63	48	●
	3		Weldon shank/Schaft	**1634SU03C-1500**	16	115	65	45	48	○
	5			**1636SU05C-1500**	16	133	83	63	48	○
	3		Whistle notch shank/Schaft	**1734SU03C-1500**	16	115	65	45	48	●
	5			**1736SU05C-1500**	16	133	83	63	48	●
	8		Zylinder-schaft	**1538SU08C-1500**	16	204	152	132	48	●
15.1	3	External Extern	Straight shank	**1534SU03-1510**	16	115	65	45	48	●
	5			**1536SU05-1510**	16	133	83	63	48	●
	3	Internal Intern	Zylinder-schaft	**1534SU03C-1510**	16	115	65	45	48	●
	5			**1536SU05C-1510**	16	133	83	63	48	●
	3		Weldon shank/Schaft	**1634SU03C-1510**	16	115	65	45	48	○
	5			**1636SU05C-1510**	16	133	83	63	48	○
	3		Whistle notch shank/Schaft	**1736SU03C-1510**	16	115	65	45	48	●
	5			**1736SU05C-1510**	16	133	83	63	48	●
15.3	3	External Extern	straight shank	**1534SU03-1530**	16	115	65	45	48	●
	5	Internal Intern	Zylinderschaft	**1536SU05C-1530**	16	133	83	63	48	●

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

Material Overview · Material Übersicht

Grade Sorte	Workpiece material · Werkstückstoff										
	Carbon steel Kohlenstoff Stahl HB≤180	Alloy steel Legierter Stahl	Hardened steel · Gehärteter Stahl			Stainless steel Rostfreier Stahl	Cast iron, Grauguss	Nodular cast iron GGG	Aluminum alloy Alu leg.	Copper alloy Kupfer leg.	Heat resist. alloy Warmfest. leg.
			~40HRC	~50HRC	~60HRC						
KDG303	✔	✔	✔			✔	✔	✔			

Code key C 10
ISO Kennzeichen
Cutting data 94-107
Schnittdaten
Technical Information C109-115
Technische Information
Non-standart tailor made C 117-121
Bestellformular für Sonderwerkzeuge

SU series · SU Serie

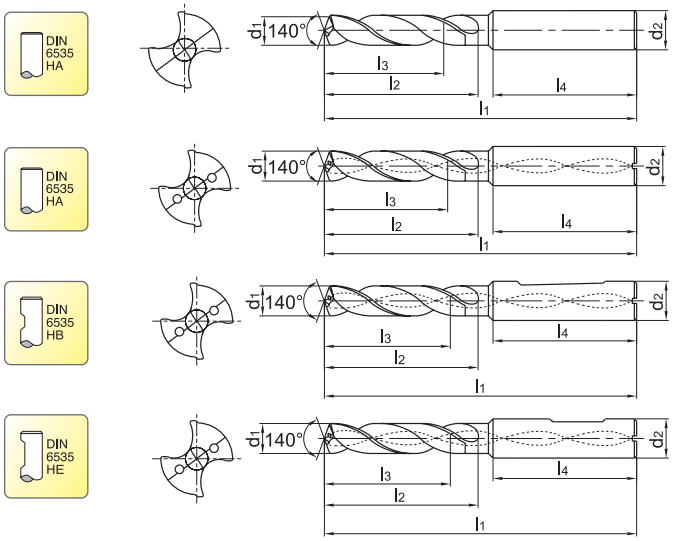
General machining · Allgemeine Bearbeitung


External Coolant
Externe Kühlung
Straight shank
Zylinderschaft


Internal Coolant
Interne Kühlung
Straight shank
Zylinderschaft


Internal Coolant
Interne Kühlung
Weldon
shank · Schaft


Internal Coolant
Interne Kühlung
Whistle notch
shank · Schaft



- For high efficient drilling of P(steel), M (stainless steel) and K(cast iron) with high performance.
- Waveform cutting edges achieve outstanding sharpness and strength, promoting chip removal.
- Hocheffizientes Bohren von allgemeinen Stahlwerkstoffen, rostfreien Werkstoffen und Guss.
- Wellenförmige Schneidkante mit hoher Schneidenschärfe, Stabilität und guter Spanabfuhr.

Drill diameter Bohrer Ø $d_1(m_7)$	Drilling depth Bohrtiefe (L/d1)	Cooling mode Kühlmittel.	Shank Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen					Grade Sorte
					Shankdiameter Ø Schaftdurchmesser	Overall length Gesamtlänge	Flute length Nutenlänge	effective drill. length Effektive Nutzlänge	Shank length Schaftlänge	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
15.5	3	External Extern	Straight shank	**1534SU03-1550**	16	115	65	45	48	●
	5			**1536SU05-1550**	16	133	83	63	48	●
	3	Internal Intern	Zylinder-schaft	**1534SU03C-1550**	16	115	65	45	48	●
	5			**1536SU05C-1550**	16	133	83	63	48	●
	3		Weldon shank/Schaft	**1634SU03C-1550**	16	115	65	45	48	○
	5			**1636SU05C-1550**	16	133	83	63	48	○
	3		Whistle notch shank/Schaft	**1734SU03C-1550**	16	115	65	45	48	●
	5			**1736SU05C-1550**	16	133	83	63	48	●
	8		Straight shank Zylinder-schaft	**1538SU08C-1550**	16	204	152	132	48	●
15.8	3	External Extern		**1534SU03-1580**	16	115	65	45	48	●
	5			**1536SU05-1580**	16	133	83	63	48	●
	3	Internal Intern		**1534SU03C-1580**	16	115	65	45	48	●
	5			**1536SU05C-1580**	16	133	83	63	48	●
	3		Weldon shank/Schaft	**1634SU03C-1580**	16	115	65	45	48	○
	5			**1636SU05C-1580**	16	133	83	63	48	○
	3		Whistle notch shank/Schaft	**1734SU03C-1580**	16	115	65	45	48	●
	5			**1736SU05C-1580**	16	133	83	63	48	●
16.0	3	External Extern	Straight shank Zylinder-schaft	**1534SU03-1600**	16	115	65	45	48	●
	5			**1536SU05-1600**	16	133	83	63	48	●
	3	Internal Intern		**1534SU03C-1600**	16	115	65	45	48	●
	5			**1536SU05C-1600**	16	133	83	63	48	●
	3		Weldon shank/Schaft	**1634SU03C-1600**	16	115	65	45	48	○
	5			**1636SU05C-1600**	16	133	83	63	48	○
	3		Whistle notch shank/Schaft	**1734SU03C-1600**	16	115	65	45	48	●
	5			**1736SU05C-1600**	16	133	83	63	48	●
	8		Straight shank Zylinder-schaft	**1538SU08C-1600**	16	204	152	132	48	●
16.1	3	External Extern		**1534SU03-1610**	18	123	73	51	48	●

Drill diameter Bohrer Ø $d_1(m_7)$	Drilling depth Bohrtiefe (L/d1)	Cooling mode Kühlmittel.	Shank Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen					Grade Sorte
					Shankdiameter Ø Schaftdurchmesser	Overall length Gesamtlänge	Flute length Nutenlänge	effective drill. length Effektive Nutzlänge	Shank length Schaftlänge	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
16.5	3	External Extern	Straight shank	**1534SU03-1650**	18	123	73	51	48	●
	5			**1536SU05-1650**	18	143	93	71	48	●
	3	Internal Intern	Zylinder-schaft	**1534SU03C-1650**	18	123	73	51	48	●
	5			**1536SU05C-1650**	18	143	93	71	48	●
	3		Weldon shank/Schaft	**1634SU03C-1650**	18	123	73	51	48	○
	5			**1636SU05C-1650**	18	143	93	71	48	○
	3		Whistle notch shank/Schaft	**1734SU03C-1650**	18	123	73	51	48	●
	5			**1736SU05C-1650**	18	143	93	71	48	●
	8		Straight shank Zylinderschaft	**1538SU08C-1650**	18	223	171	149	48	●
16.75	3	External Extern	Straight shank	**1534SU03-1675**	18	123	73	51	48	●
	5		Zylinder-schaft	**1536SU05-1675**	18	143	93	71	48	●
	3	Internal Intern		**1534SU03C-1675**	18	123	73	51	48	●
	5			**1536SU05C-1675**	18	143	93	71	48	●
	3		Weldon shank/Schaft	**1634SU03C-1675**	18	123	73	51	48	○
	5			**1636SU05C-1675**	18	143	93	71	48	○
	3		Whistle notch shank/Schaft	**1734SU03C-1675**	18	123	73	51	48	●
	5			**1736SU05C-1675**	18	143	93	71	48	●
16.8	3	External Extern	Straight shank	**1534SU03-1680**	18	123	73	51	48	●
	5			**1536SU05-1680**	18	143	93	71	48	●
	3	Internal Intern	Zylinder-schaft	**1534SU03C-1680**	18	123	73	51	48	●
	5			**1536SU05C-1680**	18	143	93	71	48	●
	3		Weldon shank/Schaft	**1634SU03C-1680**	18	123	73	51	48	○
	5			**1636SU05C-1680**	18	143	93	71	48	○
	3		Whistle notch shank/Schaft	**1734SU03C-1680**	18	123	73	51	48	●
	5			**1736SU05C-1680**	18	143	93	71	48	●
17.0	3	External Extern	Straight shank	**1534SU03-1700**	18	123	73	51	48	●
	5			**1536SU05-1700**	18	143	93	71	48	●
	3	Internal Intern	Zylinder-schaft	**1534SU03C-1700**	18	123	73	51	48	●
	5			**1536SU05C-1700**	18	143	93	71	48	●
	3		Weldon shank/Schaft	**1634SU03C-1700**	18	123	73	51	48	○
	5			**1636SU05C-1700**	18	143	93	71	48	○
	3		Whistle notch shank/Schaft	**1734SU03C-1700**	18	123	73	51	48	●
	5			**1736SU05C-1700**	18	143	93	71	48	●
	8		Straight shank Zylinderschaft	**1538SU08C-1700**	18	223	171	149	48	●

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

Grade Sorte	Workpiece material · Werkstückstoff										
	Carbon steel Kohlenstoff Stahl HB≤180	Alloy steel Legierter Stahl	Hardened steel · Gehärteter Stahl			Stainless steel Rostfreier Stahl	Cast iron, Grauguss	Nodular cast iron GGG	Aluminum alloy Alu leg.	Copper alloy Kupfer leg.	Heat resist. alloy Warmfest. leg.
			~40HRC	~50HRC	~60HRC						
KDG303	✔	✔	✔			✔	✔	✔			

Code key C 10
ISO Kennzeichen
Cutting data 94-107
Schnittdaten
Technical Information C109-115
Technische Information
Non-standart tailor made C 117-121
Bestellformular für Sonderwerkzeuge

SU series · SU Serie

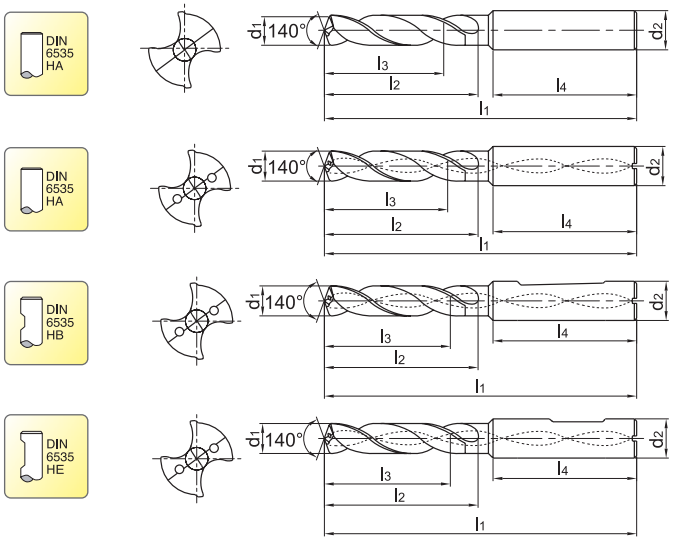
General machining · Allgemeine Bearbeitung


External Coolant
Externe Kühlung
Straight shank
Zylinderschaft


Internal Coolant
Interne Kühlung
Straight shank
Zylinderschaft


Internal Coolant
Interne Kühlung
Weldon
shank · Schaft


Internal Coolant
Interne Kühlung
Whistle notch
shank · Schaft



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Drill diameter Bohrer Ø $d_1(m_7)$	Drilling depth Bohrtiefe (L/d1)	Cooling mode Kühlmittel.	Shank Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen					Grade Sorte
					Shankdiameter Ø Schaftdurchmesser	Overall length Gesamtlänge	Flute length Nutenlänge	effective drill. length Effektive Nutzlänge	Shank length Schaftlänge	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
17.5	3	External Extern	Straight shank	**1534SU03-1750**	18	123	73	51	48	●
	5		Zylinder-schaft	**1536SU05-1750**	18	143	93	71	48	●
	3	Internal Intern		**1534SU03C-1750**	18	123	73	51	48	●
	5			**1536SU05C-1750**	18	143	93	71	48	●
	3		Weldon shank/Schaft	**1634SU03C-1750**	18	123	73	51	48	○
	5			**1636SU05C-1750**	18	143	93	71	48	○
	3		Whistle notch shank/Schaft	**1734SU03C-1750**	18	123	73	51	48	●
	5			**1736SU05C-1750**	18	143	93	71	48	●
	8		Straight shank Zylinder-schaft	**1538SU08C-1750**	18	223	171	149	48	●
17.8	3	External Extern		**1534SU03-1780**	18	123	73	51	48	●
	5			**1536SU05-1780**	18	143	93	71	48	●
	3	Internal Intern		**1534SU03C-1780**	18	123	73	51	48	●
	5			**1536SU05C-1780**	18	143	93	71	48	●
	3		Weldon shank/Schaft	**1634SU03C-1780**	18	123	73	51	48	○
	5			**1636SU05C-1780**	18	143	93	71	48	○
	3		Whistle notch shank/Schaft	**1734SU03C-1780**	18	123	73	51	48	●
	5			**1736SU05C-1780**	18	143	93	71	48	●
18.0	3	External Extern	Straight shank Zylinder-schaft	**1534SU03-1800**	18	123	73	51	48	●
	5			**1536SU05-1800**	18	143	93	71	48	●
	3	Internal Intern		**1534SU03C-1800**	18	123	73	51	48	●
	5			**1536SU05C-1800**	18	143	93	71	48	●
	3		Weldon shank/Schaft	**1634SU03C-1800**	18	123	73	51	48	○
	5			**1636SU05C-1800**	18	143	93	71	48	○
	3		Whistle notch shank/Schaft	**1734SU03C-1800**	18	123	73	51	48	●
	5			**1736SU05C-1800**	18	143	93	71	48	●
	8		straight shank Zylinderschaft	**1538SU08C-1800**	18	223	171	149	48	●

 ● ex Stock Lager ○ on demand · auf Anfrage

Drill diameter Bohrer Ø $d_1(m_7)$	Drilling depth Bohrtiefe (L/d1)	Cooling mode Kühlmittel.	Shank Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen					Grade Sorte
					Shankdiameter Ø Schaftdurchmesser	Overall length Gesamtlänge	Flute length Nutenlänge	effective drill. length Effektive Nutzlänge	Shank length Schaftlänge	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
18.5	3	External Extern	Straight shank	1534SU03-1850	20	131	79	55	50	●
	5			1536SU05-1850	20	153	101	77	50	●
	3	Internal Intern	Zylinder-schaft	1534SU03C-1850	20	131	79	55	50	●
	5			1536SU05C-1850	20	153	101	77	50	●
	3		Weldon shank/Schaft	1634SU03C-1850	20	131	79	55	50	○
	5			1636SU05C-1850	20	153	101	77	50	○
	3		Whistle notch shank/Schaft	1734SU03C-1850	20	131	79	55	50	●
	5			1736SU05C-1850	20	153	101	77	50	●
18.8	3	External Extern	Straight shank	1534SU03-1880	20	131	79	55	50	●
	5			1536SU05-1880	20	153	101	77	50	●
	3	Internal Intern	Zylinder-schaft	1534SU03C-1880	20	131	79	55	50	●
	5			1536SU05C-1880	20	153	101	77	50	●
	3		Weldon shank/Schaft	1634SU03C-1880	20	131	79	55	50	○
	5			1636SU05C-1880	20	153	101	77	50	○
	3		Whistle notch shank/Schaft	1734SU03C-1880	20	131	79	55	50	●
	5			1736SU05C-1880	20	153	101	77	50	●
19.0	3	External Extern	Straight shank	1534SU03-1900	20	131	79	55	50	●
	5			1536SU05-1900	20	153	101	77	50	●
	3	Internal Intern	Zylinder-schaft	1534SU03C-1900	20	131	79	55	50	●
	5			1536SU05C-1900	20	153	101	77	50	●
	3		Weldon shank/Schaft	1634SU03C-1900	20	131	79	55	50	○
	5			1636SU05C-1900	20	153	101	77	50	○
	3		Whistle notch shank/Schaft	1734SU03C-1900	20	131	79	55	50	●
	5			1736SU05C-1900	20	153	101	77	50	●
19.5	3	External Extern	Straight shank	1534SU03-1950	20	131	79	55	50	●
	5			1536SU05-1950	20	153	101	77	50	●
	3	Internal Intern	Zylinder-schaft	1534SU03C-1950	20	131	79	55	50	●
	5			1536SU05C-1950	20	153	101	77	50	●
	3		Weldon shank/Schaft	1634SU03C-1950	20	131	79	55	50	○
	5			1636SU05C-1950	20	153	101	77	50	○
	3		Whistle notch shank/Schaft	1734SU03C-1950	20	131	79	55	50	●
	5			1736SU05C-1950	20	153	101	77	50	●
19.8	3	External Extern	Straight shank	1534SU03-1980	20	131	79	55	50	●
	5			1536SU05-1980	20	153	101	77	50	●
	3	Internal Intern	Zylinder-schaft	1534SU03C-1980	20	131	79	55	50	●
	5			1536SU05C-1980	20	153	101	77	50	●
	3		Weldon shank/Schaft	1634SU03C-1980	20	131	79	55	50	○
	5			1636SU05C-1980	20	153	101	77	50	○
	3		Whistle notch shank/Schaft	1734SU03C-1980	20	131	79	55	50	●
	5			1736SU05C-1980	20	153	101	77	50	●

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Material Overview · Material Übersicht

Grade Sorte	Workpiece material · Werkstückstoff										
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			~40HRC	~50HRC	~60HRC						
KDG303	✔	✔	✔			✔	✔	✔			

Code key C 10
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Non-standart tailor made C 117-121
Bestellformular für Sonderwerkzeuge

SU series · SU Serie

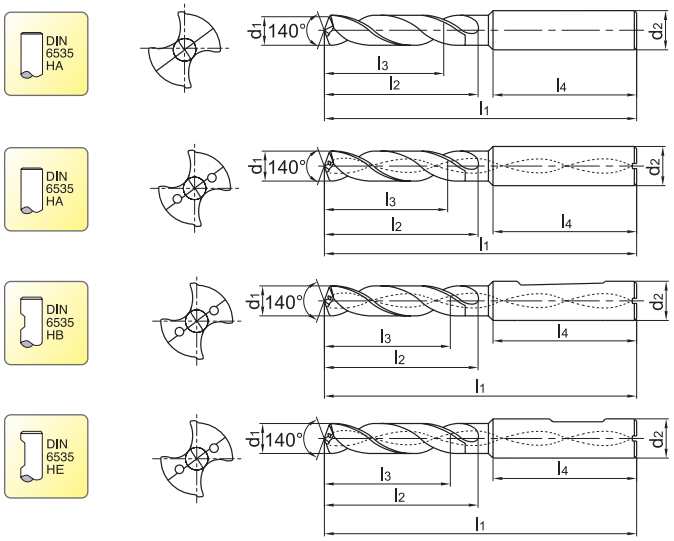
General machining · Allgemeine Bearbeitung


External Coolant
Externe Kühlung
Straight shank
Zylinderschaft


Internal Coolant
Interne Kühlung
Straight shank
Zylinderschaft


Internal Coolant
Interne Kühlung
Weldon
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Whistle notch
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Drill diameter Bohrer Ø $d_1(m_7)$	Drilling depth Bohrtiefe (L/d1)	Cooling mode Kühlmittel.	Shank Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen					Grade Sorte
					Shankdiameter Ø Schaftdurchmesser	Overall length Gesamtlänge	Flute length Nutenlänge	effective drill. length Effektive Nutzlänge	Shank length Schaftlänge	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
20.0	3	External Extern	Straight shank Zylinder-schaft	**1534SU03-2000**	20	131	79	55	50	●
	5			**1536SU05-2000**	20	153	101	77	50	●
	3	Internal Intern		**1534SU03C-2000**	20	131	79	55	50	●
	5			**1536SU05C-2000**	20	153	101	77	50	●
	3		Weldon shank/Schaft	**1634SU03C-2000**	20	131	79	55	50	○
	5			**1636SU05C-2000**	20	153	101	77	50	○
	3		Whistle notch shank/Schaft	**1734SU03C-2000**	20	131	79	55	50	●
	5			**1736SU05C-2000**	20	153	101	77	50	●

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Grade Sorte	Workpiece material · Werkstückstoff										
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			~40HRC	~50HRC	~60HRC						
KDG303	✔	✔	✔			✔	✔	✔			

● ex Stock Lager ○ on demand · auf Anfrage

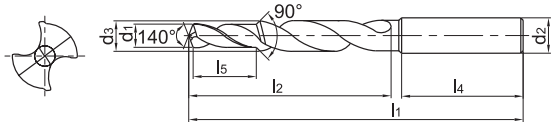
SU series · SU Serie

General machining · Allgemeine Bearbeitung (Step drill · Stufenbohrer)



External Coolant
Externe Kühlung

Straight shank
Zylinderschaft

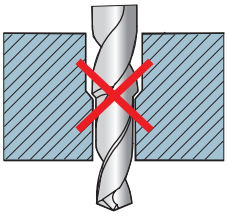


- For thread pre-hole, chamfering.
- Gewindebohrung mit Fase.

Drill diameter d_1(m_8)	Drilling depth Bohrtiefe (L/d1)	Cooling mode Kühlmittel.	Shank Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen							Grade Sorte
					Thread size Gewinde	d_2 (h_6)	d_3	l_1	l_2	l_4	l_5	KDG303
3.3	3	External Extern	Straight shank Zylinder-schaft	**1557SU03-M4**	M4	6.0	4.5	66	28	36	11.4	○
4.2	3			**1557SU03-M5**	M5	6.0	6.0	66	28	36	13.6	○
5.0	3			**1557SU03-M6**	M6	8.0	7.0	79	41	36	16.5	○
6.75	3			**1557SU03-M8**	M8	10.0	9.5	89	47	40	21.0	○
8.5	3			**1557SU03-M10**	M10	12.0	12.0	102	55	45	25.5	○
10.25	3			**1557SU03-M12**	M12	14.0	14.0	107	60	45	30.0	○
12.0	3			**1557SU03-M14**	M14	16.0	16.0	115	65	48	34.5	○
14.0	3			**1557SU03-M16**	M16	18.0	18.0	123	73	48	38.5	○
7.0	3			**1557SU03-M8×1.0**	M8×1.0	10.0	9.8	89	47	40	21.0	○
9.0	3			**1557SU03-M10×1.0**	M10×1.0	12.0	12.0	102	55	45	25.5	○
10.5	3			**1557SU03-M12×1.5**	M12×1.5	14.0	14.0	107	60	45	30.0	○
12.5	3			**1557SU03-M14×1.5**	M14×1.5	16.0	16.0	115	65	48	34.5	○
14.5	3			**1557SU03-M16×1.5**	M16×1.5	18.0	18.0	123	73	48	38.5	○

Attentions when using step drill · Einsatzempfehlung für Stufenbohrer

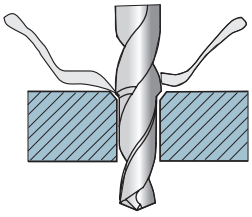
A



Because of no chamfer on the large diameter, countersink drill as shown above is not possible.

Aufgrund der fehlenden Fase, bei großen Durchmessern ist das Aufbohren nicht zu empfehlen.

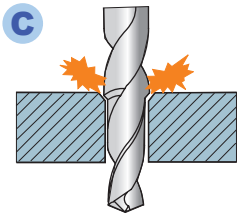
B



Long chips will roll around the drill and obstruct machining when countersink drill. It is recommended to select small feed drilling in order to cut chips.

Beim Ansenken können lange Späne entstehen. Vorschub reduzieren.

C



When countersink drill, cutting force increases at initial. Reduce the feedrate/ please.

Beim Aufbohren werden die Schnittkräfte höher.
Bitte Vorschub reduzieren.

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

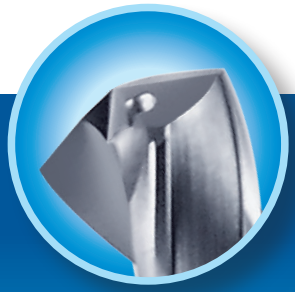
Material Overview · Material Übersicht

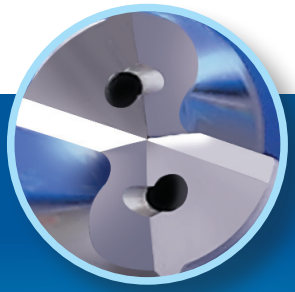
Grade Sorte	Workpiece material · Werkstückstoff										
	Carbon steel Kohlenstoff Stahl HB≤180	Alloy steel Legierter Stahl	Hardened steel · Gehärteter Stahl			Stainless steel Rostfreier Stahl	Cast iron, Grauguss	Nodular cast iron GGG	Aluminum alloy Alu leg.	Copper alloy Kupfer leg.	Heat resist. alloy Warmfest. leg.
			~40HRC	~50HRC	~60HRC						
KDG303	✔	✔	✔			✔	✔	✔			

1588SL

12xD Drills/Bohrer
20xD Drills/Bohrer
30xD Drills/Bohrer







1 Special flute design for optimal stability and good chip flow / *Spezielles Spannutendesign für optimale Stabilität und guten Spanabfluß*

2 Special margin for high accuracy and stable operatio / *Spezielle Führungsfase für hohe Genauigkeit und eine stabile Bearbeitung*

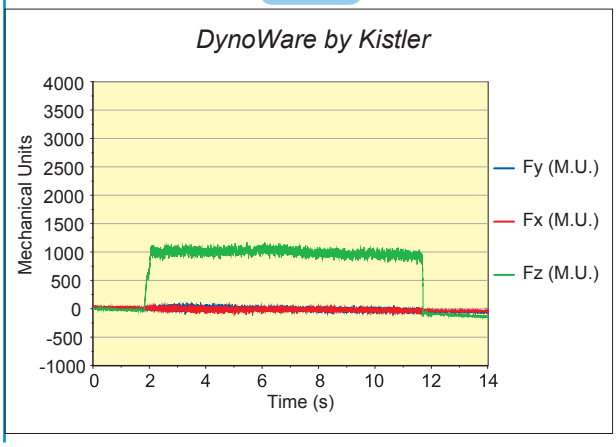
3 Optimal cutting edge for different material / *Optimierte Schneidkantenausführung für guten Spanbruch in vielen Anwendungsbereichen*

4 New PVD-coating for smooth chip flow, less friction and good wear resistance / *Neuartige PVD-Beschichtung für optimalen Spanabfluß, weniger Reibung und gute Verschleißfestigkeit*

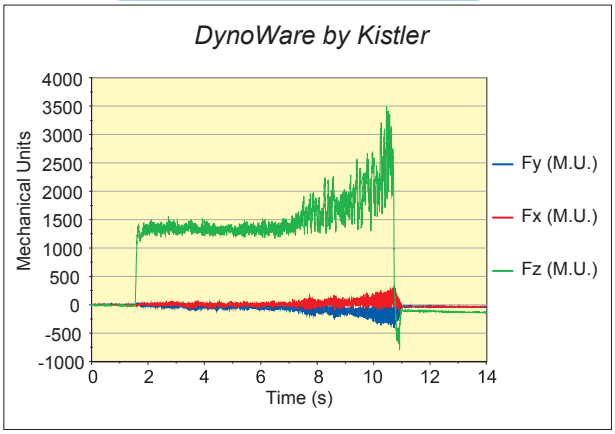
1588SL Serie Vergleich der Schnittkraft

Type/Typ	1588SL12C	Competitor Wettbewerb	Feed Vorschub	0.2mm/r
Diameter Durchmesser	Ø6mm	Ø6mm	Depth Bohrtiefe	72mm
Material	42CrMo(HB250)		cooling Kühlung	Emulsion
Cutting speed Schnittgesch.	80m/min		Machine Maschine	CNC

1588SL



other manufacturer / Andere Hersteller

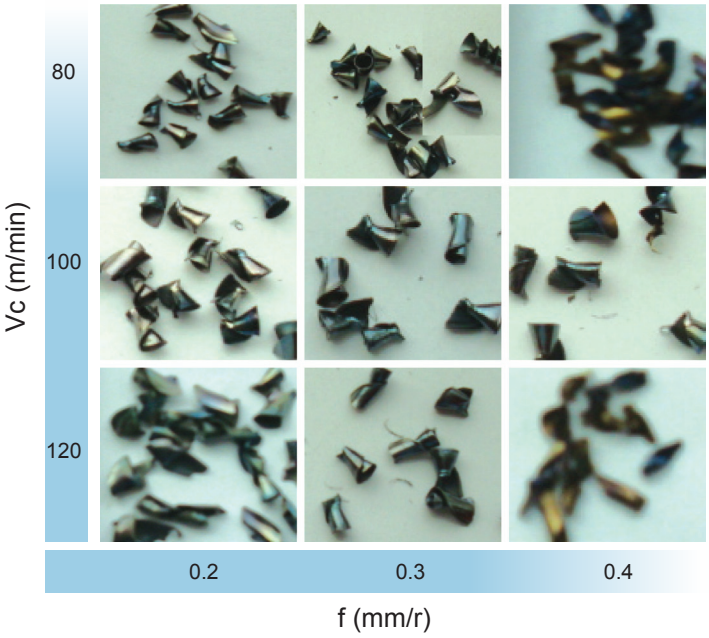


1558SL Serie Spanbruchverhalten

Type / Typ: 1588SL12C
Diameter / Durchmesser: Ø10mm
Material: 45 Stahl(HB200)
V_C: 80-120(m/min)
f_n: 0.2-0.4(mm/r)
Drilling depth / Bohrtiefe: 120mm
Cooling / Kühlsystem: Emulsion
Machine / Maschine: CNC Machine

Stable machining under different cutting speed and feed rate.

Stabile Bearbeitung bei verschiedenen Geschwindigkeiten und Vorschüben.



SL series · SL Serie

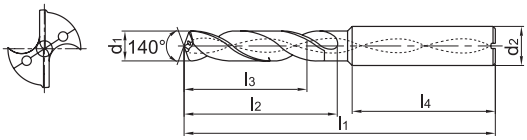
General machining · Allgemeine Bearbeitung (Deep drill · Tiefbohrer)

1588SL12C



Internal Coolant
Interne Kühlung

Straight shank
Zylinderschaft

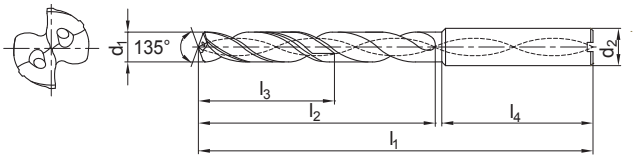


1588SL20C / 1588SL30C



Internal Coolant
Interne Kühlung

Straight shank
Zylinderschaft



Drilling diameter/ Bohrerdurchmesser d_1 12D(m7) 20/30D(h7)	Drilling depth/ Bohrtiefe (l/d_1)	Cooling mode/ Kühlmittel.	Shank/ Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen					Grade/ Sorte
					$d_2(h_5)$	l_1	l_2	l_3	l_4	KDG303
3.0	12	Internal/ Intern	Straight shank Zylinder-schaft	**1588SL12C-0300**	6	90	50	40	36	●
	20			**1588SL20C-0300**	6	110	70	62	36	●
	30			**1588SL30C-0300**	6	140	100	92	36	○
3.1	12			**1588SL12C-0310**	6	90	50	40	36	●
	20			**1588SL20C-0310**	6	123	83	72	36	○
	30			**1588SL30C-0310**	6	160	120	108	36	○
3.2	12			**1588SL12C-0320**	6	90	50	40	36	●
	20			**1588SL20C-0320**	6	123	83	72	36	○
	30			**1588SL30C-0320**	6	160	120	108	36	○
3.3	12			**1588SL12C-0330**	6	90	50	40	36	●
	20			**1588SL20C-0330**	6	123	83	72	36	○
	30			**1588SL30C-0330**	6	160	120	108	36	○
3.4	12			**1588SL12C-0340**	6	90	50	40	36	●
	20			**1588SL20C-0340**	6	123	83	72	36	○
	30			**1588SL30C-0340**	6	160	120	108	36	○
3.5	12			**1588SL12C-0350**	6	90	50	40	36	●
	20			**1588SL20C-0350**	6	123	83	72	36	●
	30			**1588SL30C-0350**	6	160	120	108	36	○
3.6	12			**1588SL12C-0360**	6	90	50	40	36	●
	20			**1588SL20C-0360**	6	136	96	84	36	○
	30			**1588SL30C-0360**	6	176	136	124	36	○
3.7	12			**1588SL12C-0370**	6	90	50	46	36	●
	20			**1588SL20C-0370**	6	136	96	84	36	○
	30			**1588SL30C-0370**	6	176	136	124	36	○
3.8	12			**1588SL12C-0380**	6	90	50	46	36	●
	20			**1588SL20C-0380**	6	136	96	84	36	○
	30			**1588SL30C-0380**	6	176	136	124	36	○
3.9	12			**1588SL12C-0390**	6	90	50	46	36	○
	20			**1588SL20C-0390**	6	136	96	84	36	○
	30			**1588SL30C-0390**	6	176	136	124	36	○
4.0	12			**1588SL12C-0400**	6	102	64	56	36	●
	20			**1588SL20C-0400**	6	136	96	84	36	●
	30			**1588SL30C-0400**	6	176	136	124	36	○
4.1	12			**1588SL12C-0410**	6	102	64	56	36	●
	20			**1588SL20C-0410**	6	148	108	96	36	○
	30			**1588SL30C-0410**	6	192	152	140	36	○
4.2	12			**1588SL12C-0420**	6	102	64	56	36	●
	20			**1588SL20C-0420**	6	148	108	96	36	○
	30			**1588SL30C-0420**	6	192	152	140	36	○

 ● ex Stock Lager ○ on demand · auf Anfrage

Drilling diameter/ Bohrerdurchmesser d_1 12D(m7) 20/30D(h7)	Drilling depth/ Bohrtiefe (l/d_1)	Cooling mode/ Kühlmittel.	Shank/ Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen					Grade/ Sorte
					$d_2(h_5)$	l_1	l_2	l_3	l_4	KDG303
4.3	12	Internal/ Intern	Straight shank Zylinder-schaft	**1588SL12C-0430**	6	102	64	56	36	●
	20			**1588SL20C-0430**	6	148	108	96	36	○
	30			**1588SL30C-0430**	6	192	152	140	36	○
4.4	12			**1588SL12C-0440**	6	102	64	56	36	○
	20			**1588SL20C-0440**	6	148	108	96	36	○
	30			**1588SL30C-0440**	6	192	152	140	36	○
4.5	12			**1588SL12C-0450**	6	102	64	56	36	●
	20			**1588SL20C-0450**	6	148	108	96	36	●
	30			**1588SL30C-0450**	6	192	152	140	36	○
4.6	12			**1588SL12C-0460**	6	102	64	56	36	●
	20			**1588SL20C-0460**	6	158	118	106	36	○
	30			**1588SL30C-0460**	6	208	168	156	36	○
4.7	12			**1588SL12C-0470**	6	102	64	56	36	●
	20			**1588SL20C-0470**	6	158	118	106	36	○
	30			**1588SL30C-0470**	6	208	168	156	36	○
4.8	12			**1588SL12C-0480**	6	102	64	56	36	●
	20			**1588SL20C-0480**	6	158	118	106	36	○
	30			**1588SL30C-0480**	6	208	168	156	36	○
4.9	12			**1588SL12C-0490**	6	102	64	56	36	●
	20			**1588SL20C-0490**	6	158	118	106	36	○
	30			**1588SL30C-0490**	6	208	168	156	36	○
5.0	12			**1588SL12C-0500**	6	116	78	72	36	●
	20			**1588SL20C-0500**	6	158	118	106	36	●
	30			**1588SL30C-0500**	6	208	168	156	36	●
5.1	12			**1588SL12C-0510**	6	116	78	72	36	●
	20			**1588SL20C-0510**	6	168	128	116	36	○
	30			**1588SL30C-0510**	6	228	188	170	36	○
5.2	12			**1588SL12C-0520**	6	116	78	72	36	●
	20			**1588SL20C-0520**	6	168	128	116	36	○
	30			**1588SL30C-0520**	6	228	188	170	36	○
5.3	12			**1588SL12C-0530**	6	116	78	72	36	○
	20			**1588SL20C-0530**	6	168	128	116	36	○
	30			**1588SL30C-0530**	6	228	188	170	36	○
5.4	12			**1588SL12C-0540**	6	116	78	72	36	○
	20			**1588SL20C-0540**	6	168	128	116	36	○
	30			**1588SL30C-0540**	6	228	188	170	36	○
5.5	12			**1588SL12C-0550**	6	116	78	72	36	●
	20			**1588SL20C-0550**	6	168	128	116	36	●
	30			**1588SL30C-0550**	6	228	188	170	36	●
5.6	12			**1588SL12C-0560**	6	116	78	72	36	●
	20			**1588SL20C-0560**	6	180	140	126	36	○
	30			**1588SL30C-0560**	6	240	200	182	36	○

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

Grade/ Sorte	Workpiece material · Werkstückstoff										
	Carbon steel/ Kohlenstoff Stahl HB≤180	Alloy steel	Hardened steel · Gehärteter Stahl			Stainless steel/ Rostfreier Stahl	Cast iron/ Gusseisen	Nodular cast iron GGG	Aluminum alloy/ Alu leg.	Copper alloy/ Kupfer leg.	Heat resist. alloy/ Warmfest. leg.
			~40HRC	~50HRC	~60HRC						
KDG303	✔	✔	✔			✔	✔	✔	✔		✔

Code key C 10
ISO Kennzeichen
Cutting data 94-107
Schnittdaten
Technical Information C109-115
Technische Information
Non-standart tailor made C 117-121
Bestellformular für Sonderwerkzeuge

SL series · SL Serie

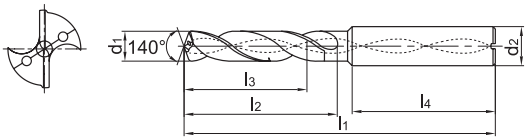
General machining · Allgemeine Bearbeitung (Deep drill · Tiefbohrer)

1588SL12C



Internal Coolant
Interne Kühlung

Straight shank
Zylinderschaft

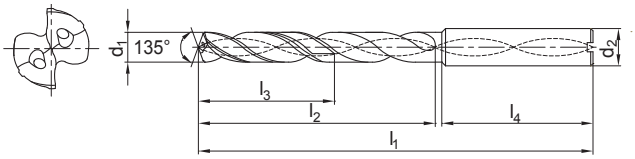


1588SL20C / 1588SL30C



Internal Coolant
Interne Kühlung

Straight shank
Zylinderschaft



Drilling diameter/ Bohrerdurchmesser d_1 12D(m7) 20/30D(h7)	Drilling depth/ Bohrtiefe (l/d_1)	Cooling mode/ Kühlmittel.	Shank/ Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen					Grade/ Sorte
					$d_2(h_5)$	l_1	l_2	l_3	l_4	KDG303
5.7	12	Internal/ Intern	Straight shank Zylinder-schaft	**1588SL12C-0570**	6	116	78	72	36	●
	20			**1588SL20C-0570**	6	180	140	126	36	○
	30			**1588SL30C-0570**	6	240	200	182	36	○
5.8	12			**1588SL12C-0580**	6	116	78	72	36	●
	20			**1588SL20C-0580**	6	180	140	126	36	○
	30			**1588SL30C-0580**	6	240	200	182	36	○
5.9	12			**1588SL12C-0590**	6	116	78	72	36	●
	20			**1588SL20C-0590**	6	180	140	126	36	○
	30			**1588SL30C-0590**	6	240	200	182	36	○
6.0	12			**1588SL12C-0600**	6	116	78	72	36	●
	20			**1588SL20C-0600**	6	180	140	126	36	●
	30			**1588SL30C-0600**	6	240	200	182	36	●
6.1	12			**1588SL12C-0610**	8	131	93	84	36	●
	20			**1588SL20C-0610**	8	192	150	132	36	○
	30			**1588SL30C-0610**	8	260	220	202	36	○
6.2	12			**1588SL12C-0620**	8	131	93	84	36	●
	20			**1588SL20C-0620**	8	192	150	132	36	○
	30			**1588SL30C-0620**	8	260	220	202	36	○
6.3	12			**1588SL12C-0630**	8	131	93	84	36	○
	20			**1588SL20C-0630**	8	192	150	132	36	○
	30			**1588SL30C-0630**	8	260	220	202	36	○
6.4	12			**1588SL12C-0640**	8	131	93	84	36	○
	20			**1588SL20C-0640**	8	192	150	132	36	○
	30			**1588SL30C-0640**	8	260	220	202	36	○
6.5	12			**1588SL12C-0650**	8	131	93	84	36	●
	20			**1588SL20C-0650**	8	192	150	132	36	●
	30			**1588SL30C-0650**	8	260	220	202	36	○
6.6	12			**1588SL12C-0660**	8	131	93	84	36	●
	20			**1588SL20C-0660**	8	202	162	144	36	○
	30			**1588SL30C-0660**	8	272	232	214	36	○
6.7	12			**1588SL12C-0670**	8	131	93	84	36	●
	20			**1588SL20C-0670**	8	202	162	144	36	○
	30			**1588SL30C-0670**	8	272	232	214	36	○
6.8	12			**1588SL12C-0680**	8	131	93	84	36	●
	20			**1588SL20C-0680**	8	202	162	144	36	○
	30			**1588SL30C-0680**	8	272	232	214	36	○
6.9	12			**1588SL12C-0690**	8	131	93	84	36	●
	20			**1588SL20C-0690**	8	202	162	144	36	○
	30			**1588SL30C-0690**	8	272	232	214	36	○

● ex Stock Lager ○ on demand · auf Anfrage

Drilling diameter/ Bohrerdurchmesser d_1 12D(m7) 20/30D(h7)	Drilling depth/ Bohrtiefe (l/d_1)	Cooling mode/ Kühlmittel.	Shank/ Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen					Grade/ Sorte
					$d_2(h_5)$	l_1	l_2	l_3	l_4	KDG303
7.0	12	Internal/ Intern	Straight shank Zylinder-schaft	**1588SL12C-0700**	8	131	93	84	36	●
	20			**1588SL20C-0700**	8	202	162	144	36	●
	30			**1588SL30C-0700**	8	272	232	214	36	○
7.1	12			**1588SL12C-0710**	8	146	108	96	36	●
	20			**1588SL20C-0710**	8	213	173	155	36	○
	30			**1588SL30C-0710**	8	290	250	232	36	○
7.2	12			**1588SL12C-0720**	8	146	108	96	36	●
	20			**1588SL20C-0720**	8	213	173	155	36	○
	30			**1588SL30C-0720**	8	290	250	232	36	○
7.3	12			**1588SL12C-0730**	8	146	108	96	36	●
	20			**1588SL20C-0730**	8	213	173	155	36	○
	30			**1588SL30C-0730**	8	290	250	232	36	○
7.4	12			**1588SL12C-0740**	8	146	108	96	36	●
	20			**1588SL20C-0740**	8	213	173	155	36	○
	30			**1588SL30C-0740**	8	290	250	232	36	○
7.5	12			**1588SL12C-0750**	8	146	108	96	36	●
	20			**1588SL20C-0750**	8	213	173	155	36	○
	30			**1588SL30C-0750**	8	290	250	232	36	○
7.6	12			**1588SL12C-0760**	8	146	108	96	36	○
	20			**1588SL20C-0760**	8	223	183	165	36	○
	30			**1588SL30C-0760**	8	305	265	246	36	○
7.7	12			**1588SL12C-0770**	8	146	108	96	36	○
	20			**1588SL20C-0770**	8	223	183	165	36	○
	30			**1588SL30C-0770**	8	305	265	246	36	○
7.8	12			**1588SL12C-0780**	8	146	108	96	36	●
	20			**1588SL20C-0780**	8	223	183	165	36	○
	30			**1588SL30C-0780**	8	305	265	246	36	○
7.9	12			**1588SL12C-0790**	8	146	108	96	36	○
	20			**1588SL20C-0790**	8	223	183	165	36	○
	30			**1588SL30C-0790**	8	305	265	246	36	○
8.0	12			**1588SL12C-0800**	8	146	108	96	36	●
	20			**1588SL20C-0800**	8	223	183	165	36	●
	30			**1588SL30C-0800**	8	305	265	246	36	●
8.1	12			**1588SL12C-0810**	10	162	120	108	40	●
	20			**1588SL20C-0810**	10	239	195	176	40	○
	30			**1588SL30C-0810**	10	330	285	265	40	○
8.2	12			**1588SL12C-0820**	10	162	120	108	40	●
	20			**1588SL20C-0820**	10	239	195	176	40	○
	30			**1588SL30C-0820**	10	330	285	265	40	○
8.3	12			**1588SL12C-0830**	10	162	120	108	40	○
	20			**1588SL20C-0830**	10	239	195	176	40	○
	30			**1588SL30C-0830**	10	330	285	265	40	○

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

Grade/ Sorte	Workpiece material · Werkstückstoff										
	Carbon steel/ Kohlenstoff Stahl HB≤180	Alloy steel	Hardened steel · Gehärteter Stahl			Stainless steel/ Rostfreier Stahl	Cast iron/ Gusseisen	Nodular cast iron GGG	Aluminum alloy/ Alu leg.	Copper alloy/ Kupfer leg.	Heat resist. alloy/ Warmfest. leg.
			~40HRC	~50HRC	~60HRC						
KDG303	✔	✔	✔			✔	✔	✔	✔		✔

Code key C 10
ISO Kennzeichen
Cutting data 94-107
Schnittdaten
Technical Information C109-115
Technische Information
Non-standart tailor made C 117-121
Bestellformular für Sonderwerkzeuge

SL series · SL Serie

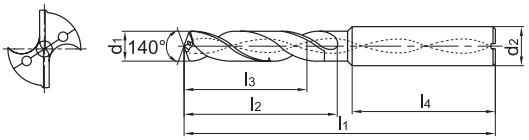
General machining · Allgemeine Bearbeitung (Deep drill · Tiefbohrer)

1588SL12C



Internal Coolant
Interne Kühlung

Straight shank
Zylinderschaft

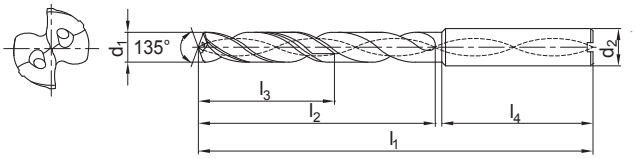


1588SL20C / 1588SL30C



Internal Coolant
Interne Kühlung

Straight shank
Zylinderschaft



Drilling diameter/ Bohrerdurchmesser d_1 12D(m7) 20/30D(h7)	Drilling depth/ Bohrtiefe (l/d_1)	Cooling mode/ Kühlmittel.	Shank/ Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen					Grade/ Sorte
					$d_2(h_5)$	l_1	l_2	l_3	l_4	KDG303
8.4	12	Internal/ Intern	Straight shank Zylinder-schaft	**1588SL12C-0840**	10	162	120	108	40	○
	20			**1588SL20C-0840**	10	239	195	176	40	○
	30			**1588SL30C-0840**	10	330	285	265	40	○
8.5	12			**1588SL12C-0850**	10	162	120	108	40	●
	20			**1588SL20C-0850**	10	239	195	176	40	○
	30			**1588SL30C-0850**	10	330	285	265	40	○
8.6	12			**1588SL12C-0860**	10	162	120	108	40	●
	20			**1588SL20C-0860**	10	249	205	186	40	○
	30			**1588SL30C-0860**	10	340	295	275	40	○
8.7	12			**1588SL12C-0870**	10	162	120	108	40	●
	20			**1588SL20C-0870**	10	249	205	186	40	○
	30			**1588SL30C-0870**	10	340	295	275	40	○
8.8	12			**1588SL12C-0880**	10	162	120	108	40	●
	20			**1588SL20C-0880**	10	249	205	186	40	○
	30			**1588SL30C-0880**	10	340	295	275	40	○
8.9	12			**1588SL12C-0890**	10	162	120	108	40	○
	20			**1588SL20C-0890**	10	249	205	186	40	○
	30			**1588SL30C-0890**	10	340	295	275	40	○
9.0	12			**1588SL12C-0900**	10	162	120	108	40	●
	20			**1588SL20C-0900**	10	249	205	186	40	●
	30			**1588SL30C-0900**	10	340	295	275	40	○
9.1	12			**1588SL12C-0910**	10	174	132	120	40	○
	20			**1588SL20C-0910**	10	262	218	196	40	○
	30			**1588SL30C-0910**	10	360	315	292	40	○
9.2	12			**1588SL12C-0920**	10	174	132	120	40	●
	20			**1588SL20C-0920**	10	262	218	196	40	○
	30			**1588SL30C-0920**	10	360	315	292	40	○
9.3	12			**1588SL12C-0930**	10	174	132	120	40	○
	20			**1588SL20C-0930**	10	262	218	196	40	○
	30			**1588SL30C-0930**	10	360	315	292	40	○
9.4	12			**1588SL12C-0940**	10	174	132	120	40	○
	20			**1588SL20C-0940**	10	262	218	196	40	○
	30			**1588SL30C-0940**	10	360	315	292	40	○
9.5	12			**1588SL12C-0950**	10	174	132	120	40	●
	20			**1588SL20C-0950**	10	262	218	196	40	○
	30			**1588SL30C-0950**	10	360	315	292	40	○
9.6	12			**1588SL12C-0960**	10	174	132	120	40	○
	20			**1588SL20C-0960**	10	272	228	206	40	○
	30			**1588SL30C-0960**	10	372	328	305	40	○

 ● ex Stock Lager ○ on demand · auf Anfrage

Drilling diameter/ Bohrerdurchmesser d_1 12D(m7) 20/30D(h7)	Drilling depth/ Bohrtiefe (l/d_1)	Cooling mode/ Kühlmittel.	Shank/ Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen					Grade/ Sorte
					$d_2(h_5)$	l_1	l_2	l_3	l_4	KDG303
9.7	12	Internal/ Intern	Straight shank Zylinder-schaft	**1588SL12C-0970**	10	174	132	120	40	○
	20			**1588SL20C-0970**	10	272	228	206	40	○
	30			**1588SL30C-0970**	10	372	328	305	40	○
9.8	12			**1588SL12C-0980**	10	174	132	120	40	○
	20			**1588SL20C-0980**	10	272	228	206	40	○
	30			**1588SL30C-0980**	10	372	328	305	40	○
9.9	12			**1588SL12C-0990**	10	174	132	120	40	○
	20			**1588SL20C-0990**	10	272	228	206	40	○
	30			**1588SL30C-0990**	10	372	328	305	40	○
10.0	12			**1588SL12C-1000**	10	174	132	120	40	●
	20			**1588SL20C-1000**	10	272	228	206	40	●
	30			**1588SL30C-1000**	10	372	328	305	40	○
10.1	12			**1588SL12C-1010**	12	204	156	144	45	●
	20			**1588SL20C-1010**	12	292	242	220	45	○
10.2	12			**1588SL12C-1020**	12	204	156	144	45	●
	20			**1588SL20C-1020**	12	292	242	220	45	○
10.3	12			**1588SL12C-1030**	12	204	156	144	45	●
	20			**1588SL20C-1030**	12	292	242	220	45	○
10.4	12			**1588SL12C-1040**	12	204	156	144	45	●
	20			**1588SL20C-1040**	12	292	242	220	45	○
10.5	12			**1588SL12C-1050**	12	204	156	144	45	●
	20			**1588SL20C-1050**	12	292	242	220	45	○
10.6	12			**1588SL12C-1060**	12	204	156	144	45	○
	20			**1588SL20C-1060**	12	300	250	228	45	○
10.7	12			**1588SL12C-1070**	12	204	156	144	45	○
	20			**1588SL20C-1070**	12	300	250	228	45	○
10.8	12			**1588SL12C-1080**	12	204	156	144	45	○
	20			**1588SL20C-1080**	12	300	250	228	45	○
10.9	12			**1588SL12C-1090**	12	204	156	144	45	○
	20			**1588SL20C-1090**	12	300	250	228	45	○
11.0	12			**1588SL12C-1100**	12	204	156	144	45	●
	20			**1588SL20C-1100**	12	300	250	228	45	○
11.1	12			**1588SL12C-1110**	12	204	156	144	45	○
	20			**1588SL20C-1110**	12	315	265	240	45	○
11.2	12			**1588SL12C-1120**	12	204	156	144	45	●
	20			**1588SL20C-1120**	12	315	265	240	45	○
11.3	12			**1588SL12C-1130**	12	204	156	144	45	○
	20			**1588SL20C-1130**	12	315	265	240	45	○
11.4	12			**1588SL12C-1140**	12	204	156	144	45	○
	20			**1588SL20C-1140**	12	315	265	240	45	○
11.5	12			**1588SL12C-1150**	12	204	156	144	45	●
	20			**1588SL20C-1150**	12	315	265	240	45	○

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

Grade/ Sorte	Workpiece material · Werkstückstoff										
	Carbon steel/ Kohlenstoff Stahl HB≤180	Alloy steel	Hardened steel · Gehärteter Stahl			Stainless steel/ Rostfreier Stahl	Cast iron/ Gusseisen	Nodular cast iron GGG	Aluminum alloy/ Alu leg.	Copper alloy/ Kupfer leg.	Heat resist. alloy/ Warmfest. leg.
			~40HRC	~50HRC	~60HRC						
KDG303	✔	✔	✔			✔	✔	✔	✔		✔

Code key C 10
ISO Kennzeichen
Cutting data 94-107
Schnittdaten
Technical Information C109-115
Technische Information
Non-standart tailor made C 117-121
Bestellformular für Sonderwerkzeuge

SL series · SL Serie

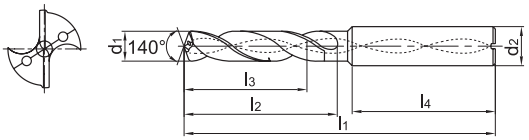
General machining · Allgemeine Bearbeitung (Deep drill · Tiefbohrer)

1588SL12C



Internal Coolant
Interne Kühlung

Straight shank
Zylinderschaft

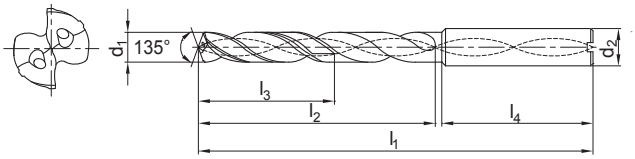


1588SL20C / 1588SL30C



Internal Coolant
Interne Kühlung

Straight shank
Zylinderschaft



Drilling diameter/ Bohrerdurchmesser d_1 12D(m7) 20/30D(h7)	Drilling depth/ Bohrtiefe (l/d_1)	Cooling mode/ Kühlmittel.	Shank/ Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen					Grade/ Sorte
					$d_2(h_5)$	l_1	l_2	l_3	l_4	KDG303
11.6	12	Internal/ Intern	Straight shank Zylinder-schaft	**1588SL12C-1160**	12	204	156	144	45	○
	20			**1588SL20C-1160**	12	325	275	250	45	○
11.7	12			**1588SL12C-1170**	12	204	156	144	45	●
	20			**1588SL20C-1170**	12	325	275	250	45	○
11.8	12			**1588SL12C-1180**	12	204	156	144	45	●
	20			**1588SL20C-1180**	12	325	275	250	45	○
11.9	12			**1588SL12C-1190**	12	204	156	144	45	○
	20			**1588SL20C-1190**	12	325	275	250	45	○
12.0	12			**1588SL12C-1200**	12	204	156	144	45	●
	20			**1588SL20C-1200**	12	325	275	250	45	●
12.5	12			**1588SL12C-1250**	14	230	182	168	45	●
	20			**1588SL20C-1250**	14	325	275	250	45	○
12.7	12			**1588SL12C-1270**	14	230	182	168	45	○
12.8	12			**1588SL12C-1280**	14	230	182	168	45	○
13.0	12			**1588SL12C-1300**	14	230	182	168	45	●
	20			**1588SL20C-1300**	14	338	290	265	45	○
13.5	12			**1588SL12C-1350**	14	230	182	168	45	●
	20			**1588SL20C-1350**	14	338	290	265	45	○
14.0	12			**1588SL12C-1400**	14	230	182	168	45	●
	20			**1588SL20C-1400**	14	367	318	290	45	○
14.5	12			**1588SL12C-1450**	16	260	208	194	48	●
15.0	12			**1588SL12C-1500**	16	260	208	194	48	●
15.5	12			**1588SL12C-1550**	16	260	208	194	48	●
16.0	12			**1588SL12C-1600**	16	260	208	194	48	●
16.5	12			**1588SL12C-1650**	18	286	234	218	48	●
17.0	12			**1588SL12C-1700**	18	286	234	218	48	●
17.5	12			**1588SL12C-1750**	18	286	234	218	48	●
18.0	12			**1588SL12C-1800**	18	286	234	218	48	●
18.5	12			**1588SL12C-1850**	20	310	258	240	48	○
19.0	12			**1588SL12C-1900**	20	310	258	240	48	●
19.5	12			**1588SL12C-1950**	20	310	258	240	48	○
20.0	12			**1588SL12C-2000**	20	310	258	240	48	●
20.5	12			**1588SL12C-2050**	22	310	258	240	48	○
21.0	12			**1588SL12C-2100**	22	310	258	240	48	●

 ● ex Stock Lager ○ on demand · auf Anfrage

SP series · SP Serie

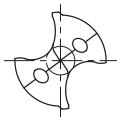
General machining · Allgemeine Bearbeitung

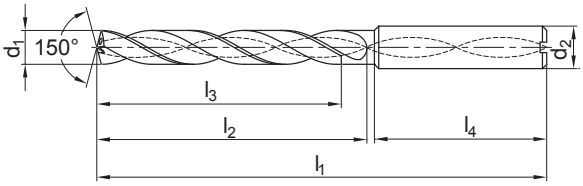
1534SP03C Pilot drills · Pilotbohrer



Internal Coolant
Interne Kühlung

Straight shank
Zylinderschaft





1534SP03C* Drilling diameter/ Bohrerdurchmesser $d_1(h_7)$	Drilling depth/ Bohrtiefe (l/d_1)	1588SL20C*/30C* Drilling diameter/ Bohrerdurchmesser $d_1(h_7)$	Cooling mode/ Kühlmittel.	Shank/ Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen					Grade/ Sorte
						$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
3.03	3	3.0	Internal/ Intern	Straight shank Zylinder-schaft	**1534SP03C-0303**	6	62	20	14	36	●
3.13	3	3.10			**1534SP03C-0313**	6	62	20	14	36	○
3.23	3	3.20			**1534SP03C-0323**	6	62	20	14	36	○
3.33	3	3.30			**1534SP03C-0333**	6	62	20	14	36	○
3.43	3	3.40			**1534SP03C-0343**	6	62	20	14	36	○
3.53	3	3.50			**1534SP03C-0353**	6	62	20	14	36	●
3.63	3	3.60			**1534SP03C-0363**	6	62	20	14	36	○
3.73	3	3.70			**1534SP03C-0373**	6	62	20	14	36	○
3.83	3	3.80			**1534SP03C-0383**	6	66	24	17	36	○
3.93	3	3.90			**1534SP03C-0393**	6	66	24	17	36	○
4.03	3	4.0			**1534SP03C-0403**	6	66	24	17	36	●
4.13	3	4.10			**1534SP03C-0413**	6	66	24	17	36	○
4.23	3	4.20			**1534SP03C-0423**	6	66	24	17	36	○
4.33	3	4.30			**1534SP03C-0433**	6	66	24	17	36	○
4.43	3	4.40			**1534SP03C-0443**	6	66	24	17	36	○
4.53	3	4.50			**1534SP03C-0453**	6	66	24	17	36	●
4.63	3	4.60			**1534SP03C-0463**	6	66	24	17	36	○
4.73	3	4.70			**1534SP03C-0473**	6	66	24	17	36	○
4.83	3	4.80			**1534SP03C-0483**	6	66	28	20	36	○
4.93	3	4.90			**1534SP03C-0493**	6	66	28	20	36	○
5.03	3	5.0			**1534SP03C-0503**	6	66	28	20	36	●
5.13	3	5.10			**1534SP03C-0513**	6	66	28	20	36	○
5.23	3	5.20			**1534SP03C-0523**	6	66	28	20	36	○
5.33	3	5.30			**1534SP03C-0533**	6	66	28	20	36	○
5.43	3	5.40			**1534SP03C-0543**	6	66	28	20	36	○
5.53	3	5.50			**1534SP03C-0553**	6	66	28	20	36	●
5.63	3	5.60			**1534SP03C-0563**	6	66	28	20	36	○
5.73	3	5.70			**1534SP03C-0573**	6	66	28	20	36	○

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

Material Overview · Material Übersicht

Grade/ Sorte	Workpiece material · Werkstückstoff										
	Carbon steel/ Kohlenstoff Stahl HB≤180	Alloy steel	Hardened steel · Gehärteter Stahl			Stainless steel/ Rostfreier Stahl	Cast iron/ Gusseisen	Nodular cast iron GGG	Aluminum alloy/ Alu leg.	Copper alloy/ Kupfer leg.	Heat resist. alloy/ Warmfest. leg.
			~40HRC	~50HRC	~60HRC						
KDG303	✔	✔	✔			✔	✔	✔	✔		✔

Code key C 10
ISO Kennzeichen

Cutting data 94-107
Schnittdaten

Technical Information C109-115
Technische Information

Non-standart tailor made C 117-121
Bestellformular für Sonderwerkzeuge

SP series · SP Serie

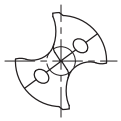
General machining · Allgemeine Bearbeitung

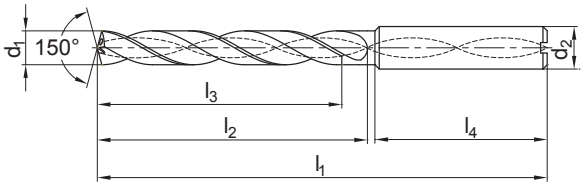
1534SP03C Pilot drills · Pilotbohrer



Internal Coolant
Interne Kühlung

Straight shank
Zylinderschaft





1534SP03C* Drilling diameter/ Bohrerdurchmesser $d_1(h_7)$	Drilling depth/ Bohrtiefe (l/d_1)	1588SL20C*/30C* Drilling diameter/ Bohrerdurchmesser $d_1(h_7)$	Cooling mode/ Kühlmittel.	Shank/ Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen					Grade/ Sorte
						$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
5.83	3	5.80	Internal/ Intern	Straight shank Zylinder-schaft	**1534SP03C-0583**	6	66	28	20	36	○
5.93	3	5.90			**1534SP03C-0593**	6	66	28	20	36	○
6.03	3	6.0			**1534SP03C-0603**	6	66	28	20	36	●
6.13	3	6.10			**1534SP03C-0613**	8	79	34	24	36	○
6.23	3	6.20			**1534SP03C-0623**	8	79	34	24	36	○
6.33	3	6.30			**1534SP03C-0633**	8	79	34	24	36	○
6.43	3	6.40			**1534SP03C-0643**	8	79	34	24	36	○
6.53	3	6.50			**1534SP03C-0653**	8	79	34	24	36	●
6.63	3	6.60			**1534SP03C-0663**	8	79	34	24	36	○
6.73	3	6.70			**1534SP03C-0673**	8	79	34	24	36	○
6.83	3	6.80			**1534SP03C-0683**	8	79	34	24	36	○
6.93	3	6.90			**1534SP03C-0693**	8	79	34	24	36	○
7.03	3	7.0			**1534SP03C-0703**	8	79	34	24	36	●
7.13	3	7.10			**1534SP03C-0713**	8	79	41	29	36	○
7.23	3	7.20			**1534SP03C-0723**	8	79	41	29	36	○
7.33	3	7.30			**1534SP03C-0733**	8	79	41	29	36	○
7.43	3	7.40			**1534SP03C-0743**	8	79	41	29	36	○
7.53	3	7.50			**1534SP03C-0753**	8	79	41	29	36	○
7.63	3	7.60			**1534SP03C-0763**	8	79	41	29	36	○
7.73	3	7.70			**1534SP03C-0773**	8	79	41	29	36	○
7.83	3	7.80			**1534SP03C-0783**	8	79	41	29	36	○
7.93	3	7.90			**1534SP03C-0793**	8	79	41	29	36	○
8.03	3	8.0			**1534SP03C-0803**	8	79	41	29	36	●
8.13	3	8.10			**1534SP03C-0813**	10	89	47	35	40	○
8.23	3	8.20			**1534SP03C-0823**	10	89	47	35	40	○
8.33	3	8.30			**1534SP03C-0833**	10	89	47	35	40	○
8.43	3	8.40			**1534SP03C-0843**	10	89	47	35	40	○
8.53	3	8.50			**1534SP03C-0853**	10	89	47	35	40	○
8.63	3	8.60			**1534SP03C-0863**	10	89	47	35	40	○
8.73	3	8.70			**1534SP03C-0873**	10	89	47	35	40	○
8.83	3	8.80			**1534SP03C-0883**	10	89	47	35	40	○
8.93	3	8.90			**1534SP03C-0893**	10	89	47	35	40	○
9.03	3	9.0			**1534SP03C-0903**	10	89	47	35	40	●
9.13	3	9.10			**1534SP03C-0913**	10	89	47	35	40	○
9.23	3	9.20			**1534SP03C-0923**	10	89	47	35	40	○
9.33	3	9.30			**1534SP03C-0933**	10	89	47	35	40	○

● ex Stock Lager ○ on demand · auf Anfrage

1534SP03C* Drilling diameter/ Bohrerdurchmesser $d_1(h_7)$	Drilling depth/ Bohrtiefe (l/d_1)	1588SL20C*/30C* Drilling diameter/ Bohrerdurchmesser $d_1(h_7)$	Cooling mode/ Kühlmittel.	Shank/ Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen					Grade/ Sorte
						$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
9.43	3	9.40	Internal/ Intern	Straight shank Zylinder-schaft	**1534SP03C-0943**	10	89	47	35	40	○
9.53	3	9.50			**1534SP03C-0953**	10	89	47	35	40	○
9.63	3	9.60			**1534SP03C-0963**	10	89	47	35	40	○
9.73	3	9.70			**1534SP03C-0973**	10	89	47	35	40	○
9.83	3	9.80			**1534SP03C-0983**	10	89	47	35	40	○
9.93	3	9.90			**1534SP03C-0993**	10	89	47	35	40	○
10.03	3	10.0			**1534SP03C-1003**	10	89	47	35	40	●
10.13	3	10.10			**1534SP03C-1013**	12	102	55	40	45	○
10.23	3	10.20			**1534SP03C-1023**	12	102	55	40	45	○
10.33	3	10.30			**1534SP03C-1033**	12	102	55	40	45	○
10.43	3	10.40			**1534SP03C-1043**	12	102	55	40	45	○
10.53	3	10.50			**1534SP03C-1053**	12	102	55	40	45	○
10.63	3	10.60			**1534SP03C-1063**	12	102	55	40	45	○
10.73	3	10.70			**1534SP03C-1073**	12	102	55	40	45	○
10.83	3	10.80			**1534SP03C-1083**	12	102	55	40	45	○
10.93	3	10.90			**1534SP03C-1093**	12	102	55	40	45	○
11.03	3	11.0			**1534SP03C-1103**	12	102	55	40	45	○
11.13	3	11.10			**1534SP03C-1113**	12	102	55	40	45	○
11.23	3	11.20			**1534SP03C-1123**	12	102	55	40	45	○
11.33	3	11.30			**1534SP03C-1133**	12	102	55	40	45	○
11.43	3	11.40			**1534SP03C-1143**	12	102	55	40	45	○
11.53	3	11.50			**1534SP03C-1153**	12	102	55	40	45	○
11.63	3	11.60			**1534SP03C-1163**	12	102	55	40	45	○
11.73	3	11.70			**1534SP03C-1173**	12	102	55	40	45	○
11.83	3	11.80			**1534SP03C-1183**	12	102	55	40	45	○
11.93	3	11.90			**1534SP03C-1193**	12	102	55	40	45	○
12.03	3	12.0			**1534SP03C-1203**	12	102	55	40	45	○
12.53	3	12.50			**1534SP03C-1253**	14	107	60	43	45	○
12.73	3	12.70			**1534SP03C-1273**	14	107	60	43	45	○
12.83	3	12.80			**1534SP03C-1283**	14	107	60	43	45	○
13.03	3	13.0			**1534SP03C-1303**	14	107	60	43	45	○
13.53	3	13.50			**1534SP03C-1353**	14	107	60	43	45	○
14.03	3	14.0			**1534SP03C-1403**	14	107	60	43	45	○
14.53	3	14.50			**1534SP03C-1453**	16	115	65	45	48	○
15.03	3	15.0			**1534SP03C-1503**	16	115	65	45	48	○
15.53	3	15.50			**1534SP03C-1553**	16	115	65	45	48	○

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

Grade/ Sorte	Workpiece material · Werkstückstoff										
	Carbon steel/ Kohlenstoff Stahl HB≤180	Alloy steel	Hardened steel · Gehärteter Stahl			Stainless steel/ Rostfreier Stahl	Cast iron/ Gusseisen	Nodular cast iron GGG	Aluminum alloy/ Alu leg.	Copper alloy/ Kupfer leg.	Heat resist. alloy/ Warmfest. leg.
			~40HRC	~50HRC	~60HRC						
KDG303	✔	✔	✔			✔	✔	✔	✔		✔

Code key C 10
ISO Kennzeichen
Cutting data 94-107
Schnittdaten
Technical Information C109-115
Technische Information
Non-standart tailor made C 117-121
Bestellformular für Sonderwerkzeuge

SP series · SP Serie

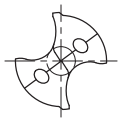
General machining · Allgemeine Bearbeitung

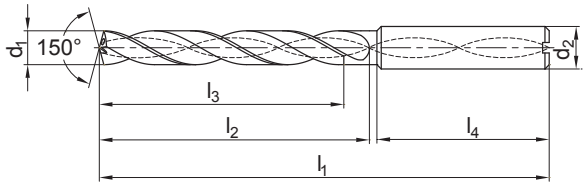
1534SP03C Pilot drills · Pilotbohrer



Internal Coolant
Interne Kühlung

Straight shank
Zylinderschaft





1534SP03C* Drilling diameter/ Bohrerdurchmesser $d_1(h_7)$	Drilling depth/ Bohrtiefe (l/d_1)	1588SL20C*/30C* Drilling diameter/ Bohrerdurchmesser $d_1(h_7)$	Cooling mode/ Kühlmittel.	Shank/ Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen					Grade/ Sorte
						$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
16.03	3	16.0	Internal/ Intern	Straight shank Zylinder-schaft	**1534SP03C-1603**	16	115	65	45	48	○
16.53	3	16.50			**1534SP03C-1653**	18	123	73	51	48	○
17.03	3	17.0			**1534SP03C-1703**	18	123	73	51	48	○
17.53	3	17.50			**1534SP03C-1753**	18	123	73	51	48	○
18.03	3	18.0			**1534SP03C-1803**	18	123	73	51	48	○
18.53	3	18.50			**1534SP03C-1853**	20	131	79	55	50	○
19.03	3	19.0			**1534SP03C-1903**	20	131	79	55	50	○
19.53	3	19.50			**1534SP03C-1953**	20	131	79	55	50	○
20.03	3	20.0			**1534SP03C-2003**	20	131	79	55	50	○

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

Material Overview · Material Übersicht

Grade/ Sorte	Workpiece material · Werkstückstoff										
	Carbon steel/ Kohlenstoff Stahl HB≤180	Alloy steel	Hardened steel · Gehärteter Stahl			Stainless steel/ Rostfreier Stahl	Cast iron/ Gusseisen	Nodular cast iron GGG	Aluminum alloy/ Alu leg.	Copper alloy/ Kupfer leg.	Heat resist. alloy/ Warmfest. leg.
			~40HRC	~50HRC	~60HRC						
KDG303	✔	✔	✔			✔	✔	✔	✔		✔

 ● ex Stock Lager ○ on demand · auf Anfrage

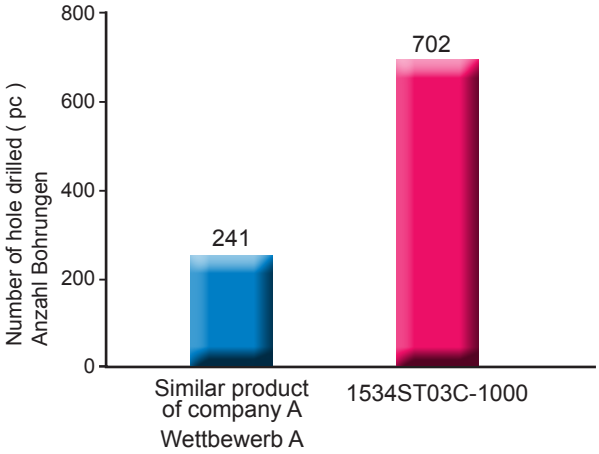


ST series twist drill
Spiralbohrer Serie

For soft steel & stainless steel
Für weichen & rostfreien Stahl

ST special series. A bigger space for chips and its curved edges increases the sharpness of the drills during cutting. Especially suitable for cutting materials with long chips, such as low carbon steels with a high elongation rate and austenitic stainless steel.

Ein definierter Spanraum in Verbindung mit einer scharfen Schneide ermöglicht das Bohren mit einer hohen Produktivität von langspanenden Stahlwerkstoffen und rostfreien Werkstoffen.



Type · Typ:1534ST03C-1000
Size · Größe: Ø10mm
Workpiece material
Werkstückstoff: 1Cr18Ni9Ti
Cutting speed · Schnittgeschw.: 70m/min
Rotating speed · Umdrehung pro min: 2200r/min
Feed rate per revolution
Vorschub pro Umdrehung: 0.15mm/r
Feed speed · Vorschub: 330mm/min
Drilling depth· Bohrtiefe: 30mm(L/D=3)
Cooling system: water-soluble liquid (Internal)
Külmittel : wasserlösliche Emulsion (Intern)
Machine: Mikron UCP 1000



Chips (Company A)



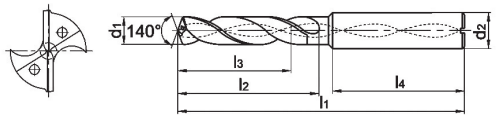
1534ST03C-1000 chips (ZCC CT)

ST series · ST Serie for soft and stainless steel · für weichen & rostfreien Stahl



Internal Coolant
Interne Kühlung

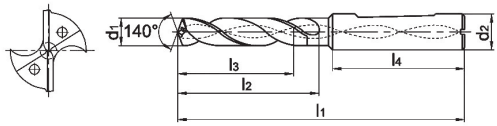
Straight shank
Zylinderschaft





Internal Coolant
Interne Kühlung

Whistle notch
shank · Schaft



- First choice for drilling soft & stainless steel.
- Sharp cutting edge can avoid build-up edge, suitable for drilling hole with high performance.
- Erste Wahl für das Bohren von weichen und rostfreien Stählen.
- Scharfe Schneiden reduzieren bzw. vermeiden Aufbauschneidenbildung. Besonders geeignet für das Hochleistungsbohren.

Drill diameter Bohrer Ø $d_1(m_7)$	Drilling depth Bohrtiefe (L/d1)	Cooling mode Kühlmittel.	Shank Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen					Grade Sorte
					Shankdiameter Ø Schaftdurchmesser	Overall length Gesamtlänge	Flute length Nutenlänge	effective drill. length Effektive Nutzlänge	Shank length Schaftlänge	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
3.0	3	Internal · Intern	Straight shank	1534ST03C-0300	6	62	20	14	36	○
	5		Zylinder	1536ST05C-0300	6	66	28	23	36	●
	5		Whistle notch	1736ST05C-0300	6	66	28	23	36	○
3.1	3		Straight shank	1534ST03C-0310	6	62	20	14	36	○
	5		Zylinder	1536ST05C-0310	6	66	28	23	36	●
	5		Whistle notch	1736ST05C-0310	6	66	28	23	36	○
3.2	3		Straight shank	1534ST03C-0320	6	62	20	14	36	○
	5		Zylinder	1536ST05C-0320	6	66	28	23	36	●
	5		Whistle notch	1736ST05C-0320	6	66	28	23	36	○
3.25	3		Straight shank	1534ST03C-0325	6	62	20	14	36	○
	5		Zylinder	1536ST05C-0325	6	66	28	23	36	○
	5		Whistle	1736ST05C-0325	6	66	28	23	36	○
3.3	3		Straight shank	1534ST03C-0330	6	62	20	14	36	○
	5		Zylinder	1536ST05C-0330	6	66	28	23	36	●
	5		Whistle	1736ST05C-0330	6	66	28	23	36	○
3.4	3		Straight shank	1534ST03C-0340	6	62	20	14	36	○
	5		Zylinder	1536ST05C-0340	6	66	28	23	36	●
	5		Whistle	1736ST05C-0340	6	66	28	23	36	○
3.5	3		Straight shank	1534ST03C-0350	6	62	20	14	36	○
	5		Zylinder	1536ST05C-0350	6	66	28	23	36	●
	5		Whistle	1736ST05C-0350	6	66	28	23	36	○
3.6	3		Straight shank	1534ST03C-0360	6	62	20	14	36	○
	5		Zylinder	1536ST05C-0360	6	66	28	23	36	●
	5		Whistle	1736ST05C-0360	6	66	28	23	36	○
3.7	3		Straight shank	1534ST03C-0370	6	62	20	14	36	○
	5		Zylinder	1536ST05C-0370	6	66	28	23	36	●
	5		Whistle	1736ST05C-0370	6	66	28	23	36	○
3.8	3		Straight shank	1534ST03C-0380	6	66	24	17	36	○
	5		Zylinder	1536ST05C-0380	6	74	36	29	36	●
	5		Whistle	1736ST05C-0380	6	74	36	29	36	○

Drill diameter Bohrer Ø $d_1(m_7)$	Drilling depth Bohrtiefe (L/d1)	Cooling mode Kühlmittel.	Shank Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen					Grade Sorte
					Shankdiameter Ø Schaftdurchmesser	Overall length Gesamtlänge	Flute length Nutenlänge	effective drill. length Effektive Nutzlänge	Shank length Schaftlänge	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
3.9	3	Internal · Intern	Straight shank Zylinderschaft	**1534ST03C-0390**	6	66	24	17	36	○
	5			**1536ST05C-0390**	6	74	36	29	36	●
	5		Whistle notch shank Schaft	**1736ST05C-0390**	6	74	36	29	36	○
4.0	3		Straight shank Zylinderschaft	**1534ST03C-0400**	6	66	24	17	36	○
	5			**1536ST05C-0400**	6	74	36	29	36	●
	5		Whistle notch shank · Schaft	**1736ST05C-0400**	6	74	36	29	36	○
4.1	3		Straight shank Zylinderschaft	**1534ST03C-0410**	6	66	24	17	36	○
	5			**1536ST05C-0410**	6	74	36	29	36	●
	5		Whistle notch shank · Schaft	**1736ST05C-0410**	6	74	36	29	36	○
4.2	3		Straight shank Zylinderschaft	**1534ST03C-0420**	6	66	24	17	36	○
	5			**1536ST05C-0420**	6	74	36	29	36	●
	5		Whistle notch shank · Schaft	**1736ST05C-0420**	6	74	36	29	36	○
4.3	3		Straight shank Zylinderschaft	**1534ST03C-0430**	6	66	24	17	36	○
	5			**1536ST05C-0430**	6	74	36	29	36	●
	5		Whistle notch shank · Schaft	**1736ST05C-0430**	6	74	36	29	36	○
4.4	3		Straight shank Zylinderschaft	**1534ST03C-0440**	6	66	24	17	36	○
	5			**1536ST05C-0440**	6	74	36	29	36	●
	5		Whistle notch shank · Schaft	**1736ST05C-0440**	6	74	36	29	36	○
4.5	3		Straight shank Zylinderschaft	**1534ST03C-0450**	6	66	24	17	36	○
	5			**1536ST05C-0450**	6	74	36	29	36	●
	5		Whistle notch shank · Schaft	**1736ST05C-0450**	6	74	36	29	36	○
4.6	3		Straight shank Zylinderschaft	**1534ST03C-0460**	6	66	24	17	36	○
	5			**1536ST05C-0460**	6	74	36	29	36	●
	5		Whistle notch shank · Schaft	**1736ST05C-0460**	6	74	36	29	36	○
4.65	3		Straight shank Zylinderschaft	**1534ST03C-0465**	6	66	24	17	36	○
	5			**1536ST05C-0465**	6	74	36	29	36	○
	5		Whistle notch shank · Schaft	**1736ST05C-0465**	6	74	36	29	36	○
4.7	3		Straight shank Zylinderschaft	**1534ST03C-0470**	6	66	24	17	36	○
	5			**1536ST05C-0470**	6	74	36	29	36	●
	5		Whistle notch shank · Schaft	**1736ST05C-0470**	6	74	36	29	36	○
4.8	3		Straight shank Zylinderschaft	**1534ST03C-0480**	6	66	28	20	36	○
	5			**1536ST05C-0480**	6	82	44	35	36	●
	5		Whistle notch shank · Schaft	**1736ST05C-0480**	6	82	44	35	36	○

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

Grade Sorte	Workpiece material · Werkstückstoff										
	Carbon Steel Kohlenstoff Stahl HB≤180	Alloy steel Liegierter Stahl	Hardened steel · Gehärteter Stahl			Stainless steel Rostfreier Stahl	Cast iron Gusseisen	Nodular cast iron GGG	Aluminum alloy Alu leg.	Copper alloy Kupfer leg.	Heat resist. alloy Warmfest. leg.
			~40HRC	~50HRC	~60HRC						
KDG303	✔	✔				✔					✔

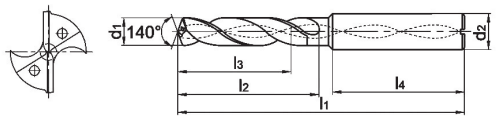
Code key C 10
ISO Kennzeichen
Cutting data 94-107
Schnittdaten
Technical Information C109-115
Technische Information
Non-standart tailor made C 117-121
Bestellformular für Sonderwerkzeuge

ST series · ST Serie for soft and stainless steel · für weichen & rostfreien Stahl



Internal Coolant
Interne Kühlung

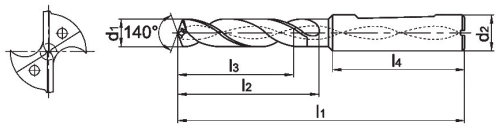
Straight shank
Zylinderschaft





Internal Coolant
Interne Kühlung

Whistle notch
shank · Schaft



- First choice for drilling soft & stainless steel.
- Sharp cutting edge can avoid build-up edge, suitable for drilling with high performance.
- Erste Wahl für das Bohren von weichen und rostfreien Stählen.
- Scharfe Schneiden reduzieren bzw. vermeiden Aufbauschneidenbildung. Besonders geeignet für das Hochleistungsbohren.

Drill diameter Bohrer Ø d1(m7)	Drilling depth Bohrtiefe (L/d1)	Cooling mode Kühlmittel.	Shank Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen					Grade Sorte
					Shankdiameter Ø Schaftdurchmesser	Overall length Gesamtlänge	Flute length Nutenlänge	effective drill. length Effektive Nutzlänge	Shank length Schaftlänge	
					d2(h6)	l1	l2	l3	l4	KDG303
4.9	3	Internal · Intern	Straight shank Zylinderschaft	1534ST03C-0490	6	66	28	20	36	○
	5			1536ST05C-0490	6	82	44	35	36	●
	5		Whistle notch shank · Schaft	1736ST05C-0490	6	82	44	35	36	○
5.0	3		Straight shank Zylinderschaft	1534ST03C-0500	6	66	28	20	36	○
	5			1536ST05C-0500	6	82	44	35	36	●
	5		Whistle notch shank · Schaft	1736ST05C-0500	6	82	44	35	36	○
5.1	3		Straight shank Zylinderschaft	1534ST03C-0510	6	66	28	20	36	○
	5			1536ST05C-0510	6	82	44	35	36	●
	5		Whistle notch shank · Schaft	1736ST05C-0510	6	82	44	35	36	○
5.2	3		Straight shank Zylinderschaft	1534ST03C-0520	6	66	28	20	36	○
	5			1536ST05C-0520	6	82	44	35	36	●
	5		Whistle notch shank · Schaft	1736ST05C-0520	6	82	44	35	36	○
5.3	3		Straight shank Zylinderschaft	1534ST03C-0530	6	66	28	20	36	○
	5			1536ST05C-0530	6	82	44	35	36	●
	5		Whistle notch shank · Schaft	1736ST05C-0530	6	82	44	35	36	○
5.4	3		Straight shank Zylinderschaft	1534ST03C-0540	6	66	28	20	36	○
	5			1536ST05C-0540	6	82	44	35	36	●
	5		Whistle notch shank · Schaft	1736ST05C-0540	6	82	44	35	36	○
5.5	3		Straight shank Zylinderschaft	1534ST03C-0550	6	66	28	20	36	○
	5			1536ST05C-0550	6	82	44	35	36	●
	5		Whistle notch shank · Schaft	1736ST05C-0550	6	82	44	35	36	○
5.55	3		Straight shank Zylinderschaft	1534ST03C-0555	6	66	28	20	36	○
	5			1536ST05C-0555	6	82	44	35	36	○
	5		Whistle notch shank · Schaft	1736ST05C-0555	6	82	44	35	36	○
5.6	3		Straight shank Zylinderschaft	1534ST03C-0560	6	66	28	20	36	○
	5			1536ST05C-0560	6	82	44	35	36	●
	5		Whistle notch shank · Schaft	1736ST05C-0560	6	82	44	35	36	○
5.7	3		Straight shank Zylinderschaft	1534ST03C-0570	6	66	28	20	36	○
	5			1536ST05C-0570	6	82	44	35	36	●
	5		Whistle notch shank · Schaft	1736ST05C-0570	6	82	44	35	36	○

Drill diameter Bohrer Ø $d_1(m_7)$	Drilling depth Bohrtiefe (L/d1)	Cooling mode Kühlmittel.	Shank Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen					Grade Sorte
					Shankdiameter Ø Schaftdurchmesser	Overall length Gesamtlänge	Flute length Nutenlänge	effective drill. length Effektive Nutzlänge	Shank length Schaftlänge	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
5.8	3	Internal · Intern	Straight shank Zylinderschaft	**1534ST03C-0580**	6	66	28	20	36	○
	5			**1536ST05C-0580**	6	82	44	35	36	●
	5		Whistle notch shank Schaft	**1736ST05C-0580**	6	82	44	35	36	○
5.9	3		Straight shank Zylinderschaft	**1534ST03C-0590**	6	66	28	20	36	○
	5			**1536ST05C-0590**	6	82	44	35	36	●
	5		Whistle notch shank · Schaft	**1736ST05C-0590**	6	82	44	35	36	○
6.0	3		Straight shank Zylinderschaft	**1534ST03C-0600**	6	66	28	20	36	○
	5			**1536ST05C-0600**	6	82	44	35	36	●
	5		Whistle notch shank · Schaft	**1736ST05C-0600**	6	82	44	35	36	○
6.1	3		Straight shank Zylinderschaft	**1534ST03C-0610**	8	79	34	24	36	○
	5			**1536ST05C-0610**	8	91	53	43	36	●
	5		Whistle notch shank · Schaft	**1736ST05C-0610**	8	91	53	43	36	○
6.2	3		Straight shank Zylinderschaft	**1534ST03C-0620**	8	79	34	24	36	○
	5			**1536ST05C-0620**	8	91	53	43	36	●
	5		Whistle notch shank · Schaft	**1736ST05C-0620**	8	91	53	43	36	○
6.3	3		Straight shank Zylinderschaft	**1534ST03C-0630**	8	79	34	24	36	○
	5			**1536ST05C-0630**	8	91	53	43	36	●
	5		Whistle notch shank · Schaft	**1736ST05C-0630**	8	91	53	43	36	○
6.4	3		Straight shank Zylinderschaft	**1534ST03C-0640**	8	79	34	24	36	○
	5			**1536ST05C-0640**	8	91	53	43	36	●
	5		Whistle notch shank · Schaft	**1736ST05C-0640**	8	91	53	43	36	○
6.5	3		Straight shank Zylinderschaft	**1534ST03C-0650**	8	79	34	24	36	○
	5			**1536ST05C-0650**	8	91	53	43	36	●
	5		Whistle notch shank · Schaft	**1736ST05C-0650**	8	91	53	43	36	○
6.6	3		Straight shank Zylinderschaft	**1534ST03C-0660**	8	79	34	24	36	○
	5			**1536ST05C-0660**	8	91	53	43	36	●
	5		Whistle notch shank · Schaft	**1736ST05C-0660**	8	91	53	43	36	○
6.7	3		Straight shank Zylinderschaft	**1534ST03C-0670**	8	79	34	24	36	○
	5			**1536ST05C-0670**	8	91	53	43	36	●
	5		Whistle notch shank · Schaft	**1736ST05C-0670**	8	91	53	43	36	○
6.75	3		Straight shank Zylinderschaft	**1534ST03C-0675**	8	79	34	24	36	○
	5			**1536ST05C-0675**	8	91	53	43	36	○
	5		Whistle notch shank · Schaft	**1736ST05C-0675**	8	91	53	43	36	○
6.80	5		Straight shank Zylinderschaft	**1536ST05C-0680**	8	91	53	43	36	●

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

Grade Sorte	Workpiece material · Werkstückstoff										
	Carbon Steel Kohlenstoff Stahl HB≤180	Alloy steel Liegierter Stahl	Hardened steel · Gehärteter Stahl			Stainless steel Rostfreier Stahl	Cast iron Gusseisen	Nodular cast iron GGG	Aluminum alloy Alu leg.	Copper alloy Kupfer leg.	Heat resist. alloy Warmfest. leg.
			~40HRC	~50HRC	~60HRC						
KDG303	✔	✔				✔					✔

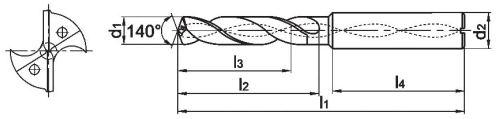
Code key C 10
ISO Kennzeichen
Cutting data 94-107
Schnittdaten
Technical Information C109-115
Technische Information
Non-standart tailor made C 117-121
Bestellformular für Sonderwerkzeuge

ST series · ST Serie for soft and stainless steel · für weichen & rostfreien Stahl



Internal Coolant
Interne Kühlung

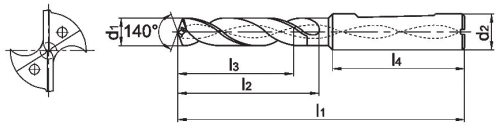
Straight shank
Zylinderschaft





Internal Coolant
Interne Kühlung

Whistle notch
shank · Schaft



- First choice for drilling soft & stainless steel.
- Sharp cutting edge can avoid build-up edge, suitable for drilling with high performance.
- Erste Wahl für das Bohren von weichen und rostfreien Stählen.
- Scharfe Schneiden reduzieren bzw. vermeiden Aufbauschneidenbildung. Besonders geeignet für das Hochleistungsbohren.

Drill diameter Bohrer Ø $d_1(m_7)$	Drilling depth Bohrtiefe (L/d1)	Cooling mode Kühlmittel.	Shank Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen					Grade Sorte
					Shankdiameter Ø Schaftdurchmesser	Overall length Gesamtlänge	Flute length Nutenlänge	effective drill. length Effektive Nutzlänge	Shank length Schaftlänge	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
6.9	3	Internal · Intern	Straight shank Zylinderschaft	1534ST03C-0690	8	79	34	24	36	○
	5			1536ST05C-0690	8	91	53	43	36	●
	5		Whistle notch shank · Schaft	1736ST05C-0690	8	91	53	43	36	○
7.0	3		Straight shank Zylinderschaft	1534ST03C-0700	8	79	34	24	36	○
	5			1536ST05C-0700	8	91	53	43	36	●
	5		Whistle notch shank · Schaft	1736ST05C-0700	8	91	53	43	36	○
7.1	3		Straight shank Zylinderschaft	1534ST03C-0710	8	79	41	29	36	○
	5			1536ST05C-0710	8	91	53	43	36	●
	5		Whistle notch shank · Schaft	1736ST05C-0710	8	91	53	43	36	○
7.2	3		Straight shank Zylinderschaft	1534ST03C-0720	8	79	41	29	36	○
	5			1536ST05C-0720	8	91	53	43	36	●
	5		Whistle notch shank · Schaft	1736ST05C-0720	8	91	53	43	36	○
7.3	3		Straight shank Zylinderschaft	1534ST03C-0730	8	79	41	29	36	○
	5			1536ST05C-0730	8	91	53	43	36	●
	5		Whistle notch shank · Schaft	1736ST05C-0730	8	91	53	43	36	○
7.4	3		Straight shank Zylinderschaft	1534ST03C-0740	8	79	41	29	36	○
	5			1536ST05C-0740	8	91	53	43	36	●
	5		Whistle notch shank · Schaft	1736ST05C-0740	8	91	53	43	36	○
7.5	3		Straight shank Zylinder-schaft	1534ST03C-0750	8	79	41	29	36	○
	5			1536ST05C-0750	8	91	53	43	36	●
	5		Whistle notch shank · Schaft	1736ST05C-0750	8	91	53	43	36	○
7.6	3		Straight shank Zylinderschaft	1534ST03C-0760	8	79	41	29	36	○
	5			1536ST05C-0760	8	91	53	43	36	●
	5		Whistle notch shank · Schaft	1736ST05C-0760	8	91	53	43	36	○
7.7	3		Straight shank Zylinderschaft	1534ST03C-0770	8	79	41	29	36	○
	5			1536ST05C-0770	8	91	53	43	36	●
	5		Whistle notch shank · Schaft	1736ST05C-0770	8	91	53	43	36	○
7.8	3		Straight shank Zylinderschaft	1534ST03C-0780	8	79	41	29	36	○
	5			1536ST05C-0780	8	91	53	43	36	●
	5		Whistle notch shank · Schaft	1736ST05C-0780	8	91	53	43	36	○

Drill diameter Bohrer Ø $d_1(m_7)$	Drilling depth Bohrtiefe (L/d1)	Cooling mode Kühlmittel.	Shank Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen					Grade Sorte
					Shankdiameter Ø Schaftdurchmesser	Overall length Gesamtlänge	Flute length Nutenlänge	effective drill. length Effektive Nutzlänge	Shank length Schaftlänge	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
7.9	3	Internal · Intern	Straight shank Zylinderschaft	**1534ST03C-0790**	8	79	41	29	36	○
	5			**1536ST05C-0790**	8	91	53	43	36	●
	5		Whistle notch shank Schaft	**1736ST05C-0790**	8	91	53	43	36	○
8.0	3		Straight shank Zylinderschaft	**1534ST03C-0800**	8	79	41	29	36	○
	5			**1536ST05C-0800**	8	91	53	43	36	●
	5		Whistle notch shank · Schaft	**1736ST05C-0800**	8	91	53	43	36	○
8.1	3		Straight shank Zylinderschaft	**1534ST03C-0810**	10	89	47	35	40	○
	5			**1536ST05C-0810**	10	103	61	49	40	●
	5		Whistle notch shank · Schaft	**1736ST05C-0810**	10	103	61	49	40	○
8.2	3		Straight shank Zylinderschaft	**1534ST03C-0820**	10	89	47	35	40	○
	5			**1536ST05C-0820**	10	103	61	49	40	●
	5		Whistle notch shank · Schaft	**1736ST05C-0820**	10	103	61	49	40	○
8.3	3		Straight shank Zylinderschaft	**1534ST03C-0830**	10	89	47	35	40	○
	5			**1536ST05C-0830**	10	103	61	49	40	●
	5		Whistle notch shank · Schaft	**1736ST05C-0830**	10	103	61	49	40	○
8.4	3		Straight shank Zylinderschaft	**1534ST03C-0840**	10	89	47	35	40	○
	5			**1536ST05C-0840**	10	103	61	49	40	●
	5		Whistle notch shank · Schaft	**1736ST05C-0840**	10	103	61	49	40	○
8.5	3		Straight shank Zylinderschaft	**1534ST03C-0850**	10	89	47	35	40	○
	5			**1536ST05C-0850**	10	103	61	49	40	●
	5		Whistle notch shank · Schaft	**1736ST05C-0850**	10	103	61	49	40	○
8.6	3		Straight shank Zylinderschaft	**1534ST03C-0860**	10	89	47	35	40	○
	5			**1536ST05C-0860**	10	103	61	49	40	●
	5		Whistle notch shank · Schaft	**1736ST05C-0860**	10	103	61	49	40	○
8.7	3		Straight shank Zylinderschaft	**1534ST03C-0870**	10	89	47	35	40	○
	5			**1536ST05C-0870**	10	103	61	49	40	●
	5		Whistle notch shank · Schaft	**1736ST05C-0870**	10	103	61	49	40	○
8.8	3		Straight shank Zylinderschaft	**1534ST03C-0880**	10	89	47	35	40	○
	5			**1536ST05C-0880**	10	103	61	49	40	●
	5		Whistle notch shank · Schaft	**1736ST05C-0880**	10	103	61	49	40	○
8.9	3		Straight shank Zylinderschaft	**1534ST03C-0890**	10	89	47	35	40	○
	5			**1536ST05C-0890**	10	103	61	49	40	●
	5		Whistle notch shank · Schaft	**1736ST05C-0890**	10	103	61	49	40	○
9.0	3		Straight shank Zylinderschaft	**1534ST03C-0900**	10	89	47	35	40	○
	5			**1536ST05C-0900**	10	103	61	49	40	●
	5		Whistle notch shank · Schaft	**1736ST05C-0900**	10	103	61	49	40	○

Material Overview · Material Übersicht

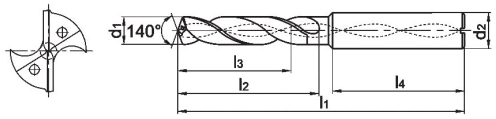
✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

Grade Sorte	Workpiece material · Werkstückstoff										
	Carbon Steel Kohlenstoff Stahl HB≤180	Alloy steel Liegierter Stahl	Hardened steel · Gehärteter Stahl			Stainless steel Rostfreier Stahl	Cast iron Gusseisen	Nodular cast iron GGG	Aluminum alloy Alu leg.	Copper alloy Kupfer leg.	Heat resist. alloy Warmfest. leg.
			~40HRC	~50HRC	~60HRC						
KDG303	✔	✔				✔					✔

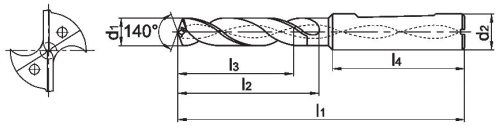
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ISO Kennzeichen
Cutting data 94-107
Schnittdaten
Technical Information C109-115
Technische Information
Non-standart tailor made C 117-121
Bestellformular für Sonderwerkzeuge

ST series · ST Serie for soft and stainless steel · für weichen & rostfreien Stahl









- First choice for drilling soft & stainless steel.
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Drill diameter Bohrer Ø $d_1(m_7)$	Drilling depth Bohrtiefe (L/d1)	Cooling mode Kühlmittel.	Shank Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen					Grade Sorte
					Shankdiameter Ø Schaftdurchmesser	Overall length Gesamtlänge	Flute length Nutenlänge	effective drill. length Effektive Nutzlänge	Shank length Schaftlänge	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
9.1	3	Internal · Intern	Straight shank Zylinderschaft	1534ST03C-0910	10	89	47	35	40	○
	5			1536ST05C-0910	10	103	61	49	40	●
	5		Whistle notch shank · Schaft	1736ST05C-0910	10	103	61	49	40	○
9.2	5		Straight shank Zylinderschaft	1536ST05C-0920	10	103	61	49	40	●
9.3	3			1534ST03C-0930	10	89	47	35	40	○
	5			1536ST05C-0930	10	103	61	49	40	●
	5		Whistle notch shank · Schaft	1736ST05C-0930	10	103	61	49	40	○
9.4	3		Straight shank Zylinderschaft	1534ST03C-0940	10	89	47	35	40	○
	5			1536ST05C-0940	10	103	61	49	40	●
	5		Whistle notch shank · Schaft	1736ST05C-0940	10	103	61	49	40	○
9.5	3		Straight shank Zylinderschaft	1534ST03C-0950	10	89	47	35	40	○
	5			1536ST05C-0950	10	103	61	49	40	●
	5		Whistle notch shank · Schaft	1736ST05C-0950	10	103	61	49	40	○
9.6	3		Straight shank Zylinderschaft	1534ST03C-0960	10	89	47	35	40	○
	5			1536ST05C-0960	10	103	61	49	40	●
	5		Whistle notch shank · Schaft	1736ST05C-0960	10	103	61	49	40	○
9.7	3		Straight shank Zylinderschaft	1534ST03C-0970	10	89	47	35	40	○
	5			1536ST05C-0970	10	103	61	49	40	●
	5		Whistle notch shank · Schaft	1736ST05C-0970	10	103	61	49	40	○
9.8	3		Straight shank Zylinderschaft	1534ST03C-0980	10	89	47	35	40	○
	5			1536ST05C-0980	10	103	61	49	40	●
	5		Whistle notch shank · Schaft	1736ST05C-0980	10	103	61	49	40	○
9.9	3		Straight shank Zylinderschaft	1534ST03C-0990	10	89	47	35	40	○
	5			1536ST05C-0990	10	103	61	49	40	●
	5		Whistle notch shank · Schaft	1736ST05C-0990	10	103	61	49	40	○
10.0	3		Straight shank Zylinderschaft	1534ST03C-1000	10	89	47	35	40	○
	5			1536ST05C-1000	10	103	61	49	40	●
	5		Whistle notch shank · Schaft	1736ST05C-1000	10	103	61	49	40	○
10.1	3		Straight shank Zylinderschaft	1534ST03C-1010	12	102	55	40	45	○
	5			1536ST05C-1010	12	118	71	56	45	●
	5		Whistle notch shank · Schaft	1736ST05C-1010	12	118	71	56	45	○

Drill diameter Bohrer Ø $d_1(m_7)$	Drilling depth Bohrtiefe (L/d1)	Cooling mode Kühlmittel.	Shank Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen					Grade Sorte
					Shankdiameter Ø Schaftdurchmesser	Overall length Gesamtlänge	Flute length Nutenlänge	effective drill. length Effektive Nutzlänge	Shank length Schaftlänge	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
10.2	5	Internal · Intern	Straight shank Zylinderschaft	**1536ST05C-1020**	12	118	71	56	45	●
10.25	3			**1534ST03C-1025**	12	102	55	40	45	○
	5			**1536ST05C-1025**	12	118	71	56	45	○
	5		Whistle notch	**1736ST05C-1025**	12	118	71	56	45	○
10.3	3		Straight shank Zylinderschaft	**1534ST03C-1030**	12	102	55	40	45	○
	5			**1536ST05C-1030**	12	118	71	56	45	●
	5		Whistle notch	**1736ST05C-1030**	12	118	71	56	45	○
10.4	3		Straight shank Zylinderschaft	**1534ST03C-1040**	12	102	55	40	45	○
	5			**1536ST05C-1040**	12	118	71	56	45	●
	5		Whistle notch	**1736ST05C-1040**	12	118	71	56	45	○
10.5	3		Straight shank Zylinderschaft	**1534ST03C-1050**	12	102	55	40	45	○
	5			**1536ST05C-1050**	12	118	71	56	45	●
	5		Whistle notch	**1736ST05C-1050**	12	118	71	56	45	○
10.6	3		Straight shank Zylinderschaft	**1534ST03C-1060**	12	102	55	40	45	○
	5			**1536ST05C-1060**	12	118	71	56	45	●
	5		Whistle notch	**1736ST05C-1060**	12	118	71	56	45	○
10.7	3		Straight shank Zylinderschaft	**1534ST03C-1070**	12	102	55	40	45	○
	5			**1536ST05C-1070**	12	118	71	56	45	●
	5		Whistle notch	**1736ST05C-1070**	12	118	71	56	45	○
10.8	3		Straight shank Zylinderschaft	**1534ST03C-1080**	12	102	55	40	45	○
	5			**1536ST05C-1080**	12	118	71	56	45	●
	5		Whistle notch	**1736ST05C-1080**	12	118	71	56	45	○
10.9	3		Straight shank Zylinderschaft	**1534ST03C-1090**	12	102	55	40	45	○
	5			**1536ST05C-1090**	12	118	71	56	45	●
	5		Whistle notch	**1736ST05C-1090**	12	118	71	56	45	○
11.0	3		Straight shank Zylinderschaft	**1534ST03C-1100**	12	102	55	40	45	○
	5			**1536ST05C-1100**	12	118	71	56	45	●
	5		Whistle notch	**1736ST05C-1100**	12	118	71	56	45	○
11.1	3		Straight shank Zylinderschaft	**1534ST03C-1110**	12	102	55	40	45	○
	5			**1536ST05C-1110**	12	118	71	56	45	●
	5		Whistle notch	**1736ST05C-1110**	12	118	71	56	45	○
11.2	3		Straight shank Zylinderschaft	**1534ST03C-1120**	12	102	55	40	45	○
	5			**1536ST05C-1120**	12	118	71	56	45	●
	5		Whistle notch	**1736ST05C-1120**	12	118	71	56	45	○
11.3	3		Straight shank Zylinderschaft	**1534ST03C-1130**	12	102	55	40	45	○
	5			**1536ST05C-1130**	12	118	71	56	45	●
	5		Whistle notch	**1736ST05C-1130**	12	118	71	56	45	○

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

Grade Sorte	Workpiece material · Werkstückstoff										
	Carbon Steel Kohlenstoff Stahl HB≤180	Alloy steel Liegierter Stahl	Hardened steel · Gehärteter Stahl			Stainless steel Rostfreier Stahl	Cast iron Gusseisen	Nodular cast iron GGG	Aluminum alloy Alu leg.	Copper alloy Kupfer leg.	Heat resist. alloy Warmfest. leg.
			~40HRC	~50HRC	~60HRC						
KDG303	✔	✔				✔					✔

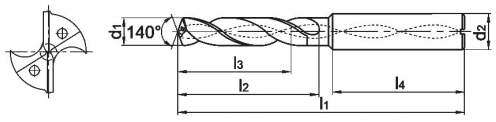
Code key C 10
ISO Kennzeichen
Cutting data 94-107
Schnittdaten
Technical Information C109-115
Technische Information
Non-standart tailor made C 117-121
Bestellformular für Sonderwerkzeuge

ST series · ST Serie for soft and stainless steel · für weichen & rostfreien Stahl



Internal Coolant
Interne Kühlung

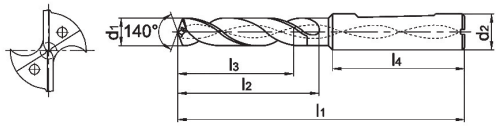
Straight shank
Zylinderschaft





Internal Coolant
Interne Kühlung

Whistle notch
shank · Schaft



- First choice for drilling soft & stainless steel.
- Sharp cutting edge can avoid build-up edge, suitable for drilling with high performance.
- Erste Wahl für das Bohren von weichen und rostfreien Stählen.
- Scharfe Schneiden reduzieren bzw. vermeiden Aufbauschneidenbildung. Besonders geeignet für das Hochleistungsbohren.

Drill diameter Bohrer Ø $d_1(m_7)$	Drilling depth Bohrtiefe (L/d1)	Cooling mode Kühlmittel.	Shank Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen					Grade Sorte
					Shankdiameter Ø Schaftdurchmesser	Overall length Gesamtlänge	Flute length Nutenlänge	effective drill. length Effektive Nutzlänge	Shank length Schaftlänge	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
11.4	3	Internal · Intern	Straight shank Zylinderschaft	**1534ST03C-1140**	12	102	55	40	45	○
	5			**1536ST05C-1140**	12	118	71	56	45	●
	5		Whistle notch	**1736ST05C-1140**	12	118	71	56	45	○
11.5	3		Straight shank Zylinderschaft	**1534ST03C-1150**	12	102	55	40	45	○
	5			**1536ST05C-1150**	12	118	71	56	45	●
	5		Whistle notch	**1736ST05C-1150**	12	118	71	56	45	○
11.6	3		Straight shank Zylinderschaft	**1534ST03C-1160**	12	102	55	40	45	○
	5			**1536ST05C-1160**	12	118	71	56	45	●
	5		Whistle notch	**1736ST05C-1160**	12	118	71	56	45	○
11.7	3		Straight shank Zylinderschaft	**1534ST03C-1170**	12	102	55	40	45	○
	5			**1536ST05C-1170**	12	118	71	56	45	●
	5		Whistle notch	**1736ST05C-1170**	12	118	71	56	45	○
11.8	3		Straight shank Zylinderschaft	**1534ST03C-1180**	12	102	55	40	45	○
	5			**1536ST05C-1180**	12	118	71	56	45	●
	5		Whistle notch	**1736ST05C-1180**	12	118	71	56	45	○
11.9	3		Straight shank Zylinderschaft	**1534ST03C-1190**	12	102	55	40	45	○
	5			**1536ST05C-1190**	12	118	71	56	45	●
	5		Whistle notch	**1736ST05C-1190**	12	118	71	56	45	○
12.0	3		Straight shank Zylinderschaft	**1534ST03C-1200**	12	102	55	40	45	○
	5			**1536ST05C-1200**	12	118	71	56	45	●
	5		Whistle notch	**1736ST05C-1200**	12	118	71	56	45	○
12.20	5		Straight shank Zylinderschaft	**1536ST05C-1220**	14	124	77	60	45	●
12.25	3			**1534ST03C-1225**	14	107	60	43	45	○
	5			**1536ST05C-1225**	14	124	77	60	45	○
	5		Whistle notch	**1736ST05C-1225**	14	124	77	60	45	○
12.3	3		Straight shank Zylinderschaft	**1534ST03C-1230**	14	107	60	43	45	○
	5			**1536ST05C-1230**	14	124	77	60	45	●
	5		Whistle notch	**1736ST05C-1230**	14	124	77	60	45	○
12.5	3		Straight shank Zylinderschaft	**1534ST03C-1250**	14	107	60	43	45	○
	5			**1536ST05C-1250**	14	124	77	60	45	●
	5		Whistle notch	**1736ST05C-1250**	14	124	77	60	45	○

Drill diameter Bohrer Ø $d_1(m_7)$	Drilling depth Bohrtiefe (L/d1)	Cooling mode Kühlmittel.	Shank Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen					Grade Sorte
					Shankdiameter Ø Schaftdurchmesser	Overall length Gesamtlänge	Flute length Nutenlänge	effective drill. length Effektive Nutzlänge	Shank length Schaftlänge	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
12.7	3	Internal · Intern	Straight shank Zylinderschaft	1534ST03C-1270	14	107	60	43	45	○
	5			1536ST05C-1270	14	124	77	60	45	●
	5		Whistle notch shank · Schaft	1736ST05C-1270	14	124	77	60	45	○
12.75	3		Straight shank Zylinderschaft	1534ST03C-1275	14	107	60	43	45	○
	5			1536ST05C-1275	14	124	77	60	45	○
	5		Whistle notch shank · Schaft	1736ST05C-1275	14	124	77	60	45	○
12.8	3		Straight shank Zylinderschaft	1534ST03C-1280	14	107	60	43	45	○
	5			1536ST05C-1280	14	124	77	60	45	●
	5		Whistle notch shank · Schaft	1736ST05C-1280	14	124	77	60	45	○
13.0	3		Straight shank Zylinderschaft	1534ST03C-1300	14	107	60	43	45	○
	5			1536ST05C-1300	14	124	77	60	45	●
	5		Whistle notch shank · Schaft	1736ST05C-1300	14	124	77	60	45	○
13.1	3		Straight shank Zylinderschaft	1534ST03C-1310	14	107	60	43	45	○
	5			1536ST05C-1310	14	124	77	60	45	●
	5		Whistle notch shank · Schaft	1736ST05C-1310	14	124	77	60	45	○
13.5	3		Straight shank Zylinderschaft	1534ST03C-1350	14	107	60	43	45	○
	5			1536ST05C-1350	14	124	77	60	45	●
	5		Whistle notch shank · Schaft	1736ST05C-1350	14	124	77	60	45	○
13.8	3		Straight shank Zylinderschaft	1534ST03C-1380	14	107	60	43	45	○
	5			1536ST05C-1380	14	124	77	60	45	●
	5		Whistle notch shank · Schaft	1736ST05C-1380	14	124	77	60	45	○
14.0	3		Straight shank Zylinderschaft	1534ST03C-1400	14	107	60	43	45	○
	5			1536ST05C-1400	14	124	77	60	45	●
	5		Whistle notch shank · Schaft	1736ST05C-1400	14	124	77	60	45	○
14.25	3		Straight shank Zylinderschaft	1534ST03C-1425	16	115	65	45	48	○
	5			1536ST05C-1425	16	133	83	63	48	○
	5		Whistle notch shank · Schaft	1736ST05C-1425	16	133	83	63	48	○
14.3	3		Straight shank Zylinderschaft	1534ST03C-1430	16	115	65	45	48	○
	5			1536ST05C-1430	16	133	83	63	48	●
	5		Whistle notch shank · Schaft	1736ST05C-1430	16	133	83	63	48	○
14.5	3		Straight shank Zylinderschaft	1534ST03C-1450	16	115	65	45	48	○
	5			1536ST05C-1450	16	133	83	63	48	●
	5		Whistle notch shank · Schaft	1736ST05C-1450	16	133	83	63	48	○
14.75	3		Straight shank Zylinderschaft	1534ST03C-1475	16	115	65	45	48	○
	5			1536ST05C-1475	16	133	83	63	48	○
	5		Whistle notch shank · Schaft	1736ST05C-1475	16	133	83	63	48	○

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

Grade Sorte	Workpiece material · Werkstückstoff										
	Carbon Steel Kohlenstoff Stahl HB≤180	Alloy steel Liegierter Stahl	Hardened steel · Gehärteter Stahl			Stainless steel Rostfreier Stahl	Cast iron Gusseisen	Nodular cast iron GGG	Aluminum alloy Alu leg.	Copper alloy Kupfer leg.	Heat resist. alloy Warmfest. leg.
			~40HRC	~50HRC	~60HRC						
KDG303	✔	✔				✔					✔

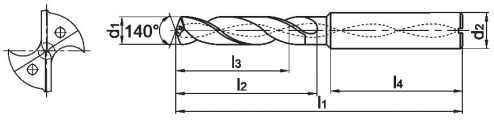
Code key C 10
ISO Kennzeichen
Cutting data 94-107
Schnittdaten
Technical Information C109-115
Technische Information
Non-standart tailor made C 117-121
Bestellformular für Sonderwerkzeuge

ST series · ST Serie for soft and stainless steel · für weichen & rostfreien Stahl



Internal Coolant
Interne Kühlung

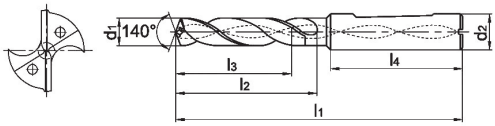
Straight shank
Zylinderschaft





Internal Coolant
Interne Kühlung

Whistle notch
shank · Schaft



- First choice for drilling soft & stainless steel.
- Sharp cutting edge can avoid build-up edge, suitable for drilling with high performance.
- Erste Wahl für das Bohren von weichen und rostfreien Stählen.
- Scharfe Schneiden reduzieren bzw. vermeiden Aufbauschneidenbildung. Besonders geeignet für das Hochleistungsbohren.

Drill diameter Bohrer Ø $d_1(m_7)$	Drilling depth Bohrtiefe (L/d1)	Cooling mode Kühlmittel.	Shank Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen					Grade Sorte
					Shankdiameter Ø Schaftdurchmesser	Overall length	Flute length	Recommended drilling depth	Shank length	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
14.8	3	Internal · Intern	Straight shank Zylinderschaft	**1534ST03C-1480**	16	115	65	45	48	○
	5			**1536ST05C-1480**	16	133	83	63	48	●
	5		Whistle notch	**1736ST05C-1480**	16	133	83	63	48	○
15.0	3		Straight shank Zylinderschaft	**1534ST03C-1500**	16	115	65	45	48	○
	5			**1536ST05C-1500**	16	133	83	63	48	●
	5		Whistle notch	**1736ST05C-1500**	16	133	83	63	48	○
15.1	3		Straight shank Zylinderschaft	**1534ST03C-1510**	16	115	65	45	48	○
	5			**1536ST05C-1510**	16	133	83	63	48	●
	5		Whistle notch	**1736ST05C-1510**	16	133	83	63	48	○
15.5	3		Straight shank Zylinderschaft	**1534ST03C-1550**	16	115	65	45	48	○
	5			**1536ST05C-1550**	16	133	83	63	48	●
	5		Whistle notch	**1736ST05C-1550**	16	133	83	63	48	○
15.8	3		Straight shank Zylinderschaft	**1534ST03C-1580**	16	115	65	45	48	○
	5			**1536ST05C-1580**	16	133	83	63	48	●
	5		Whistle notch	**1736ST05C-1580**	16	133	83	63	48	○
16.0	3		Straight shank Zylinderschaft	**1534ST03C-1600**	16	115	65	45	48	○
	5			**1536ST05C-1600**	16	133	83	63	48	●
	5		Whistle notch	**1736ST05C-1600**	16	133	83	63	48	○
16.5	3		Straight shank Zylinderschaft	**1534ST03C-1650**	18	123	73	51	48	○
	5			**1536ST05C-1650**	18	143	93	71	48	●
	5		Whistle notch	**1736ST05C-1650**	18	143	93	71	48	○
16.75	3		Straight shank Zylinderschaft	**1534ST03C-1675**	18	123	73	51	48	○
	5			**1536ST05C-1675**	18	143	93	71	48	○
	5		Whistle notch	**1736ST05C-1675**	18	143	93	71	48	○
16.8	3		Straight shank Zylinderschaft	**1534ST03C-1680**	18	123	73	51	48	○
	5			**1536ST05C-1680**	18	143	93	71	48	●
	5		Whistle notch	**1736ST05C-1680**	18	143	93	71	48	○
17.0	3		Straight shank Zylinderschaft	**1534ST03C-1700**	18	123	73	51	48	○
	5			**1536ST05C-1700**	18	143	93	71	48	●
	5		Whistle notch	**1736ST05C-1700**	18	143	93	71	48	○

Drill diameter Bohrer Ø $d_1(m_7)$	Drilling depth Bohrtiefe (L/d1)	Cooling mode Kühlmittel.	Shank Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen					Grade Sorte
					Shankdiameter Ø Schaftdurchmesser	Overall length Gesamtlänge	Flute length Nutenlänge	effective drill. length Effektive Nutzlänge	Shank length Schaftlänge	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
17.5	3	Internal · Intern	Straight shank Zylinderschaft	**1534ST03C-1750**	18	123	73	51	48	○
	5			**f-1750**	18	143	93	71	48	●
	5		Whistle notch shank · Schaft	**1736ST05C-1750**	18	143	93	71	48	○
17.8	3		Straight shank Zylinderschaft	**1534ST03C-1780**	18	123	73	51	48	○
	5			**1536ST05C-1780**	18	143	93	71	48	●
	5		Whistle notch shank · Schaft	**1736ST05C-1780**	18	143	93	71	48	○
18.0	3		Straight shank Zylinderschaft	**1534ST03C-1800**	18	123	73	51	48	○
	5			**1536ST05C-1800**	18	143	93	71	48	●
	5		Whistle notch shank · Schaft	**1736ST05C-1800**	18	143	93	71	48	○
18.5	3		Straight shank Zylinderschaft	**1534ST03C-1850**	20	131	79	55	50	○
	5			**1536ST05C-1850**	20	153	101	77	50	●
	5		Whistle notch shank · Schaft	**1736ST05C-1850**	20	153	101	77	50	○
18.8	3		Straight shank Zylinderschaft	**1534ST03C-1880**	20	131	79	55	50	○
	5			**1536ST05C-1880**	20	153	101	77	50	●
	5		Whistle notch shank · Schaft	**1736ST05C-1880**	20	153	101	77	50	○
19.0	3		Straight shank Zylinderschaft	**1534ST03C-1900**	20	131	79	55	50	○
	5			**1536ST05C-1900**	20	153	101	77	50	●
	5		Whistle notch shank · Schaft	**1736ST05C-1900**	20	153	101	77	50	○
19.5	3		Straight shank Zylinderschaft	**1534ST03C-1950**	20	131	79	55	50	○
	5			**1536ST05C-1950**	20	153	101	77	50	●
	5		Whistle notch shank · Schaft	**1736ST05C-1950**	20	153	101	77	50	○
19.8	3		Straight shank Zylinderschaft	**1534ST03C-1980**	20	131	79	55	50	○
	5			**1536ST05C-1980**	20	153	101	77	50	●
	5		Whistle notch shank · Schaft	**1736ST05C-1980**	20	153	101	77	50	○
20.0	3		Straight shank Zylinderschaft	**1534ST03C-2000**	20	131	79	55	50	○
	5			**1536ST05C-2000**	20	153	101	77	50	●
	5		Whistle notch shank · Schaft	**1736ST05C-2000**	20	153	101	77	50	○

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

Grade Sorte	Workpiece material · Werkstückstoff										
	Carbon Steel Kohlenstoff Stahl HB≤180	Alloy steel Liegierter Stahl	Hardened steel · Gehärteter Stahl			Stainless steel Rostfreier Stahl	Cast iron Gusseisen	Nodular cast iron GGG	Aluminum alloy Alu leg.	Copper alloy Kupfer leg.	Heat resist. alloy Warmfest. leg.
			~40HRC	~50HRC	~60HRC						
KDG303	✔	✔				✔					✔

Code key C 10
ISO Kennzeichen
Cutting data 94-107
Schnittdaten
Technical Information C109-115
Technische Information
Non-standart tailor made C 117-121
Bestellformular für Sonderwerkzeuge

SH series twist drill
Spiralbohrer Serie

For high hardness steel
Für gehärteten Stahl



- Uniquely designed chip-breakers and treated with high performance coating render to the drills high rigidity and durability. Especially suitable for the machining of heat treated materials (hardness up to HRC=40-60) and high strength steel (tensile strength 1500N/mm^2).
- Speziell entwickelte Spangeometrie in Verbindung mit einer Hochleistungsbeschichtung gibt dem Bohrer die entsprechende Voraussetzung zum Zerspanen von gehärteten Stahl und von hochvergütetem Stahl (Zugfestigkeit 1500N/mm^2) und (HRC=40-60).

Type · Typ: 1534SH03-1000

Size/Durchmesser: Ø10.0mm

Workpiece material
Werkstückstoff: S136 (53HRC)

Rotating speed
Umdrehung pro min: 800r/min

Cutting speed
Schnittgeschwindigkeit: 25m/min

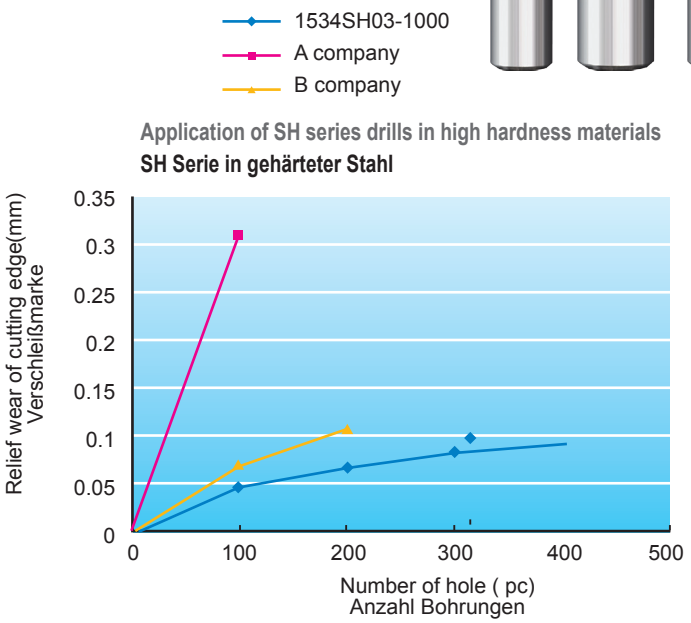
Feed rate per revolution
Vorschub pro Umdrehung: 0.08mm/r

Feed speed
Vorschub: 64mm/r

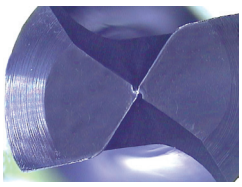
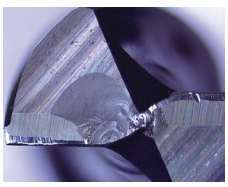
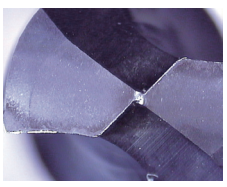
Drilling depth
Bohrtiefe: 20mm (blind hole)

Cooling system: water-soluble liquid
Kühlmittel.: Emulsion

Machine Maschine: MIKRON UCP 1000



■ **Drill wear status in machining process · Abb.: Verschleiß nach der Bearbeitung**

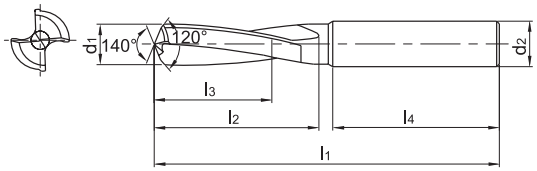
Drill/ Bohrer	ZCC 1534SH03-1000	Similar product of company A Vergleichbares Produkt A	Similar product of company B Vergleichbares Produkt B
Number of hole (pc) Bohrungen	400	100	200
Wear value Verschleißmarkenbreite	0.08 mm	Wear 0.31mm fracture 2.59 mm	0.108 mm
Wear Verschleiß			

SH series · SH Serie for high hardness steel · für die Hartbearbeitung



External Coolant
Externe Kühlung

Straight shank
Zylinderschaft



- For drilling high hardness steel (HRC 40~60) and higher tensile strength.
- Small helical angle and large core designed, greatly improve tool rigidity.
- Bohren von gehärteten Stählen (HRC 40-60) und Stählen mit hoher Zugfestigkeit.
- Kleiner Spiralwinkel und größerer Kerndurchmesser (Seele). Erhöht die Werkzeugstabilität deutlich.

Drill diameter Bohrer Ø $d_1(m_7)$	Drilling depth Bohrtiefe (L/d1)	Cooling mode Kühlmittel.	Shank Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen					Grade Sorte
					Shankdiameter Ø Schaftdurchmesser	Overall length Gesamtlänge	Flute length Nutenlänge	effective drill. length Effektive Nutzlänge	Shank length Schaftlänge	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	KDG303
3.0	3	External · Extern	Straight shank Zylinder-schaft	**1534SH03-0300**	6	62	20	14	36	○
3.3	3			**1534SH03-0330**	6	62	20	14	36	○
4.0	3			**1534SH03-0400**	6	66	24	17	36	○
4.2	3			**1534SH03-0420**	6	66	24	17	36	○
5.0	3			**1534SH03-0500**	6	66	28	20	36	○
6.0	3			**1534SH03-0600**	6	66	28	20	36	○
6.75	3			**1534SH03-0675**	8	79	34	24	36	○
7.0	3			**1534SH03-0700**	8	79	34	24	36	○
8.0	3			**1534SH03-0800**	8	79	41	29	36	○
8.5	3			**1534SH03-0850**	10	89	47	35	40	○
9.0	3			**1534SH03-0900**	10	89	47	35	40	○
10.0	3			**1534SH03-1000**	10	89	47	35	40	○
10.25	3			**1534SH03-1025**	12	102	55	40	45	○
10.5	3			**1534SH03-1050**	12	102	55	40	45	○
12.0	3			**1534SH03-1200**	12	102	55	40	45	○
12.5	3			**1534SH03-1250**	14	107	60	43	45	○
14.0	3			**1534SH03-1400**	14	107	60	43	45	○
14.5	3			**1534SH03-1450**	16	115	65	45	48	○
16.0	3			**1534SH03-1600**	16	115	65	45	48	○

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

Material Overview · Material Übersicht

Grade	Workpiece material										
	Mild steel Baustahl HB≤180	Liegierter Stahl, Alloy steel	Hardened steel · Gehärteter Stahl			Stainless steel Rostfreier Stahl	Cast iron Gusseisen	Nodular cast iron GGG	Aluminum alloy Alu-leg.	Copper alloy Kupfer leg.	Heat resist. alloy Warmfest. leg.
			~40HRC	~50HRC	~60HRC						
KDG303			✔	✔	✔						

Code key C 10
ISO Kennzeichen

Cutting data 94-107
Schnittdaten

Technical Information C109-115
Technische Information

Non-standart tailor made C 117-121
Bestellformular für Sonderwerkzeuge

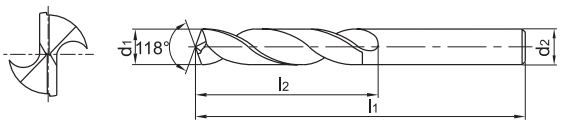
● ex Stock Lager · ab Lager ○ on demand · auf Anfrage

SC series · SC Serie for cast iron & AL alloy · für Grauguss & Alu Legierungen



External Coolant
Externe Kühlung

Straight shank
Zylinderschaft



- For materials with short chips such as cast iron, silicon-aluminum alloy etc.
- Cutting edge and shank with same diameter.
- Zur Bearbeitung von kurzspanenden Werkstoffen.
- Gleicher Schneiden-und Schaftdurchmesser.

Drill diameter $d_1(h_8)$	Drilling depth Bohrtiefe (L/d1)	Cooling mode Kühlmittel.	Shank Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen			Grade Sorte
					Shankdiameter Ø Schaftdurchmesser	Overall length Gesamtlänge	Flute length Nutenlänge	
					$d_2(h_7)$	l_1	l_2	YK20F
2.0	3	External · Extern	Straight shank Zylinder-schaft	**1105SC03-0200**	2.0	38	12	○
	5			**1101SC05-0200**	2.0	49	24	○
2.5	3			**1105SC03-0250**	2.5	43	14	○
	5			**1101SC05-0250**	2.5	57	30	○
2.8	3			**1105SC03-0280**	2.8	46	16	○
	5			**1101SC05-0280**	2.8	61	33	○
3.0	3			**1105SC03-0300**	3.0	46	16	○
	5			**1101SC05-0300**	3.0	61	33	○
3.1	3			**1105SC03-0310**	3.1	49	18	○
3.2	3			**1105SC03-0320**	3.2	49	18	○
3.3	3			**1105SC03-0330**	3.3	49	18	○
3.4	3			**1105SC03-0340**	3.4	52	20	○
3.5	3			**1105SC03-0350**	3.5	52	20	○
	5			**1101SC05-0350**	3.5	70	39	○
3.6	3			**1105SC03-0360**	3.6	52	20	○
3.7	3			**1105SC03-0370**	3.7	52	20	○
3.8	3			**1105SC03-0380**	3.8	55	22	○
	5			**1101SC05-0380**	3.8	75	43	○
3.9	3			**1105SC03-0390**	3.9	55	22	○
4.0	3			**1105SC03-0400**	4.0	55	22	○
	5			**1101SC05-0400**	4.0	75	43	○
4.1	3			**1105SC03-0410**	4.1	55	22	○
4.2	3			**1105SC03-0420**	4.2	55	22	○
	5			**1101SC05-0420**	4.2	75	43	○
4.3	3			**1105SC03-0430**	4.3	58	24	○
4.4	3			**1105SC03-0440**	4.4	58	24	○
4.5	3			**1105SC03-0450**	4.5	58	24	○
	5			**1101SC05-0450**	4.5	80	47	○
4.6	3			**1105SC03-0460**	4.6	58	24	○
4.7	3			**1105SC03-0470**	4.7	58	24	○
4.8	3			**1105SC03-0480**	4.8	62	26	○
	5			**1101SC05-0480**	4.8	86	52	○
4.9	3			**1105SC03-0490**	4.9	62	26	○

Drill diameter $d_1(h_8)$	Drilling depth Bohrtiefe (L/d1)	Cooling mode Kühlmittel.	Shank Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen			Grade Sorte
					Shankdiameter Ø Schaftdurchmesser	Overall length Gesamtlänge	Flute length Nutenlänge	
					$d_2(h_7)$	l_1	l_2	YK20F
5.0	3	External · Extern	Straight shank Zylinder-schaft	**1105SC03-0500**	5.0	62	26	○
	5			**1101SC05-0500**	5.0	86	52	○
5.1	3			**1105SC03-0510**	5.1	62	26	○
5.2	3			**1105SC03-0520**	5.2	62	26	○
5.3	3			**1105SC03-0530**	5.3	62	26	○
5.4	3			**1105SC03-0540**	5.4	66	28	○
5.5	3			**1105SC03-0550**	5.5	66	28	○
	5			**1101SC05-0550**	5.5	93	57	○
5.6	3			**1105SC03-0560**	5.6	66	28	○
5.7	3			**1105SC03-0570**	5.7	66	28	○
5.8	3			**1105SC03-0580**	5.8	66	28	○
	5			**1101SC05-0580**	5.8	93	57	○
5.9	3			**1105SC03-0590**	5.9	66	28	○
6.0	3			**1105SC03-0600**	6.0	66	28	○
	5			**1101SC05-0600**	6.0	93	57	○
6.1	3			**1105SC03-0610**	6.1	70	31	○
6.2	3			**1105SC03-0620**	6.2	70	31	○
6.3	3			**1105SC03-0630**	6.3	70	31	○
6.4	3			**1105SC03-0640**	6.4	70	31	○
6.5	3			**1105SC03-0650**	6.5	70	31	○
	5			**1101SC05-0650**	6.5	101	63	○
6.6	3			**1105SC03-0660**	6.6	70	31	○
6.7	3			**1105SC03-0670**	6.7	70	31	○
6.8	3			**1105SC03-0680**	6.8	74	34	○
	5			**1101SC05-0680**	6.8	109	69	○
6.9	3			**1105SC03-0690**	6.9	74	34	○
7.0	3			**1105SC03-0700**	7.0	74	34	○
	5			**1101SC05-0700**	7.0	109	69	○
7.1	3			**1105SC03-0710**	7.1	74	34	○
7.2	3			**1105SC03-0720**	7.2	74	34	○
7.3	3			**1105SC03-0730**	7.3	74	34	○
7.4	3			**1105SC03-0740**	7.4	74	34	○

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

Grade	Workpiece material · Werkstückstoff										
	Mild steel Baustahl HB≤180	Carbon steel, Alloy steel	Hardened steel · Gehärteter Stahl			Stainless steel Rostfreier Stahl	Cast iron	Nodular cast iron GGG	Aluminum alloy Alu-leg.	Copper alloy Kupfer leg.	Heat resist. alloy Warmfest. leg.
			~40HRC	~50HRC	~60HRC						
YK20F							✔	✔			

Code key C 10
ISO Kennzeichen

Cutting data 94-107
Schnittdaten

Technical Information C109-115
Technische Information

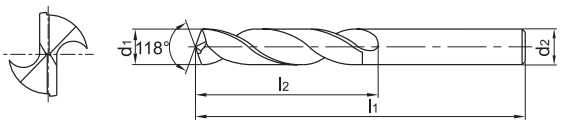
Non-standart tailor made C 117-121
Bestellformular für Sonderwerkzeuge

SC series · SC Serie for cast iron, AL alloy · für Grauguss Alu Legierungen



External Coolant
Externe Kühlung

Straight shank
Zylinderschaft



- For materials with short chips such as cast iron, silicon-aluminum alloy etc.
- Cutting edge and shank with same diameter.
- Zur Bearbeitung von kurzspanenden Werkstoffen.
- Gleicher Schneiden-und Schaftdurchmesser.

Drill diameter $d_1(h_8)$	Drilling depth Bohrtiefe (L/d1)	Cooling mode Kühlmittel.	Shank Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen			Grade Sorte
					Shankdiameter Ø Schaftdurchmesser	Overall length Gesamtlänge	Flute length Nutenlänge	
					$d_2(h_7)$	l_1	l_2	YK20F
7.5	3	External · Extern	Straight shank Zylinder-schaft	**1105SC03-0750**	7.5	74	34	○
	5			**1101SC05-0750**	7.5	109	69	○
7.6	3			**1105SC03-0760**	7.6	79	37	○
7.7	3			**1105SC03-0770**	7.7	79	37	○
7.8	3			**1105SC03-0780**	7.8	79	37	○
	5			**1101SC05-0780**	7.8	117	75	○
7.9	3			**1105SC03-0790**	7.9	79	37	○
8.0	3			**1105SC03-0800**	8.0	79	37	○
	5			**1101SC05-0800**	8.0	117	75	○
8.1	3			**1105SC03-0810**	8.1	79	37	○
8.2	3			**1105SC03-0820**	8.2	79	37	○
8.3	3			**1105SC03-0830**	8.3	79	37	○
8.4	3			**1105SC03-0840**	8.4	79	37	○
8.5	3			**1105SC03-0850**	8.5	79	37	○
	5			**1101SC05-0850**	8.5	117	75	○
8.6	3			**1105SC03-0860**	8.6	84	40	○
8.7	3			**1105SC03-0870**	8.7	84	40	○
8.8	3			**1105SC03-0880**	8.8	84	40	○
	5			**1101SC05-0880**	8.8	125	81	○
8.9	3			**1105SC03-0890**	8.9	84	40	○
9.0	3			**1105SC03-0900**	9.0	84	40	○
	5			**1101SC05-0900**	9.0	125	81	○
9.1	3			**1105SC03-0910**	9.1	84	40	○
9.2	3			**1105SC03-0920**	9.2	84	40	○
9.3	3			**1105SC03-0930**	9.3	84	40	○
9.4	3			**1105SC03-0940**	9.4	84	40	○
9.5	3			**1105SC03-0950**	9.5	84	40	○
	5			**1101SC05-0950**	9.5	125	81	○
9.6	3			**1105SC03-0960**	9.6	89	43	○
9.7	3			**1105SC03-0970**	9.7	89	43	○
9.8	3			**1105SC03-0980**	9.8	89	43	○
	5			**1101SC05-0980**	9.8	133	87	○
9.9	3			**1105SC03-0990**	9.9	89	43	○

Drill diameter $d_1(h_8)$	Drilling depth Bohrtiefe (L/d1)	Cooling mode Kühlmittel.	Shank Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen			Grade Sorte
					Shankdiameter Ø Schaftdurchmesser	Overall length Gesamtlänge	Flute length Nutenlänge	
					d_2 (h_7)	l_1	l_2	YK20F
10.0	3	External · Extern	Straight shank Zylinder-schaft	**1105SC03-1000**	10.0	89	43	○
	5			**1101SC05-1000**	10.0	133	87	○
10.1	3			**1105SC03-1010**	10.1	89	43	○
10.2	3			**1105SC03-1020**	10.2	89	43	○
10.4	3			**1105SC03-1040**	10.4	89	43	○
10.5	3			**1105SC03-1050**	10.5	89	43	○
	5			**1101SC05-1050**	10.5	133	87	○
10.7	3			**1105SC03-1070**	10.7	95	47	○
10.8	3			**1105SC03-1080**	10.8	95	47	○
	5			**1101SC05-1080**	10.8	142	94	○
11.0	3			**1105SC03-1100**	11.0	95	47	○
	5			**1101SC05-1100**	11.0	142	94	○
11.5	3			**1105SC03-1150**	11.5	95	47	○
	5			**1101SC05-1150**	11.5	142	94	○
12.0	3			**1105SC03-1200**	12.0	102	51	○
	5			**1101SC05-1200**	12.0	151	101	○
12.5	3			**1105SC03-1250**	12.5	102	51	○
	5			**1101SC05-1250**	12.5	151	101	○
12.8	3			**1105SC03-1280**	12.8	102	51	○
13.0	3			**1105SC03-1300**	13.0	102	51	○
	5			**1101SC05-1300**	13.0	151	101	○
13.1	3			**1105SC03-1310**	13.1	102	51	○
13.5	3			**1105SC03-1350**	13.5	107	54	○
	5			**1101SC05-1350**	13.5	160	108	○
14.0	3			**1105SC03-1400**	14.0	107	54	○
	5			**1101SC05-1400**	14.0	160	108	○
14.3	3			**1105SC03-1430**	14.3	111	56	○
14.5	3			**1105SC03-1450**	14.5	111	56	○
	5			**1101SC05-1450**	14.5	169	114	○
15.0	3			**1105SC03-1500**	15.0	111	56	○
	5			**1101SC05-1500**	15.0	169	114	○
15.5	5			**1101SC05-1550**	15.5	178	120	○
16.0	3			**1105SC03-1600**	16.0	115	58	○
	5			**1101SC05-1600**	16.0	178	120	○

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

Material Overview · Material Übersicht

Grade	Workpiece material										
	Mild steel Baustahl HB≤180	Carbon steel, Alloy steel	Hardened steel · Gehärteter Stahl			Stainless steel Rostfreier Stahl	Cast iron Gusseisen	Nodular cast iron GGG	Aluminum alloy Alu-leg.	Copper alloy Kupfer leg.	Heat resist. alloy Warmfest. leg.
			~40HRC	~50HRC	~60HRC						
YK20F							✔	✔	✔		

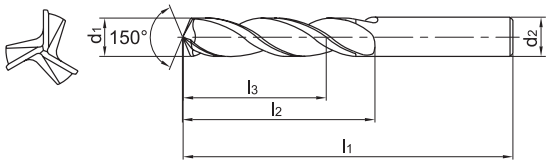
Code key C 10
ISO Kennzeichen
Cutting data 94-107
Schnittdaten
Technical Information C109-115
Technische Information
Non-standart tailor made C 117-121
Bestellformular für Sonderwerkzeuge

PA series · PA Serie for cast iron, AL alloy · für Grauguss Alu Legierungen



External Coolant
Externe Kühlung

Straight shank
Zylinderschaft



- For drilling solid workpiece composed of cast iron or Al alloy etc.
- Three-lips structure can achieve high feed rate and prominent centering capability.
- High machining reliability, suitable for poor conditions such as interrupted cutting.

- Bohren von stabilen Werkstücken aus Grauguss oder Alu-Legierungen.
- 3-Lippen-Bohrerform ist besonders geeignet für hohe Vorschübe.
- Hohe Bearbeitungssicherheit auch bei ungünstigen Bedingungen (z.B. unterbrochenem Schnitt)

Drill diameter $d_1(h_7)$	Drilling depth Bohrtiefe (L/d1)	Cooling mode Kühlmittel.	Shank Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen				Grade · Sorte	
					Shankdiameter Ø Schaftdurchmesser	Overall length Gesamtlänge	Flute length Nutenlänge	effective drill. length Effektive Nutzlänge	KDG303	YK30F
					$d_2(h_7)$	l_1	l_2	l_3		
3.0	3	External · Extern	Straight shank Zylinder-schaft	**1165PA03-0300**	3.0	46	16	12	○	○
3.1	3			**1165PA03-0310**	3.1	49	18	14	○	○
3.2	3			**1165PA03-0320**	3.2	49	18	14	○	○
3.3	3			**1165PA03-0330**	3.3	49	18	14	○	○
3.4	3			**1165PA03-0340**	3.4	52	20	15	○	○
3.5	3			**1165PA03-0350**	3.5	52	20	15	○	○
3.6	3			**1165PA03-0360**	3.6	52	20	15	○	○
3.7	3			**1165PA03-0370**	3.7	52	20	15	○	○
3.8	3			**1165PA03-0380**	3.8	55	22	17	○	○
3.9	3			**1165PA03-0390**	3.9	55	22	17	○	○
4.0	3			**1165PA03-0400**	4.0	55	22	17	○	○
4.1	3			**1165PA03-0410**	4.1	55	22	17	○	○
4.2	3			**1165PA03-0420**	4.2	55	22	17	○	○
4.3	3			**1165PA03-0430**	4.3	58	24	18	○	○
4.4	3			**1165PA03-0440**	4.4	58	24	18	○	○
4.5	3			**1165PA03-0450**	4.5	58	24	18	○	○
4.6	3			**1165PA03-0460**	4.6	58	24	18	○	○
4.7	3			**1165PA03-0470**	4.7	58	24	18	○	○
4.8	3			**1165PA03-0480**	4.8	62	26	20	○	○
4.9	3			**1165PA03-0490**	4.9	62	26	20	○	○
5.0	3			**1165PA03-0500**	5.0	62	26	20	○	○
5.1	3			**1165PA03-0510**	5.1	62	26	20	○	○
5.2	3			**1165PA03-0520**	5.2	62	26	20	○	○
5.3	3			**1165PA03-0530**	5.3	62	26	20	○	○
5.4	3			**1165PA03-0540**	5.4	66	28	21	○	○
5.5	3			**1165PA03-0550**	5.5	66	28	21	○	○
5.6	3			**1165PA03-0560**	5.6	66	28	21	○	○
5.7	3			**1165PA03-0570**	5.7	66	28	21	○	○
5.8	3			**1165PA03-0580**	5.8	66	28	21	○	○
5.9	3			**1165PA03-0590**	5.9	66	28	21	○	○
6.0	3			**1165PA03-0600**	6.0	66	28	21	○	○
6.1	3			**1165PA03-0610**	6.1	70	31	23	○	○
6.2	3			**1165PA03-0620**	6.2	70	31	23	○	○

Drill diameter $d_1(h_7)$	Drilling depth Bohrtiefe (L/d1)	Cooling mode Kühlmittel.	Shank Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen				Grade · Sorte	
					Shankdiameter Ø Schaftdurchmesser	Overall length Gesamtlänge	Flute length Nutenlänge	effective drill. length Effektive Nutzlänge	KDG303	YK30F
					$d_2(h_7)$	l_1	l_2	l_3		
6.3	3	External · Extern	Straight shank Zylinder-schaft	**1165PA03-0630**	6.3	70	31	23	○	○
6.4	3			**1165PA03-0640**	6.4	70	31	23	○	○
6.5	3			**1165PA03-0650**	6.5	70	31	23	○	○
6.6	3			**1165PA03-0660**	6.6	70	31	23	○	○
6.7	3			**1165PA03-0670**	6.7	70	31	23	○	○
6.8	3			**1165PA03-0680**	6.8	74	34	25	○	○
6.9	3			**1165PA03-0690**	6.9	74	34	25	○	○
7.0	3			**1165PA03-0700**	7.0	74	34	25	○	○
7.1	3			**1165PA03-0710**	7.1	74	34	25	○	○
7.2	3			**1165PA03-0720**	7.2	74	34	25	○	○
7.3	3			**1165PA03-0730**	7.3	74	34	25	○	○
7.4	3			**1165PA03-0740**	7.4	74	34	25	○	○
7.5	3			**1165PA03-0750**	7.5	74	34	25	○	○
7.6	3			**1165PA03-0760**	7.6	79	37	27	○	○
7.7	3			**1165PA03-0770**	7.7	79	37	27	○	○
7.8	3			**1165PA03-0780**	7.8	79	37	27	○	○
7.9	3			**1165PA03-0790**	7.9	79	37	27	○	○
8.0	3			**1165PA03-0800**	8.0	79	37	27	○	○
8.1	3			**1165PA03-0810**	8.1	79	37	27	○	○
8.2	3			**1165PA03-0820**	8.2	79	37	27	○	○
8.3	3			**1165PA03-0830**	8.3	79	37	27	○	○
8.4	3			**1165PA03-0840**	8.4	79	37	27	○	○
8.5	3			**1165PA03-0850**	8.5	79	37	27	○	○
8.6	3			**1165PA03-0860**	8.6	84	40	29	○	○
8.7	3			**1165PA03-0870**	8.7	84	40	29	○	○
8.8	3			**1165PA03-0880**	8.8	84	40	29	○	○
8.9	3			**1165PA03-0890**	8.9	84	40	29	○	○
9.0	3			**1165PA03-0900**	9.0	84	40	29	○	○
9.1	3			**1165PA03-0910**	9.1	84	40	29	○	○
9.2	3			**1165PA03-0920**	9.2	84	40	29	○	○
9.3	3			**1165PA03-0930**	9.3	84	40	29	○	○
9.4	3			**1165PA03-0940**	9.4	84	40	29	○	○
9.5	3			**1165PA03-0950**	9.5	84	40	29	○	○
9.6	3			**1165PA03-0960**	9.6	89	43	31	○	○
9.7	3			**1165PA03-0970**	9.7	89	43	31	○	○
9.8	3			**1165PA03-0980**	9.8	89	43	31	○	○

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

Material Overview · Material Übersicht

Grade Sorte	Workpiece material · Werkstückstoff										
	Mild steel Baustahl HB≤180	Carbon steel, Alloy steel	Hardened steel · gehärteter Stahl			Stainless steel Rostfreier Stahl	gray Cast iron Gusseisen	Nodular cast iron GGG	Aluminum alloy Alu leg.	Copper alloy Kupfer leg.	Heat resist. alloy warmfest. leg.
			~40HRC	~50HRC	~60HRC						
KDG303						✔	✔	✔	✔		✔
YK30F						✔	✔	✔	✔		✔

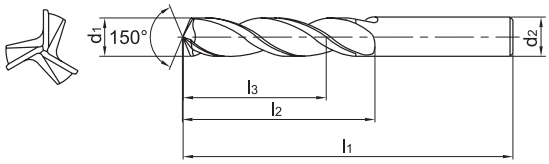
Code key C 10
ISO Kennzeichen
Cutting data 94-107
Schnittdaten
Technical Information C109-115
Technische Information
Non-standart tailor made C 117-121
Bestellformular für Sonderwerkzeuge

PA series · PA Serie for cast iron, AL alloy · für Grauguss Alu Legierungen



External Coolant
Externe Kühlung

Straight shank
Zylinderschaft



- For drilling solid workpiece composed of cast iron or Al alloy etc.
- Three-lips structure can achieve high feed rate and prominent centering capability.
- High machining reliability, suitable for poor conditions such as interrupted cutting.

- Bohren von stabilien Werkstücken aus Grauguss oder Alu Legierungen.
- 3 Lippen Bohrerform ist besonders geeignet für hohe Vorschübe.
- Hohe Bearbeitungssicherheit auch bei ungünstigen Bedingungen (z.B. unterbrochenem Schnitt)

Drill diameter $d_1(h_7)$	Drilling depth Bohrtiefe (L/d1)	Cooling mode Kühlmittel.	Shank Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen				Grade · Sorte	
					Shankdiameter Ø Schaftdurchmesser	Overall length Gesamtlänge	Flute length Nutenlänge	effective drill. length Effektive Nutzlänge	KDG303	YK30F
					$d_2(h_7)$	l_1	l_2	l_3		
9.9	3	External · Extern	Straight shank Zylinder-schaft	**1165PA03-0990**	9.9	89	43	31	○	○
10.0	3			**1165PA03-1000**	10.0	89	43	31	○	○
10.1	3			**1165PA03-1010**	10.1	89	43	31	○	○
10.2	3			**1165PA03-1020**	10.2	89	43	31	○	○
10.3	3			**1165PA03-1030**	10.3	89	43	31	○	○
10.5	3			**1165PA03-1050**	10.5	89	43	31	○	○
11.0	3			**1165PA03-1100**	11.0	95	47	33	○	○
11.2	3			**1165PA03-1120**	11.2	95	47	33	○	○
11.5	3			**1165PA03-1150**	11.5	95	47	33	○	○
11.8	3			**1165PA03-1180**	11.8	95	47	33	○	○
12.0	3			**1165PA03-1200**	12.0	102	51	35	○	○
12.1	3			**1165PA03-1210**	12.1	102	51	35	○	○
12.5	3			**1165PA03-1250**	12.5	102	51	35	○	○
13.0	3			**1165PA03-1300**	13.0	102	51	35	○	○
13.5	3			**1165PA03-1350**	13.5	107	54	37	○	○
14.0	3			**1165PA03-1400**	14.0	107	54	37	○	○
14.5	3			**1165PA03-1450**	14.5	111	56	38	○	○
15.0	3			**1165PA03-1500**	15.0	111	56	38	○	○
15.5	3			**1165PA03-1550**	15.5	115	58	38	○	○
16.0	3			**1165PA03-1600**	16.0	115	58	38	○	○
16.5	3			**1165PA03-1650**	16.5	119	60	39	○	○
17.0	3			**1165PA03-1700**	17.0	119	60	39	○	○
17.5	3			**1165PA03-1750**	17.5	123	62	40	○	○
18.0	3			**1165PA03-1800**	18.0	123	62	40	○	○
18.5	3			**1165PA03-1850**	18.5	127	64	41	○	○
19.0	3			**1165PA03-1900**	19.0	127	64	41	○	○
19.5	3			**1165PA03-1950**	19.5	131	66	42	○	○
20.0	3			**1165PA03-2000**	20.0	131	66	42	○	○

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

Material Overview · Material Übersicht

Grade	Workpiece material · Werkstückstoff										
	Mild steel Baustahl HB≤180	Carbon steel, Alloy steel	Hardened steel · gehärteter Stahl			Stainless steel Rostfreier Stahl	Cast iron Gusseisen	Nodular cast iron GGG	Aluminum alloy Alu-leg.	Copper alloy Kupfer leg.	Heat resist. alloy warmfest. leg.
			~40HRC	~50HRC	~60HRC						
KDG303						✔	✔	✔	✔		✔
YK30F						✔	✔	✔	✔		✔

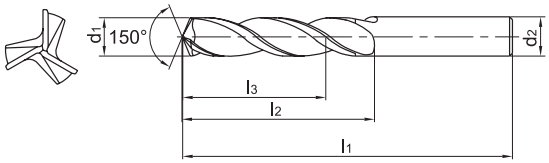
● ex Stock Lager ○ on demand · auf Anfrage

PC series · PC Serie for cast iron· für Grauguss



External Coolant
Externe Kühlung

Straight shank
Zylinderschaft



- For drilling solid workpiece composed of cast iron or Al alloy etc.
- Three-lips structure can achieve high feed rate and prominent centering capability.
- High machining reliability, suitable for poor conditions such as interrupted cutting.

- Bohren von stabilien Werkstücken aus Grauguss oder Alu Legierungen.
- 3 Lippen Bohrerform ist besonders geeignet für hohe Vorschübe.
- Hohe Bearbeitungssicherheit auch bei ungünstigen Bedingungen (z.B. unterbrochenem Schnitt)

Drill diameter $d_1(h_7)$	Drilling depth Bohrtiefe (L/d1)	Cooling mode Kühlmittel.	Shank Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen				Grade · Sorte	
					Shankdiameter Ø Schaftdurchmesser	Overall length Gesamtlänge	Flute length Nutenlänge	effective drill. length Effektive Nutzlänge	KDG303	YK30F
					$d_2(h_7)$	l_1	l_2	l_3		
3.0	3	External · Extern	Straight shank Zylinder-schaft	**1165PC03-0300**	3.0	46	16	12	○	○
3.1	3			**1165PC03-0310**	3.1	49	18	14	○	○
3.2	3			**1165PC03-0320**	3.2	49	18	14	○	○
3.3	3			**1165PC03-0330**	3.3	49	18	14	○	○
3.4	3			**1165PC03-0340**	3.4	52	20	15	○	○
3.5	3			**1165PC03-0350**	3.5	52	20	15	○	○
3.6	3			**1165PC03-0360**	3.6	52	20	15	○	○
3.7	3			**1165PC03-0370**	3.7	52	20	15	○	○
3.8	3			**1165PC03-0380**	3.8	55	22	17	○	○
3.9	3			**1165PC03-0390**	3.9	55	22	17	○	○
4.0	3			**1165PC03-0400**	4.0	55	22	17	○	○
4.1	3			**1165PC03-0410**	4.1	55	22	17	○	○
4.2	3			**1165PC03-0420**	4.2	55	22	17	○	○
4.3	3			**1165PC03-0430**	4.3	58	24	18	○	○
4.4	3			**1165PC03-0440**	4.4	58	24	18	○	○
4.5	3			**1165PC03-0450**	4.5	58	24	18	○	○
4.6	3			**1165PC03-0460**	4.6	58	24	18	○	○
4.7	3			**1165PC03-0470**	4.7	58	24	18	○	○
4.8	3			**1165PC03-0480**	4.8	62	26	20	○	○
4.9	3			**1165PC03-0490**	4.9	62	26	20	○	○
5.0	3			**1165PC03-0500**	5.0	62	26	20	○	○
5.1	3			**1165PC03-0510**	5.1	62	26	20	○	○
5.2	3			**1165PC03-0520**	5.2	62	26	20	○	○
5.3	3			**1165PC03-0530**	5.3	62	26	20	○	○
5.4	3			**1165PC03-0540**	5.4	66	28	21	○	○
5.5	3			**1165PC03-0550**	5.5	66	28	21	○	○
5.6	3			**1165PC03-0560**	5.6	66	28	21	○	○
5.7	3			**1165PC03-0570**	5.7	66	28	21	○	○
5.8	3			**1165PC03-0580**	5.8	66	28	21	○	○
5.9	3			**1165PC03-0590**	5.9	66	28	21	○	○
6.0	3			**1165PC03-0600**	6.0	66	28	21	○	○
6.1	3			**1165PC03-0610**	6.1	70	31	23	○	○
6.2	3			**1165PC03-0620**	6.2	70	31	23	○	○

Code key C 10
ISO Kennzeichen

Cutting data 94-107
Schnittdaten

Technical Information C109-115
Technische Information

Non-standart tailor made C 117-121
Bestellformular für Sonderwerkzeuge

Drill diameter $d_1(h_7)$	Drilling depth Bohrtiefe (L/d1)	Cooling mode Kühlmittel.	Shank Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen				Grade · Sorte	
					Shankdiameter Ø Schaftdurchmesser	Overall length Gesamtlänge	Flute length Nutenlänge	effective drill. length Effektive Nutzlänge	KDG303	YK30F
					$d_2(h_7)$	l_1	l_2	l_3		
6.3	3	External · Extern	Straight shank Zylinder-schaft	**1165PC03-0630**	6.3	70	31	23	○	○
6.4	3			**1165PC03-0640**	6.4	70	31	23	○	○
6.5	3			**1165PC03-0650**	6.5	70	31	23	○	○
6.6	3			**1165PC03-0660**	6.6	70	31	23	○	○
6.7	3			**1165PC03-0670**	6.7	70	31	23	○	○
6.8	3			**1165PC03-0680**	6.8	74	34	25	○	○
6.9	3			**1165PC03-0690**	6.9	74	34	25	○	○
7.0	3			**1165PC03-0700**	7.0	74	34	25	○	○
7.1	3			**1165PC03-0710**	7.1	74	34	25	○	○
7.2	3			**1165PC03-0720**	7.2	74	34	25	○	○
7.3	3			**1165PC03-0730**	7.3	74	34	25	○	○
7.4	3			**1165PC03-0740**	7.4	74	34	25	○	○
7.5	3			**1165PC03-0750**	7.5	74	34	25	○	○
7.6	3			**1165PC03-0760**	7.6	79	37	27	○	○
7.7	3			**1165PC03-0770**	7.7	79	37	27	○	○
7.8	3			**1165PC03-0780**	7.8	79	37	27	○	○
7.9	3			**1165PC03-0790**	7.9	79	37	27	○	○
8.0	3			**1165PC03-0800**	8.0	79	37	27	○	○
8.1	3			**1165PC03-0810**	8.1	79	37	27	○	○
8.2	3			**1165PC03-0820**	8.2	79	37	27	○	○
8.3	3			**1165PC03-0830**	8.3	79	37	27	○	○
8.4	3			**1165PC03-0840**	8.4	79	37	27	○	○
8.5	3			**1165PC03-0850**	8.5	79	37	27	○	○
8.6	3			**1165PC03-0860**	8.6	84	40	29	○	○
8.7	3			**1165PC03-0870**	8.7	84	40	29	○	○
8.8	3			**1165PC03-0880**	8.8	84	40	29	○	○
9.0	3			**1165PC03-0900**	9.0	84	40	29	○	○
9.1	3			**1165PC03-0910**	9.1	84	40	29	○	○
9.2	3			**1165PC03-0920**	9.2	84	40	29	○	○
9.3	3			**1165PC03-0930**	9.3	84	40	29	○	○
9.4	3			**1165PC03-0940**	9.4	84	40	29	○	○
9.5	3			**1165PC03-0950**	9.5	84	40	29	○	○
9.6	3			**1165PC03-0960**	9.6	89	43	31	○	○
9.7	3			**1165PC03-0970**	9.7	89	43	31	○	○
9.8	3			**1165PC03-0980**	9.8	89	43	31	○	○
9.9	3			**1165PC03-0990**	9.9	89	43	31	○	○
10.0	3			**1165PC03-1000**	10.0	89	43	31	○	○
10.1	3			**1165PC03-1010**	10.1	89	43	31	○	○
10.2	3			**1165PC03-1020**	10.2	89	43	31	○	○
10.3	3			**1165PC03-1030**	10.3	89	43	31	○	○
10.5	3			**1165PC03-1050**	10.5	89	43	31	○	○
11.0	3			**1165PC03-1100**	11.0	95	47	33	○	○
11.2	3			**1165PC03-1120**	11.2	95	47	33	○	○
11.5	3			**1165PC03-1150**	11.5	95	47	33	○	○
11.8	3			**1165PC03-1180**	11.8	95	47	33	○	○

Drill diameter $d_1(h_7)$	Drilling depth Bohrtiefe (L/d1)	Cooling mode Kühlmittel.	Shank Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen				Grade · Sorte	
					Shankdiameter Ø Schaftdurchmesser	Overall length Gesamtlänge	Flute length Nutenlänge	effective drill. length Effektive Nutzlänge	KDG303	YK30F
					$d_2(h_7)$	l_1	l_2	l_3		
12.0	3	External · Extern	Straight shank Zylinder-schaft	**1165PC03-1200**	12.0	102	51	35	○	○
12.1	3			**1165PC03-1210**	12.1	102	51	35	○	○
12.5	3			**1165PC03-1250**	12.5	102	51	35	○	○
13.0	3			**1165PC03-1300**	13.0	102	51	35	○	○
13.5	3			**1165PC03-1350**	13.5	107	54	37	○	○
14.0	3			**1165PC03-1400**	14.0	107	54	37	○	○
14.5	3			**1165PC03-1450**	14.5	111	56	38	○	○
15.0	3			**1165PC03-1500**	15.0	111	56	38	○	○
15.5	3			**1165PC03-1550**	15.5	115	58	38	○	○
16.0	3			**1165PC03-1600**	16.0	115	58	38	○	○
16.5	3			**1165PC03-1650**	16.5	119	60	39	○	○
17.0	3			**1165PC03-1700**	17.0	119	60	39	○	○
17.5	3			**1165PC03-1750**	17.5	123	62	40	○	○
18.0	3			**1165PC03-1800**	18.0	123	62	40	○	○
18.5	3			**1165PC03-1850**	18.5	127	64	41	○	○
19.0	3			**1165PC03-1900**	19.0	127	64	41	○	○
19.5	3			**1165PC03-1950**	19.5	131	66	42	○	○
20.0	3			**1165PC03-2000**	20.0	131	66	42	○	○

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

Grade	Workpiece material · Werkstückstoff										
	Mild steel Baustahl HB≤180	Carbon steel, Alloy steel	Hardened steel · gehärteter Stahl			Stainless steel Rostfreier Stahl	Cast iron Gusseisen	Nodular cast iron GGG	Aluminum alloy Alu-leg.	Copper alloy Kupfer leg.	Heat resist. alloy warmfest. leg.
			~40HRC	~50HRC	~60HRC						
KDG303							✔	✔			
YK30F							✔	✔			

Code key C 10
ISO Kennzeichen
Cutting data 94-107
Schnittdaten
Technical Information C109-115
Technische Information
Non-standart tailor made C 117-121
Bestellformular für Sonderwerkzeuge

PC series · PC Serie for cast iron, AL alloy · für Grauguss Alu Legierungen



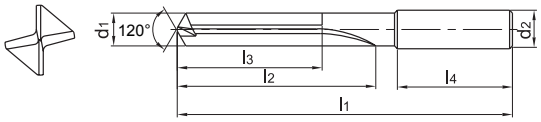
External Coolant
Externe Kühlung

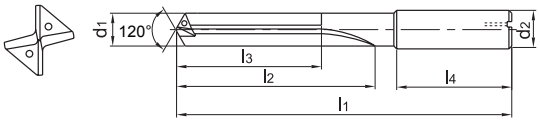
Straight shank
Zylinderschaft



Internal Coolant
Interne Kühlung

Straight shank
Zylinderschaft





- For materials with short chips such as cast iron, silicon-aluminum alloy etc.
- Excellent self centering capability can machine high efficiently, and the hole precision can reach H7.
- High positional accuracy, high linearity and good surface finish can be obtained in the hole drilled.

- Bearbeitung von kurzspanenden Werkstoffen wie Grauguss, Silizium-Alu-Legierungen etc.
- Exzellente Zentrierungseigenschaften für hocheffiziente Bearbeitung, Bohrungsqualität bis H7.
- Hohe Genauigkeit, hohe Zentrizität und gute Oberflächenqualität wird auf der gesamten Bohrungslänge erzielt.

Drill diameter Bohrer Ø $d_1(m_7)$	Drilling depth Bohrtiefe (L/d1)	Cooling mode Kühlmittel	Shank Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen					Grade Sorte
					Shankdiameter Ø Schaftdurchmesser	Overall length Gesamtlänge	Flute length Nutenlänge	effective drill. length Effektive Nutzlänge	Shank length Schaftlänge	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	YK20F
4.0	5	External Extern	Straight shank Zylinder schaft	**1576PC05-0400**	6.0	74	36	29	36	○
		Internal Intern		**1576PC05C-0400**	6.0	74	36	29	36	●
4.2	5	External Extern		**1576PC05-0420**	6.0	74	36	29	36	○
		Internal Intern		**1576PC05C-0420**	6.0	74	36	29	36	●
5.0	5	External Extern		**1576PC05-0500**	6.0	82	44	35	36	○
		Internal Intern		**1576PC05C-0500**	6.0	82	44	35	36	●
	15	Internal Intern		**1579PC15C-0500**	6.0	145	105	96	36	○
6.0	5	External Extern		**1576PC05-0600**	6.0	82	44	35	36	○
		Internal Intern		**1576PC05C-0600**	6.0	82	44	35	36	●
	15	Internal Intern		**1579PC15C-0600**	6.0	145	105	96	36	○
6.75	5	External Extern		**1576PC05-0675**	8.0	91	53	43	36	○
		Internal Intern		**1576PC05C-0675**	8.0	91	53	43	36	●
7.0	5	External Extern		**1576PC05-0700**	8.0	91	53	43	36	○
		Internal Intern		**1576PC05C-0700**	8.0	91	53	43	36	●
8.0	5	External Extern		**1576PC05-0800**	8.0	91	53	43	36	○
		Internal Intern		**1576PC05C-0800**	8.0	91	53	43	36	●
	15	Internal Intern		**1579PC15C-0800**	8.0	180	137	127	36	○
8.5	5	External Extern		**1576PC05-0850**	10.0	103	61	49	40	○
		Internal Intern		**1576PC05C-0850**	10.0	103	61	49	40	●
9.0	5	External Extern		**1576PC05-0900**	10.0	103	61	49	40	○
		Internal Intern		**1576PC05-0900**	10.0	103	61	49	40	●
	15	Internal Intern		**1579PC15C-0900**	10.0	217	170	158	40	○
10.0	5	External Extern		**1576PC05-1000**	10.0	103	61	49	40	○
		Internal Intern		**1576PC05C-1000**	10.0	103	61	49	40	●
	15	Internal Intern		**1579PC15C-1000**	10.0	217	170	158	40	○
10.25	5	External Extern		**1576PC05-1025**	12.0	118	71	56	45	○
		Internal Intern		**1576PC05C-1025**	12.0	118	71	56	45	●

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

Grade	Workpiece material · Werkstückstoff										
	Mild steel Baustahl HB≤180	Carbon steel, Alloy steel	Hardened steel · Gehärteter Stahl			Stainless steel Rostfreier Stahl	Cast iron	Nodular cast iron GGG	Aluminum alloy Alu-leg.	Copper alloy Kupfer leg.	Heat resist. alloy Warmfest. leg.
			~40HRC	~50HRC	~60HRC						
YK20F							✔	✔	✔		

● ex Stock Lager ○ on demand · auf Anfrage

PC series · PC Serie for cast iron, AL alloy · für Grauguss Alu Legierungen



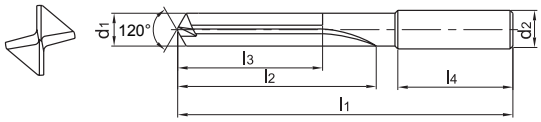
External Coolant
Externe Kühlung

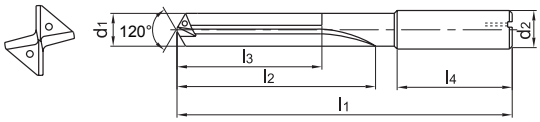
Straight shank
Zylinderschaft



Internal Coolant
Interne Kühlung

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Drill diameter Bohrer Ø $d_1(m_7)$	Drilling depth Bohrtiefe (L/d1)	Cooling mode Kühlmittel	Shank Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen					Grade Sorte
					Shankdiameter Ø Schaftdurchmesser	Overall length Gesamtlänge	Flute length Nutenlänge	effective drill. length Effektive Nutzlänge	Shank length Schaftlänge	
					$d_2(h_6)$	l_1	l_2	l_3	l_4	YK20F
11.0	5	External Extern	Straight shank Zylinder schaft	**1576PC05-1100**	12.0	118	71	56	45	○
		Internal Intern		**1576PC05C-1100**	12.0	118	71	56	45	●
	15	Internal Intern		**1579PC15C-1100**	12.0	258	205	190	45	○
12.0	5	External Extern		**1576PC05-1200**	12.0	118	71	56	45	○
		Internal Intern		**1576PC05C-1200**	12.0	118	71	56	45	●
	15	Internal Intern		**1579PC15C-1200**	12.0	258	205	190	45	○
13.0	5	External Extern		**1576PC05-1300**	14.0	124	77	60	45	○
		Internal Intern		**1576PC05C-1300**	14.0	124	77	60	45	●
14.0	5	External Extern		**1576PC05-1400**	14.0	124	77	60	45	○
		Internal Intern		**1576PC05C-1400**	14.0	124	77	60	45	●
	15	Internal Intern		**1579PC15C-1400**	14.0	290	236	219	45	○
15.0	5	External Extern		**1576PC05-1500**	16.0	133	83	63	48	○
		Internal Intern		**1576PC05C-1500**	16.0	133	83	63	48	●
15.5	5	External Extern		**1576PC05-1550**	16.0	133	83	63	48	○
		Internal Intern		**1576PC05-1550**	16.0	133	83	63	48	
16.0	5	External Extern		**1576PC05-1600**	16.0	133	83	63	48	○
		Internal Intern		**1576PC05C-1600**	16.0	133	83	63	48	●
17.0	5	External Extern		**1576PC05-1700**	18.0	143	93	71	48	○
		Internal Intern		**1576PC05C-1700**	18.0	143	93	71	48	○
17.5	5	External Extern		**1576PC05-1750**	18.0	143	93	71	48	○
		Internal Intern		**1576PC05C-1750**	18.0	143	93	71	48	○
18.0	5	External Extern		**1576PC05-1800**	18.0	143	93	71	48	○
		Internal Intern		**1576PC05C-1800**	18.0	143	93	71	48	○
19.5	5	External Extern		**1576PC05-1950**	20.0	153	101	77	50	○
		Internal Intern		**1576PC05C-1950**	20.0	153	101	77	50	○
20.0	5	External Extern		**1576PC05-2000**	20.0	153	101	77	50	○
		Internal Intern		**1576PC05C-2000**	20.0	153	101	77	50	○

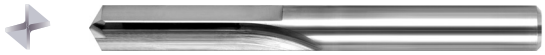
Code key C 10
ISO Kennzeichen

Cutting data 94-107
Schnittdaten

Technical Information C109-115
Technische Information

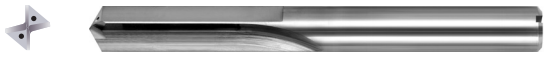
Non-standart tailor made C 117-121
Bestellformular für Sonderwerkzeuge

PC series · PC Serie for cast iron & AL alloy · für Grauguss & Alu Legierungen



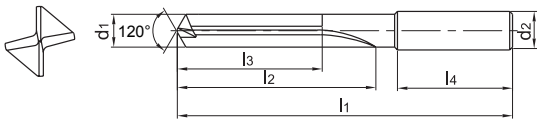
External Coolant
Externe Kühlung

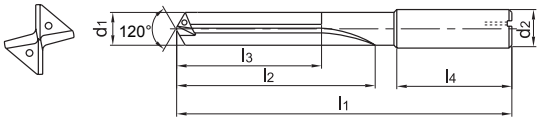
Straight shank
Zylinderschaft



Internal Coolant
Interne Kühlung

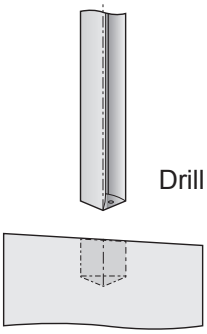
Straight shank
Zylinderschaft





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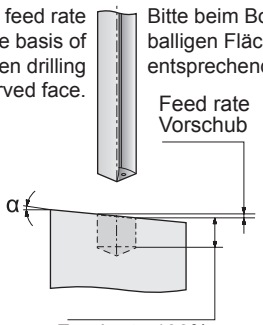
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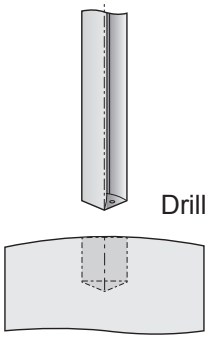
Drill inclined face
· Bohren in Schrägen

Please reduce the feed rate correspondingly to the basis of recommended parameters when drilling inclined or curved face.

Bitte beim Bohren in schrägen oder balligen Flächen den Vorschub entsprechend reduzieren.



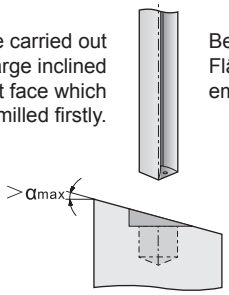
Inclined angle α	Max. feed rate
1°	80%
2°	50%
3°	30%



Drill curved face
· Bohren in balligen Flächen

Pretreatment should be carried out when the face possess a large inclined angle, drill hole at the flat face which milled firstly.

Beim Bohren in sehr großen schrägen Flächen, ist eine Vorbearbeitung zu empfehlen.(Anfasen)



Material Overview · Material Übersicht

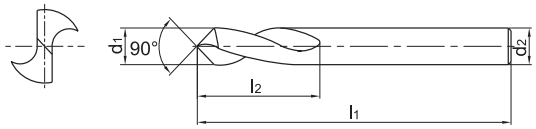
✔ = Very suitable · Sehr empfohlen
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Grade Sorte	Workpiece material · Werkstückstoff										
	Mild steel Baustahl HB≤180	Carbon steel, Alloy steel	Hardened steel · gehärteter Stahl			Stainless steel Rostfreier Stahl	Cast iron Gusseisen	Nodular cast iron GGG	Aluminum alloy Alu leg.	Copper alloy Kupfer leg.	Heat resist. alloy warmfest. leg.
			~40HRC	~50HRC	~60HRC						
YK20F							✔	✔	✔		

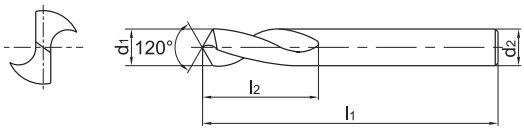
● ex Stock Lager ○ on demand · auf Anfrage

SC series · SC Serie for cast iron & AL alloy · für Grauguss & Alu Legierungen


External Coolant
Externe Kühlung
Straight shank
Zylinderschaft



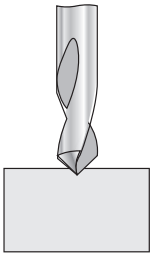

Internal Coolant
Interne Kühlung
Straight shank
Zylinderschaft



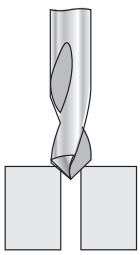
- Suitable for drilling center hole and chamfer.
- Comparing with common centering drills, it possesses more stable centering capability. Even at the slant face, it is also easy to carry out center drilling.
- Zum Zentrierbohren und Fasen.
- Die Bohrer sind in ihrer Stabilität höher im Vergleich zu normalen Zentrierbohren.

Drill diameter Bohrer Ø $d_1(h_6)$	Point angle Spitzen-winkel	Cooling mode Kühlmittel.	Shank Schaft	Type · Typ	Basic dimension(mm) · Basis Abmessungen			Grade Sorte	
					Shankdiameter Ø Schaftdurchmesser	Overall length Gesamtlänge	Flute length Nutenlänge		
					$d_2(h_6)$	l_1	l_2	YK20F	KDG303
5	90°	External Extern	Straight shank Zylinder-schaft	**1143SC90-0500**	5.00	62	10	○	●
	120°			**1143SC120-0500**	5.00	62	10	○	●
6	90°			**1143SC90-0600**	6.00	66	15	○	●
	120°			**1143SC120-0600**	6.00	66	15	○	●
8	90°			**1143SC90-0800**	8.00	79	17	○	●
	120°			**1143SC120-0800**	8.00	79	17	○	●
10	90°			**1143SC90-1000**	10.00	89	20	○	●
	120°			**1143SC120-1000**	10.00	89	20	○	●
12	90°			**1143SC90-1200**	12.00	102	25	○	●
	120°			**1143SC120-1200**	12.00	102	25	○	●
14	90°			**1143SC90-1400**	14.00	107	30	○	●
	120°			**1143SC120-1400**	14.00	107	30	○	●
16	90°			**1143SC90-1600**	16.00	115	35	○	●
	120°			**1143SC120-1600**	16.00	115	35	○	●
20	90°			**1143SC90-2000**	20.00	131	40	○	●
	120°			**1143SC120-2000**	20.00	131	40	○	●

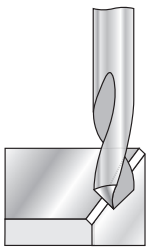
Centering
Zentrieren



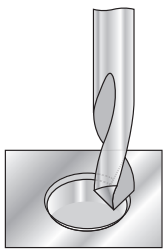
Hole chamfering
Bohrungen anfasen



Chamfering
Fasen



Hole chamfering
Größere Bohrungen anfasen



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Material Overview · Material Übersicht

Grade Sorte	Workpiece material · Werkstückstoff										
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			~40HRC	~50HRC	~60HRC						
YK20F							✔	✔	✔		

Code key C 10
ISO Kennzeichen
Cutting data 94-107
Schnittdaten
Technical Information C109-115
Technische Information
Non-standart tailor made C 117-121
Bestellformular für Sonderwerkzeuge

SU series twist drills · SU Spiralbohrer Serie (External coolant/ Kühlung)

3D 5D

Workpiece material / Werkstück-stoff	Mild steel Baustahl HB≤180		Carbon steel, alloy steel Kohlenstoffstahl Leg. Stahl ~30HRC		Pre-hardened steel Vergüteter Stahl ~40HRC		Stainless steel Rostfreier Stahl		Cast iron Gusseisen		Nodular cast iron GGG		Aluminum alloy Alu. Legierungen		Heat resistant alloy Warmfeste Legierungen	
Vc	60~120m/min		60~120m/min		40~70m/min		25~40m/min		60~120m/min		50~100m/min		60~140m/min		15~25m/min	
Ø (mm)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)
2	14000	0.06~0.08	14000	0.06~0.08	9500	0.06~0.08	5500	0.02~0.05	14000	0.06~0.08	11000	0.06~0.08	16000	0.06~0.08	3200	0.02~0.04
3	9500	0.09~0.12	9500	0.09~0.12	6300	0.09~0.12	3700	0.03~0.07	9500	0.09~0.12	7400	0.09~0.12	10600	0.09~0.12	2100	0.03~0.06
4	7000	0.10~0.15	7000	0.10~0.15	4700	0.10~0.15	2700	0.04~0.08	7000	0.10~0.15	5600	0.10~0.15	8000	0.10~0.15	1600	0.04~0.07
5	5700	0.12~0.18	5700	0.12~0.18	3800	0.12~0.18	2200	0.05~0.10	5700	0.12~0.18	4500	0.12~0.18	6400	0.12~0.18	1250	0.05~0.09
6	4700	0.14~0.20	4700	0.14~0.20	3100	0.14~0.20	1850	0.06~0.12	4700	0.14~0.20	3700	0.14~0.20	5300	0.14~0.20	1050	0.06~0.11
8	3600	0.16~0.24	3600	0.16~0.24	2400	0.16~0.24	1400	0.08~0.16	3600	0.16~0.24	2800	0.16~0.24	4000	0.16~0.24	800	0.08~0.14
10	2800	0.18~0.27	2800	0.18~0.27	1900	0.18~0.27	1100	0.10~0.18	2800	0.18~0.27	2200	0.18~0.27	3200	0.18~0.27	600	0.10~0.16
12	2400	0.20~0.30	2400	0.20~0.30	1600	0.20~0.30	930	0.12~0.20	2400	0.20~0.30	1900	0.20~0.30	2700	0.20~0.30	500	0.12~0.18
14	2100	0.22~0.35	2100	0.22~0.35	1400	0.22~0.35	800	0.13~0.22	2100	0.22~0.35	1600	0.22~0.35	2300	0.22~0.35	450	0.13~0.20
16	1800	0.25~0.36	1800	0.25~0.36	1200	0.25~0.36	700	0.14~0.25	1800	0.25~0.36	1400	0.25~0.36	2000	0.25~0.36	400	0.14~0.23
18	1600	0.28~0.38	1600	0.28~0.38	1100	0.28~0.38	620	0.15~0.28	1600	0.28~0.38	1200	0.28~0.38	1800	0.28~0.38	350	0.15~0.25
20	1400	0.30~0.40	1400	0.30~0.40	950	0.30~0.40	550	0.16~0.30	1400	0.30~0.40	1100	0.30~0.40	1600	0.30~0.40	320	0.16~0.28

1. When the tool is used for the first time, please make a test cutting with 90% of cutting speed or 85% feed rate mentioned above. If the cutting conditions remain stable, gradually increase the cutting speed and feed rate.
2. The cutting conditions above are for drilling with emulsion.
3. Use a collet without any defect or dust. The radial run-out of drill must be under 0.02mm.
4. These conditions above are for cutting depth under 5D.

1. Beim ersten Einsatz 90% der empfohlenen Schnittgeschwindigkeit oder 85% des Vorschubes wählen. Bei stabiler Bearbeitung die Schnittdaten entsprechend erhöhen.
2. Die obigen Schnittdatenempfehlung basieren auf dem Einsatz von Emulsion.
3. Keine defekte Werkzeugaufnahme wählen. Die Rundlaufgenauigkeit muss unter 0,02mm liegen.
4. Die obigen Schnittdaten sind für Bohrungstiefen unter 5xD ausgelegt.

SU series twist drills · SU Spiralbohrer Serie (Internal coolant/ Kühlung)

3D 5D

Workpiece material / Werkstück-stoff	Mild steel Baustahl HB≤180		Carbon steel, alloy steel Kohlenstoffstahl Leg. Stahl ~30HRC		Pre-hardened steel Vergüteter Stahl ~40HRC		Stainless steel Rostfreier Stahl		Cast iron Gusseisen		Nodular cast iron GGG		Aluminum alloy Alu. Legierungen		Heat resistant alloy Warmfeste Legierungen	
Vc	80~150m/min		80~150m/min		50~80m/min		50~80m/min		80~150m/min		60~120m/min		100~180m/min		15~25m/min	
Ø (mm)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)
3	12700	0.09~0.12	12700	0.09~0.12	7400	0.09~0.12	6300	0.03~0.07	12700	0.09~0.12	9500	0.09~0.12	15000	0.09~0.12	2100	0.03~0.06
4	9600	0.10~0.15	9600	0.10~0.15	5600	0.10~0.15	4700	0.04~0.08	9600	0.10~0.15	7000	0.10~0.15	11100	0.10~0.15	1600	0.04~0.07
5	7600	0.12~0.18	7600	0.12~0.18	4500	0.12~0.18	3800	0.05~0.10	7600	0.12~0.18	5700	0.12~0.18	9000	0.12~0.18	1250	0.05~0.09
6	6400	0.14~0.20	6400	0.14~0.20	3700	0.14~0.20	3200	0.06~0.12	6400	0.14~0.20	4700	0.14~0.20	7400	0.14~0.20	1050	0.06~0.11
8	4800	0.16~0.24	4800	0.16~0.24	2800	0.16~0.24	2400	0.08~0.16	4800	0.16~0.24	3600	0.16~0.24	5600	0.16~0.24	800	0.08~0.14
10	3800	0.18~0.27	3800	0.18~0.27	2200	0.18~0.27	1900	0.10~0.18	3800	0.18~0.27	2800	0.18~0.27	4500	0.18~0.27	600	0.10~0.16
12	3200	0.20~0.30	3200	0.20~0.30	1900	0.20~0.30	1600	0.12~0.20	3200	0.20~0.30	2400	0.20~0.30	3700	0.20~0.30	500	0.12~0.18
14	2700	0.22~0.35	2700	0.22~0.35	1600	0.22~0.35	1350	0.13~0.22	2700	0.22~0.35	2100	0.22~0.35	3200	0.22~0.35	450	0.13~0.20
16	2400	0.25~0.36	2400	0.25~0.36	1400	0.25~0.36	1200	0.14~0.25	2400	0.25~0.36	1800	0.25~0.36	2800	0.25~0.36	400	0.14~0.23
18	2100	0.28~0.38	2100	0.28~0.38	1200	0.28~0.38	1050	0.15~0.28	2100	0.28~0.38	1600	0.28~0.38	2500	0.28~0.38	350	0.15~0.25
20	1900	0.30~0.40	1900	0.30~0.40	1100	0.30~0.40	950	0.16~0.30	1900	0.30~0.40	1400	0.30~0.40	2300	0.30~0.40	320	0.16~0.28

1. When the tool is used for the first time, please make a test cutting with 90% of cutting speed or 85% feed rate mentioned above. If the cutting conditions remain stable, gradually increase the cutting speed and feed rate.
2. The cutting conditions above are for drilling with emulsion.
3. Use a collet without any defect or dust. The radial run-out of drill must be under 0.02mm.
4. These conditions above are for cutting depth under 5D.

1. Beim ersten Einsatz 90% der empfohlenen Schnittgeschwindigkeit oder 85% des Vorschubes wählen. Bei stabiler Bearbeitung die Schnittdaten entsprechend erhöhen.
2. Die obigen Schnittdatenempfehlung basieren auf dem Einsatz von Emulsion.
3. Keine defekte Werkzeugaufnahme wählen. Die Rundlaufgenauigkeit muss unter 0,02mm liegen.
4. Die obigen Schnittdaten sind für Bohrungstiefen unter 5xD ausgelegt.

SU series twist drills · SU Spiralbohrer Serie (Internal coolant/ Kühlung)

8D

Workpiece material / Werkstück-stoff	Mild steel Baustahl HB≤180		Carbon steel, alloy steel Kohlenstoffstahl Leg. Stahl ~30HRC		Pre-hardened steel Vergüteter Stahl ~40HRC		Stainless steel Rostfreier Stahl		Cast iron Gusseisen		Nodular cast iron GGG		Aluminum alloy Alu. Legierungen		Heat resistant alloy Warmfeste Legierungen	
Vc	80~150m/min		80~150m/min		50~80m/min		40~60m/min		80~150m/min		60~120m/min		100~180m/min		15~25m/min	
Ø (mm)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)
3	12700	0.06~0.10	12700	0.06~0.10	7400	0.06~0.10	5300	0.03~0.07	12700	0.06~0.10	9500	0.06~0.10	15000	0.09~0.12	2100	0.03~0.06
4	9600	0.08~0.12	9600	0.08~0.12	5600	0.08~0.12	4000	0.04~0.08	9600	0.08~0.12	7000	0.08~0.12	11100	0.10~0.15	1600	0.04~0.07
5	7600	0.10~0.14	7600	0.10~0.14	4500	0.10~0.14	3200	0.05~0.10	7600	0.10~0.14	5700	0.10~0.14	9000	0.10~0.14	1250	0.05~0.09
6	6400	0.11~0.16	6400	0.11~0.16	3700	0.11~0.16	2700	0.06~0.12	6400	0.11~0.16	4700	0.11~0.16	7400	0.11~0.16	1050	0.06~0.11
8	4800	0.13~0.19	4800	0.13~0.19	2800	0.13~0.19	2000	0.08~0.16	4800	0.13~0.19	3600	0.13~0.19	5600	0.13~0.19	800	0.08~0.14
10	3800	0.14~0.22	3800	0.14~0.22	2200	0.14~0.22	1600	0.10~0.18	3800	0.14~0.22	2800	0.14~0.22	4500	0.14~0.22	600	0.10~0.16
12	3200	0.16~0.24	3200	0.16~0.24	1900	0.16~0.24	1300	0.12~0.20	3200	0.16~0.24	2400	0.16~0.24	3700	0.16~0.24	500	0.12~0.18
14	2700	0.18~0.28	2700	0.18~0.28	1600	0.18~0.28	1100	0.13~0.22	2700	0.18~0.28	2100	0.18~0.28	3200	0.18~0.28	450	0.13~0.20
16	2400	0.20~0.29	2400	0.20~0.29	1400	0.20~0.29	1000	0.14~0.25	2400	0.20~0.29	1800	0.20~0.29	2800	0.20~0.29	400	0.14~0.23
18	2100	0.24~0.32	2100	0.24~0.32	1200	0.24~0.32	880	0.15~0.28	2100	0.24~0.32	1600	0.24~0.32	2500	0.24~0.32	350	0.15~0.25

1. When the tool is used for the first time, please make a test cutting with 90% of cutting speed or 85% feed rate mentioned above. If the cutting conditions remain stable, gradually increase the cutting speed and feed rate.
2. The cutting conditions above are for drilling with emulsion.
3. Use a collet without any defect or dust. The radial run-out of drill must be under 0.02mm.
4. These conditions above are for cutting depth under 8D.

1. Beim ersten Einsatz 90% der empfohlenen Schnittgeschwindigkeit oder 85% des Vorschubes wählen. Bei stabiler Bearbeitung die Schnittdaten entsprechend erhöhen.
2. Die obigen Schnittdatenempfehlung basieren auf dem Einsatz von Emulsion.
3. Keine defekte Werkzeugaufnahme wählen. Die Rundlaufgenauigkeit muss unter 0,02mm liegen.
4. Die obigen Schnittdaten sind für Bohrungstiefen unter 8xD ausgelegt.

SU series step drills · SU Stufenbohrer Serie (External coolant/ Kühlung)

3D

workpiece material / Werkstück-stoff	Mild steel Baustahl HB≤180		Carbon steel, alloy steel Kohlenstoffstahl Leg. Stahl ~30HRC		Pre-hardened steel Vergüteter Stahl ~40HRC		Stainless steel Rostfreier Stahl		Cast iron Gusseisen		Nodular cast iron GGG		Aluminum alloy Alu. Legierungen		Heat resistant alloy Warmfeste Legierungen	
Vc	50~100m/min		50~100m/min		30~50m/min		25~40m/min		50~100m/min		40~80m/min		60~120m/min		15~25m/min	
Ø (mm)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)
3.3	5800	0.09~0.12	5800	0.09~0.12	3850	0.09~0.12	2900	0.03~0.07	5800	0.09~0.12	5000	0.09~0.12	10000	0.09~0.12	1600	0.03~0.06
4.2	4550	0.10~0.15	4550	0.10~0.15	3000	0.10~0.15	2300	0.04~0.08	4550	0.10~0.15	3800	0.10~0.15	7600	0.10~0.15	1250	0.04~0.07
5	3800	0.12~0.18	3800	0.12~0.18	2550	0.12~0.18	1900	0.05~0.10	3800	0.12~0.18	3200	0.12~0.18	6400	0.12~0.18	1050	0.05~0.10
6.75	2850	0.14~0.20	2850	0.14~0.20	1900	0.14~0.20	1400	0.06~0.12	2850	0.14~0.20	2400	0.14~0.20	4800	0.14~0.20	800	0.06~0.11
7	2750	0.15~0.22	2750	0.15~0.22	1800	0.15~0.22	1350	0.07~0.14	2750	0.15~0.22	2300	0.15~0.22	4550	0.15~0.22	730	0.07~0.12
8.5	2250	0.16~0.24	2250	0.16~0.24	1500	0.16~0.24	1100	0.08~0.16	2250	0.16~0.24	1800	0.16~0.24	3600	0.16~0.24	600	0.08~0.14
9	2100	0.17~0.25	2100	0.17~0.25	1400	0.17~0.25	1050	0.09~0.17	2100	0.17~0.25	1750	0.17~0.25	3500	0.17~0.25	560	0.09~0.15
10.25	1850	0.18~0.27	1850	0.18~0.27	1250	0.18~0.27	930	0.10~0.18	1850	0.18~0.27	1550	0.18~0.27	3100	0.18~0.27	500	0.10~0.16
10.5	1800	0.19~0.28	1800	0.19~0.28	1200	0.19~0.28	900	0.11~0.19	1800	0.19~0.28	1500	0.19~0.28	3000	0.19~0.28	480	0.11~0.17
12	1600	0.20~0.30	1600	0.20~0.30	1050	0.20~0.30	800	0.12~0.20	1600	0.20~0.30	1300	0.20~0.30	2600	0.20~0.30	450	0.12~0.18
12.5	1550	0.20~0.30	1550	0.20~0.30	1000	0.20~0.30	760	0.12~0.20	1550	0.20~0.30	1250	0.20~0.30	2550	0.20~0.30	410	0.12~0.18
14	1350	0.22~0.35	1350	0.22~0.35	900	0.22~0.35	700	0.14~0.24	1350	0.22~0.35	1150	0.22~0.35	2300	0.22~0.35	370	0.13~0.20
14.5	1300	0.22~0.35	1300	0.22~0.35	880	0.22~0.35	650	0.14~0.24	1300	0.22~0.35	1050	0.22~0.35	2200	0.22~0.35	350	0.13~0.20

1. When the tool is used for the first time, please make a test cutting with 90% of cutting speed or 85% feed rate mentioned above. If the cutting conditions remain stable, gradually increase the cutting speed and feed rate.
2. The cutting conditions above are for drilling with emulsion.
3. Use a collet without any defect or dust. The radial run-out of drill must be under 0.02mm.

1. Beim ersten Einsatz 90% der empfohlenen Schnittgeschwindigkeit oder 85% des Vorschubes wählen. Bei stabiler Bearbeitung die Schnittdaten entsprechend erhöhen.
2. Die obigen Schnittdatenempfehlung basieren auf dem Einsatz von Emulsion.
3. Keine defekte Werkzeugaufnahme wählen. Die Rundlaufgenauigkeit muss unten 0,02mm liegen.

SL series twist deep drills · SL Spiraltiefbohrer Serie (Internal coolant · Interne Kühlung) 12D

Workpiece material/ Werkstück-stoff	Mild steel/ Baustahl HB≤180		Carbon steel, alloy steel/ Kohlenstoffstahl Leg. Stahl ~30HRC		Pre-hardened steel/ Vergüteter Stahl ~40HRC		Stainless steel/ Rostfreier Stahl		Cast iron/ Gusseisen		Nodular cast iron/ GGG		Aluminum alloy/ Alu. Legierungen		Heat resistant alloy/ Warmfeste Legierungen	
Vc	60~120m/min		60~120m/min		50~80 m/min		40~60 m/min		80~150 m/min		60~120 m/min		100~180 m/min		10~20 m/min	
Ø (mm)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)
3	10600	0.06~0.1	10600	0.06~0.1	7400	0.06~0.1	5300	0.03~0.07	12700	0.06~0.1	9500	0.06~0.1	15000	0.09~0.12	2100	0.03~0.06
4	8000	0.08~0.12	8000	0.08~0.12	5600	0.08~0.12	4000	0.04~0.08	96000	0.08~0.12	7000	0.08~0.12	11000	0.10~0.15	1600	0.04~0.07
5	6400	0.10~0.14	6400	0.10~0.14	4500	0.10~0.14	3200	0.05~0.10	7600	0.10~0.14	5700	0.10~0.14	9000	0.10~0.15	1250	0.05~0.9
6	5300	0.11~0.16	5300	0.11~0.16	3700	0.11~0.16	2700	0.06~0.12	6400	0.11~0.16	4700	0.11~0.16	7400	0.11~0.16	1050	0.06~0.11
8	4000	0.13~0.19	4000	0.13~0.19	2800	0.13~0.19	2000	0.08~0.16	4800	0.13~0.19	3600	0.13~0.19	5600	0.13~0.19	800	0.08~0.14
10	3200	0.14~0.22	3200	0.14~0.22	2200	0.14~0.22	1600	0.10~0.18	3800	0.14~0.22	2800	0.14~0.22	4500	0.14~0.22	600	0.10~0.16
12	2700	0.16~0.24	2700	0.16~0.24	1900	0.16~0.24	1300	0.12~0.20	3200	0.16~0.24	2400	0.16~0.24	3700	0.16~0.24	500	0.12~0.18
14	2300	0.18~0.28	2300	0.18~0.28	1600	0.18~0.28	1100	0.13~0.22	2700	0.18~0.28	2100	0.18~0.28	3200	0.18~0.28	450	0.13~0.20

SL series twist deep drills · SL Spiraltiefbohrer Serie (Internal coolant · Interne Kühlung) 20D 30D

Workpiece material/ Werkstück-stoff	Mild steel/ Baustahl HB≤180		Carbon steel, alloy steel/ Kohlenstoffstahl Leg. Stahl ~30HRC		Pre-hardened steel/ Vergüteter Stahl ~40HRC		Stainless steel/ Rostfreier Stahl		Cast iron/ Gusseisen		Nodular cast iron/ GGG		Aluminum alloy/ Alu. Legierungen		Heat resistant alloy/ Warmfeste Legierungen	
Vc	70~90 m/min		50~80 m/min		40~60 m/min		40~60 m/min		50~80 m/min		60~80 m/min		100~180 m/min		8~15 m/min	
Ø (mm)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)
3	8250	0.06~0.1	7650	0.06~0.1	5200	0.06~0.1	4750	0.03~0.07	7100	0.06~0.1	7600	0.06~0.1	12750	0.09~0.12	1350	0.03~0.06
4	6250	0.08~0.12	5750	0.08~0.12	3900	0.08~0.12	3600	0.04~0.08	5400	0.08~0.12	5600	0.08~0.12	9350	0.10~0.15	1050	0.04~0.07
5	5000	0.10~0.14	4600	0.10~0.14	3150	0.10~0.14	2900	0.05~0.10	4250	0.10~0.14	4550	0.10~0.14	7650	0.10~0.15	800	0.05~0.9
6	4150	0.11~0.16	3800	0.11~0.16	2600	0.11~0.16	2450	0.06~0.12	3600	0.11~0.16	3750	0.11~0.16	6300	0.11~0.16	700	0.06~0.11
8	3100	0.13~0.19	2900	0.13~0.19	1950	0.13~0.19	1800	0.08~0.16	2700	0.13~0.19	2900	0.13~0.19	4750	0.13~0.19	500	0.08~0.14
10	2500	0.14~0.22	2300	0.14~0.22	1550	0.14~0.22	1450	0.10~0.18	2150	0.14~0.22	2250	0.14~0.22	3850	0.14~0.22	400	0.10~0.16
12	2100	0.16~0.24	1950	0.16~0.24	1350	0.16~0.24	1150	0.12~0.20	1800	0.16~0.24	1900	0.16~0.24	3150	0.16~0.24	350	0.12~0.18
14	1800	0.18~0.28	1650	0.18~0.28	1100	0.18~0.28	1000	0.13~0.22	1500	0.18~0.28	1700	0.18~0.28	2700	0.18~0.28	300	0.13~0.20

1. When the tool is used for the first time, please make a test cutting with 90% of cutting speed or 85% feed rate mentioned above. If the cutting conditions remain stable, gradually increase the cutting speed and feed rate.
2. The cutting conditions above are for drilling with emulsion.
3. Use a collet without any defect or dust. The radial run-out of drill must be under 0.02mm.
4. These conditions above are for cutting depth below 30xD.

1. Beim ersten Einsatz 90% der empfohlenen Schnittgeschwindigkeit oder 85% des Vorschubs wählen. Bei stabiler Bearbeitung die Schnittdaten entsprechend erhöhen.
2. Die obigen Schnittdatenempfehlungen basieren auf dem Einsatz von Emulsion.
3. Keine defekte Werkzeugaufnahme wählen. Die Rundlaufgenauigkeit muss unter 0,02mm liegen.
4. Die obigen Schnittdaten sind für Bohrungstiefen unter 30xD ausgelegt.

SP series pilot drills · SP Pilotbohrer Serie (Internal coolant · Interne Kühlung)

3D

Workpiece material/ Werkstück-stoff	Mild steel/ Baustahl HB≤180		Carbon steel, alloy steel/ Kohlenstoffstahl Leg. Stahl ~30HRC		Pre-hardened steel/ Vergüteter Stahl ~40HRC		Stainless steel/ Rostfreier Stahl		Cast iron/ Gusseisen		Nodular cast iron/ GGG		Aluminum alloy/ Alu. Legierungen		Heat resistant alloy/ Warmfeste Legierungen	
Vc	80~150m/min		80~150m/min		50~80m/min		50~80m/min		80~150m/min		60~120m/min		100~180m/min		15~25m/min	
Ø (mm)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)
3	12700	0.09~ 0.12	12700	0.09~ 0.12	7400	0.09~ 0.12	6300	0.03~ 0.07	12700	0.09~ 0.12	9500	0.09~ 0.12	15000	0.09~ 0.12	2100	0.03~ 0.06
4	9600	0.10~ 0.15	9600	0.10~ 0.15	5600	0.10~ 0.15	4700	0.04~ 0.08	9600	0.10~ 0.15	7000	0.10~ 0.15	11100	0.10~ 0.15	1600	0.04~ 0.07
5	7600	0.12~ 0.18	7600	0.12~ 0.18	4500	0.12~ 0.18	3800	0.05~ 0.10	7600	0.12~ 0.18	5700	0.12~ 0.18	9000	0.12~ 0.18	1250	0.05~ 0.09
6	6400	0.14~ 0.20	6400	0.14~ 0.20	3700	0.14~ 0.20	3200	0.06~ 0.12	6400	0.14~ 0.20	4700	0.14~ 0.20	7400	0.14~ 0.20	1050	0.06~ 0.11
8	4800	0.16~ 0.24	4800	0.16~ 0.24	2800	0.16~ 0.24	2400	0.08~ 0.16	4800	0.16~ 0.24	3600	0.16~ 0.24	5600	0.16~ 0.24	800	0.08~ 0.14
10	3800	0.18~ 0.27	3800	0.18~ 0.27	2200	0.18~ 0.27	1900	0.10~ 0.18	3800	0.18~ 0.27	2800	0.18~ 0.27	4500	0.18~ 0.27	600	0.10~ 0.16
12	3200	0.20~ 0.30	3200	0.20~ 0.30	1900	0.20~ 0.30	1600	0.12~ 0.20	3200	0.20~ 0.30	2400	0.20~ 0.30	3700	0.20~ 0.30	500	0.12~ 0.18
14	2700	0.22~ 0.35	2700	0.22~ 0.35	1600	0.22~ 0.35	1350	0.13~ 0.22	2700	0.22~ 0.35	2100	0.22~ 0.35	3200	0.22~ 0.35	450	0.13~ 0.20

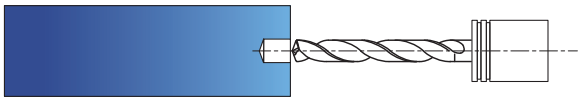
1. When the tool is used for the first time, please make a test cutting with 90% of cutting speed or 85% feed rate mentioned above. If the cutting conditions remain stable, gradually increase the cutting speed and feed rate.
2. The cutting conditions above are for drilling with emulsion.
3. Use a collet without any defect or dust. The radial run-out of drill must be under 0.02mm.
4. These conditions above are for cutting depth below 3xD.

1. Beim ersten Einsatz 90% der empfohlenen Schnittgeschwindigkeit oder 85% des Vorschubs wählen. Bei stabiler Bearbeitung die Schnittdaten entsprechend erhöhen.
2. Die obigen Schnittdatenempfehlungen basieren auf dem Einsatz von Emulsion.
3. Keine defekte Werkzeugaufnahme wählen. Die Rundlaufgenauigkeit muss unter 0,02mm liegen.
4. Die obigen Schnittdaten sind für Bohrungstiefen unter 3xD ausgelegt.

SL series · SL Serie

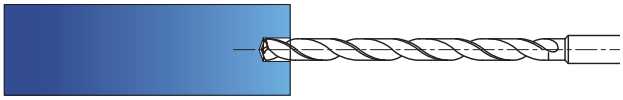
Recommended cutting data · Schnittdatenempfehlung (Deep drill · Tiefbohrer)

1 Preparation pilot hole with 1534SP03C∗
Herstellung der Pilotbohrung mit 1534SP03C∗



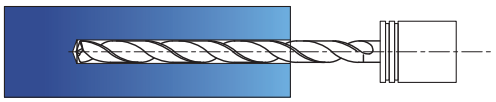
— Top angel of pilot drill must be bigger than SL-drill.
Spitzenwinkel des Pilotbohrers muß größer sein als beim SL-Bohrer.
— Diameter of pilot drill must be 0.01~0.04mm bigger than SL-drill.
Der Durchmesser des Pilotbohrers sollte 0.01~0.04 mm größer sein als beim SL-Bohrer.
— The pilot hole should be 1~3×D.
Tiefe der Pilotbohrung soll 1~3×D betragen.
— V_C: 60-80 m/min; f: 0.1-0.25 mm/r; a_p: 1~3×D

2 Entering into pilot hole with SL-drill
Einführen des SL-Bohrers in die Pilotbohrung



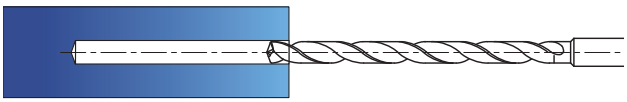
— Entering the pilot hole with low cutting speed.(V_C:20~30m/min)
Den SL-Bohrer mit geringer Drehzahl in die Pilotbohrung einführen. (V_C:20~30 m/min)
— 1~3 mm stop before end of pilot hole. (V_f=0)
1~3 mm vor dem Lochende stehenbleiben. (V_f=0)
— Increase cutting speed up to recommended parameter and than start feed rate.
Die Schnittgeschwindigkeit auf die empfohlenen Parameter erhöhen und erst dann mit dem Vorschub beginnen.

3 Making deep hole
Herstellung der Tieflochbohrung



— Drilling with suitable cutting speed and feed rate.
Bohren mit geeigneter Schnittgeschwindigkeit und Vorschüben.
— At cross holes feed rate should be reduced to 0.05 mm/rev..
Bei Querbohrungen den Vorschub auf 0.05 mm/u reduzieren.

4 Pull back of drill
Herausziehen des Bohrers



— After reaching the required depth reduce the cutting speed (V_C: 20~30 m/min) and pull back the drill by high feed rate. (V_f: 2000 mm/min)
Nach Erreichen der geforderten Bohrtiefe die Schnittgeschwindigkeit reduzieren (V_C: 20~30 m/min) und den Bohrer mit hohem Vorschub (V_f: 2000 mm/min) herausziehen.

General information · Allgemeiner Hinweis

If surface contour is not flat use suitable operation (e.g. face milling with solid carbide endmill) for preparation.
Sollte die Kontur des Bauteils eine Schräge aufweisen, eine geeignete Bearbeitung (z.B. Planfräsen mit VHM - Fräser) zur Begradigung durchführen.

ST series twist drills · ST Spiralbohrer Serie (Internal coolant/ Kühlung)

3D 5D

Workpiece material Werkstück-stoff	Mild steel Baustahl HB≤180		Carbon steel, alloy steel Kohlenstoffstahl Leg. Stahl ~30HRC		Stainless steel · Rostfreier Stahl					
					Austenite		Martensite		Ferrite	
Vc	80~150m/min		80~150m/min		40~80 m/min		50~100 m/min		60~120 m/min	
Ø (mm)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)
3	12700	0.09~0.12	12700	0.09~0.12	6300	0.03~0.07	7400	0.03~0.07	9000	0.03~0.07
4	9600	0.10~0.15	9600	0.10~0.15	4700	0.04~0.08	5600	0.04~0.08	6700	0.04~0.08
5	7600	0.12~0.18	7600	0.12~0.18	3800	0.05~0.10	4500	0.05~0.10	5400	0.05~0.10
6	6400	0.14~0.20	6400	0.14~0.20	3200	0.06~0.12	3700	0.06~0.12	4500	0.06~0.12
8	4800	0.16~0.24	4800	0.16~0.24	2400	0.08~0.16	2800	0.08~0.16	3400	0.08~0.16
10	3800	0.18~0.27	3800	0.18~0.27	1900	0.10~0.18	2200	0.10~0.18	2700	0.10~0.18
12	3200	0.20~0.30	3200	0.20~0.30	1600	0.12~0.20	1900	0.12~0.20	2300	0.12~0.20
14	2700	0.22~0.35	2700	0.22~0.35	1350	0.13~0.22	1600	0.13~0.22	1900	0.13~0.22
16	2400	0.25~0.36	2400	0.25~0.36	1200	0.14~0.25	1400	0.14~0.25	1700	0.14~0.25
18	2100	0.28~0.38	2100	0.28~0.38	1050	0.15~0.28	1200	0.15~0.28	1500	0.15~0.28
20	1900	0.30~0.40	1900	0.30~0.40	950	0.16~0.30	1100	0.16~0.30	1350	0.16~0.30

1. When the tool is used for the first time, please make a test cutting with 90% of cutting speed or 85% feed rate mentioned above. If the cutting conditions remain stable, gradually increase the cutting speed and feed rate.
2. The cutting conditions above are for drilling with emulsion.
3. Use a collet without any defect or dust. The radial run-out of drill must be under 0.02mm.
4. These conditions above are for cutting depth under 5D.

1. Beim ersten Einsatz 90% der empfohlenen Schnittgeschwindigkeit oder 85% des Vorschubes wählen. Bei stabiler Bearbeitung die Schnittdaten entsprechend erhöhen.
2. Die obigen Schnittdatenempfehlung basieren auf dem Einsatz von Emulsion.
3. Keine defekte Werkzeugaufnahme wählen. Die Rundlaufgenauigkeit muss unter 0,02mm liegen.
4. Die obigen Schnittdaten sind für Bohrungstiefen unter 5xD ausgelegt.

SH series step drills SH Spiralbohrer Serie (External coolant/ Kühlung)

3D

Workpiece material Werkstückstoff	Hardened steel · Gehärteter Stahl					
	40~50HRC		50~55HRC		55~60HRC	
Vc	20~40m/min		15~30m/min		10~20m/min	
Ø (mm)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)
3	3200	0.02~0.03	2100	0.02~0.03	1060	0.015~0.02
4	2400	0.03~0.04	1600	0.03~0.04	800	0.02~0.025
5	1900	0.04~0.05	1250	0.04~0.05	640	0.025~0.03
6	1600	0.05~0.06	1050	0.05~0.06	530	0.03~0.04
8	1200	0.06~0.08	800	0.06~0.07	400	0.04~0.05
10	950	0.08~0.10	640	0.07~0.08	320	0.05~0.06
12	800	0.10~0.12	530	0.08~0.09	270	0.06~0.07
14	680	0.12~0.14	450	0.09~0.10	230	0.07~0.08
16	600	0.14~0.16	400	0.10~0.12	200	0.08~0.10

1. When the tool is used for the first time, please make a test cutting with 90% of cutting speed or 85% feed rate mentioned above. If the cutting conditions remain stable, gradually increase the cutting speed and feed rate.
2. The cutting conditions above are for drilling with emulsion.
3. Use a collet without any defect or dust. The radial run-out of drill must be under 0.02mm.
4. These conditions above are for cutting depth under 3D.

1. Beim ersten Einsatz 90% der empfohlenen Schnittgeschwindigkeit oder 85% des Vorschubes wählen. Bei stabiler Bearbeitung die Schnittdaten entsprechend erhöhen.
2. Die obigen Schnittdatenempfehlung basieren auf dem Einsatz von Emulsion.
3. Keine defekte Werkzeugaufnahme wählen. Die Rundlaufgenauigkeit muss unter 0,02mm liegen.
4. Die obigen Schnittdaten sind für Bohrungstiefen unter 3xD ausgelegt.

SC series twist drills · SC Spiralbohrer Serie (External coolant/ Kühlung) 3D 5D

Workpiece material Werkstückstoff	Cast iron Grauguss		Nodular cast iron GGG		Silicon aluminium alloy Silizium Alu Legierung				Aluminum alloy Alu Legierung	
					Si≤10%		Si>10%			
Vc	50~80m/min		40~70m/min		100~180m/min		80~140m/min		120~200m/min	
Ø (mm)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)
2	9550	0.06~ 0.08	8000	0.06~ 0.08	20000	0.07~0.16	18000	0.07~0.16	24000	0.07~0.16
3	6400	0.09~ 0.12	5300	0.09~ 0.12	15000	0.09~0.18	12700	0.09~0.18	16000	0.09~0.18
4	4800	0.10~ 0.15	4000	0.10~ 0.15	11000	0.10~0.22	9600	0.10~0.22	12000	0.10~0.22
5	3800	0.12~ 0.18	3200	0.12~ 0.18	9000	0.12~0.25	7600	0.12~0.25	10000	0.12~0.25
6	3100	0.14~ 0.20	2700	0.14~ 0.20	7400	0.14~0.28	6400	0.14~0.28	8500	0.14~0.28
8	2400	0.16~ 0.24	2000	0.16~ 0.24	5600	0.18~0.32	4800	0.18~0.32	6400	0.18~0.32
10	1900	0.18~ 0.27	1600	0.18~ 0.27	4500	0.22~0.36	3800	0.22~0.36	5000	0.22~0.36
12	1600	0.20~ 0.30	1300	0.20~ 0.30	3700	0.25~0.40	3200	0.25~0.40	4200	0.25~0.40
14	1350	0.22~ 0.35	1150	0.22~ 0.35	3200	0.27~0.44	2700	0.27~0.44	3600	0.27~0.44
16	1200	0.25~ 0.36	1000	0.25~ 0.36	2800	0.32~0.48	2400	0.32~0.48	3200	0.32~0.48

1. When the tool is used for the first time, please make a test cutting with 90% of cutting speed or 85% feed rate mentioned above. If the cutting conditions remain stable, gradually increase the cutting speed and feed rate.
2. The cutting conditions above are for drilling with emulsion.
3. Use a collet without any defect or dust. The radial run-out of drill must be under 0.02mm.
4. These conditions above are for cutting depth under 5D.

1. Beim ersten Einsatz 90% der empfohlenen Schnittgeschwindigkeit oder 85% des Vorschubes wählen. Bei stabiler Bearbeitung die Schnittdaten entsprechend erhöhen.
2. Die obigen Schnittdatenempfehlung basieren auf dem Einsatz von Emulsion.
3. Keine defekte Werkzeugaufnahme wählen. Die Rundlaufgenauigkeit muss unter 0,02mm liegen.
4. Die obigen Schnittdaten sind für Bohrungstiefen unter 5xD ausgelegt.

PA series coated three-lips drills (External coolant/ Kühlung)
PA Serie, beschichtete 3-Lippenbohrer (External coolant/ Kühlung)

3D

Workpiece material Werkstückstoff	Cast iron Grauguss		Nodular cast iron GGG		Silicon aluminium alloy Silizium Alu Legierung				Aluminum alloy Alu Legierung		Heat resistant alloy Warmfeste Legierung	
					Si≤10%		Si>10%					
Vc	60~120m/min		50~100m/min		100~180m/min		80~140m/min		120~200m/min		20~40m/min	
Ø (mm)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)
3	9500	0.09~0.12	7400	0.09~0.12	14000	0.07~0.16	12700	0.07~0.16	16000	0.07~0.16	3200	0.03~0.06
4	7000	0.10~0.15	5600	0.10~0.15	10000	0.09~0.18	9600	0.09~0.18	12000	0.09~0.18	2400	0.04~0.07
5	5700	0.12~0.18	4500	0.12~0.18	9000	0.10~0.22	7600	0.10~0.22	10000	0.10~0.22	1900	0.05~0.09
6	4700	0.14~0.20	3700	0.14~0.20	7400	0.12~0.25	6400	0.12~0.25	8500	0.12~0.25	1600	0.06~0.11
8	3600	0.16~0.24	2800	0.16~0.24	5600	0.14~0.28	4800	0.14~0.28	6400	0.14~0.28	1200	0.08~0.14
10	2800	0.18~0.27	2200	0.18~0.27	4500	0.18~0.32	3800	0.18~0.32	5000	0.18~0.32	950	0.10~0.16
12	2400	0.20~0.30	1900	0.20~0.30	3700	0.22~0.36	3200	0.22~0.36	4200	0.22~0.36	800	0.12~0.18
14	2100	0.22~0.35	1600	0.22~0.35	3200	0.25~0.40	2700	0.25~0.40	3600	0.25~0.40	700	0.13~0.20
16	1800	0.25~0.36	1400	0.25~0.36	2800	0.27~0.44	2400	0.27~0.44	3200	0.27~0.44	600	0.14~0.23
18	1600	0.28~0.38	1200	0.28~0.38	2500	0.32~0.48	2100	0.32~0.48	2800	0.32~0.48	530	0.15~0.25
20	1400	0.30~0.40	1100	0.30~0.40	2300	0.36~0.54	1900	0.36~0.54	2550	0.36~0.54	480	0.16~0.28

1. When the tool is used for the first time, please make a test cutting with 90% of cutting speed or 85% feed rate mentioned above. If the cutting conditions remain stable, gradually increase the cutting speed and feed rate.
2. The cutting conditions above are for drilling with emulsion.
3. Use a collet without any defect or dust. The radial run-out of drill must be under 0.02mm.
4. These conditions above are for cutting depth under 3D.

1. Beim ersten Einsatz 90% der empfohlenen Schnittgeschwindigkeit oder 85% des Vorschubes wählen. Bei stabiler Bearbeitung die Schnittdaten entsprechend erhöhen.
2. Die obigen Schnittdatenempfehlung basieren auf dem Einsatz von Emulsion.
3. Keine defekte Werkzeugaufnahme wählen. Die Rundlaufgenauigkeit muss unter 0,02mm liegen.
4. Die obigen Schnittdaten sind für Bohrungstiefen unter 3xD ausgelegt.

PC series straight flute drills (External coolant/ Kühlung)
PC gerade genutete Bohrer Serie (External coolant/ Kühlung)

3D 5D

Workpiece material Werkstückstoff	Cast iron Grauguss		Nodular cast iron GGG		Silicon aluminium alloy Silizium Alu Legierung				Aluminum alloy Alu Legierung	
					Si≤10%		Si>10%			
Vc	60~120m/min		50~100m/min		100~200m/min		80~160m/min		120~220m/min	
Ø (mm)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)
4	7000	0.10~ 0.15	5600	0.10~ 0.15	11000	0.12~ 0.20	9600	0.12~ 0.20	12000	0.12~ 0.20
5	5700	0.12~ 0.18	4500	0.12~ 0.18	9000	0.14~ 0.26	7600	0.14~ 0.26	10000	0.14~ 0.26
6	4700	0.14~ 0.20	3700	0.14~ 0.20	7400	0.16~ 0.28	6400	0.16~ 0.28	8500	0.16~ 0.28
8	3600	0.16~ 0.24	2800	0.16~ 0.24	5500	0.18~ 0.30	4800	0.18~ 0.30	6400	0.18~ 0.30
10	2800	0.18~ 0.27	2200	0.18~ 0.27	4500	0.20~ 0.32	3800	0.20~ 0.32	5000	0.20~ 0.32
12	2400	0.20~ 0.30	1900	0.20~ 0.30	3700	0.24~ 0.36	3200	0.24~ 0.36	4200	0.24~ 0.36
14	2100	0.22~ 0.35	1600	0.22~ 0.35	3200	0.28~ 0.44	2700	0.28~ 0.44	3600	0.28~ 0.44
16	1800	0.25~ 0.36	1400	0.25~ 0.36	2800	0.30~ 0.48	2400	0.30~ 0.48	3200	0.30~ 0.48
18	1600	0.28~0.38	1200	0.28~ 0.38	2500	0.34~ 0.52	2100	0.34~ 0.52	3000	0.34~ 0.52
20	1400	0.30~0.40	1100	0.30~ 0.40	2300	0.40~ 0.63	1900	0.40~ 0.63	2500	0.40~ 0.63

1. When the tool is used for the first time, please make a test cutting with 90% of cutting speed or 85% feed rate mentioned above. If the cutting conditions remain stable, gradually increase the cutting speed and feed rate.
2. The cutting conditions above are for drilling with emulsion.
3. Use a collet without any defect or dust. The radial run-out of drill must be under 0.02mm.
4. These conditions above are for cutting depth under 5D.

1. Beim ersten Einsatz 90% der empfohlenen Schnittgeschwindigkeit oder 85% des Vorschubes wählen. Bei stabiler Bearbeitung die Schnittdaten entsprechend erhöhen.
2. Die obigen Schnittdatenempfehlung basieren auf dem Einsatz von Emulsion.
3. Keine defekte Werkzeugaufnahme wählen. Die Rundlaufgenauigkeit muss unter 0,02mm liegen.
4. Die obigen Schnittdaten sind für Bohrungstiefen unter 5xD ausgelegt.

PC series straight flute drills (Internal coolant/ Kühlung)
PC Bohrer Serie, gerade genutete (Internal coolant/ Kühlung)

15D

Workpiece material Werkstückstoff	Cast iron Grauguss		Nodular cast iron GGG		Silicon aluminium alloy Silizium Alu Legierung.				Aluminum alloy Alu Legierung	
					Si≤10%		Si>10%			
Vc	60~120m/min		50~100m/min		100~200m/min		80~160m/min		120~220m/min	
Ø (mm)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)
5	5700	0.08~ 0.14	4500	0.08~ 0.14	9000	0.09~ 0.18	7600	0.09~ 0.18	10000	0.09~ 0.18
6	4700	0.10~ 0.16	3700	0.10~ 0.16	7400	0.12~ 0.20	6400	0.12~ 0.20	8500	0.12~ 0.20
8	3600	0.12~ 0.20	2800	0.12~ 0.20	5500	0.12~ 0.24	4800	0.12~ 0.24	6400	0.12~ 0.24
10	2800	0.14~ 0.23	2200	0.14~ 0.23	4500	0.16~ 0.28	3800	0.16~ 0.28	5000	0.16~ 0.28
12	2400	0.16~ 0.26	1900	0.16~ 0.26	3700	0.18~ 0.32	3200	0.18~ 0.32	4200	0.18~ 0.32
14	2100	0.18~ 0.32	1600	0.18~ 0.32	3200	0.20~ 0.36	2700	0.20~ 0.36	3600	0.20~ 0.36

1. When the tool is used for the first time, please make a test cutting with 90% of cutting speed or 85% feed rate mentioned above. If the cutting conditions remain stable, gradually increase the cutting speed and feed rate.
2. The cutting conditions above are for drilling with emulsion.
3. Use a collet without any defect or dust. The radial run-out of drill must be under 0.02mm.
4. These conditions above are for cutting depth under 15D.

1. Beim ersten Einsatz 90% der empfohlenen Schnittgeschwindigkeit oder 85% des Vorschubes wählen. Bei stabiler Bearbeitung die Schnittdaten entsprechend erhöhen.
2. Die obigen Schnittdatenempfehlung basieren auf dem Einsatz von Emulsion.
3. Keine defekte Werkzeugaufnahme wählen. Die Rundlaufgenauigkeit muss unter 0,02mm liegen.
4. Die obigen Schnittdaten sind für Bohrungstiefen unter 15xD ausgelegt.

SC series centering drill · SC Serie Zentrierbohrer (External coolant/ Kühlung)

CENTER LOCATING · ZENTRIERBOHREN

Workpiece material Werkstückstoff	Cast iron Grauguss		Nodular cast iron GGG		Silicon aluminium alloy Silizium Alu Legierung				Aluminum alloy Alu Legierung	
					Si≤10%		Si>10%			
Vc	60~120m/min		50~100m/min		100~180m/min		80~140m/min		120~200m/min	
Ø (mm)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)
5	6400	0.09~0.14	5100	0.09~0.14	9000	0.12~0.25	7600	0.12~0.25	10000	0.12~0.25
6	5300	0.12~0.16	4200	0.12~0.16	7400	0.14~0.28	6400	0.14~0.28	8500	0.14~0.28
8	4000	0.13~0.20	3200	0.13~0.20	5600	0.18~0.32	4800	0.18~0.32	6400	0.18~0.32
10	3200	0.17~0.25	2500	0.17~0.25	4500	0.22~0.36	3800	0.22~0.36	5000	0.22~0.36
12	2700	0.20~0.30	2100	0.20~0.30	3700	0.25~0.40	3200	0.25~0.40	4200	0.25~0.40
14	2400	0.22~0.32	1800	0.22~0.32	3200	0.27~0.44	2700	0.27~0.44	3600	0.27~0.44
16	2000	0.24~0.34	1600	0.24~0.34	2800	0.32~0.48	2400	0.32~0.48	3200	0.32~0.48
20	1600	0.28~0. 40	1300	0.28~0. 40	2300	0.40~0.60	1900	0.40~0.60	2550	0.40~0.60

1. The cutting conditions above are applicable for center drilling.
2. When the tool is used for the first time, please make a test cutting with 90% of cutting speed or 85% feed rate mentioned above. If the cutting conditions remain stable, gradually increase the cutting speed and feed rate.
3. The cutting conditions above are for drilling with emulsion.
4. Please reduce the feed speed when center drilling at inclined and curved face.
5. Use a collet without any defect or dust. The radial run-out of drill must be under 0.02mm.

1. Obige Schnittdatenempfehlungen gelten für das Zentrierbohren.
2. Beim ersten Einsatz 90% der empfohlenen Schnittgeschwindigkeit oder 85% des Vorschubes wählen. Bei stabiler Bearbeitung die Schnittdaten entsprechend erhöhen.
3. Die obigen Schnittdatenempfehlung basieren auf dem Einsatz von Emulsion.
4. Beim Bohren in sehr großen schrägen und ungeraden Flächen, Schnittdaten reduzieren.
5. Keine defekte Werkzeugaufnahme wählen. Die Rundlaufgenauigkeit muss unten 0,02mm liegen.

CHAMFERING · FASEN

Workpiece material Werkstückstoff	Cast iron Gusseisen		Nodular cast iron GGG		Silicon aluminium alloy				Aluminum alloy Alu. Leg.	
					Si≤10%		Si>10%			
Vc	90~180m/min		70~150m/min		150~270m/min		120~210m/min		180~300m/min	
Ø (mm)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)	n (min^{-1})	f (mm/r)
5	9600	0.09~0.20	7600	0.09~0.20	13500	0.12~0.30	11500	0.12~0.30	15000	0.12~0.30
6	8000	0.12~0.22	6400	0.12~0.22	11100	0.14~0.34	9600	0.14~0.34	12700	0.14~0.34
8	6000	0.13~0.28	4800	0.13~0.28	8400	0.18~0.40	7200	0.18~0.40	9600	0.18~0.40
10	4800	0.17~0.32	3800	0.17~0.32	6800	0.22~0.44	5700	0.22~0.44	7600	0.22~0.44
12	4000	0.20~0.38	3200	0.20~0.38	5600	0.25~0.50	4800	0.25~0.50	6400	0.25~0.50
14	3600	0.22~0.42	2700	0.22~0.42	4800	0.27~0.56	4000	0.27~0.56	5400	0.27~0.56
16	3000	0.24~0.46	2400	0.24~0.46	4200	0.32~0.60	3600	0.32~0.60	4800	0.32~0.60
20	2400	0.28~0.58	1900	0.28~0.58	3500	0.40~0.76	2850	0.40~0.76	3800	0.40~0.76

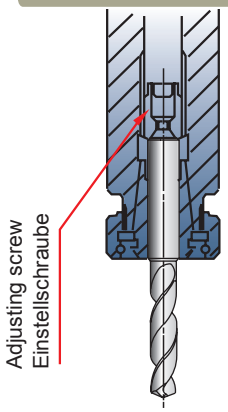
1. When the tool is used for the first time, please make a test cutting with 90% of cutting speed or 85% feed rate mentioned above. If the cutting conditions remain stable, gradually increase the cutting speed and feed rate.
2. The cutting conditions above are applicable for chamfer drilling.
3. The cutting conditions above are for drilling with emulsion.
4. Use a collet without any defect or dust. The radial run-out of drill must be under 0.02mm.

1. Beim ersten Einsatz 90% der empfohlenen Schnittgeschwindigkeit oder 85% des Vorschubes wählen. Bei stabiler Bearbeitung die Schnittdaten entsprechend erhöhen.
2. Obige Schnittdatenempfehlungen gelten für das Fasen.
3. Die obigen Schnittdatenempfehlung basieren auf dem Einsatz von Emulsion.
4. Keine defekte Werkzeugaufnahme wählen. Die Rundlaufgenauigkeit muss unter 0,02mm liegen.

NOTIZEN:

Application guide of drills · Einsatzhinweise

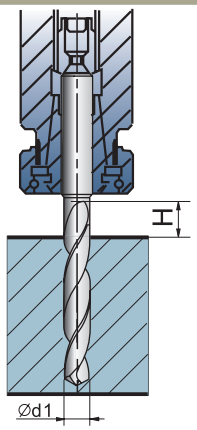
Drill clampling
Bohrer Aufnahme



Guarantee tight clamping by useing thrust bearing Type collet chuck.

Präzisionsspannzangen verwenden.

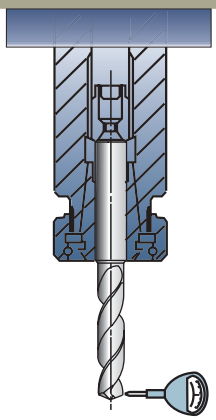
Max. drill length
Max. Bohrtiefe



Ensure the size of H is over 1.5d

Abstand H =1.5d

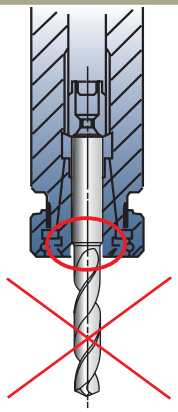
Radial Run-out
Rundlauftoleranz



The Radial Run-out should be under 0.02mm.

Rundlaufabweichung < 0,02mm

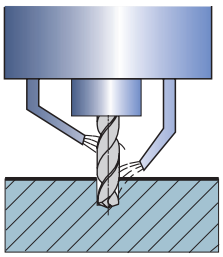
Wrong drill clamping
Ungünstige Bohrer-klemmung



Don't clamp on the drill flutes.

Bitte nicht auf dem Spankanal spannen

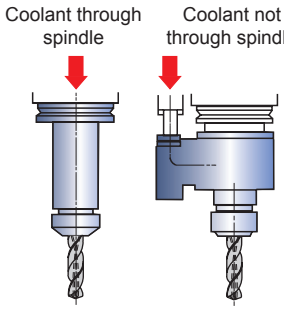
External: coolant method
Extern Kühlmittelzufuhr



The coolant liquid should shoot to the end and the center of drill as shown in the figure.

Zwei Kühlmittelleitungen sind ideal. (Bohrerspitze und Bohrer, wie in der Abb. oben)

Internal; coolant method
Intern Kühlmittelzufuhr



Coolant pressure is about 0.5~1mpa (coolant pressure is 2~3mpa when the diameter is less than Ø5 mm)
Coolant volume is 1.5~4L/min.

Kühlmitteldruck ist ca. 0,5-1 mpa (bei Durchmesser unter 5mm, Kühlmitteldruck auf 2-3 mpa erhöhen)
Kühlmittelmenge: 1,5-4L/min

Cautions to use coolant
Handling mit Kühlmittel

When using Internal Coolant

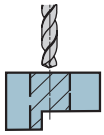
1. The little chip particles and dust will generate jamming in the oil hole. A fine mesh filter should be used to prevent jamming in the oil hole , especially for the small diameter drills.

2. Dirt and dust particles will adhere to the oil hole and lead to unsmooth coolant flow. Coolant change as early as possible is recommended.

1. Kleine Partikel können die Kühlmittelbohrungen verstopfen. Verwenden Sie daher bitte einen Kühlmittelfilter.

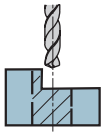
2. Stark verschmutztes Kühlmittel reduziert den Spanfluss. Wir empfehlen ein regelmäßiges Wechseln. Bitte prüfen Sie die einwandfreie Kühlmittelzufuhr.

Interrupted cutting
unterbrochene Bearb.



Reduce the feed rate when drilling interrupted cut.

Reduzieren Sie den Vorschub an der unterbrochenen Stelle.



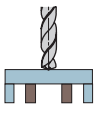
Pre-machining prior drilling
Vorbear-beitung

Machining a countersink with end mill prior to drilling.

Bearbeiten Sie die Fläche vor.

Thin workpiece
Dünne Werkstücke

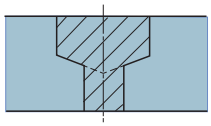




Bending occurs Add a supporter.

Wenn dünne Werkstücke sich verbiegen, verwenden Sie Hilfsmittel.

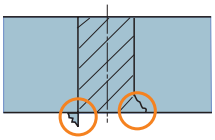
Stepped holes
Stufenbohrung



1.Divided to two drilling processes.
2.Drill the larger diameter hole firstly.
3.Multiple step and chamfer drill can be produced by us.

1. Geteilt in 2 Prozesse
2. Bohren Sie das größere Loch zuerst.
3. Auf Anfrage bieten wir auch Stufenbohrer an, die Stufenbohrungen in einem Prozess herstellen können.

burrs and workpiece chippings on Exit
Gratbildung oder Ausbrüche beim Austritt des Bohrers

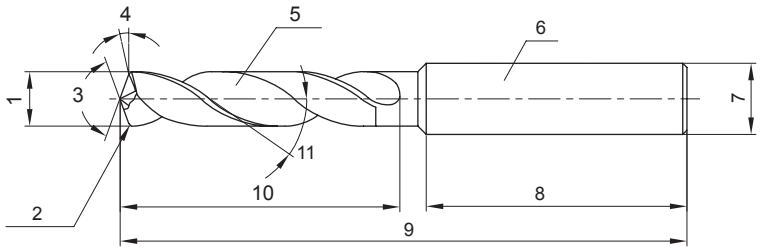


1.Reduce the feed rate at the end time of drilling through
2.Chamfer machined at the exit position.
3.Change the point angle.

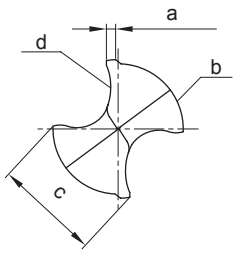
1. Reduzieren Sie den Vorschub um ca. die Hälfte beim Austritt.
2.Schleifen Sie eine Fase an den Bohrer.
3. Tauschen Sie den Spitzenwinkel.

Parts terminology of drill · Terminologie von VHM Bohrern

Version · Ausführung

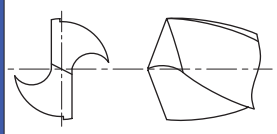
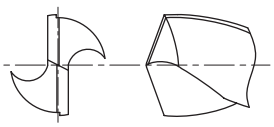
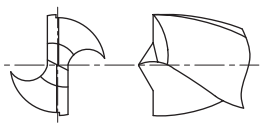


1. Drilling diameter	1. Bohrdurchmesser
2. Chamfer	2. Fase
3. Point angle	3. Spitzenwinkel
4. Clearance angle	4. Freiwinkel
5. Chip pocket	5. Spanraum
6. Shank	6. Schaft
7. Shank diameter	7. Schaftdurchmesser
8. Shank length	8. Schaftlänge
9. Overall length	9. Gesamtlänge
10. Flute length	10. Schneidenlänge
11. Helical angle	11. Spiralwinkel



a. Margin width	a. Fasenbreite
b. Body clearance	b. Körper Freischliff
c. Land width	c. Primärfasenbreite
d. Primary cutting edge	d. Hauptschneide

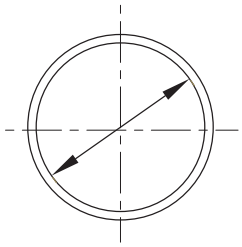
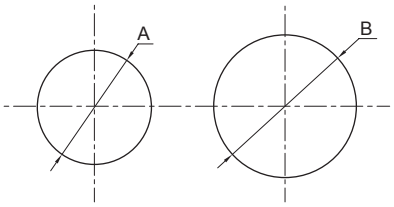
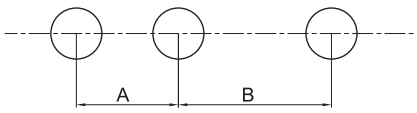
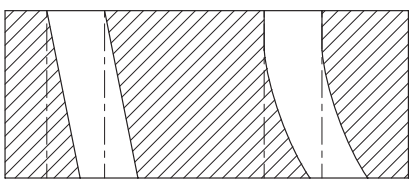
Cutting edge shapes · Schneidkanten- Ausführung

Shape Schneidkanten-ausführung	 (Conical · konisch)	 (Dual flats · flach)	 (Candler · Zentrierspitze)
Features Merkmale	• The flank face is conical and the clearance angel increases toward the center of drill. • Wide applications, commonly used both for soft and hard materials. • Die Flanke ist konisch und der Freiwinkel vergrößert sich zur Bohrermitte. • Gebräuchliche Form für weiche und harte Materialien.	• The flank face is dual flats, to facilitate cutting and initial entering. • Often used for small diameter dirlls • Flache Flanke für leichte Zerspanung. • Diese Form ist geeignet für Bohrer mit kleinem Durchmessern.	• This shape has two-stage point angle and perfect centering capability, less burs generate when drilling hole. • It is the first choice for drilling thin plate. • Diese Form hat 2 Winkelpunkte, für bessere Zentrierung und Reduzierung der Gratbildung. • Geeignet für Stahlrahmen- und Blechbearbeitung.

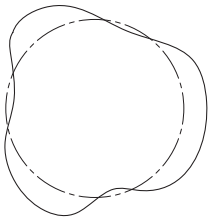
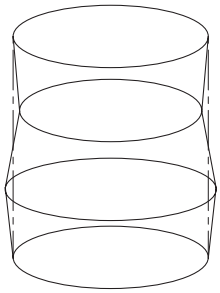
Structure specification and cutting characteristics · Bohrerspezifikation und Schnittwerte

Chip pocket **Spanraum**	The function of chip pocket is to remove the chips out of the hole. The larger the cross-sectional area is, the chips is easier to remove out. Durch den Spanraum werden die Späne während der Bearbeitung aus der Bohrung geleitet.
Helical angle **Spiral-winkel**	The helical angle is the inclined angle of flute at the axial direction of a drill. It varies according to the different position of cutting edge. It decreases greatly as the periphery toward the center. Spiralwinkel beschreibt die Steigung der Spiralnute. Der Spiralwinkel wird entsprechend dem zu bearbeitenden Material ausgelegt. High hardness material — Small ⟵ Helical angle ⟶ Large — soft material Hochvergütetes Material — klein ⟵ Spiralwinkel ⟶ groß — weiches Material
Flute length **Schneiden-länge bzw. Spirallänge**	It is determined by depth of hole, guide bush length and regrinding allowance. The longer the flute is, the worse the drill rigidity is. Since it greatly influences on the tool life, to minimize it as much as possible when other requirements are met. The minimal flute length generally is hole depth plus the 1.5 times of hole diameter. Die Schneidenlänge muss die Bohrungstiefe, die Führungsbuchsenlänge und die Gesamtnachschleiflänge berücksichtigen. Je länger der Spiralwinkel, desto geringer die Bohrerstabilität. Da hierdurch die Standzeit stark beeinflusst wird, sollte sie so kurz wie möglich gewählt werden. Die empfohlene minimale Spirallänge sollte: Bohrungstiefe +1,5 x Durchmesser sein
Point angle **Spitzen-winkel**	Generally the angle is 140°, it is set differently as per various applications. der Spitzenwinkel beträgt normalerweise 140°, er kann jedoch je nach Anwendung unterschiedlich sein. Soft material easy to cut — Small ⟵ Point angle ⟶ Large — for hard materials and high-efficiency machining klein ⟵ Spitzenwinkel ⟶ hohe Axialkraft, hohe Stabilität, gehärtetes Material und Hochleistungsbohren
Core **Kerndurch-messer**	It is an important factor that influence the rigidity and chip control of a drill. It is set according to applications. Low axial cutting force, Low rigidity, Materials easy to cut — thin ⟵ core ⟶ thick — Large axial cutting force, High rigidity, High hardness materials, cross hole drilling etc. Ist ein wichtiger Faktor und hat Einfluß auf die Stabilität und Spankontrolle: geringe Axialkraft, geringe Stabilität, leicht zu zerspanendes Material — klein ⟵ Seele ⟶ groß — hohe Axialkraft, hohe Stabilität, gehärtetes Material oder Querbohrungen.
Margin **Fasen-breite**	As a drill guide during drilling process. The margin width need to take the hole friction into consideration. small ⟵ margin width ⟶ large Fasenbreite beeinflußt die Führung und Friktion des Bohrers während der Bearbeitung. klein ⟵ Fasenbreite ⟶ groß niedrige Friktion und Bohrer Führung ⟵ Fasenbreite ⟶ hohe Friktion und gute Bohrerführung
Back taper **Bohrer-durchmesser-winkel**	To decrease the friction with inside wall of the drilled hole, there is a back taper slightly from tool nose to shank. The degree is usually represented by the quantity decreasing in the diameter per 100 mm flute length. Zur Reduzierung der Reibung während der Bearbeitung wird der Bohrerdurchmesser von der Schneide bis zum Schaft leicht reduziert.
Body clearance **Körperfrei-schliff**	It is the part formed on the clearance face after margin, mainly to reduce the friction between inside wall of hole and drill periphery Beschreibt den Bohrer hinter der Fasenbreite. Der Freischliff ist notwendig, um die Reibung des Bohrers während der Bearbeitung zu reduzieren.

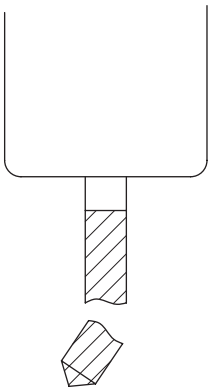
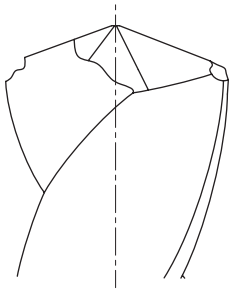
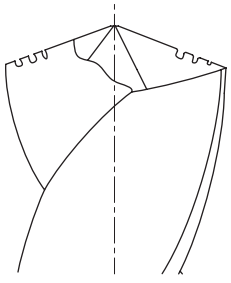
Common problems and solutions · Allgemeine Fehlerbehebungen

	Problem · Fehler	Cause · Ursache	Solution · Lösung
Hole · Bohrung	Oversize holes Bohrung zu groß 	Poor clamping Large run-out around spindle Ungenügende Werkstück bzw. Werkzeug Klemmung. großer Rundlauffehler Querschneide ist aus der Mitte	Select a holder and chuck with high precision Calibrating spindle Check and adjust after clamping drill Präzisions-Klemmung verwenden. Spindelspiel reduzieren. Bohrer im geklemmten Zustand prüfen und justieren.
		Non-symmetric point angle Large run-out Chisel edge is off center Kein semetrischer Spitzenwinkel, großer Rundlauffehler Querschneide ist aus der Mitte	Regrind drill Check the precision after regrinding Bohrer nachschleifen, Nachschliff prüfen
	Irregular hole size Ungleichmäßiger Bohrungsmaße  A ≠ B	Non-symmetric point angle Large run-out Chisel edge is off center Excessive margin wear Kein semetrischer Spitzenwinkel, großer Rundlauffehler Querschneide ist aus der Mitte Hoher Verschleiß	Select the holder and chuck with high precision Calibrating the spindle Check and adjust after clamping drill Präzisions-Klemmung verwenden. Spindelspiel reduzieren. Bohrer im geklemmten Zustand prüfen und justieren.
		Poor clamping Large spindle run-out Workpiece is unfirmly hold Ungenügende Werkstück/Werkzeug-Klemmung. großer Rundlauffehler Querschneide ist aus der Mitte Hoher Verschleiß	Select the holder and chuck with high precision Calibrating spindle Check and adjust after clamping drill Präzisions-Klemmung verwenden. Spindelspiel reduzieren. Bohrer im geklemmten Zustand prüfen und justieren.
		Feed rate is too high Vorschub zu hoch	Reduce the feed speed Vorschub reduzieren
		Coolant is not enough Kühlmittel nicht ausreichend	Change the coolant supply method, or increase coolant volume. Kühlmittelmenge erhöhen
	Low position accuracy schlechte Bohrer Positionierung  A ≠ B	Poor re-positioning precision of spindle.Poor clamping Large run-out with spindle Unzureichende Klemmung sowie Spindel Positionierung. Großer Rundlaufabweichung der Spindel.	Improve the re-positioning precision of machine Select the holder and chuck with high precision Calibrating the spindle Check and adjust after clamping drill Positionierung der Maschine verbessern Präzisions-Klemmung verwenden. Spindel kalibrieren, Bohrer im geklemmten Zustand prüfen und justieren.
		The feed direction is not vertical to the workpiece surface Die Vorschubrichtung ist nicht vertikal zur Werkstückfläche	Adjust the feed direction vertical to the workpiece. Vorschubrichtung vertikal zur Werkstückoberfläche einstellen.
		Top center not align with the spindle center (lathe) Werkzeugmitte nicht auf Spindelmitte ausgerichtet (Drehmaschine)	Check and adjust alignment carefully before drilling Werkzeugmitte ausrichten
	Bad linearity Bad perpendicularity Schlechter Bohrungsverlauf 	Excessive tool wear hoher Werkzeugverschleiß	Regrind Nachschleifen
		Poor center hole accuracy schlechte Bohrungsgenauigkeit	Increase the position accuracy of hole Bohrungspositionierung verbessern
		Non-symmetric point angle Large run-out Chisel edge is off center Kein semetrischer Spitzenwinkel, großer Rundlauffehler Querschneide ist aus der Mitte	Regrind drill Check the precision after regrinding Bohrer nachschleifen, Nachschliff prüfen
		Insufficient drill rigidity Unzureichende Bohrerstabilität	Increase drill rigidity Bohrerstabilität verbessern
		Uneven workpiece surface Top center ders not align with the spindle center (lathe) Unebene Werkstückoberfläche Werkzeugmitte nicht auf Spindelmitte ausgerichtet (Drehmaschinen)	The workpiece must be horizontal or pre-machined to horizontal before drilling Pre-drill a center hole Das Werkstück muss vor dem Bohren horizontal ausgerichtet bzw. vorbearbeitet werden.

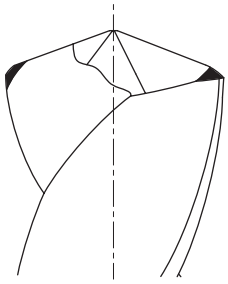
Common problems and solutions· Allgemeine Fehlerbehebungen

	Problem · Fehler	Cause · Ursache	Solution · Lösung
Hole Bohrung	Poor roundness Ungenaue Bohrung (Rundheit) 	Non-symmetric point angle Large drill run-out Chisel edge is off center Kein symetrischer Spitzenwinkel, großer Rundlauffehler, Zentrumschneide ist aus der Mitte Hoher Verschleiß	Regrind drill Check the precision after regrinding Bohrer nachschleifen, Nachschliff prüfen
		Poor clamping Large spindle run-out Workpiece is unfirmly hold Unzureichende Klemmung (Werkstück, Werkzeug). Großer Rundlaufabweichung der Spindel	Select the holder and chuck with high precision Calibrating the spindle Check run-out and adjust after clamping drill Präzisions-Klemmung verwenden. Spindel kalibrieren, Bohrer im geklemmten Zusand auf Rundlauf prüfen und justieren
		Clearance angle is too large Freiwinkel zu groß	Regrind drill Bohrer nachschleifen
		Insufficient drill rigidity Ungenügende Bohrerstabilität	Increase drill rigidity Bohrerstabilität verbessern
	Poor workpiece surface quality Schlechte Werkstückoberflächenqualität	Incorrect regrinding Schlechter Bohrer Nachschliff	Regrind calibration Nachschliff verbessern
		Insufficient coolant or unsuitable coolant Type Ungenügende Kühlmittelmenge bzw. Methode	Change coolant supply method, increase coolant volume Select the cutting oil with good lubricating property Kühlmittelzuführungsmethode ändern Kühlmittelmenge erhöhen
		Poor clamping Large spindle run-out Unzureichende Klemmung, großer Spiralrundlauffehler	Select the holder and chuck with high precision Calibrating the spindle Präzisions-Klemmung verwenden. Spindel kalibrieren
		Feed rate is too high Vorschub zu hoch	Decrease the feed rate Vorschub verringern
		Excessive wear on cutting edge Excessive build-up on margin Großer Schneidenverschleiß, große Aufbauschneidenbildung	Regrind drill Select a coated drill Bohrer nachschleifen, beschichtete Bohrer verwenden
		Chip jamming Schlechte Spanabfuhr	Select a suitable drill (considering flute geometry , helical angle etc) Change the cutting method (adjust feed rate, use step feed etc) Einen geeigneten Bohrer wählen (mit entsprechender Spannute, Spiralwinkel etc.) Schnittgeschw. anpassen (Vorschub verringern usw.)
	Poor cylindricity Schlechte Zylindrizität 	Non-symmetric point angle Large drill run-out Chisel edge is off center Excessive margin wear Kein symetrischer Spitzenwinkel, großer Rundlauffehler (Bohren) Zentrumschneide ist aus der Mitte großer Schneidenverschleiß	Regrind drill Check the precision after regrinding Bohrer nachschleifen, Nachschliff prüfen
		Feed speed is too low Vorschub zu gering	Increase the feed speed Vorschub erhöhen

Common problems and solutions · Allgemeine Fehlerbehebungen

	Problem · Fehler	Cause · Ursache	Solution · Lösung
Drill Bohrer	Drill breakage Bruch des Bohrers 	In sufficient clamping of tool and/or workpiece Nicht ausreichende Spannung des Werkzeuges und/oder Werkstücks.	Increase the rigidity of drill, machine, workpiece and clamp Stabilität des Werkzeuges sowie Spannung des Werkzeuges bzw. Werkstücks verbessern
		Clearance angle is too small Freiwinkel zu klein	Use drill will bigger clearance angle or regrind. Bohrer mit größerem Freiwinkel verwenden oder nachschleifen
		Feed rate is too high Vorschub zu hoch	Decrease the feed rate Vorschub verringern
		Excessive drill wear Großer Verschleiß	Regrind drill Bohrer nachschleifen
		Chip jamming Spänestau	Select a suitable drill (considering flute geometry , helical angle etc) Change the cutting method (adjust feed rate, use step feed etc) Einen geeigneten Bohrer wählen (mit entsprechender Spannute, Spiralwinkel etc.) Schnittgeschw. anpassen (Vorschub verringern, Bohrer lüften usw.)
		Difficult entering the workpiece Schwieriges Anbohren	Increase the rigidity of drill and machine Increase rigidity of workpiece and clamping. Select the drill with a sharp point for easy entry Pre-drill a centre hole. Adjust the level of workpiece or pre-machined to horizontal before drilling. Use guide bush or bush plate Stabilität des Werkzeuges sowie Spannung der Maschine und Werkstückes verbessern. Bohrer mit scharfer Zentrierschneide. Pilotbohrung setzen. Anbohrwinkel korrigieren oder gerade Fläche fräsen. Einsatz einer Führungsbuchse.
	Chipping on the cutting corner Ausbröcklung am Bohrer 	Hard skin or porons spot Harte Oberfläche oder Lunker	Analyse the workpiece or select a suitable grade Change the cutting parameters(cutting speed , feed rate or machining method) Werkstoff prüfen und entsprechende Sorte auswählen. Schnittbedingungen ändern (Schnittgeschw., Vorschub oder Bearbeitungsmethode)
		Feed rate is too high Vorschub zu hoch	Decrease the feed rate Vorschub verringern
		Insufficient coolant Zu wenig Kühlmittel	Change coolant supply method, increase coolant volume Kühlmittelzufuhr verbessern / erhöhen
	Chipping on cutting edge Ausbröcklung an der Schneide 	Poor clamping Large spindle run-out schlechte Spannung großer Spiralrundlauf	Select the holder and chuck with high precision Calibrating the spindle Spannmittel mit höhere Präzision verwenden. Spindel neu ausrichten.
		Cutting speed and feed speed are too high Decrease the feed rate Schnittgeschwindigkeit und Vorschub zu hoch	Reduce the cutting speed and feed speed. Schnittgeschwindigkeit und Vorschub reduzieren.
		Clearance angle is too large Freiwinkel zu groß	Regrind calibration Bohrer mit kleinerem Freiwinkel verwenden oder nachschleifen

Common problems and solutions · Allgemeine Fehlerbehebungen

	Problem · Fehler	Cause · Ursache	Solution · Lösung
Drill Bohrer	Abnormal wear on cutting corner Übermäßiger Verschleiß 	Delay to regrind Überfälliger Nachschliff	Regrind in time Frühzeitiger Nachschliff
		Drill point does not align with the spindle center (lathe) Bohrerspitze steht nicht mittig	Check and adjust alignment carefully before drilling Bohrerposition auf Spindelmitte justieren.
		Cutting speed is too high Schnittgeschwindigkeit zu hoch	Reduce cutting speed Schnittgeschwindigkeit reduzieren
		Cutting edge shape is inappropriate Schneidwinkel nicht geeignet	Select correct cutting edge shape Richtigen Schneidwinkel wählen.
		Unsuitable drill material Schneidstoff ungeeignet	Select the suitable drill material Geeigneten Schneidstoff wählen
		Incorrect coolant Type Unzureichende Kühlung	Change coolant Ausreichende Kühlung verwenden
	Wear and chipping on chisel edge Verschleiß und Ausbrüche an Querschneide	Feed speed is too high Vorschub zu hoch	Reduce feed speed Vorschub reduzieren
		Cutting edge shape is inappropriate Schneidwinkel nicht geeignet	Select correct cutting edge shape Richtigen Schneidwinkel wählen.
		Unsuitable drill material Freiwinkel zu gering	Select the suitable drill material Geeigneten Schneidstoff wählen.
		Clearance angle is too small Freiwinkel zu gering	Regrind drill Bohrer nachschleifen
	Breakage on margin Bruch der Führungsfase	The size of guide bush or drill bush is too large Führungsbuchse zu groß	Select another bush with correct size Führungsbuchse austauschen
	Margin build-up Aufbauschneide an der Führungsfase	Excessive wear on cutting edge generates high heat Hoher Verschleiß und Hitze	Regrind drill Bohrer nachschleifen
		Insufficient coolant Unzureichende Kühlung	Change coolant supply method, increase coolant volume Kühlmittelzufuhr-Methode ändern
		Incorrect coolant Type falscher Kühlmittelschmierstoff	Change coolant Kühlschmierstoff ändern
		Workpiece material is too soft Ungünstig zu zerspanendes Material	Change drill or machining method Bohrer mit kleineren Freiwinkel wählen
	High vibration Hohe Vibrationen	Clearance angle is too large Freiwinkel zu groß	Regrind drill Bohrer nachschleifen
		Drill rigidity is not enough Bohrerstabilität zu gering	Increase drill rigidity Stabilität verbessern
	Chips roll around the drill Spänewickel	Long chips Chip removal is not fluent Lange Späne, Abfuhr unzureichend	Change the drill and adjust machining method and cutting parameters Schnittdaten optimieren, evt. Bohrer wechseln oder Maschine neu justieren
	One-side wear Einseitiger Verschleiß	Drill point does not align with the spindle center (lathe) Bohrerspitze steht nicht mittig	Check and adjust the alignment carefully before drilling Bohrerposition auf Spindelmitte justieren.
		Poor clamping Schlechte Spannung	Fix drill carefully, control the radial run-out Bohrerklemmung verbessern, Rundlauf kontrollieren.

NOTIZEN:

Twist drill · Spiralbohrer (Non-standard Taylor made · Sonderwerkzeuge)

Name:

Firma/Company:

Fax:

Tel:

E-MAIL:

ZCC·CT
Heltorfer Straße 12
40472 Düsseldorf Germany
Fax: +49-(0)211-989240-111
E-Mail:info@zccct-europe.com

Machining information
Bearbeitungsinfomation

Size of machined hole Bohrungsdurchmesser	mm
Tolerance of machined hole Toleranz der Bohrung	
Depth of machined hole Bohrtiefe	mm

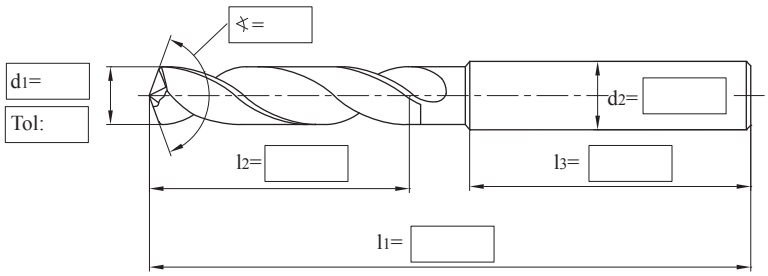
Selection of twist drill series
Spiralbohrerserie

☐ SU ☐ SH
☐ ST ☐ SC

Workpiece material · Werkstückstoff

Carbon steel	Alloy steel Legierter Stahl	Hardened steel · gehärteter Stahl				Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg.	Aluminum Alu.	Aluminum alloy Alu. Leg. Si%=	Titanium alloy Titan Leg.	Heat resist. alloy Warmfest Leg.
		~40HRC	~50HRC	~60HRC	~68HRC							

Tool information • Werkzeug Information:



Cooling/ Kühlung	Coating/ Beschichtung
☐ External Cooling	☐ Yes/ Ja
☐ Internal Cooling	☐ No/ Nein

Shank • Schaft

DIN6535
- ☐ Form HA
- ☐ Form HB
- ☐ Form HE

- ☐ Straight shank/ Zylinders.
- ☐ Shank with tang DIN 1809
- ☐ Morse taper shank ☐
- Special type

Remarks:
Bemerkungen:

Order quantity: piece
Auftragsmenge: Stück

Expected delivery date:
Ewartetes Lieferdatum:

Date · Datum:

Confirmation · Unterschrift:

Step twist drill · Stufespiralbohrer (Non-standard Taylor made · Sonderwerkzeuge)

Name:

Firma/Company:

Fax:

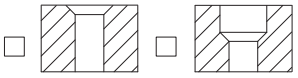
Tel:

E-MAIL:

ZCC·CT
Heltorfer Straße 12
40472 Düsseldorf Germany
Fax: +49-(0)211-989240-111
E-Mail:info@zccct-europe.com

Machining information
Bearbeitungsinfomation

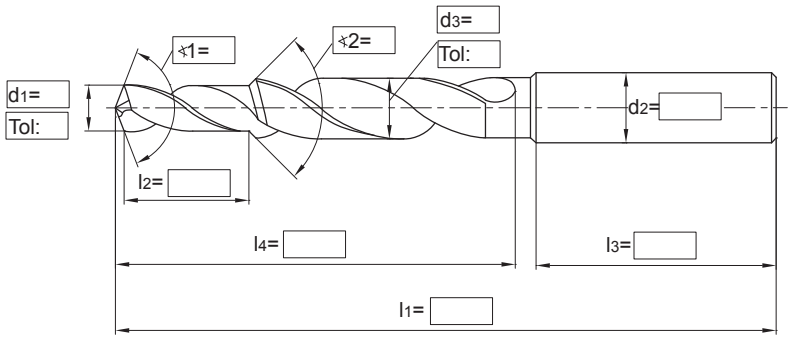
Size of small machined hole Ø Kleine Bohrung	mm
Tolerance of small machined hole Toleranz der kleinen Bohrung	
Size of big machined hole Ø Große Bohrung	mm
Tolerance of big machined hole Ø Toleranz der großen Bohrung	
Depth of machined hole Tiefe der großen Bohrung	mm



Workpiece material · Werkstückstoff

Carbon steel	Alloy steel Legierter Stahl	Hardened steel · gehärteter Stahl				Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg.	Aluminum Alu.	Aluminum alloy Alu. Leg.	Titanium alloy Titan Leg.	Heat resist. alloy Warmfest Leg.
		~40HRC	~50HRC	~60HRC	~68HRC					Si%=		

Tool information • Werkzeug Information



Shank • Schaft	
DIN6535	Form HA
	Form HB
	Form HE
Straight shank/ Zylinders.	
Shank with tang DIN 1809	
Morse taper shank ☐	
Special type	

Cooling/ Kühlung	Coating/ Beschichtung
☐ External Cooling	☐ Yes/ Ja
☐ Internal Cooling	☐ No/ Nein

Remarks:
Bemerkungen:

Order quantity: piece
Auftragsmenge: Stück

Expected delivery date:
Ewartetes Lieferdatum:

Date · Datum:

Confirmation · Unterschrift:

Three lips drill · Drei Schneidebohrer (Non-standard Taylor made · Sonderwerkzeuge)

Name:

Firma/Company:

Fax:

Tel:

E-MAIL:

ZCC·CT
Heltorfer Straße 12
40472 Düsseldorf Germany
Fax: +49-(0)211-989240-111
E-Mail:info@zccct-europe.com

Workpiece material · Werkstückstoff

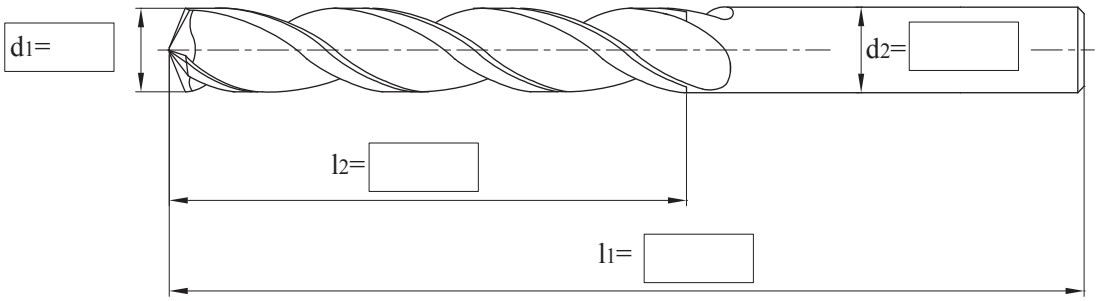
Carbon steel	Alloy steel Legierter Stahl	Hardened steel · gehärteter Stahl				Stainless steel · Rostfreier Stahl	Cast iron, Nodular cast iron Grauguss GGG	Copper alloy Kupfer Leg.	Aluminum Alu.	Aluminum alloy Alu. Leg. Si%=	Titanium alloy Titan Leg.	Heat resist. alloy Warmfest Leg.
		~40HRC	~50HRC	~60HRC	~68HRC							

Cooling/ Kühlung

☐ External Cooling 

☐ Internal Cooling 

Three lips drill · Drei Schneiden Bohrer



Remarks:
Bemerkungen:

Order quantity: piece
Auftragsmenge: Stück

Expected delivery date:
Ewartetes Lieferdatum:

Date · Datum:

Confirmation · Unterschrift:

Straight-flate drill · Grade Genutetebohrer
(Non-standard Taylor made · Sonderwerkzeuge)

Name:

Firma/Company:

Fax:

Tel:

E-MAIL:

ZCC·CT
Heltorfer Straße 12
40472 Düsseldorf Germany
Fax: +49-(0)211-989240-111
E-Mail:info@zccct-europe.com

Machining information and Workpiece Material • Bearbeitungsinfo. und Werkstück Material

Size of machined hole
Bohrungsdurchmesser ____ mm

Tolerance of machined hole
Toleranz der Bohrung ____

Depth of machined hole
Bohrtiefe ____ mm

- ☐ Grey cast iron
  Grauguss
- ☐ Nodular cast iron
  GGG
- ☐ Aluminium alloy
  Alu leg.
- ☐ Si Al alloy Si＜10%
  Si Alu leg.
- ☐ Si Al alloy Si≥10%
  Si Alu legierung

Machined material trademark
Spezieller Werkstoff:

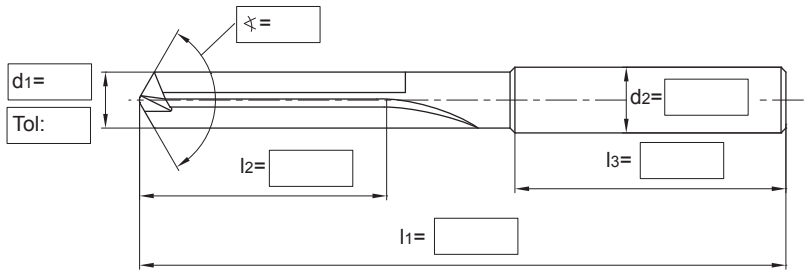
Tensile Strength · Zugfestigkeit:
N/mm ^{2}

Hardness · Härte:

The straight-flute drill is widely used for cutting short ship materials from cast iron and common Al alloy to high Si Al alloy

Gerade genutete Bohrer werden weites und gehend für die Bearbeitung von Gusseisen und Alu leg. bis Si Alu Leg. eingesetzt.

Tool information • Werkzeug Information:



Cooling/ Kühlung	Coating/ Beschichtung
☐ External Cooling	☐ Yes/ Ja
☐ Internal Cooling	☐ No/ Nein

DIN6535

Shank • Schaft

- ☐ Form HA
- ☐ Form HB
- ☐ Form HE
- ☐ Straight shank / Zylinders.
- ☐ Shank with tang DIN 1809
- ☐ Morse taper shank ☐
- Special type

Remarks:
Bemerkungen:

Order quantity: piece
Auftragsmenge: Stück

Expected delivery date:
Ewartetes Lieferdatum:

Date · Datum:

Confirmation · Unterschrift:

Step straight-flate drill · Stufe Grade Genutetebohrer

(Non-standard Taylor made · Sonderwerkzeuge)

Name:

Firma/Company:

Fax:

Tel:

E-MAIL:

ZCC·CT
Heltorfer Straße 12
40472 Düsseldorf Germany
Fax: +49-(0)211-989240-111
E-Mail:info@zccct-europe.com

Machining information and Workpiece Material • Bearbeitungsinfo. und Werkstück Material

Machined hole
Bohrung ☐ ☐

Size of small machined hole kleiner Lochdurchmesser		mm
Tolerance of small machined hole Toleranz der Bohrung (klein)		
Size of big machined hole großer Lochdurchmesser		mm
Tolerance of big machined hole Toleranz der Bohrung (groß)		
Depth of machined hole Bohrtiefe		mm

- ☐ Grey cast iron
  Grauguss
- ☐ Nodular cast iron
  GGG
- ☐ Aluminium alloy
  Alu leg.
- ☐ Si Al alloy Si＜10%
  Si Alu leg.
- ☐ Si Al alloy Si≥10%
  Si Alu legierung

Machined material
Spezieller Werkstoff:

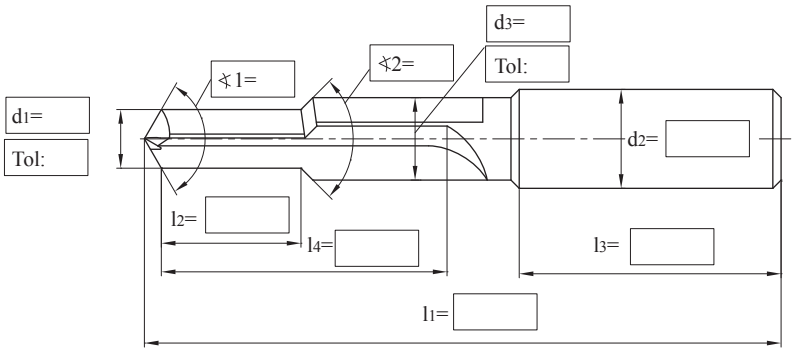
Tensile Strength · Zugfestigkeit:
N/mm ²

Hardness · Härte:

The straight-flute drill is widely used for cutting short materials from cast iron and common Al alloy to high Si Al alloy

Gerade genutete Bohrer werden weites und gehend für die Bearbeitung von Gusseisen und Alu leg. bis Si-Alu-Leg.eingesetzt.

Tool information • Werkzeug Information:



Cooling/ Kühlung	Coating/ Beschichtung
☐ External Cooling	☐ Yes/ Ja
☐ Internal Cooling	☐ No/ Nein

Shank • Schaft

DIN6535

- ☐ Form HA
- ☐ Form HB
- ☐ Form HE
- ☐ Straight shank/ Zylinders.
- ☐ Shank with tang DIN 1809
- ☐ Morse taper shank ☐
- Special type

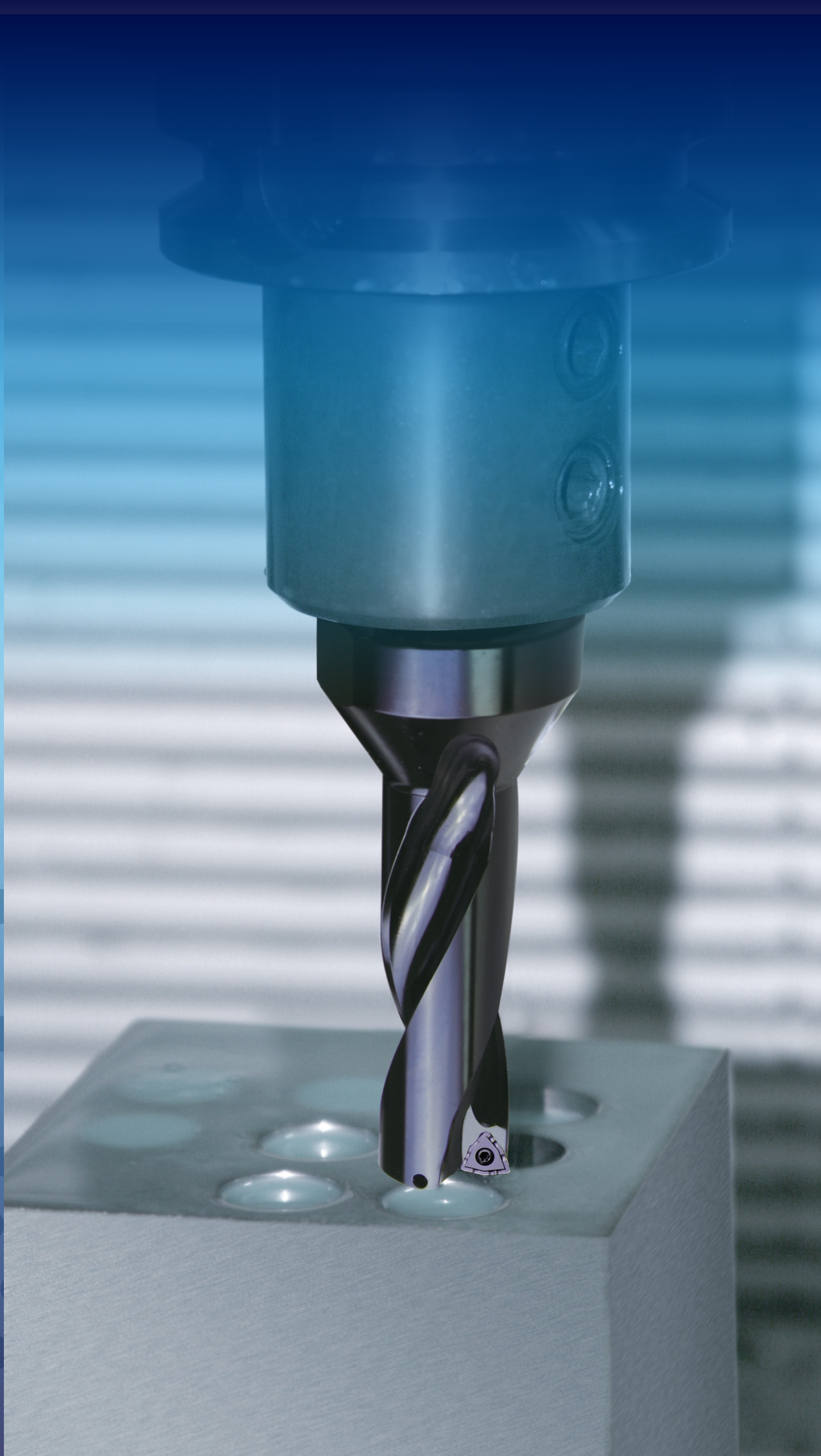
Remarks:
Bemerkungen:

Order quantity: piece
Auftragsmenge: Stück

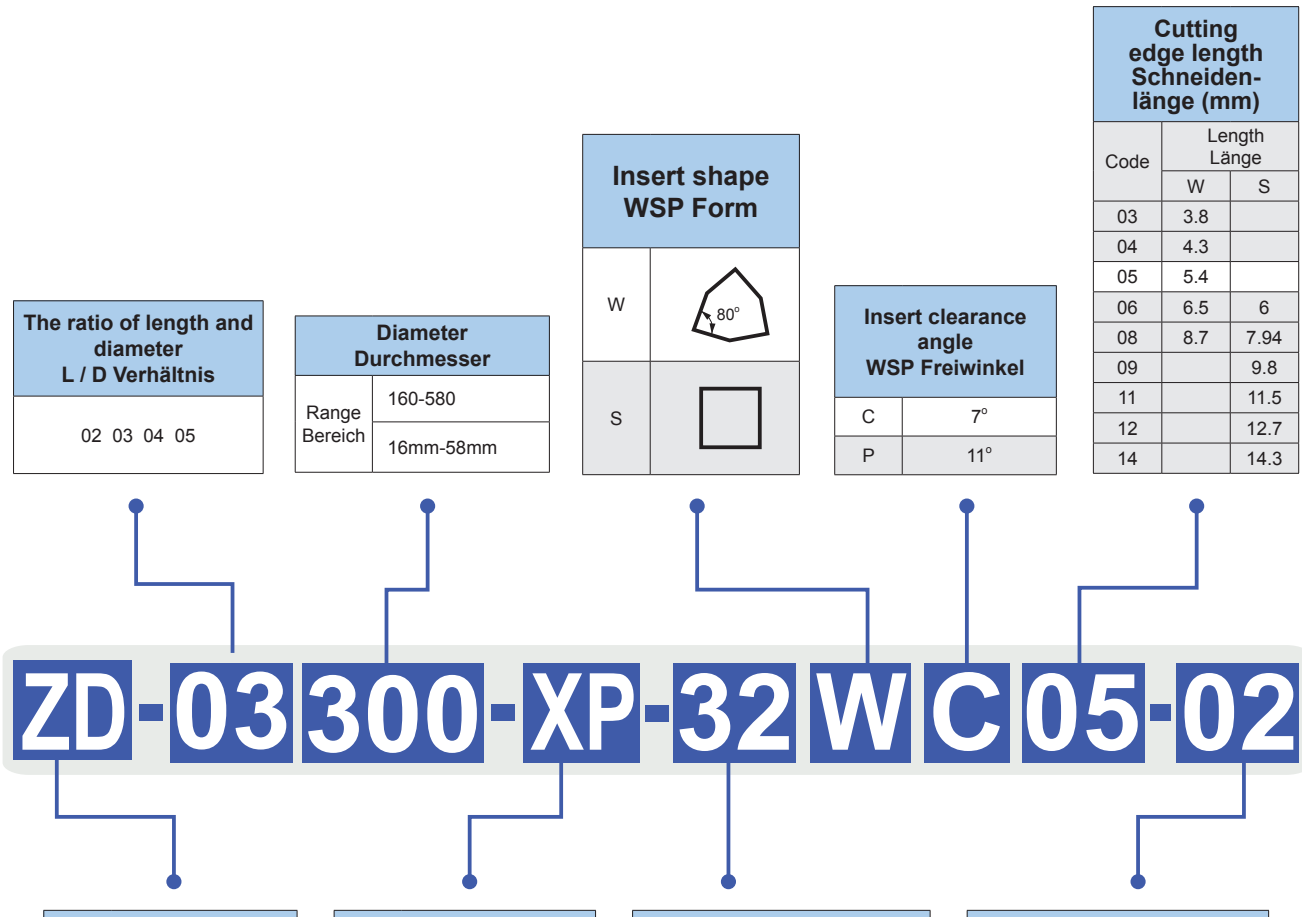
Expected delivery date:
Lieferdatum:

Date · Datum:

confirmation · Unterschrift:



Indexable drill Code Key · ISO Kennzeichnung WSP-Bohrern



The ratio of length and diameter L / D Verhältnis

02	03	04	05

Diameter Durchmesser

Range Bereich	160-580
	16mm-58mm

Insert shape WSP Form

W	80°
S	

Insert clearance angle WSP Freiwinkel

C	7°
P	11°

Cutting edge length Schneiden-länge (mm)

Code	Length Länge	
	W	S
03	3.8	
04	4.3	
05	5.4	
06	6.5	6
08	8.7	7.94
09		9.8
11		11.5
12		12.7
14		14.3

Tool Type Werkzeugtyp

Code	Description Beschreibung
ZD	Indexable drill (WCMX *)
ZTD	Indexable drill (SPGT *)

Coupling structure and Type Kupplungsart

Code	Description Beschreibung
XP	Weldon shank

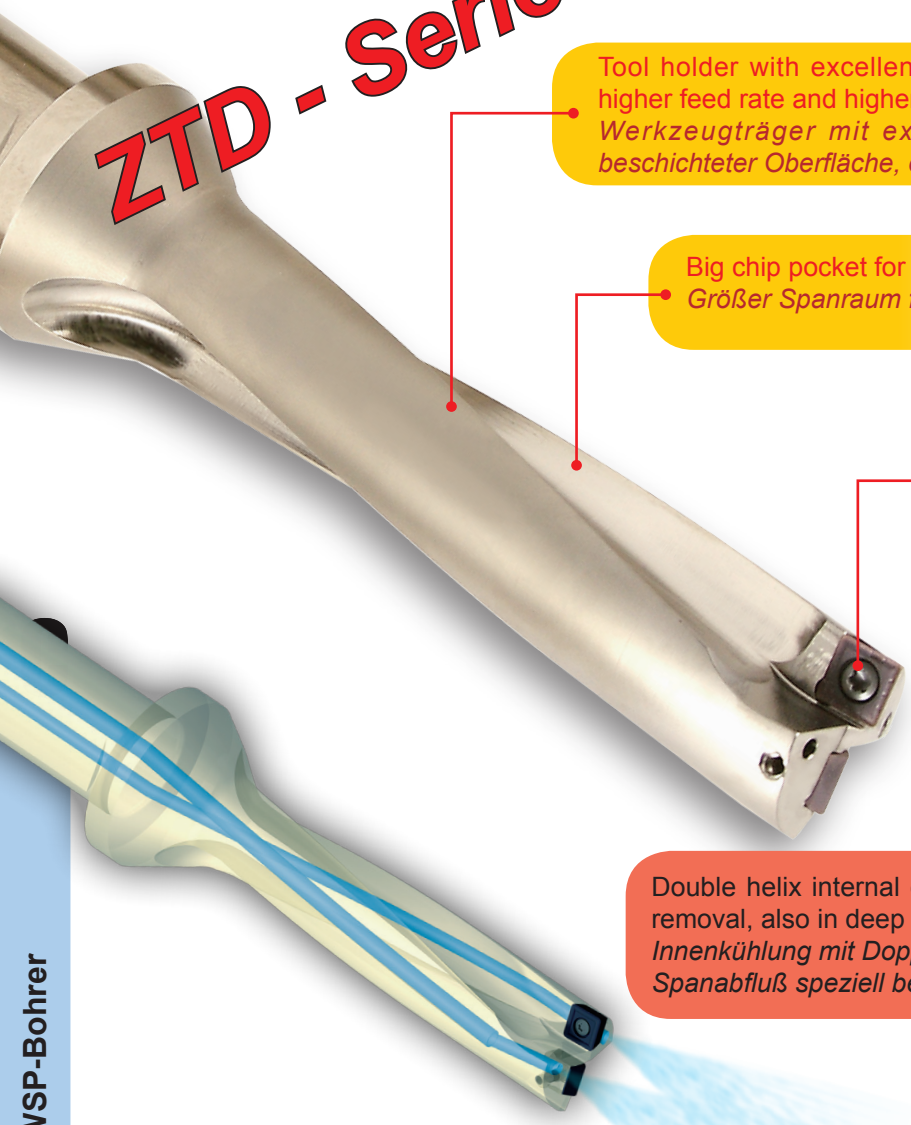
Coupling size(mm) Kupplungsgröße

25	32	40

Number of teeth Anzahl der Zähne

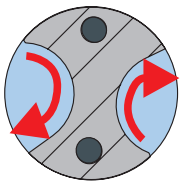
2

ZTD - Serie

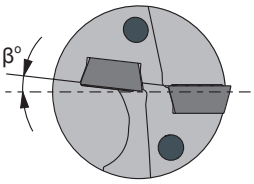


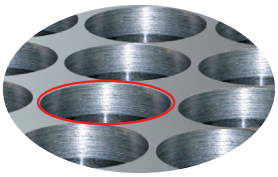
Tool holder with excellent stiffness and special surface coating. For higher feed rate and higher productivity.
Werkzeugträger mit exzellenter Torsionsteifigkeit und speziell beschichteter Oberfläche, ermöglicht höhere Vorschübe und Produktivität

Big chip pocket for better chip removal
Größer Spanraum für optimalen Spanabfluß



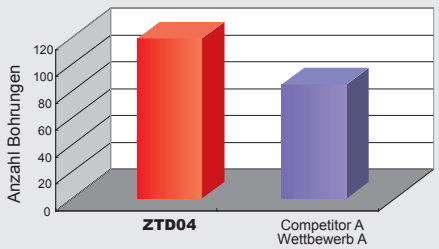
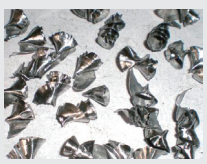
Optimised insert seat and clamping. Less vibration and higher tool life.
Optimierter Plattensitz und optimierte Plattenklemmung für vibrationsfreie Bearbeitung mit hohen Standzeiten





Double helix internal cooling for more effective cooling and good chip removal, also in deep hole boring.
Innenkühlung mit Doppelhelixdesign für effektivere Kühlmittelzufuhr und Spanabfluß speziell bei tieferen Bohrungen.

Beispiel

Type / Typ	ZTD04-260-XP25-SP07-02 SPGT07T308-PM /YBG205 (Außenschneide / outer insert) SPGT07T308-PM / YBG212 (Innenschneide / inner insert)	Comparison Vergleich	
Workpiece Werkstückstoff	50Mn(HB240)		
Cooling system Kühlsystem	Doublehelix internal cooling Doppelhelix-Innenkülung		
Cutting data Schnittdaten	V_c=130m/min f=210mm/min a_p=90mm		
Results Ergebnis	 	Chips Span- bildung	 

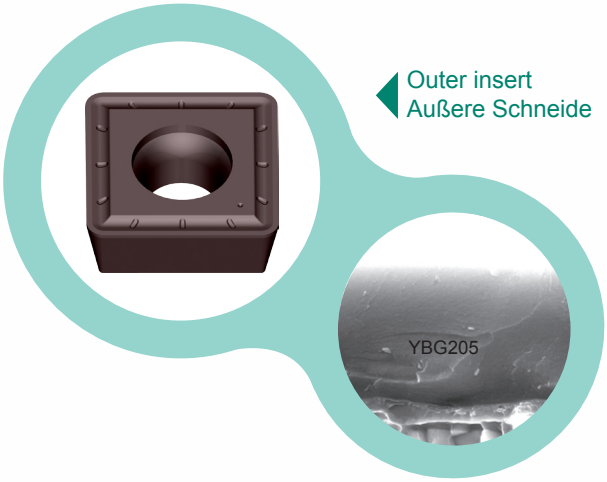
ZTD04-260-XP25-SP07-02

Competitor A
Wettbewerb A

ZTD-Serie

Optimised edge design for stable operation with new chip breaker design / *Optimierte Schneidkante, stabile Bearbeitung, neuartiger Spanbrecher*

Special grades for outer and inner insert for more efficiency in different material / *Optimierte Sorten für Innen- und Außenschneide für höhere Effizienz bei vielen Materialen*





YBG205

New nano coating structure with good hardness and wear resistance, but also good toughness. Ultra fine surface design prevent friction for best chip flow. Excellent thermal and chemical wear resistance. Best choice for all material also for stainless steel and high alloy material.

Neue Nano-Beschichtungsstruktur mit gleichzeitiger Härte und Verschleißfestigkeit bzw. Zähigkeit. Eine ultra glatte Schichtoberfläche vermindert die Reibung und garantiert einen optimierten Spanabfluß. Die exzellente thermische und chemische Widerstandsfähigkeit zeigt diese Sorte besonders bei der Bearbeitung von rostfreien Stählen und warmfesten Legierungen.

YBG212

Special Nano TiAlN coating with smooth surface for less friction and better chipflow / *Speziale Nano TiAlN Beschichtung mit sehr glatter Oberfläche für weniger Reibung und besseren Spanablauf*

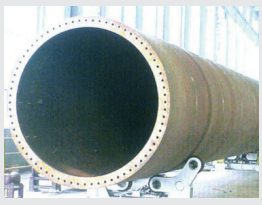
In combination with super fine grain size substract good balance between wear resistance and toughness / *In Verbindung mit neuem Superfeinkorn-Substrat die ideale Kombination aus Verschleißfestigkeit und Zähigkeit*

Excellent thermal and oxidation resistence for more stable edge / *Mit sehr guter Temperatur- und Oxidationsbeständigkeit für optimalen Schneidkantenschutz*

For boring operation the cutting speed at inner insert is lower. Therefore the grade must be more tough to prevent breakage. YBG212 is best choice in that case. YBG205 is excellent for higher wear resistance.

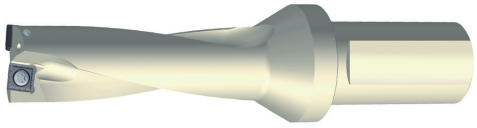
Bei der Bohrbearbeitung ist die Schnittgeschwindigkeit an der Innenschneide niedriger als an der Außerschneide. Mit solch ungünstigen Bearbeitungsbedingungen sollte die Innenschneide eine höhere Zähigkeit haben. Hier ist die YBG212 optimal einzusetzen. Die Außenplatte hat mit der YBG205 eine höhere Verschleißfestigkeit.

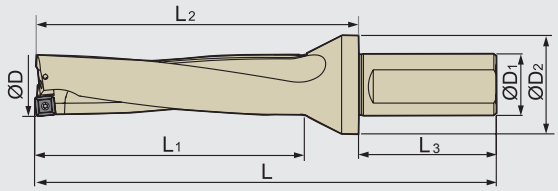
Beispiel

		Cooling system Kühlsystem	Doublehelix Internal cooling Doppelhelix-Innenkühlung	
		Type / Typ	ZTD04-240-XP25-SP07-02 SPGT07T308-PM/YBG205 (Außenschneide / outer insert) SPGT07T308-PM/YBG212 (Innenschneide / inner insert)	Competitor A Wettbewerb A
Workpiece Werkstückstoff	42CrMo(HRC25)	Compare Vergleich (after 15 min / nach 15 min)		
Cutting data Schnittdaten	V_c=150m/min f_r=0.12mm/µ a_p=80mm			

ZTD03

3D

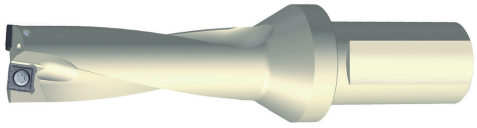


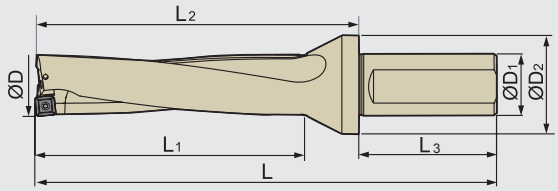


Type Typ	Stock Lager	Dimension Abmessung (mm)							Insert WSP	Screw Schraube	Wrench Schlüssel
		ØD	ØD1	ØD2	L3	L2	L1	L			
ZTD03-170-XP25-SP06-02	●	17	25	32	56	79	56	135	SPGT060204-PM	I60M2.2×4.5	WT07IP
ZTD03-180-XP25-SP06-02	●	18	25	32	56	82	59	138	SPGT060204-PM	I60M2.2×4.5	WT07IP
ZTD03-190-XP25-SP06-02	●	19	25	32	56	84	62	140	SPGT060204-PM	I60M2.2×4.5	WT07IP
ZTD03-200-XP25-SP06-02	●	20	25	32	56	87	65	143	SPGT060204-PM	I60M2.2×5.5	WT07IP
ZTD03-210-XP25-SP06-02	●	21	25	32	56	90	68	146	SPGT060204-PM	I60M2.2×5.5	WT07IP
ZTD03-220-XP25-SP06-02	●	22	25	32	56	93	71	149	SPGT060204-PM	I60M2.2×5.5	WT07IP
ZTD03-230-XP25-SP07-02	●	23	25	40	56	96	74	153	SPGT07T308-PM	I60M2.5×6.5	WT07IP
ZTD03-240-XP25-SP07-02	●	24	25	40	56	102	77	159	SPGT07T308-PM	I60M2.5×6.5	WT07IP
ZTD03-250-XP25-SP07-02	●	25	25	40	56	102	80	159	SPGT07T308-PM	I60M2.5×6.5	WT07IP
ZTD03-260-XP25-SP07-02	●	26	25	40	56	105	83	162	SPGT07T308-PM	I60M2.5×6.5	WT07IP
ZTD03-270-XP25-SP07-02	●	27	25	40	56	108	86	165	SPGT07T308-PM	I60M2.5×6.5	WT07IP
ZTD03-280-XP25-SP07-02	●	28	25	40	56	111	89	168	SPGT07T308-PM	I60M2.5×6.5	WT07IP
ZTD03-290-XP32-SP07-02	●	29	32	45	60	117	92	178	SPGT07T308-PM	I60M2.5×6.5	WT07IP
ZTD03-300-XP32-SP09-02	●	30	32	45	60	120	95	181	SPGT090408-PM	I60M3.5×8	WT15IP
ZTD03-310-XP32-SP09-02	●	31	32	45	60	123	98	184	SPGT090408-PM	I60M3.5×8	WT15IP
ZTD03-320-XP32-SP09-02	●	32	32	45	60	126	101	187	SPGT090408-PM	I60M3.5×8	WT15IP
ZTD03-330-XP32-SP09-02	●	33	32	45	60	129	104	190	SPGT090408-PM	I60M3.5×8	WT15IP
ZTD03-340-XP32-SP09-02	●	34	32	45	60	132	107	193	SPGT090408-PM	I60M3.5×8	WT15IP
ZTD03-350-XP32-SP09-02	●	35	32	45	60	135	110	196	SPGT090408-PM	I60M3.5×8	WT15IP
ZTD03-360-XP32-SP09-02	●	36	32	45	60	138	113	199	SPGT090408-PM	I60M3.5×8	WT15IP
ZTD03-370-XP40-SP11-02	●	37	40	55	70	147	117	217	SPGT110408-PM	I60M4×10	WT15IP
ZTD03-380-XP40-SP11-02	●	38	40	55	70	150	119	220	SPGT110408-PM	I60M4×10	WT15IP
ZTD03-390-XP40-SP11-02	●	39	40	55	70	153	122	223	SPGT110408-PM	I60M4×10	WT15IP
ZTD03-400-XP40-SP11-02	●	40	40	55	70	160	125	231	SPGT110408-PM	I60M4×10	WT15IP
ZTD03-410-XP40-SP11-02	●	41	40	55	70	158	128	229	SPGT110408-PM	I60M4×10	WT15IP
ZTD03-420-XP40-SP11-02	●	42	40	55	70	161	131	232	SPGT110408-PM	I60M4×10	WT15IP
ZTD03-430-XP40-SP11-02	●	43	40	55	70	169	134	240	SPGT110408-PM	I60M4×10	WT15IP
ZTD03-440-XP40-SP14-02	●	44	40	60	70	178	138	248	SPGT140512-PM	I60M5×13	WT20IP
ZTD03-450-XP40-SP14-02	●	45	40	60	70	181	141	251	SPGT140512-PM	I60M5×13	WT20IP
ZTD03-460-XP40-SP14-02	●	46	40	60	70	184	144	254	SPGT140512-PM	I60M5×13	WT20IP
ZTD03-470-XP40-SP14-02	●	47	40	60	70	187	147	257	SPGT140512-PM	I60M5×13	WT20IP
ZTD03-480-XP40-SP14-02	●	48	40	60	70	189	149	260	SPGT140512-PM	I60M5×13	WT20IP
ZTD03-490-XP40-SP14-02	●	49	40	60	70	192	152	263	SPGT140512-PM	I60M5×13	WT20IP
ZTD03-500-XP40-SP14-02	●	50	40	60	70	195	155	266	SPGT140512-PM	I60M5×13	WT20IP

ZTD04

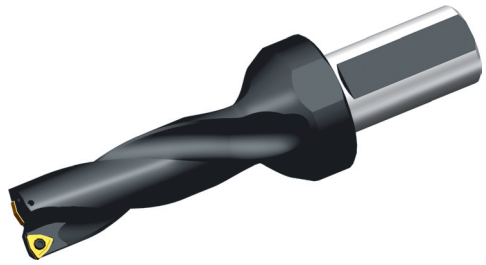
4D

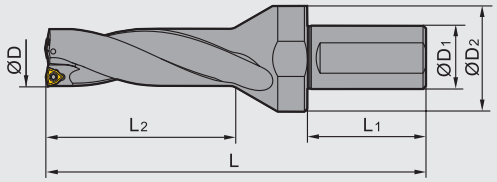




Type Typ	Dimension Abmessung (mm)							Insert WSP	Screw Schraube	Wrench Schlüssel
	ØD	ØD1	ØD2	L3	L2	L1	L			
ZTD04-170-XP25-SP06-02	17	25	32	56	95	73	152	SPGT060204-PM	I60M2.2×4.5	WT07IP
ZTD04-180-XP25-SP06-02	18	25	32	56	99	77	156	SPGT060204-PM	I60M2.2×4.5	WT07IP
ZTD04-190-XP25-SP06-02	19	25	32	56	103	81	160	SPGT060204-PM	I60M2.2×4.5	WT07IP
ZTD04-200-XP25-SP06-02	20	25	32	56	107	85	163	SPGT060204-PM	I60M2.2×5.5	WT07IP
ZTD04-210-XP25-SP06-02	21	25	32	56	111	89	167	SPGT060204-PM	I60M2.2×5.5	WT07IP
ZTD04-220-XP25-SP06-02	22	25	32	56	115	93	171	SPGT060204-PM	I60M2.2×5.5	WT07IP
ZTD04-230-XP25-SP07-02	23	25	40	56	119	97	176	SPGT07T308-PM	I60M2.5×6.5	WT07IP
ZTD04-240-XP25-SP07-02	24	25	40	56	123	101	180	SPGT07T308-PM	I60M2.5×6.5	WT07IP
ZTD04-250-XP25-SP07-02	25	25	40	56	127	105	184	SPGT07T308-PM	I60M2.5×6.5	WT07IP
ZTD04-260-XP25-SP07-02	26	25	40	56	131	109	188	SPGT07T308-PM	I60M2.5×6.5	WT07IP
ZTD04-270-XP25-SP07-02	27	25	40	56	135	113	192	SPGT07T308-PM	I60M2.5×6.5	WT07IP
ZTD04-280-XP25-SP07-02	28	25	40	56	139	117	196	SPGT07T308-PM	I60M2.5×6.5	WT07IP
ZTD04-290-XP32-SP07-02	29	32	45	60	146	121	207	SPGT07T308-PM	I60M2.5×6.5	WT07IP
ZTD04-300-XP32-SP09-02	30	32	45	60	150	125	211	SPGT090408-PM	I60M3.5×8	WT15IP
ZTD04-310-XP32-SP09-02	31	32	45	60	154	129	215	SPGT090408-PM	I60M3.5×8	WT15IP
ZTD04-320-XP32-SP09-02	32	32	45	60	158	133	219	SPGT090408-PM	I60M3.5×8	WT15IP
ZTD04-330-XP32-SP09-02	33	32	45	60	162	137	223	SPGT090408-PM	I60M3.5×8	WT15IP
ZTD04-340-XP32-SP09-02	34	32	45	60	166	141	227	SPGT090408-PM	I60M3.5×8	WT15IP
ZTD04-350-XP32-SP09-02	35	32	45	60	170	145	231	SPGT090408-PM	I60M3.5×8	WT15IP
ZTD04-360-XP32-SP09-02	36	32	45	60	174	149	235	SPGT090408-PM	I60M3.5×8	WT15IP
ZTD04-370-XP40-SP11-02	37	40	55	70	184	154	254	SPGT110408-PM	I60M4×10	WT15IP
ZTD04-380-XP40-SP11-02	38	40	55	70	188	158	258	SPGT110408-PM	I60M4×10	WT15IP
ZTD04-390-XP40-SP11-02	39	40	55	70	196	161	267	SPGT110408-PM	I60M4×10	WT15IP
ZTD04-400-XP40-SP11-02	40	40	55	70	200	165	271	SPGT110408-PM	I60M4×10	WT15IP
ZTD04-410-XP40-SP11-02	41	40	55	70	199	169	270	SPGT110408-PM	I60M4×10	WT15IP
ZTD04-420-XP40-SP11-02	42	40	55	70	208	173	279	SPGT110408-PM	I60M4×10	WT15IP
ZTD04-430-XP40-SP11-02	43	40	55	70	212	177	283	SPGT110408-PM	I60M4×10	WT15IP
ZTD04-440-XP40-SP14-02	44	40	60	70	222	182	292	SPGT140512-PM	I60M5×13	WT20IP
ZTD04-450-XP40-SP14-02	45	40	60	70	226	186	296	SPGT140512-PM	I60M5×13	WT20IP
ZTD04-460-XP40-SP14-02	46	40	60	70	230	190	300	SPGT140512-PM	I60M5×13	WT20IP
ZTD04-470-XP40-SP14-02	47	40	60	70	234	194	304	SPGT140512-PM	I60M5×13	WT20IP
ZTD04-480-XP40-SP14-02	48	40	60	70	237	198	308	SPGT140512-PM	I60M5×13	WT20IP
ZTD04-490-XP40-SP14-02	49	40	60	70	241	202	312	SPGT140512-PM	I60M5×13	WT20IP
ZTD04-500-XP40-SP14-02	50	40	60	70	245	206	316	SPGT140512-PM	I60M5×13	WT20IP

ZD03



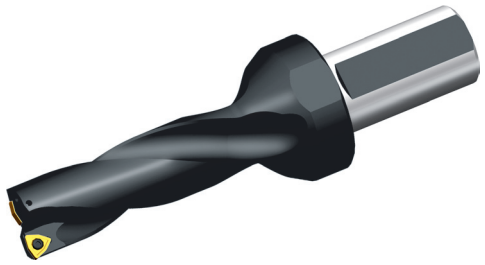


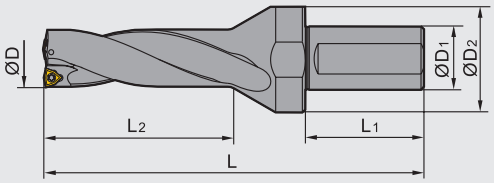
Type · Typ	Stock Lager	Basic dimension(mm) · Abmessungen						Inserts WSP	Screw Schraube	Wrench Schlüssel
		D	D1	D2	L1	L2	L			
ZD03-160-XP25-WC03-02	●	16	25	32	56	52	129	WCMX030208	I60M2.5×6.5	WT07IP
ZD03-170-XP25-WC03-02	●	17	25	32	56	55	133	WCMX030208	I60M2.5×6.5	WT07IP
ZD03-180-XP25-WC03-02	●	18	25	32	56	58	137	WCMX030208	I60M2.5×6.5	WT07IP
ZD03-190-XP25-WC03-02	●	19	25	32	56	61	140	WCMX030208	I60M2.5×6.5	WT07IP
ZD03-200-XP25-WC03-02	●	20	25	32	56	64	143	WCMX030208	I60M2.5×6.5	WT07IP
ZD03-210-XP25-WC04-02	●	21	25	45	56	67	153	WCMX040208	I60M2.5×6.5T	WT08IP
ZD03-220-XP25-WC04-02	●	22	25	45	56	70	156	WCMX040208	I60M2.5×6.5T	WT08IP
ZD03-230-XP25-WC04-02	●	23	25	45	56	73	159	WCMX040208	I60M2.5×6.5T	WT08IP
ZD03-240-XP25-WC04-02	●	24	25	45	56	76	162	WCMX040208	I60M2.5×6.5T	WT08IP
ZD03-250-XP25-WC04-02	●	25	25	45	56	79	165	WCMX040208	I60M2.5×6.5T	WT08IP
ZD03-260-XP32-WC05-02	●	26	32	55	60	83	176	WCMX050308	I60M3×7	WT09IP
ZD03-270-XP32-WC05-02	●	27	32	55	60	86	180	WCMX050308	I60M3×7	WT09IP
ZD03-280-XP32-WC05-02	●	28	32	55	60	89	184	WCMX050308	I60M3×7	WT09IP
ZD03-290-XP32-WC05-02	●	29	32	55	60	92	188	WCMX050308	I60M3×7	WT09IP
ZD03-300-XP32-WC05-02	●	30	32	55	60	95	192	WCMX050308	I60M3×7	WT09IP
ZD03-310-XP40-WC06-02	●	31	40	60	70	98	203	WCMX06T308	I60M3×7	WT09IP
ZD03-320-XP40-WC06-02	●	32	40	60	70	101	206	WCMX06T308	I60M3×7	WT09IP
ZD03-330-XP40-WC06-02	●	33	40	60	70	104	209	WCMX06T308	I60M3×7	WT09IP
ZD03-340-XP40-WC06-02	●	34	40	60	70	107	212	WCMX06T308	I60M3×7	WT09IP
ZD03-350-XP40-WC06-02	●	35	40	60	70	110	215	WCMX06T308	I60M3×7	WT09IP
ZD03-360-XP40-WC06-02	●	36	40	60	70	113	218	WCMX06T308	I60M3×7	WT09IP
ZD03-370-XP40-WC06-02	●	37	40	60	70	116	221	WCMX06T308	I60M3×7	WT09IP
ZD03-380-XP40-WC06-02	●	38	40	60	70	119	225	WCMX06T308	I60M3×7	WT09IP
ZD03-390-XP40-WC06-02	●	39	40	60	70	122	228	WCMX06T308	I60M3×7	WT09IP

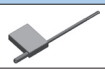
● Ex Stock / ab Lager ○ On demand / auf Anfrage

● Ex Stock / ab Lager ○ On demand / auf Anfrage

ZD03





Type · Typ	Stock Lager	Basic dimension(mm) · Abmessungen						Inserts WSP	Screw Schraube	Wrench Schlüssel
		D	D1	D2	L1	L2	L			
ZD03-400-XP40-WC06-02	●	40	40	60	70	125	231	WCMX06T308	I60M3×7	WT09IP
ZD03-410-XP40-WC06-02	●	41	40	60	70	128	234	WCMX06T308	I60M3×7	WT09IP
ZD03-420-XP40-WC08-02	●	42	40	60	70	131	239	WCMX080412	I60M3.5×10.4	WT15IP
ZD03-430-XP40-WC08-02	●	43	40	60	70	134	242	WCMX080412	I60M3.5×10.4	WT15IP
ZD03-440-XP40-WC08-02	●	44	40	60	70	137	245	WCMX080412	I60M3.5×10.4	WT15IP
ZD03-450-XP40-WC08-02	●	45	40	60	70	140	248	WCMX080412	I60M3.5×10.4	WT15IP
ZD03-460-XP40-WC08-02	●	46	40	60	70	143	251	WCMX080412	I60M3.5×10.4	WT15IP
ZD03-470-XP40-WC08-02	●	47	40	60	70	146	253	WCMX080412	I60M3.5×10.4	WT15IP
ZD03-480-XP40-WC08-02	●	48	40	70	70	149	255	WCMX080412	I60M3.5×10.4	WT15IP
ZD03-490-XP40-WC08-02	●	49	40	70	70	152	257	WCMX080412	I60M3.5×10.4	WT15IP
ZD03-500-XP40-WC08-02	●	50	40	70	70	155	259	WCMX080412	I60M3.5×10.4	WT15IP
ZD03-510-XP40-WC08-02	●	51	40	70	70	158	261	WCMX080412	I60M3.5×10.4	WT15IP
ZD03-520-XP40-WC08-02	●	52	40	70	70	161	263	WCMX080412	I60M3.5×10.4	WT15IP
ZD03-530-XP40-WC08-02	●	53	40	70	70	164	265	WCMX080412	I60M3.5×10.4	WT15IP
ZD03-540-XP40-WC08-02	●	54	40	70	70	167	267	WCMX080412	I60M3.5×10.4	WT15IP
ZD03-550-XP40-WC08-02	●	55	40	70	70	170	269	WCMX080412	I60M3.5×10.4	WT15IP
ZD03-560-XP40-WC08-02	●	56	40	70	70	173	271	WCMX080412	I60M3.5×10.4	WT15IP
ZD03-570-XP40-WC08-02	●	57	40	70	70	176	273	WCMX080412	I60M3.5×10.4	WT15IP
ZD03-580-XP40-WC08-02	●	58	40	70	70	179	275	WCMX080412	I60M3.5×10.4	WT15IP

● Ex Stock / ab Lager ○ On demand / auf Anfrage

Code key C130-131
ISO Kennzeichen

Cutting data 138
Schnittdaten

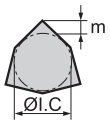
Technical Information C132-137
Technische Information.

Inserts rills Code Key · ISO Kennzeichnung Wendeschneidplatten

Insert shape · Plattenform

Code	Insert shap
S	
W	

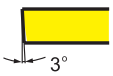
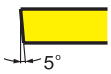
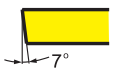
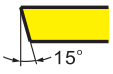
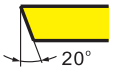
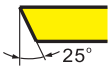
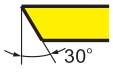
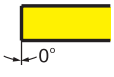
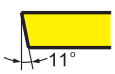
Tolerance · Toleranz



Code	m Tolerance(mm)	ØI.C Tolerance(mm)	S Tolerance(mm)	Code	m Tolerance(mm)	ØI.C Tolerance(mm)	S Tolerance(mm)
A	±0.005	±0.025	±0.025	J	±0.005	±0.05-±0.13	±0.025
F	±0.005	±0.013	±0.025	K	±0.013	±0.05-±0.13	±0.025
C	±0.013	±0.025	±0.025	L	±0.025	±0.05-±0.13	±0.025
H	±0.013	±0.013	±0.025	M	±0.08-±0.18	±0.05-±0.13	±0.13
E	±0.025	±0.025	±0.025	N	±0.08-±0.18	±0.05-±0.13	±0.025
G	±0.025	±0.025	±0.13	U	±0.13-±0.38	±0.08-±0.25	±0.13

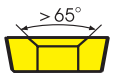
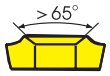
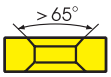
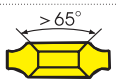
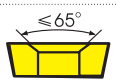
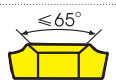
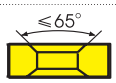
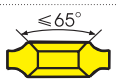
W C M X

Clearance angle of main cutting edge
Freiwinkel der Hauptschneide

Code	Clearance angle	Code	Clearance angle
A	 3°	B	 5°
C	 7°	D	 15°
E	 20°	F	 25°
G	 30°	N	 0°
P	 11°	O	Other clearance angle andere

Chipbreaker and clamping system
Spanformstufen und Klemmung

Metric · Metrisch

Code	With/Without hole/ Loch	With/Without chipbreaker	Section plane of Insert	Code	With/Without hole/ Loch	With/Without chipbreaker	Section plane of Insert
B	✔	-	 > 65°	N	-	-	
H	✔	Single-side Einseitig	 > 65°	R	-	Single-side Einseitig	
C	✔	-	 > 65°	F	-	Double-side Doppelseitig	
J	✔	Double-side Doppelseitig	 > 65°	A	✔	-	
W	✔	-	 ≤ 65°	M	-	Single-side Einseitig	
T	✔	Single-side Einseitig	 ≤ 65°	G	✔	Double-side Doppelseitig	
Q	✔	-	 ≤ 65°	X	---	---	Special
U	✔	Double-side Doppelseitig	 ≤ 65°				

Length of cutting edge
Schneidenlänge

Code	Length	
	W	S
03	3.8	
04	4.3	
05	5.4	
06	6.5	6.35
08	8.7	8.0
09		9.525
12		12.7

Insert thickness
Dicke



Thickness is defined as height from bottom of insert to the highest part of cutting edge

Code	Insert thickness WSP Dick.(mm)	Code	Insert thickness WSP Dick.(mm)
00	0.79	**05**	5.96
T0	0.99	**T5**	5.95
01	1.59	**06**	6.35
T1	1.98	**T6**	6.75
02	2.38	**07**	7.94
T2	2.58	**09**	9.52
03	3.18	**T9**	9.72
T3	3.97	**11**	11.11
04	4.76	**12**	12.70
T4	4.96		

08 04 12 R – PG

Nose radius
Schneidenradius

Code	Description
04	0.4mm
08	0.8mm
12	1.2mm

Cutting direction
Vorschubsrichtung

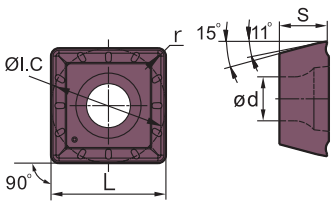
Code	Description
R	Right hand/ Rechts
L	Left hand/ Links
N	Neutral

Chipbreaker code
Spanformstufe

ZTD03 / 04







Type Typ	Dimension Abmessung (mm)					Grade Sorte	
	L	ØI.C	s	ød	r	YBG205 outer insert Außenschneide	YBG212 inner insert Innenschneide
SPGT060204-PM	6	6	2.38	2.6	0.4	•	•
SPGT07T308-PM	7.94	7.94	3.97	2.8	0.8	•	•
SPGT090408-PM	9.8	9.8	4.3	4.2	0.8	•	•
SPGT110408-PM	11.5	11.5	4.76	4.4	0.8	•	•
SPGT140512-PM	14.3	14.3	5.2	5.75	1.2	•	•

● ex stock / ab Lager ○ on demand /auf Anfrage

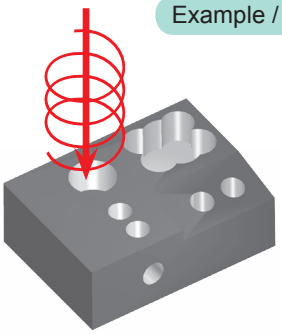
Material Overview · Material Übersicht

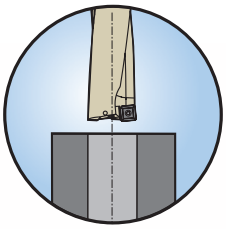
✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

Geometry Geometrie	Workpiece material · Werkstückstoff										
	Carbon steel Kohlenstoff Stahl HB≤180	Alloy steel Legierter Stahl	Hardened steel · Gehärteter Stahl			Stainless steel Rostfreier Stahl	Cast iron, Grauguss	Nodular cast iron GGG	Aluminum alloy Alu leg.	Copper alloy Kupfer leg.	Heat resist. alloy Warmfest. leg.
			~40HRC	~50HRC	~60HRC						
SPGT*-PM	✔	✔	✔			✔	✔	✔			

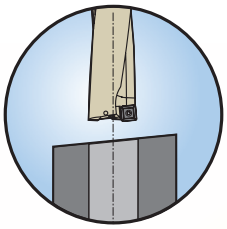


Example / Beispiel

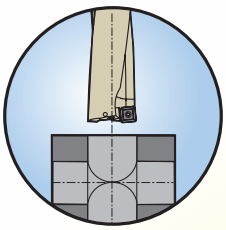




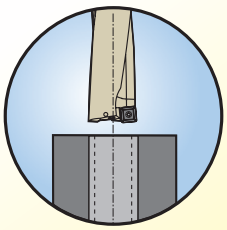
1 Allgemeine Bohrung
General boring



2 Schiefe Ebene
Inclined plane

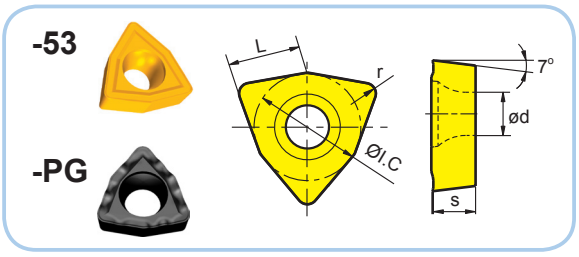


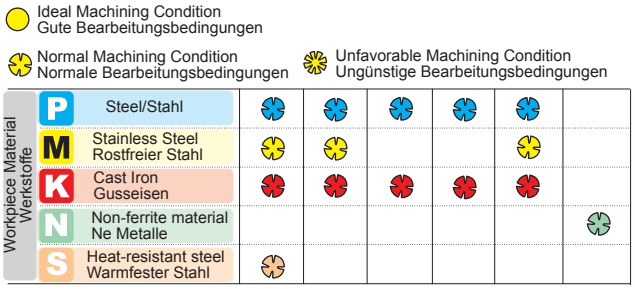
3 Kreuzbohrung
Cross hole



4 Expansionsbohrung
expansion boring

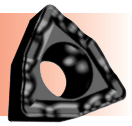
Indexable inserts for drilling · WSP zum Bohren





Type · Typ	Basic dimension(mm) · Basis Abmessungen					Grade · Sorte					
	L	I.C	s	d	r	YBG202	YBG205	YBG201	YBD252	YBG40	YD201
WCMX030208R-53	3.8	5.56	2.38	2.8	0.8	○		●	●	○	○
WCMX040208R-53	4.3	6.35	2.38	3.1	0.8	○		●	●	○	○
WCMX050308R-53	5.4	7.94	3.18	3.2	0.8	○		●	●	○	○
WCMX06T308R-53	6.5	9.525	3.97	3.7	0.8	○		●	●	○	○
WCMX080412R-53	8.7	12.7	4.76	4.3	1.2	○		●	●	○	○
WCMX030208-D	3.8	5.56	2.38	2.8	0.8				○	○	
WCMX040208-D	4.3	6.35	2.38	3.1	0.8				○	○	
WCMX050308-D	5.4	7.94	3.18	3.2	0.8				○	○	
WCMX06T308-D	6.5	9.525	3.97	3.7	0.8				○	○	
WCMX080412-D	8.7	12.7	4.76	4.3	1.2				○	○	
WCMX030208R-PG	3.8	5.56	2.38	2.8	0.8	●			○		
WCMX040208R-PG	4.3	6.35	2.38	3.1	0.8	●			○		
WCMX050308R-PG	5.4	7.94	3.18	3.2	0.8	●	○		○		
WCMX06T308R-PG	6.5	9.525	3.97	3.7	0.8	●			○		
WCMX080412R-PG	8.7	12.7	4.76	4.3	1.2	●			○		

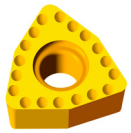
-PG chipbreaker
-PG Spanbrecher



Unique design of waveform edge ensure high edge strength and good chip breaking performance for machining carbon steel and alloy steel.

Wellenförmige Schneide mit hoher Stabilität und Spankontrolle zur Bearbeitung von Kohlenstoffstahl, legiertem Stahl und Guss

-D chipbreaker
-D Spanbrecher



Inserts for outer positioning with optimized chipbreaker geometriy. And good chip breaking performance for machining,steel, stainless steel, cast iron for common cutting speed .

Optimierte Geometrie als Außenschneide einsetzbar. Gute Spankontrolle bei Stahl, rostfreiem Stahl, Grauguss bei mittleren Schnittgeschwindigkeiten.

-53 chipbreaker
-53 Spanbrecher



Sharp cutting edge benefits to achieve low roughness surface, mainly applicable for low load cutting of aluminum alloy, mild steel, stainless steel and cast iron.

Scharfe Schneidkante zur Erziehlung exclusiver Oberflächen. Zur Bearbeitung von Alu-Legierungen, Baustahl, rostfreiem Stahl und Grauguss.

● Ex Stock / ab Lager ○ On demand / auf Anfrage

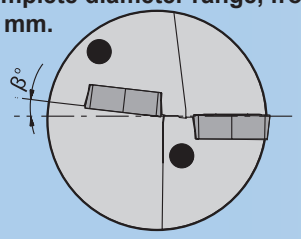
Comparison table for drilling Insert - Grades
Bohrwendeplatten Übersichtstabelle - Sorten

Workpiece material	ISO	Coating · Beschichtung		Cermet	uncoated carbide unb. Hartmetall	PCBN & PCD PCBN & PKD
		CVD	PVD			
P Steel · Stahl	P01					
	P10	YBD252	YBG202, YBG205, YBG212			
	P20					
	P30					
	P40					
M Stainless Steel Rostfreier Stahl	M01					
	M10		YBG202, YBG205, YBG212			
	M20					
	M30					
	M40					
K Cast iron · Grauguss	K01					
	K10	YBD252	YBG202, YBG205, YBG212			
	K20					
	K30					
	K40					
N Hardened material Gehärtete Werkstoffe	N01					
	N10				YD201	
	N20					
	N30					
S Heat-resistant steel Warmfester Stahl	S01					
	S10		YBG202, YBG205			
	S20					
	S30					
H Non-ferrite materials Ne Metalle	H01					
	H10					
	H20					
	H30					

Features of drill · Merkmale der WSP-Bohrer

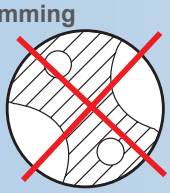
- Perfect insert assembling angle makes balanced cutting force, low vibration in machining process, thus achieve excellent surface quality.
- Advanced flute design possesses large chip pocket for chip removal.
- Complete diameter range, from 16 mm to 58 mm.

- Perfekte WSP Positionierung für ausgewogene Schnittkraftverteilung. Zur Erzielung guter Oberflächen.
- Fortschrittlicher großer Spanraum für eine gute Spanabfuhr.
- kompletter Durchmesserbereich von 16 mm-58mm



Small chip pocket
Easy to generate chips jamming

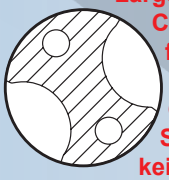
kleiner Spanraum,
Spanstau.



Competitor
Wettbewerber

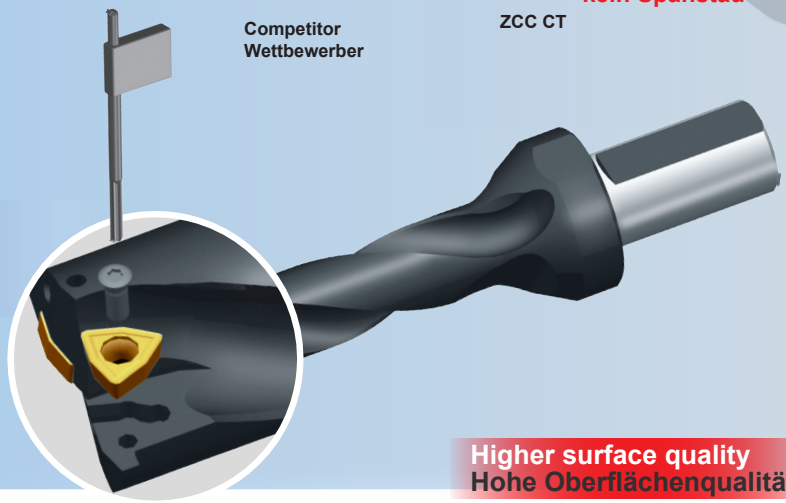
Large chip pocket
Chip jamming free

Großer Spanraum
kein Spanstau

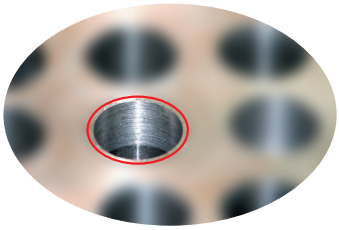


ZCC CT

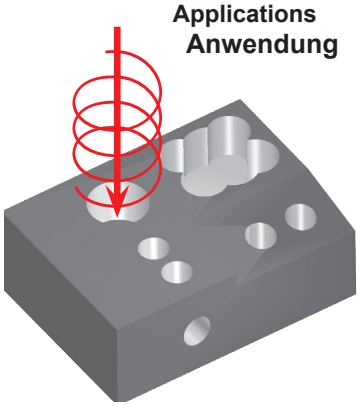
Insert assembling
WSP Wechsel

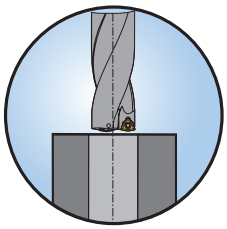


Higher surface quality
Hohe Oberflächenqualität

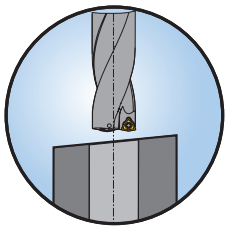


Applications
Anwendung





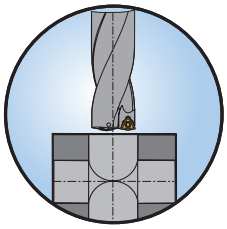
1. Common drilling
Normalbohren



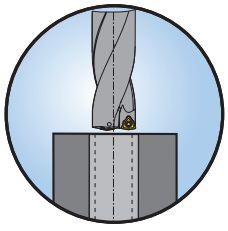
2. Slant face drilling
Schrägbohren

Better chip breaking performance
Gute Spankontrolle





3. Cross-hole drilling
Bohren bei Querbohrungen



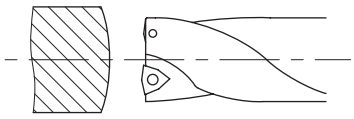
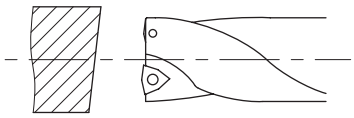
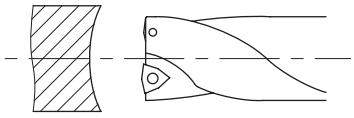
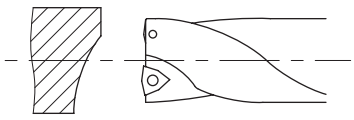
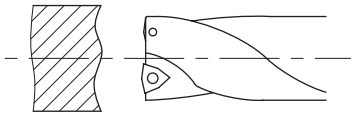
4. Counterboring
Aufbohren

Technical information for shallo drills · Technische Informationen über WSP-Bohrer

■ initial drill penetration · Das Anbohren

Initial drill penetration is an important factor for successful drilling. One way of ensuring good hole quality is to make sure the penetration surface of the workpiece is vertical to the drill centre axis. In addition, an indexable drill can carry out initial penetration of convex, concave, inclined and irregular surfaces when accompanied with an adjustment of feed rates.

Das Anbohren ist ein wichtiger bzw. entscheidener Faktor für das erfolgreiche Bohren. Eine gute Bohrungsqualität und Standzeit erzielt man bei einer ebenen Anbohrfläche vertikal zur Bohrerachse. Beim Anbohren in konkaven, konvexen und unebenen Flächen soll der Vorschub entsprechend reduziert werden.

Workpiece surface Werkstück Oberflächen	Countermeasures Maßnahmen
	For a convex surface, the conditions are relatively good and the centre of the drill ideally makes contact with the workpiece first, thus can adopt normal feed. Bei konvexen Anbohrflächen ist die Bearbeitungsituation realtiv gut. Der erste Kontakt des Bohrers geschieht über die Zentrums-schneide, so daß normale Vorschübe gewählt werden können.
	When penetrating an inclined surface, the cutting edges will be unevenly loaded which may result in the premature drill wear. If the angle of the inclined surface is larger than two degrees, the feed should be reduced to 1/3 of that recommended for the drill. Bei Schrägflächen wird der Bohrer aus dem Zentrum gedrückt. Dadurch wird der Bohrerverschleiß erhöht. Bei einem Winkel von über 2° sollte der Vorschub auf 1/3 der empfohlenen Werte reduziert werden.
	When drilling into concave surface, drill center axis normally tends to off-center, the feed should be reduced to 1/3 of that recommended for the drill. Beim Anbohren in konkaven Flächen kann der Bohrer aus dem Zentrum gedrückt werden. Vorschub auf 1/3 reduzieren.
	When drilling into non-symmetric curved surfaces, the drill tends to deviate from the centre because of penetrating against an inclined surface. The feed should be reduced to lower than that recommended for the initial penetration of concave surfaces. Beim Bohren in asymetrischen Flächen sollte der Vorschub entsprechend reduziert werden. Eventuell unter den Werten die konkaven Flächen.
	When drilling into irregular surface, there is a risk of the inserts chipping and this may also occur when drilling through the workpiece. Therefore the feed rate should be reduced. Beim Bohren in stark asymetrischen Flächen können beim Anbohren und beim Austritt des Bohrens aus dem Werkstück Ausbrüche an der Wendeschneidplatte entstehen. Auch hier den Vorschub entsprechend reduzieren.

Calculations for shallow drilling · Berechnungsbeispiele für WSP-Bohrer

• Cutting speed · Schnittgeschwindigkeit (Vc)

$$Vc = \frac{Dc \times \pi \times n}{1000}$$

Vc (m/min): cutting speed · Schnittgeschwindigkeit
Dc (mm): drill diameter · Bohrerdurchm. Ø
n (rev/min): rotating speed · Umdrehungen
π ~ 3,14

○ Example · Beispiel

Spindle speed is1600 rev/min, drill diameter is 20mm, thus cutting speed is:
Spindelumdrehung beträgt 1600 u/min, Bohrerdurchmesser ist 20mm, dadurch ist die Schnittgeschw.:

$$Vc = \frac{Dc \times \pi \times n}{1000} = \frac{20 \times 3.14 \times 1600}{1000} = 100\ (m/min)$$

• Feed speed · Vorschub

$$Vf = fr \times n\ (mm/min)$$

Vf (mm/min): feed speed · Schnittgeschwindigkeit
fr (mm/rev): feed rate per revolution · Vorschub pro Umdreh.
n (rev/min): spindle speed · Umdrehungen

○ Example · Beispiel

Spindle speed is1500 rev/min, feed rate per revolution is 0.1mm/rev, thus feed speed is:
Spindelumdrehung beträgt 1500 u/min, Vorschub pro Umdrehung= 0,1mm/rev:

$$Vf = fr \times n = 0.1 \times 1500 = 150\ (mm/min)$$

• Machining time · Bearbeitungszeit

$$Tc = \frac{Id \times i}{n \times f}$$

Tc (min): machining time · Bearbeitungszeit
fr (mm/rev): feed rate per revolution · Vorschub pro Umdreh.
i: number of holes · i: Anzahl der Bohrung.
Id (mm): drilling depth · Bohrtiefe
n (rev/min): spindle speed · Drehzahl

○ Example · Beispiel

Calculate the drilling time, with following formular:

drill diameter 20mm, depth 40mm
cutting speed 100m/min
feed rate 0,1/rev

$$n = \frac{Vc \times 1000}{Dc \times \pi} = \frac{100 \times 1000}{20 \times 3.14} = 1600\ (rev/min)$$

Berechnen Sie die Bohrzeit, mit folgender Formel:

Bohrdurchm. 20mm, Bohrtiefe 40mm
Schnittgeschwindigk. 100m/min
Vorschub pro Umdrehung 0,1/re

$$Tc = \frac{Id \times i}{n \times fr} = \frac{40 \times 1}{1600 \times 0.1} = 0.25\ (min)$$

• Metal removal rate · Zerspanungsvolumen

$$Q = \frac{Vf \times \pi \times Dc^2}{4 \times 1000}$$

Q (cm3/min): metal removal rate · Zerspanungsvolumen
Dc(mm): drill diameter · Bohrerdurchmesser
Vf (mm/min): feed speed · Vorschub
π ~ 3,14

○ Example · Beispiel

Drill diameter is 20mm, feed speed is 160mm/min, thus metal removal rate is:
Bohrdurchmesser20mm, Vorschub ist 160mm/min, dadurch liegt das Zerspanungsvolumen bei:

$$Q = \frac{Vf \times \pi \times Dc^2}{4 \times 1000} = \frac{160 \times 3.14 \times 20^2}{4 \times 1000} = 50.24\ (cm^3/min)$$

Recommended cutting data for shallow drills · Empfohlene Schnittdaten für WSP-Bohrern

ISO	Material	Hardness HB Härte HB	Diameter Ø Durchmesser [mm]	Feed rate Vorschub fn [mm/r]	Cutting speed Schnittgeschwindigk.Vc [m/min]
P	Carbon steel Kohlenstoff-stahl	80-200	16.0-23.0 24.0-30.0 31.0-38.0 39.0-46.0 47.0-58.0	0.05-0.09 0.05-0.09 0.06-0.10 0.07-0.11 0.08-0.12	200(170-240)
	Low alloy steel Niedrigleg. Stahl	150-260	16.0-23.0 24.0-30.0 31.0-38.0 39.0-46.0 47.0-58.0	0.05-0.09 0.05-0.12 0.06-0.14 0.08-0.16 0.10-0.20	170(140-220)
	High alloy steel Hochleg. Stahl	150-320	16.0-23.0 24.0-30.0 31.0-38.0 39.0-46.0 47.0-58.0	0.05-0.09 0.05-0.12 0.06-0.16 0.08-0.18 0.10-0.22	150(120-180)
	Cast steel Gussstahl	180-250	16.0-23.0 24.0-30.0 31.0-38.0 39.0-46.0 47.0-58.0	0.05-0.08 0.05-0.08 0.06-0.10 0.07-0.11 0.07-0.12	140(120-170)
M	Stainless steel Ferrite Martensite Rostfreier Stahl	150-270	16.0-23.0 24.0-30.0 31.0-38.0 39.0-46.0 47.0-58.0	0.05-0.09 0.05-0.12 0.06-0.16 0.08-0.18 0.10-0.22	160(110-230)
	Austenite	150-275	16.0-23.0 24.0-30.0 31.0-38.0 39.0-46.0 47.0-58.0	0.05-0.09 0.05-0.11 0.06-0.13 0.08-0.14 0.10-0.16	140(110-220)
K	Malleable cast iron Temperguss	150-230	16.0-23.0 24.0-30.0 31.0-38.0 39.0-46.0 47.0-58.0	0.05-0.10 0.05-0.14 0.08-0.16 0.10-0.20 0.12-0.24	160(120-220)
	Gray cast iron Grauguss	150-220	16.0-23.0 24.0-30.0 31.0-38.0 39.0-46.0 47.0-58.0	0.05-0.10 0.05-0.14 0.08-0.16 0.10-0.20 0.12-0.24	200(170-240)
	Nodular cast iron GGG	160-250	16.0-23.0 24.0-30.0 31.0-38.0 39.0-46.0 47.0-58.0	0.05-0.09 0.05-0.12 0.06-0.14 0.08-0.16 0.10-0.20	160(130-200)
N	Al alloy Alu-Leg.	60-110	16.0-23.0 24.0-30.0 31.0-38.0 39.0-46.0 47.0-58.0	0.05-0.10 0.05-0.14 0.08-0.16 0.10-0.20 0.12-0.24	300(250-350)

Reaming · Reiben

Reamers · Reibahlen

Solid carbide reamers overview	**C140**	**VHM Reibahlen Übersicht**
Graphics identification	**C140**	Graphische Werkzeugbeschreibung
Code Key	**C141**	ISO Kennzeichnung
Solid carbide reamer program	**C142-C145**	**VHM Reibahlen Programm**
Recommended cutting datas	**C146**	Empfohlene Schnittdaten
Technical information	**C147-149**	**Technische Informationen**
Order form for non-standard products	**C150**	Bestellformular für Sonderwerkzeuge

Solid carbide reamers overview · VHM Reibahlen Übersicht

Name	Type · Typ	Shape Ausführung	Diameter range Durchmesser bereich Ø	Workpiece material Werkstück Material								Page Seite	
				P	M	K	N		S	H			
				Carbon steel Alloy steel Kohlenst. Stahl Leg. Stahl	Stainless steel Rostfreier Stahl	Cast iron Gusseisen	Aluminum alloy Alu leg.	Copper alloy Kupfer leg.	Heat resist. alloy Warmfeste leg.	High hard. steel Gehärteter Stahl		Specification Spezifikation	Cutting datas Schnittdaten
Right helical flute Rechts gedrallt	**3101H7**		Ø4-Ø20			✔	✔	✔				C142	C146
Straight flute Gerade genutet	**3102H7**		Ø4-Ø20			✔	✔	✔				C143	C146
Straight flute with inner hole Gerad genutet mit einem inneren Loch	**3112H7**		Ø4-Ø20	✔		✔						C144	C146
Left helical flute Links gedrallt	**3103H7**		Ø4-Ø20			✔	✔	✔				C145	C146

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

Solid carbide reamers icons information · VHM Reibahlen Grafische Beschreib.

Precision class of reamed hole
Bohrungstoleranzklasse

H7

The precision class of reamed hole reaches H7 specified in GB/T1800-1804

Toleranzklasse H7 angegeben in GB/T1800-1804

Shank · Schaft



Straight shank
Zylinderschaft

Solid carbide reamer Code Key · VHM Reibahlen ISO Kennzeichnung

Tool Type · Werkzeugtyp	
Code	Description / *Beschreibung*
3	Reamer Reibahle

Chip flute · Spannut	
Code	Description · Beschreibung
1	Right chip flute Spannut Rechtsdrall
2	Straight flute Spannut gerade genutet
3	Left chip flute Spannut Linksdrall

Precision class of reamed hole Toleranzklasse	
Code	Description · Beschreibung
H7	The precision class of reamed hole reaches H7 specified in GB/T1800-1804 Die Toleranzklasse der geriebenen Bohrung entspricht H7

3 1 0 1 H7 -0850

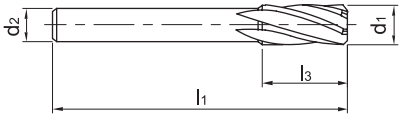
Shank type Schaftausführung	
Code	Description · Beschreibung
1	Parallel shank Zylinderschaft
2	Square Straight shank Zylinderschaft DIN10 Zylinderschaft DIN10
5	Straight shank Zylinderschaft as per DIN 6535HA Zylinderschaft DIN6535HA
9	Taper shank MK-Schaft

Mode of cooling Kühlung	
Code	Description · Beschreibung
0	External Außenkühlung
1	Internal Innenkühlung

Diameter Durchmesser	
Code	Description · Beschreibung
0850	Diameter is 8.5mm Durchmesser is 8.5mm

3101H7 with Straight shank and rigth helical flute · mit Zylindersch. und rechtsgedrallte Spannute





H7

Type · Typ	Basic dimension(mm) · Basis Abmessungen				Number of teeth Zähnezahl	Grade · Sorte
	d_1	$d_{2(h6)}$	l_1	l_3		YK10F
3101H7-0400	4.0	3.55	56	20	4	○
3101H7-0450	4.5	4.00	63	22	6	○
3101H7-0500	5.0	4.00	63	22	6	○
3101H7-0550	5.5	5.00	63	22	6	○
3101H7-0600	6.0	5.00	63	22	6	○
3101H7-0650	6.5	5.00	63	22	6	○
3101H7-0700	7.0	6.30	71	25	6	○
3101H7-0750	7.5	6.30	71	25	6	○
3101H7-0800	8.0	6.30	71	25	6	○
3101H7-0850	8.5	8.00	71	25	6	○
3101H7-0900	9.0	8.00	71	25	6	○
3101H7-0950	9.5	8.00	71	25	6	○
3101H7-1000	10.0	8.00	71	25	6	○
3101H7-1050	10.5	8.00	71	25	6	○
3101H7-1100	11.0	10.00	80	28	6	○
3101H7-1150	11.5	10.00	80	28	6	○
3101H7-1200	12.0	10.00	80	28	6	○
3101H7-1250	12.5	10.00	80	28	6	○
3101H7-1300	13.0	10.00	80	28	6	○
3101H7-1350	13.5	12.5	90	32	6	○
3101H7-1400	14.0	12.5	90	32	6	○
3101H7-1450	14.5	12.5	90	32	6	○
3101H7-1500	15.0	12.5	90	32	6	○
3101H7-1550	15.5	12.5	90	32	6	○
3101H7-1600	16.0	12.5	90	32	6	○
3101H7-1700	17.0	12.5	90	32	6	○
3101H7-1800	18.0	16.00	100	36	6	○
3101H7-1900	19.0	16.00	100	36	6	○
3101H7-2000	20.0	16.00	100	36	6	○

Material Overview · Material Übersicht

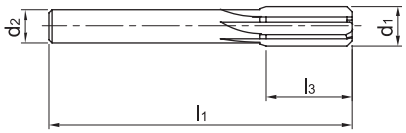
✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

Grade	Workpiece material · Werkstückstoff										
	Mild steel Baustahl HB≤180	Carbon steel, Alloy steel	Hardened steel · gehärteter Stahl			Stainless steel Rostfreier Stahl	Cast iron Gusseisen	Nodular cast iron GGG	Aluminum alloy Alu-leg.	Copper alloy Kupfer leg.	Heat resist. alloy warmfest. leg.
			~40HRC	~50HRC	~60HRC						
YK10F							✔	✔	✔	✔	

● Ex Stock / ab Lager ○ On demand / auf Anfrage

3102H7 with Straight shank and flute · mit Zylinderschaft und gerader Spannute





H7

Type · Typ	Basic dimension(mm) · Basis Abmessungen				Number of teeth Zähnezahl	Grade · Sorte
	d_1	$d_2(h_6)$	l_1	l_3		YK10F
3102H7-0400	4.0	3.55	56	20	4	○
3102H7-0450	4.5	4.00	63	22	6	○
3102H7-0500	5.0	4.00	63	22	6	○
3102H7-0550	5.5	5.00	63	22	6	○
3102H7-0600	6.0	5.00	63	22	6	○
3102H7-0650	6.5	5.00	63	22	6	○
3102H7-0700	7.0	6.30	71	25	6	○
3102H7-0750	7.5	6.30	71	25	6	○
3102H7-0800	8.0	6.30	71	25	6	○
3102H7-0850	8.5	8.00	71	25	6	○
3102H7-0900	9.0	8.00	71	25	6	○
3102H7-0950	9.5	8.00	71	25	6	○
3102H7-1000	10.0	8.00	71	25	6	○
3102H7-1050	10.5	8.00	71	25	6	○
3102H7-1100	11.0	10.00	80	28	6	○
3102H7-1150	11.5	10.00	80	28	6	○
3102H7-1200	12.0	10.00	80	28	6	○
3102H7-1250	12.5	10.00	80	28	6	○
3102H7-1300	13.0	10.00	80	28	6	○
3102H7-1350	13.5	12.5	90	32	6	○
3102H7-1400	14.0	12.5	90	32	6	○
3102H7-1450	14.5	12.5	90	32	6	○
3102H7-1500	15.0	12.5	90	32	6	○
3102H7-1550	15.5	12.5	90	32	6	○
3102H7-1600	16.0	12.5	90	32	6	○
3102H7-1700	17.0	12.5	90	32	6	○
3102H7-1800	18.0	16.00	100	36	6	○
3102H7-1900	19.0	16.00	100	36	6	○
3102H7-2000	20.0	16.00	100	36	6	○

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

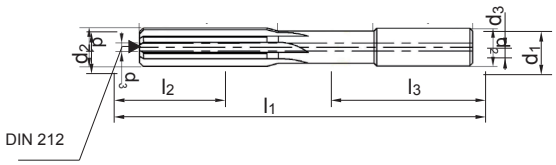
Grade	Workpiece material · Werkstückstoff										
	Mild steel Baustahl HB≤180	Carbon steel, Alloy steel	Hardened steel · gehärteter Stahl			Stainless steel Rostfreier Stahl	Cast iron Gusseisen	Nodular cast iron GGG	Aluminum alloy Alu-leg.	Copper alloy Kupfer leg.	Heat resist. alloy warmfest. leg.
			~40HRC	~50HRC	~60HRC						
YK10F							✔	✔	✔	✔	

Code key C141
ISO Kennzeichen
Cutting data C146
Schnittdaten
Technical Information C147-149
Technische Information.
Non-standart tailor made C150
Bestellformular für Sonderwerkzeuge

● Ex Stock / ab Lager ○ On demand / auf Anfrage

3112H7 with Straight shank and flute · mit Zylinderschaft und gerader Spannute





H7

Type · Typ	Basic dimension(mm) · Basis Abmessungen						Number of teeth Zähnezahl	Grade · Sorte
	d_1 DIN 1420	$d_2(h_6)$	d_3	l_1	l_3	l_2		KRG102
3112H7-0400	4.0	4.0	0.6	70	20	28	6	●
3112H7-0500	5.0	5.0	1.0	70	22	28	6	●
3112H7-0600	6.0	6.00	1.0	100	22	36	6	●
3112H7-0700	7.0	8.00	1.3	110	25	42	6	●
3112H7-0800	8.0	8.00	1.3	110	25	42	6	●
3112H7-0900	9.0	10.00	2.0	110	25	42	6	●
3112H7-1000	10.0	10.00	2.0	110	25	38	6	●
3112H7-1100	11.0	12.00	2.0	110	28	38	6	●
3112H7-1200	12.0	12.00	2.0	110	28	38	6	●
3112H7-1300	13.0	14.00	2.0	110	28	38	6	●
3112H7-1400	14.0	14.00	2.0	110	32	38	6	●
3112H7-1500	15.0	16.00	2.0	110	32	38	6	●
3112H7-1600	16.0	16.00	2.0	150	32	52	6	●
3112H7-1800	18.0	18.00	3.0	150	36	52	6	●
3112H7-2000	20.0	20.00	3.0	150	36	50	6	●

Material Overview · Material Übersicht

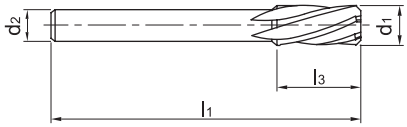
✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

Grade	Workpiece material · Werkstückstoff										
	Mild steel Baustahl HB≤180	Carbon steel, Alloy steel	Hardened steel · gehärteter Stahl ~40HRC	~50HRC	~60HRC	Stainless steel Rostfreier Stahl	Cast iron	Nodular cast iron GGG	Aluminum alloy Alu-leg.	Copper alloy Kupfer leg.	Heat resist. alloy warmfest. leg.
KRG102		✔	✔				✔	✔			

● Ex Stock / ab Lager ○ On demand / auf Anfrage

3103H7 with Straight shank and left helical flute · mit Zylinderschaft und linksgedrallte Spannute





H7

Type · Typ	Basic dimension(mm) · Basis Abmessungen				Number of teeth Zähnezahl	Grade · Sorte
	d_1	$d_{2(h6)}$	l_1	l_3		YK10F
3103H7-0400	4.0	3.55	56	20	4	○
3103H7-0450	4.5	4.00	63	22	6	○
3103H7-0500	5.0	4.00	63	22	6	○
3103H7-0550	5.5	5.00	63	22	6	○
3103H7-0600	6.0	5.00	63	22	6	○
3103H7-0650	6.5	5.00	63	22	6	○
3103H7-0700	7.0	6.30	71	25	6	○
3103H7-0750	7.5	6.30	71	25	6	○
3103H7-0800	8.0	6.30	71	25	6	○
3103H7-0850	8.5	8.00	71	25	6	○
3103H7-0900	9.0	8.00	71	25	6	○
3103H7-0950	9.5	8.00	71	25	6	○
3103H7-1000	10.0	8.00	71	25	6	○
3103H7-1050	10.5	8.00	71	25	6	○
3103H7-1100	11.0	10.00	80	28	6	○
3103H7-1150	11.5	10.00	80	28	6	○
3103H7-1200	12.0	10.00	80	28	6	○
3103H7-1250	12.5	10.00	80	28	6	○
3103H7-1300	13.0	10.00	80	28	6	○
3103H7-1350	13.5	12.5	90	32	6	○
3103H7-1400	14.0	12.5	90	32	6	○
3103H7-1450	14.5	12.5	90	32	6	○
3103H7-1500	15.0	12.5	90	32	6	○
3103H7-1550	15.5	12.5	90	32	6	○
3103H7-1600	16.0	12.5	90	32	6	○
3103H7-1700	17.0	12.5	90	32	6	○
3103H7-1800	18.0	16.00	100	36	6	○
3103H7-1900	19.0	16.00	100	36	6	○
3103H7-2000	20.0	16.00	100	36	6	○

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

Grade	Workpiece material · Werkstückstoff										
	Mild steel Baustahl HB≤180	Carbon steel, Alloy steel	Hardened steel · gehärteter Stahl ~40HRC	~50HRC	~60HRC	Stainless steel Rostfreier Stahl	Cast iron	Nodular cast iron GGG	Aluminum alloy Alu-leg.	Copper alloy Kupfer leg.	Heat resist. alloy warmfest. leg.
YK10F							✔	✔	✔	✔	

Code key C141
ISO Kennzeichen
Cutting data C146
Schnittdaten
Technical Information C147-149
Technische Information.
Non-standart tailor made C150
Bestellformular für Sonderwerkzeuge

3101H7 / 3102H7 / 3103H7

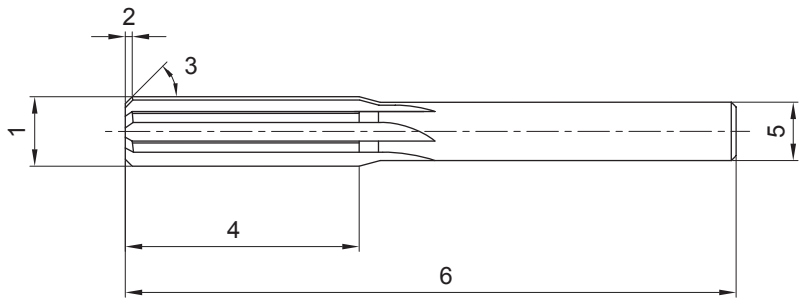
Workpiece material Werkstück-stoff	Cast iron Nodular cast iron Gusseisen · GGG			Copper alloy Kupfer leg.			Aluminium alloy Alu leg.		
Vc	8~16m/min			10~25m/min			15~30 m/min		
Ø (mm)	n (min^{-1})	f (mm/r)	Toleranz (mm)	n (min^{-1})	f (mm/r)	Toleranz (mm)	n (min^{-1})	f (mm/r)	Toleranz (mm)
4	950	0.04~0.06	0.1~0.2	1600	0.04~0.06	0.1~0.2	2000	0.04~0.06	0.1~0.2
5	760	0.05~0.09	0.1~0.2	1300	0.05~0.09	0.1~0.2	1600	0.05~0.09	0.1~0.2
6	640	0.06~0.12	0.1~0.2	1050	0.06~0.12	0.1~0.2	1300	0.06~0.12	0.1~0.2
7	550	0.07~0.14	0.1~0.2	910	0.07~0.14	0.1~0.2	1150	0.07~0.14	0.1~0.2
8	480	0.08~0.16	0.1~0.2	800	0.08~0.16	0.1~0.2	1000	0.08~0.16	0.1~0.2
9	430	0.09~0.18	0.1~0.2	710	0.09~0.18	0.1~0.2	890	0.09~0.18	0.1~0.2
10	380	0.10~0.20	0.1~0.2	640	0.10~0.20	0.1~0.2	800	0.10~0.20	0.1~0.2
11	350	0.11~0.22	0.1~0.2	580	0.11~0.22	0.1~0.2	720	0.11~0.22	0.1~0.2
12	320	0.12~0.24	0.1~0.2	530	0.12~0.24	0.1~0.2	660	0.12~0.24	0.1~0.2
13	290	0.13~0.26	0.1~0.2	490	0.13~0.26	0.1~0.2	610	0.13~0.26	0.1~0.2
14	270	0.14~0.28	0.1~0.2	460	0.14~0.28	0.1~0.2	570	0.14~0.28	0.1~0.2
15	250	0.15~0.30	0.1~0.2	430	0.15~0.30	0.1~0.2	530	0.15~0.30	0.1~0.2
16	240	0.16~0.32	0.1~0.2	400	0.16~0.32	0.1~0.2	500	0.16~0.32	0.1~0.2
17	225	0.18~0.34	0.1~0.2	380	0.18~0.34	0.1~0.2	470	0.18~0.34	0.1~0.2
18	210	0.20~0.36	0.1~0.2	350	0.20~0.36	0.1~0.2	440	0.20~0.36	0.1~0.2
19	200	0.22~0.38	0.1~0.2	340	0.22~0.38	0.1~0.2	420	0.22~0.38	0.1~0.2
20	190	0.24~0.40	0.1~0.2	320	0.24~0.40	0.1~0.2	400	0.24~0.40	0.1~0.2

1.Please select the holder with high rigidity and precision.
2.Make sure supply sufficient coolant.
3.Please adjust cutting parameters according to workpiece and machine rigidity.

1. Bitte wählen Sie einen Halter mit hoher Stabilität und Genauigkeit.
2. Stellen Sie sicher, dass ausreichend Kühlmittel bereit gestellt wird.
3. Bitte stimmen Sie die Schnittdaten mit dem Werkstück und der Stabilität der Maschine ab.

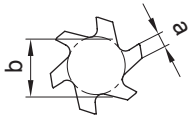
Terminology of reamer · Terminology von Reibahlen

Version · Ausführung



1. Cutting diameter
2. Cutting chamfer length
3. Approach angle
4. Cutting edge length
5. Shank diameter
6. Overall length

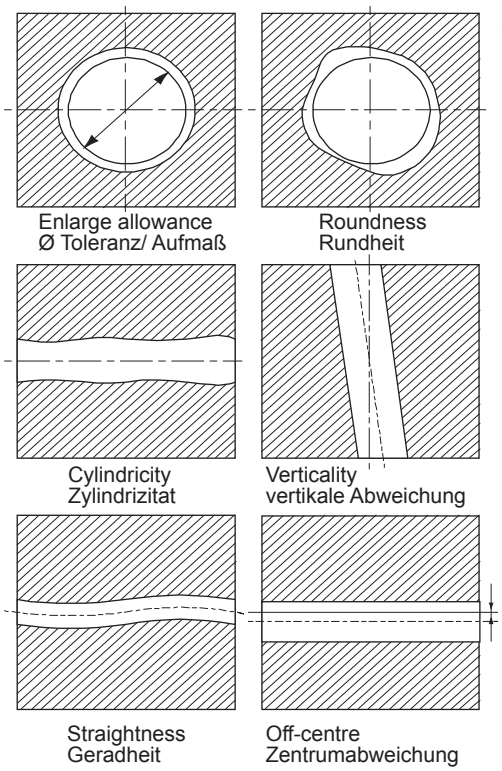
1. Schneidendurchmesser
2. Schneidenfasenlänge
3. Einstellwinkel
4. Schneidenlänge
5. Schaftdurchmesser
6. Gesamtlänge



a. Margin width
b. Core diameter

a. Schneidenstärke
b. Kerndurchmesser

Reaming is the semi-finishing and finishing of an existing hole to achieve precise size, high surface quality, perfect roundness and cylindricity etc. In order to achieve precise hole in reaming process, it must to determine the reamer diameter correctly. Therefore, it is need to consider allowance determined by workpiece material and machining conditions. In addition, it is also need to select the cutting conditions correctly except using high precision reamer to achieve good surface quality. The reaming precision is mainly decided by diameter and radial run-out. With respect to cutting condition, it is better to select low speed cutting considering to improve machining precision, but it also must take upper limit of machining efficiency into consideration.



Als Reiben bezeichnet man die Vor- oder Fertigbearbeitung einer vorhandenen Bohrung innerhalb einer engen Toleranz, mit hoher Oberflächenqualität, perfekte Rundheit, Zylindrizität etc.
Um eine exakte Bohrung durch Reiben zu erzielen kommt es, auf die Auswahl der Reibahle und des Reibahlendurchmessers an.
Zusätzlich sind die Bohrungstoleranzen, die Werkstückstoffe und die Maschinenbedingungen zu berücksichtigen.
Die Bohrungsqualität wird darüber hinaus stark von dem Rundlauf des Werkzeuges beeinflusst. Die Schnittdaten sollten zur Erzielung einer präzisen Bohrung eher etwas niedriger gewählt werden, ohne allerdings die Wirtschaftlichkeit unberücksichtigt zu lassen.

Common problems Fehler	Solutions	Lösungen
Oversize holes Bohrung zu groß	1. Reduce diameter of reamer. 2. The center of reamer is not in alignment with hole center, adjust the concentricity of hole and reamer. 3. Large radial run-out of reamer, good radial run-out is a Key Keil to successful reaming 4. Scratches on reamer shank. 5. Select a suitable coolant. 6. Adjust cutting parameters.	1. Reibahlendurchmesser reduzieren. 2. Zentrizität von Reibahle und Bohrung prüfen. 3. Rundlaufgenauigkeit der Reibahle prüfen. 4. Reibahlenschaft auf Kratzer oder Verletzungen prüfen. 5. Richtige Kühlmittel verwenden. 6. Schnittdaten anpassen.
Smaller holes Bohrung zu klein	1. Increase diameter of reamer. 2. Reduce rotating speed. 3. Reduce the margin width. 4. Excessive tool wear, please conduct cutting after regrinding. 5. Thermal expansion coefficient of workpiece is too large, please keep it cooled enough.	1. Reibahlendurchmesser erhöhen. 2. Schnittgeschwindigkeit reduzieren. 3. Aufmaß reduzieren. 4. zu goßer Werkzeugverschleiß. (Reibahle nachschleifen oder neu) 5. Der thermische Ausdehnungskoeffizient des Werkstückstoffes ist zu groß. Für ausreichende Kühlung sorgen.
Poor hole roundness & straightness Bohrung unrund & verlaufen	1. Ensure better roundness of reamer chamfer. 2. Low rigidity make the overhang as short as possible if no inference. 3. Check radial run-out after clamping reamer. 4. Adjust the concentricity of hole and reamer. 5. Ensure reaming allowance equality.	1. Rundlaufgenauigkeit der Reibahlenfase sicherstellen. 2. Geringe Stabilität; Überhang reduzieren. 3. Rundlaufgenauigkeit der Reibahle im geklemmten Zustand prüfen. 4. Konzentrizität zwischen Reibahle und Bohrung justieren. 5. Bohrergeometrie prüfen und sicherstellen.
Poor hole surface quality schlechte Oberflächenqualität	1. The hole surface roughness of entering part is bad. 2. Reduce rotating speed. 3. Ensure correct reaming allowance, too large or too small both will result bad surface roughness. 4. Select the reamer with large chip pocket, avoid chip jamming. 5. Increase clearance angle of reamer entering part . 6. Check whether there are built-up on chamfer and margin land. 7. Increase the rigidity of machine, holder and reamer . 8. Ensure whether the Type of reamer head is suitable for the workpiece. 9. Increase the margin width and land width appropriately.	1. Die Oberflächenqualität im Anschnittbereich prüfen und gegenfalls verbessern. 2. Schnittgeschwindigkeit reduzieren. 3. Richtiges Reibaufmaß versichern. Zu gering oder zu groß bringt schlechte Oberflächen. 4. Reibahlen mit ausreichend großem Spanraum verwenden. 5. Freiwinkel im Anschnitt der Reibahle vergrößern. 6. Anschnittfase der Reibahle auf Verschleiß oder Aufbauschneide prüfen. 7. Stabilität, der Maschine, Aufnahme und Reibahle gewährleisten. 8. Richtige Auswahl der Reibahle für den entsprechenden Einsatz prüfen. 9. Bohrungsaufmaß prüfen.
Hole precision is worse Geringe Bohrungsqualität	1. In return pass, the reamer should be pulled out of hole when rotating as the same direction before. Opposite rotation must be prohibited. 2. Reduce rotating speed. 3. Select the reamer with more lips. 4. Increase the margin width appropriately, enhance its guiding performance and extrusion effect. 5. Improve reamer lubricating property by surface treatment. 6. Select a suitable coolant.	1. Reibahle in Schnittrichtung zurück ziehen. 2. Schnittgeschwindigkeit reduzieren 3. Reibahlen mit mehr schneiden einsetzen. 4. Schneidenausführung und Rundlauffase Bohrerführung verbessern. Auf Zentrizität und Rundlauf prüfen. 5. Kühlmittelzuführung verbessern. 6. Auswahl des optimalen richtigen Kühlmittelschmierstoffes.

Common problems Fehler	Solutions	Lösungen
Reamer breakage, thermal damage Reibahlenbruch und termische Verformung	1. The guiding hole is defective before reaming, such as linearity in not good. 2. Adjust machining allowance to avoid tool breakage caused by too large allowance. 3. If the chip removal is not fluent, select a reamer with larger chip pocket. 4. Ensure supply insufficient coolant. 5. Adjust rotating speed and feed speed appropriately. 6. Increase the rigidity of machine, holder and reamer . 7. Improve the sharpness of reamer, make cutting light and fast. 8. Excessive wear on cutting edge, reach or surpass tool life, recommend to change tool or regrind.	1. Die Führungsbohrung ist qualitativ unzureichend. Bohrer und Bohrungsachse prüfen. 2. Bearbeitungsaufmaß nicht zu groß wählen. 3. Reibahlen mit ausreichend großen Spanraum wählen. 4. Ausreichende Kühlmittelmenge sicherstellen. 5. Richtige Schnittgeschwindigkeit und Vorschübe einstellen. 6. Stabilität der Maschine, Aufnahme und Werkzeug verbessern. 7. Schneidenschärfe der Reibahle verbessern. 8. Bei zu hohem Schneidenverschleiß, das Werkzeug wechseln oder Nachschleifen.
Damage on reamer shank Reibahlenschaft Beschädigung	1. Check whether the shank hardness is enough, too low hardness will cause deformation, too high hardness may cause breakage. 2. Check the conjunction of holder and bush, don't use the defective holder.	1. Die vorgegebene Härte des Schaftes prüfen. 2. Spannhülse und Halter auf Beschädigung prüfen.
short tool life Kurze Standzeit	1. Enhance reamer's cutting edge hardness. 2. Check the coolant. 3. Change the straight flute to helical flute. 4. Check all factors affecting machining precision.	1. Reibahlen mit verschleißfesteren Schneiden wählen. 2. Kühlmittelzufuhr prüfen. 3. Wechsel von gerade- zu spiralgenuteten Reibahlen. 4. Prüfen Sie die Faktoren, die die Bearbeitungspräzision beeinflussen.
Scratches on hole surface Zerkratzte Bohrungsoberfläche	1. Check no built-up on reamer surface. 2. Improve workpiece holding.	1. Schneide auf Aufbauschneidenbildung untersuchen und gegebenenfalls Schnittdaten korrigieren. 2. Werkstückspannung verbessern.
Trumpet-shaped entry hole Bohrungseintrittsbereich zu groß	1. Improve workpiece holding. 2. Check radial run-out after clamping reamer. 3. The center of reamer is not in alignment with hole center, adjust the concentricity of hole and reamer.	1. Werkstückspannung verbessern. 2. Rundlauf der Reibahle im geklemmten Zustand prüfen. 3. Das Zentrum des Werkzeuges stimmt nicht mit dem Zentrum der Bohrung überein. Zentrizität justieren.

Non-standard Taylor made · Sonderwerkzeuge

Name:

Firma/Company:

Fax:

Tel:

E-MAIL:

ZCC·CT
Heltorfer Straße 12
40472 Düsseldorf Germany
Fax: +49-(0)211-989240-111
E-Mail:info@zccct-europe.com

Machining information and Workpiece Material • Bearbeitungsinfo. und Werkstück Material

Machined hole
Bohrung

☐ Through-hole
Durchgangs-bohrung

☐ Blind-hole
Sackbohrung

Size of machined hole
Lochdurchmesser ____ mm

Tolerance of machined hole
Toleranz der Bohrung ____

Depth of machined hole
Bohrtiefe ____ mm

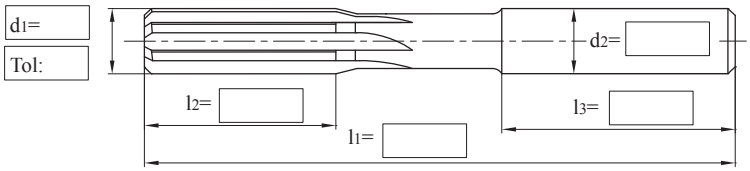
☐ Grey cast iron
Grauguss
☐ Nodular cast iron
GGG
☐ Aluminium alloy
Alu leg.
☐ Si Al alloy Si＜10%
Si Alu leg.
☐ Si Al alloy Si≥10%
Si Alu legierung

Machined material trademark
Spezieller Werkstoffstück: ____

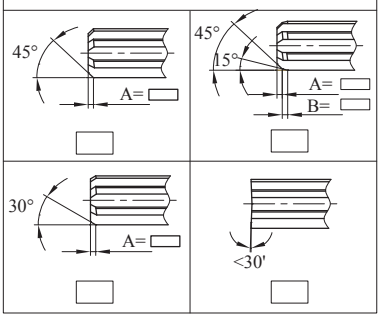
Tensile strength · Zugfestigkeit: ____ N/mm²

Hardness · Härte: ____

Tool information • Werkzeug Information:



approach angle
Winkelangabe an der Hauptschneide



Cutter rotating direction · Drehrichtung	
Right rotating rechts gedreht	☐
Straight flute gerade genutet	☐
Left rotating links gedreht	☐

Cooling/ Kühlung	
☐ External Cooling	
☐ Internal Cooling	

Coating Beschichtung	
☐ Yes/ Ja	
☐ No/ Nein	

DIN6535

Shank • Schaft

☐ Form HA

☐ Form HB

☐ Form HE

☐ Straight shank/ Zylinders.

☐ Shank with tang DIN 1809

☐ Morse taper shank ☐

Special type

Remarks:
Bemerkungen:

Order quantity: ____ piece
Auftragsmenge: Stück

Expected delivery date:
Lieferart:

Date · Datum:

confirmation · Unterschrift:

NOTIZEN:

Threading · Gewinde

Threading tools · Gewindewerkzeuge

Threading tools overview	**C153**	**Gewindewerkzeuge Übersicht**
Graphics identification	**C153**	**Graphische Werkzeugbeschreibung**
Threading tools Code Key	**C154**	**ISO Kennzeichnung**
Detail information	**C155-C162**	**Detaillierte Informationen**
Solid carbide threading tools	C155-C158	VHM Gewindebohrer
Solid carbide threading end mills	C159	VHM Gewindefräser
Recommended cutting data	C160	Empfohlene Schnittdaten
Technical information	**C161**	**Technische Information**
Order form for non-standard products	C162	Bestellformular für Sonderwerkzeuge

Threading tool overview · VHM-Gewindebohrer, -fräser Übersicht

Name	Type Typ	Shape Ausführung	Diameter range Durchmesser bereich Ø	Workpiece material Werkstückstoff								Page · Seite	
				P		M	K	N		S	H		
				Carbon steel alloy steel	Kohlenst. Stahl Leg. Stahl	Stainless steel Rostfreier Stahl	Cast iron Gusseisen	Aluminum alloy Alu leg.	Copper alloy Kupfer leg.	Heat resist. alloy warmfeste leg.	High hard. steel gehärteter Stahl	Specification Spezifikation	Cutting datas Schnittdaten
Helical-flute tap Spiral genutet	**4201C**		M4-M10				✔					C155	C160
Helical-flute tap Spiral genutet	**4201A**		M4-M10					✔				C156	C160
Straight-flute tap Gerade genutet	**4202C**		M4-M10				✔					C157	C160
Straight-flute tap Gerade genutet	**4202A**		M4-M10					✔				C158	C160
Threading end mills Gewindefräser	**4111**		M5-M20	✔	✔		✔	✔				C159	C160

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

Graphics identification · Graphische Werkzeugbeschreibung

Shank · Schaft

Straight shank
Zylinderschaft

Square Straight shank as per DIN10
DIN 10 Schaft

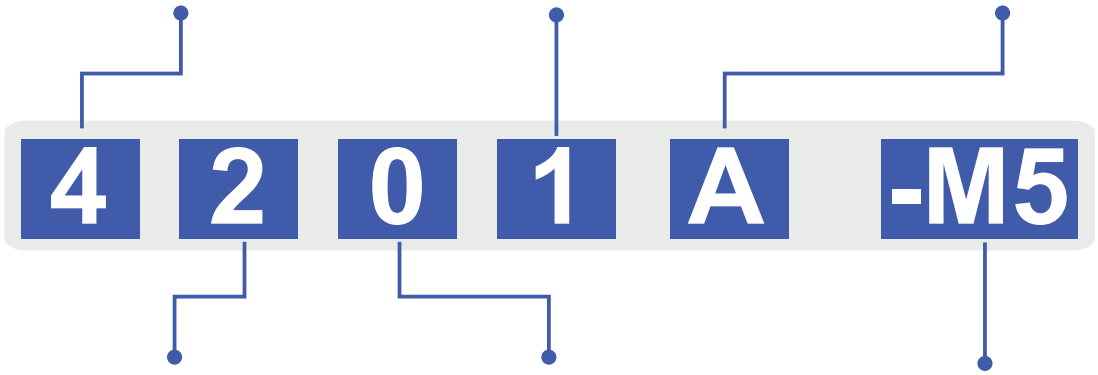
Thread profile angle of tap
Winkel des Gewindeprofils

60°
Indicate 60°

Precision class of screw thread
Prezisionsklasse des Gewindes

ISO 2 (6H)
screw thread
Schraubengewinde

Threading taps and cutter Code Key · ISO Kennzeichnung Gewindefräser, -bohrer



Tool Type Werkzeugtyp	
Code	Description · Beschreibung
4	Threading cutter Gewinde-Bearbeitungs-Werkzeug

Chip flute Spannut	
Code	Description · Beschreibung
1	Right chip flute · Spannut Rechtsdrall
2	Straight flute · Spannut gerade
3	Left chip flute · Spannut Linksdrall

material Material	
Code	Description · Beschreibung
A	Aluminum alloy Aluminum Legierung
C	Cast iron Grauguß

Shank Schaftausführung	
Code	Description · Beschreibung
1	Straight shank / Zylinderschaft
2	Square Straight shank as per DIN10 Zylinderschaft DIN10
5	Straight shank as per DIN 6535HA Zylinderschaft DIN 6535HA
9	Tapered shank Konischer Schaft

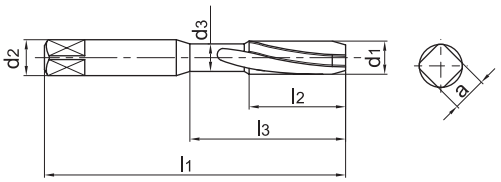
Typ of function Art der Bearbeitung	
Code	Description · Beschreibung
0	Tap Gewindebohrer
1	Thread milling cutter Gewindefräser

Specification Spezifikation	
Code	Description · Beschreibung
M5	Nominal diameter of standard threading cutters is M5 Der angegebene Durchmesser ist M 5

4201C

with right helical-flute taps with square head and straight shank
Gewindebohrer mit rechtsgedrallter Spannute und 4 Kant-Mitnahme und Zylinderschaft





60° ISO 2 (6H)

Type · Typ	Basic dimension(mm) · Basis Abmessungen									Number of teeth Zähne-anzahl	Grade · Sorte	
	d_1	P	d_2	d_3	l_1	l_2	l_3	a×a	Thread profile		KTG202	YK20F
4201C -M4	M4	0.7	4.5	3.1	63	13	21	3.4	60°	3	○	●
4201C –M5	M5	0.8	6.0	4.0	70	16	25	4.9	60°	3	○	●
4201C –M6	M6	1.0	6.0	4.7	80	19	30	4.9	60°	3	○	●
4201C –M8	M8	1.25	8.0	6.4	90	22	35	6.2	60°	3	○	●
4201C –M10	M10	1.5	10.0	8.1	100	24	39	8.0	60°	3	○	●

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

Grade	Workpiece material · Werkstückstoff										
	Mild steel Baustahl HB≤180	Carbon steel, Alloy steel	Hardened steel · gehärteter Stahl ~40HRC	~50HRC	~60HRC	Stainless steel Rostfreier Stahl	Cast iron Gusseisen	Nodular cast iron GGG	Aluminum alloy Alu leg.	Copper alloy Kupfer leg.	Heat resist. alloy warmfest. leg.
KTG202							✔	✔			
YK20F							✔	✔			

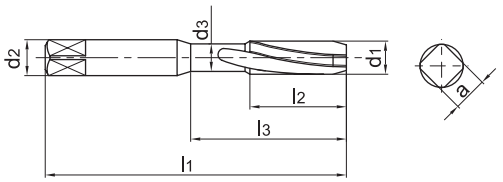
Code key C 154 ISO Kennzeichen
Cutting data C160 Schnittdaten
Technical Information C161 Technische Information.
Non-standart tailor made C162 Bestellformular für Sonderwerkzeuge

● Ex Stock / ab Lager ○ On demand / auf Anfrage

4201A

with right helical-flute taps with square head and straight shank
Gewindebohrer mit rechtsgedrallter Spannute und 4 Kant-Mitnahme und Zylinderschaft







Type · Typ	Basic dimension(mm) · Basis Abmessungen									Number of teeth Zähne-anzahl	Grade · Sorte
	d_1	P	d_2	d_3	l_1	l_2	l_3	a×a	Thread profile		YK20F
4201A - M4	M4	0.7	4.5	3.1	63	13	21	3.4	60°	3	●
4201A - M5	M5	0.8	6.0	4.0	70	16	25	4.9	60°	3	●
4201A - M6	M6	1.0	6.0	4.7	80	19	30	4.9	60°	3	●
4201A - M8	M8	1.25	8.0	6.4	90	22	35	6.2	60°	3	●
4201A-M10	M10	1.5	10.0	8.1	100	24	39	8.0	60°	3	●

● Ex Stock / ab Lager ○ On demand / auf Anfrage

Material Overview · Material Übersicht

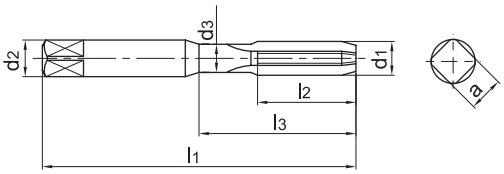
✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

Grade Sorte	Workpiece material · Werkstückstoff										
	Mild steel Baustahl HB≤180	Carbon steel, Alloy steel	Hardened steel · gehärteter Stahl ~40HRC	~50HRC	~60HRC	Stainless steel Rostfreier Stahl	Cast iron Gusseisen	Nodular cast iron GGG	Aluminum alloy Alu leg.	Copper alloy Kupfer leg.	Heat resist. alloy warmfest. leg.
YK20F									✔		

4202C

with right straight-flute taps with square head and straight shank
Gewindebohrer mit gerader Spannute und 4 Kant-Mitnahme und Zylinderschaft





60° ISO 2 (6H)

Type · Typ	Basic dimension(mm) · Basis Abmessungen									Number of teeth Zähne-anzahl	Grade · Sorte	
	d_1	P	d_2	d_3	l_1	l_2	l_3	a×a	Thread profile		KTG202	YK20F
4202C - M4	M4	0.7	4.5	3.1	63	13	21	3.4	60°	3	○	●
4202C - M5	M5	0.8	6.0	4.0	70	16	25	4.9	60°	3	○	●
4202C - M6	M6	1.0	6.0	4.7	80	19	30	4.9	60°	3	○	●
4202C - M8	M8	1.25	8.0	6.4	90	22	35	6.2	60°	3	○	●
4202C-M10	M10	1.5	10.0	8.1	100	24	39	8.0	60°	3	○	●

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

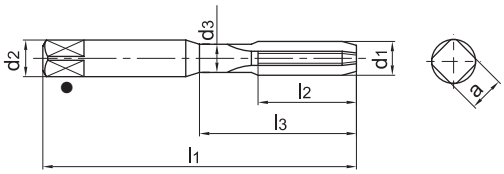
Grade	Workpiece material · Werkstückstoff										
	Mild steel Baustahl HB≤180	Carbon steel, Alloy steel	Hardened steel · gehärteter Stahl ~40HRC	~50HRC	~60HRC	Stainless steel Rostfreier Stahl	Cast iron Gusseisen	Nodular cast iron GGG	Aluminum alloy Alu-leg.	Copper alloy Kupfer leg.	Heat resist. alloy warmfest. leg.
KTG202							✔	✔			
YK20F							✔	✔			

Code key C 154
ISO Kennzeichen
Cutting data C160
Schnittdaten
Technical Information C161
Technische Information.
Non-standart tailor made C162
Bestellformular für Sonderwerkzeuge

4202A

Straight-flute taps with square head and Straight shank
Gewindebohrer mit gerader Spannute mit 4 Kant-Mitnahme und Zylinders







Type · Typ	Basic dimension(mm) · Basis Abmessungen									Number of teeth Zähne-anzahl	Grade · Sorte
	d_1	P	d_2	d_3	l_1	l_2	l_3	a×a	Thread profile		YK20F
4202A - M4	M4	0.7	4.5	3.1	63	13	21	3.4	60°	3	●
4202A - M5	M5	0.8	6.0	4	70	16	25	4.9	60°	3	●
4202A - M6	M6	1.0	6.0	4.7	80	19	30	4.9	60°	3	●
4202A - M8	M8	1.25	8.0	6.4	90	22	35	6.2	60°	3	●
4202A-M10	M10	1.5	10.0	8.1	100	24	39	8.0	60°	3	●

● Ex Stock / ab Lager ○ On demand / auf Anfrage

Material Overview · Material Übersicht

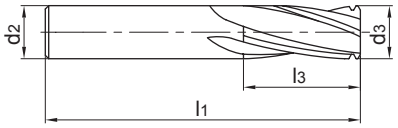
✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

Grade	Workpiece material · Werkstückstoff										
	Mild steel Baustahl HB≤180	Carbon steel, Alloy steel	Hardened steel · gehärteter Stahl ~40HRC	~50HRC	~60HRC	Stainless steel Rostfreier Stahl	Cast iron Gusseisen	Nodular cast iron GGG	Aluminum alloy Alu-leg.	Copper alloy Kupfer leg.	Heat resist. alloy warmfest. leg.
YK20F									✔		

4111

Thread milling cutter with straigth shank
Gewindefräser mit Zylinderschaft









Type · Typ	Basic dimension (mm) · Basis Abmessungen						Number of teeth Zähnezahl	Grade · Sorte	
	d_1	P	d_2	l_1	l_3	d_3		KTG303	YK30F
4111- M5	M5	0.8	6	42	8.0	3.6	3	○	○
4111 - M6	M6	1.0	6	57	9.0	4.0	3	○	○
4111 - M8	M8	1.25	6	57	12.5	5.0	3	○	○
4111- M10	M10	1.5	6	57	15.0	5.9	4	○	○
4111- M12	M12	1.75	8	63	19.25	7.9	4	○	○
4111- M16	M16	2.0	10	72	24.0	9.9	4	○	○
4111- M20	M20	2.5	12	83	30.0	11.9	4	○	○

Material Overview · Material Übersicht

✔ = Very suitable · Sehr empfohlen
✔ = Suitable · Empfohlen

Grade Sorte	Workpiece material · Werkstückstoff										
	Mild steel Baustahl HB≤180	Carbon steel, Alloy steel	Hardened steel · gehärteter Stahl ~40HRC	~50HRC	~60HRC	Stainless steel Rostfreier Stahl	Cast iron Gusseisen	Nodular cast iron GGG	Aluminum alloy Alu leg.	Copper alloy Kupfer leg.	Heat resist. alloy warmfest. leg.
KTG303	✔	✔	✔				✔	✔	✔		
YK30F							✔		✔		

Code key C 154
ISO Kennzeichen

Cutting data C160
Schnittdaten

Technical Information C161
Technische Information.

Non-standart tailor made C162
Bestellformular für Sonderwerkzeuge

Tap · Gewindebohrer

Workpiece material Werkstückstoff	Cutting speed (m/min) · Schnittgeschwindigkeit		
	4201C 4202C		4201A 4202A
	YK20F	KTG202	YK20F
Cast iron Gusseisen	10~15	20~40	---
Nodular cast iron GGG	7~12	15~30	---
Aluminum alloy Alu-Leg.	---	---	10~25
Casting aluminium alloy≤Si10% gegossene Alu-Leg.	---	---	10~20
Casting aluminium alloy≥Si10% gegossene Alu-Leg.	---	---	10~15

1. Threading is a complex machining, suitable coolant must be used. Using oil coolant is recommended for the cutting conditions above.
2. The table above is a general selecting standard, change it according to various cutting conditions.
3. Please adjust the cutting parameter appropriately according to system rigidity.

1. Beim Gewindeschneiden muss unbedingt, Kühlmittel eingesetzt werden. Die obigen Schnittdaten basieren auf dem Einsatz von Öl.
2. In der obrigen Tabelle sind Standarddaten angegeben.
3. Die Schnittdaten sollten entsprechend der Bearbeitung und Stabilität angepaßt werden.

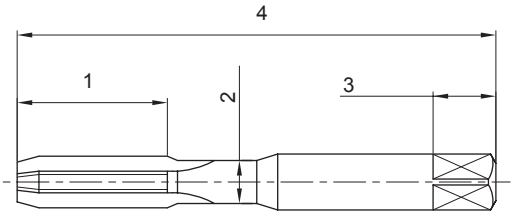
4111 Threading milling cutter · Gewindefräser

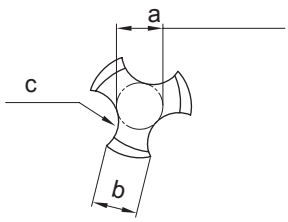
Workpiece material Werkstückstoff	carbon steel Kohlenstoffstahl ~750N/mm²		alloy steel leg. Stahl ~30HRC		Cast iron Nodular cast iron Grauguss, GGG		Aluminum alloy Alu-Leg.		casting aluminium alloy gegossene Alu-Leg.			
									≤Si 10%		≥Si 10%	
Cutting speed Schnittgeschw.	40~80m/min		20~40m/min		40~70m/min		40~80m/min		60~140m/min		60~130m/min	
Diameter Ø (mm)	Rotating speed Drehzahl (min-1)	Feed rate per tooth Vorschub pro Zahn (mm/z)	Rotating speed Drehzahl (min-1)	Feed rate per tooth Vorschub pro Zahn (mm/z)	Rotating speed Drehzahl (min-1)	Feed rate per tooth Vorschub pro Zahn (mm/z)	Rotating speed Drehzahl (min-1)	Feed rate per tooth Vorschub pro Zahn (mm/z)	Rotating speed Drehzahl (min-1)	Feed rate per tooth Vorschub pro Zahn (mm/z)	Rotating speed Drehzahl (min-1)	Feed rate per tooth Vorschub pro Zahn (mm/z)
M5	5300	0.01~0.11	2800	0.01~0.03	5300	0.03~0.10	5300	0.03~0.10	8400	0.03~0.13	7500	0.03~0.10
M6	4800	0.01~0.11	2400	0.01~0.03	4800	0.03~0.10	4800	0.03~0.10	8000	0.03~0.13	7200	0.03~0.10
M8	3850	0.01~0.11	1900	0.01~0.03	3850	0.03~0.10	3850	0.03~0.10	6400	0.03~0.13	5700	0.03~0.10
M10	3200	0.01~0.11	1600	0.01~0.03	3200	0.03~0.10	3200	0.03~0.10	5300	0.03~0.13	4800	0.03~0.10
M12	2400	0.01~0.11	1200	0.01~0.03	2400	0.03~0.10	2400	0.03~0.10	4000	0.03~0.13	3600	0.03~0.10
M16	1900	0.01~0.11	960	0.01~0.03	1900	0.03~0.10	1900	0.03~0.10	3200	0.03~0.13	2900	0.03~0.10
M20	1600	0.01~0.11	800	0.01~0.03	1600	0.03~0.10	1600	0.03~0.10	2650	0.03~0.13	2400	0.03~0.10

1. Water-soluble coolant is recommended for the cutting conditions above.
2. Please adjust the cutting parameter appropriately according to system rigidity.
3. The cutting conditions above is set on the basis of coated grade KTG303. When use uncoated grade YK30F, please reduce the cutting speed and feed rate to the 50%~70% of speed stated above.

1. Bei den obigen Schnittdaten sollte Emulsion eingesetzt werden.
2. Die Schnittdaten sollten entsprechend der Bearbeitungsstabilität angepaßt werden.
3. Die obigen Schnittdaten basieren auf dem Einsatz von VHM Gewindebohrern in der besch. Sorte KMG303. Beim Einsatz der unbeschichteten Hartmetallsorte YK30F sind die Schnittdaten, Schnittgeschw. und Vorschub um 50-70% zu reduzieren.

Terminology of tap · Terminologie von Gewindebohrern



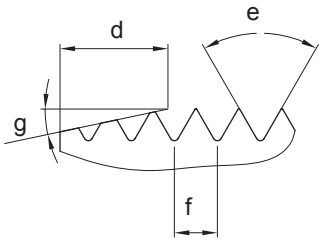


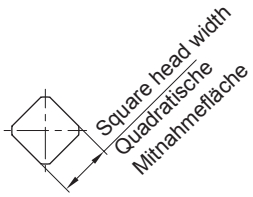
1. Thread length	1. Gewindelänge
2. Neck diameter	2. Hals Durchmesser
3. Square length	3. Schneidenlänge
4. Overall length	4. Gesamtseele

a. Web thickness	a. Kerndurchmesser
b. Margin width	b. Schneidenstärke
c. Chip flute	c. Spanraum

Magnifying chamfer and thread profile

Anschnitt und Gewindeprofil





d. Chamfer length	d. Anschnittlänge
e. Thread profile angle	e. Gewindeprofilwinkel
f. Pitch	f. Steigung
g. Chamfer angle	g. Anschnittwinkel

Different tap's chip flute and features · Spanraum und Anwendung

Type of chip flute Spanraum Typ	Feature Eigenschaften	Application Anwendung
Helical flute tap Gedrallte Spannute 	• Helical flute • Tap blind hole to its flat bottom • No chips remain • Good entering performance • Penetrate to pre-hole easily • spiralförmiger Spanraum • Für Sackloch geeignet • Keine Späne in Bohrung • Gute Ausschnittleistung • einfache Zentrierung	• Material generating long curled chips • Blind hole • The hole with axial slot on inner wall • Für langspanende Werkstoffe • Sackloch • Einsatz in Bohrungen mit Nute
Straight flute tap Gerade Spannute 	• Straight flute • High cutting edge strength • Easy to regrind • Easy selection of chamfer length • gerade genuteter Spanraum • stabile Schneide • leicht nachzuschleifen • Leichte Auswahl (Ausschnitt)	• For machining high hardness material • Material generating powdered form chips • Tap short through and blind hole • Material easy to generate wear • Für Hartbearbeitung • für kurzspanen des Material • für Durchgangs und Sackbohrungen • für verschleißendes Material

Non-standard Taylor made · Sonderwerkzeuge

Name:

Firma/Company:

Fax:

Tel:

E-MAIL:

ZCC-CT
Heltorfer Straße 12
40472 Düsseldorf Germany
Fax: +49-(0)211-989240-111
E-Mail:info@zccct-europe.com

Machining information and Workpiece Material • Bearbeitungsinfo. und Werkstück Material

Hole Shape
Bohrungs-ausführung

☐ Through-hole Durchgangs-bohrung ☐ Blind-hole Sackbohrung

Taper length Gewindelänge ____ mm

Hole tolerance Bohrungstoleranz ____

Status of hole Werkstück Zustand ☐ pre-drill vorbohren ☐ Casting-mold hole gegossene oder geschmiedete Bohrung

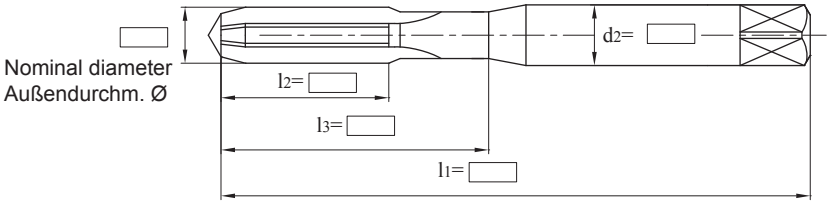
- ☐ Grey cast iron Grauguss
- ☐ Nodular cast iron GGG
- ☐ Aluminium alloy Alu leg.
- ☐ Si Al alloy Si＜10% Si Alu leg.
- ☐ Si Al alloy Si≥10% Si Alu legierung

Machined material trademark
Spezieller Werkstoffstück:

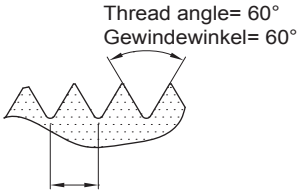
Tensile strength · Zugfestigkeit:
____ N/mm²

Hardness · Härte:

Tool information • Werkzeug Information:



thread profil
Gewindeprofil



Pitch ____
Steigung

Tool rotating direction Drehrichtung	Cooling/ Kühlung	Coating Beschichtung
☐ 	☐ External Cooling	☐ Yes/ Ja
☐ 	☐ Internal Cooling	☐ No/ Nein

Remarks:
Bemerkungen:

Order quantity: piece
Auftragsmenge: Stück

Expected delivery date:
Lieferdatum:

Date · Datum:

confirmation · Unterschrift:

Threading pre-hole diameter · Kernlochdurchmesser

- Metric Coarse thread
- Metrisch - Gewinde

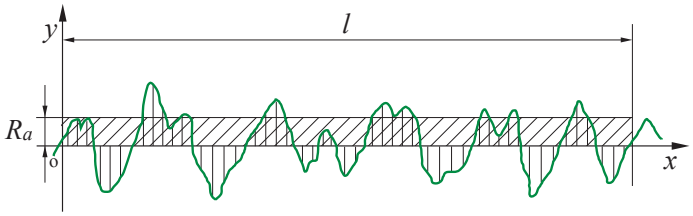
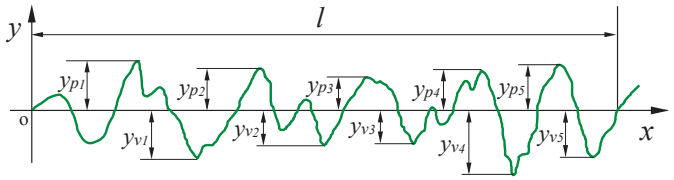
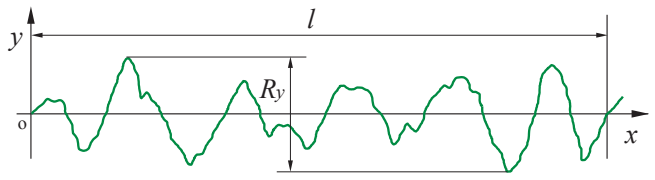
Thread code Gewindebez.	Pre-hole diameter (mm) Kerndurchmesser
M3×0.5	2.5
M3.5×0.6	2.9
M4×0.7	3.3
M5×0.8	4.2
M6×1.0	5.0
M7×1.0	6.0
M8×1.25	6.75
M9×1.25	7.75
M10×1.5	8.5
M11×1.5	9.5
M12×1.75	10.25
M14×2.0	12.0
M16×2.0	14.0
M18×2.5	15.5
M20×2.5	17.5
M24×3.0	21.0
M27×3.0	24.0
M30×3.5	26.5

- Metric fine screw fine
- Metrisch - Feingewinde

Thread code Gewindebez.	Pre-hole diameter (mm) Kerndurchmesser
M3×0.35	2.65
M3.5×0.35	3.15
M4×0.5	3.5
M4.5×0.5	4.0
M5×0.5	4.5
M5.5×0.5	5.0
M6×0.75	5.25
M7×0.75	6.25
M8×1.0	7.0
M8×0.75	7.25
M9×1.0	8.0
M9×0.75	8.25
M10×1.25	8.75
M10×1.0	9.0
M10×0.75	9.25
M11×1.0	10.0
M11×0.75	10.25
M12×1.5	10.5
M12×1.25	10.75
M12×1.0	11.0

Thread code Gewindebez.	Pre-hole diameter (mm) Kerndurchmesser
M14×1.5	12.5
M14×1.0	13.0
M15×1.5	13.5
M15×1.0	14.0
M16×1.5	14.5
M16×1.0	15.0
M17×1.5	15.5
M17×1.0	16.0
M18×2.0	16.0
M18×1.5	16.5
M18×1.0	17.0
M20×2.0	18.0
M20×1.5	18.5
M20×1.0	19.0
M22×2.0	20.0
M22×1.5	20.5
M22×1.0	21.0
M24×2.0	22.0
M24×1.5	22.5
M24×1.0	23.0

Surface roughness · Oberflächenrauhigkeit

Type	Code	Calculation method · Berechnungsmethode	Calculation example (figure) · Meßaufnahme (Abb.)
Arithmetic average deviation of profile Mittlere Rauhtiefe	Ra	Within sampling length l, the arithmetic average absolute value of profile deviation is $$Ra = \frac{1}{l}\int_0^l |y(x)|dx$$ In the formula, the profile deviation y is the distance between profile points and reference line in the measuring direction. Reference line is the profile least-square average line O. This line divide the profile and make the sum of squares of profile deviation to be the minimum within the sampling length. Der Mittelrauhwert Ra ist der arithmetische Mittelwert der absoluten Beträge der Abstände y des Rauhheitsprofils von der Mittellinie innerhalb der Messstrecke. Dies ist gleichbedeutetend mit der Höhe des Rechtecks, dessen Länge gleich der Gesamtstrecke l ist und das flächengleich mit der Summe der zwischen dem Rauheitsprofil und der Mittellinie eingeschlossenen Fläche ist y=f	
Irregularity ten-point high Gemittelte Rauhtiefe	Rz	Within sampling length l, the sum of the average value of heights of five highest profile peak and the depths of five deepest profile valleys $$Rz = \frac{\sum_{i=1}^{5} yp_i + \sum_{i=1}^{5} yv_i}{5}$$ In the formula, ypi means the height of 'i'th highest profile peak. In the formula, yvi means the depth of 'i'th deepest profile valley. Maximum height of profile Ry: the distance between the top profile peak line and the bottom profile valley line in the longitudinal direction within the sampling length l. Die gemittelte Rauhtiefe Rz ist das arithmetische Mittel aus den Einzelrauhtiefen fünf aufeinander grenzender Einzelmessstrecken gleicher Länge. Rz wird ebenfalls in (µm) angegeben.	
Maximum height of profile Maximale Rauhtiefe	Ry	The distance between the inner profile peak line and the bottom profile valley line in the longitudinal direction within the sampling length l. Top profile peak line is the line that parallels to the reference line and passes through the highest point of profile peak. Bottom profile line is the line that parallels to the reference line and passes through the lowest point of profile valley. Die maximale Rauhtiefe Ry ist die größte der auf der Gesamtmeßstrecke l vorkommenden Einzelrauhtiefen, Ry wird auch in (µm) Mikrometer angegeben. (Bemerkung) Um Rz herausfinden, wird ein Anteil ohne außergewöhnliche Höhen und Tiefen als Stichprobenlänge ausgewählt und als Schwachstelle betrachtet.	

Material comparison table · Werkstoffe Vergleichstabelle

ISO	Country and Standard · Standardbezeichnung nach Länder										
	China	USA	Germany		Great Britain		Sweden	France	Italy	Spain	Japan
	GB	AISI/SAE	W.-nr	DIN	BS	EN	SS	AFNOR	UNI	UNE	JIS
P	Alloy steel · leg. Stahl										
	15	1015	1.0401	C15	080M15	-	1350	CC12	C15C16	F.111	-
	20	1020	1.0402	C22	050A20	2C	1450	CC20	C20C21	F.112	-
	35	1035	1.0501	C35	060A35	-	1550	CC35	C35	F.113	-
	45	1045	1.0503	C45	080M40	-	1650	CC45	C45	F.114	-
	55	1055	1.0535	C55	070M55	-	1655	-	C55	-	-
	60	1060	1.0601	C60	080A62	43D	-	CC55	C60	-	-
	Y15	1213	1.7015	9SMn28	230M07	-	1912	S250	CF9SMn28	11SMn28	SUM22
	-	12L13	1.0718	9SMnPb28	-	-	1914	S250Pb	CF9MnPb28	11SMnPb28	SUM22L
	-	-	1.0722	10SPb20	-	-	-	10PbF2	CF10Pb20	10SPb20	-
	-	1140	1.0726	35S20	212M36	8M	1957	35MF4	-	F210G	-
	Y13	1215	1.0736	9SMn36	240M07	1B	-	S300	CF9SMn36	12SMn35	-
	-	12L14	1.0737	9SMnPb36	-	-	1926	S300Pb	CF9SMnPb36	12SMnP35	-
	55Si2Mn	9255	1.0904	55Si9	250A53	45	2085	55S7	55Si8	56Si7	-
	-	9262	1.0961	60SiCr7	-	-	-	60SC7	60SiCr8	60SiCr8	-
	15	1015	1.1141	Ck15	080M15	32C	1370	XC12	C16	C15K	S15C
	40Mn	1039	1.1157	40Mn4	150M36	15	-	35M5	-	-	-
	25	1025	1.1158	Ck25	-	-	-	-	-	-	S25C
	35Mn2	1335	1.1167	36Mn5	-	-	2120	40Mn5	-	36Mn5	SMn438(H)
	30Mn	1330	1.1170	28Mn6	150M28	14A	-	20M5	C28Mn	-	SCMn1
	35Mn	1035	1.1183	Cf35	060A35	-	1572	XS38TS	C36	-	S35C
	Ck45	1045	1.1191	45	080M46	-	1672	XC42	C45	C45K	S45C
	55	1055	1.1203	Ck55	070M55	-	-	XC45	C50	C55K	S55C
	50	1050	1.1213	Cf53	060A52	-	1674	XC48TS	C53	-	S50C
	60Mn	1060	1.1221	Ck60	080A62	43D	1678	XC60	C60	-	S58C
	-	1095	1.1274	Ck101	060A96	-	1870	-	-	-	SUP4
	-	-	1.3401	X120Mn12	Z120M12	-	-	X120M12	XG120Mn12	X120Mn12	SCMnH/1
	Gr15;45Gr	52100	1.3505	100Cr6	534A99	31	2258	100C6	100Cr6	F.131	SUJ2
	-	ASTM A204Gr.A	1.5415	15Mo3	1501-240	-	2912	15D3	16Mo3KW	16Mo3	-
	-	4520	1.5426	16Mo5	1503-245-420	-	-	-	16Mo5	16Mo5	-
	-	ASTM A350LF5	1.5622	14Ni6	-	-	-	16N6	14Ni6	15Ni6	-
	-	ASTM A353	1.5662	X8Ni9	1501-509;510	-	-	-	X10Ni9	XBNi09	-

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P	Alloy steel · leg. Stahl										
	-	2515	1.5680	12Ni19	-	-	-	Z18N5	-	-	-
	-	3135	1.5710	36NiCr6	640A35	111A	-	35NC6	-	-	SNC236
	-	3415	1.5732	14NiCr10	-	-	-	14NC11	16NiCr11	15NiCr11	SNC415(H)
	-	3415 3310	1.5752	14NiCr14	655M13 655A12	36A	-	12NC15	-	-	SNC815(H)
	-	9840	1.6511	36CrNiMo4	816M40	110	-	40NCD3	38CrNiMo4(KB)	35CrNiMo4	-
	-	8620	1.6523	21NiCrMo2	850M20	362	2503	20NCD2	20NiCrMo2	20NiCrMo2	SNCCM220(H)
	-	8740	1.6546	40NiCrMo2	311-Type7	-	-	-	40NiCrMo2(KB)	40NiCrMo2	SNC240
	40CrNiMoA	4340	1.6582	34CrNiMo6	817M40	24	2541	35NCD6	35CrNiMo6(KB)	-	-
	-	-	1.6587	17CrNiMo6	820A16	-	-	18NCD6	-	14CrNiMo13	-
	15Cr	5015	1.7015	15Cr3	523M15	-	-	12C3	-	-	SCr415(H)
	35Cr	5132	1.7033	34Cr4	530A32	18B	-	32C4	34Cr4(KB)	35Cr4	SCr430(H)
	40Cr	5140	1.7035	41Cr4	530M40	18	-	42C4	41Cr4	42Cr4	SCr440(H)
	40Cr	5140	1.7045	42Cr4	-	-	2245	-	-	42Cr4	SCr440
	18CrMn	5115	1.7131	16MnCr15	(527M20)	-	2511	16MC5	16MnCr15	16MnCr15	-
	20CrMn	5155	1.7176	55Cr3	527A60	48	-	55C3	-	-	SUP9(A)
	30CrMn	4130	1.7218	25CrMo4	1717CDS110	-	2225	25CD4	25CrMo4(KB)	55Cr3	SCM420; SCM430
	35CrMo	4137;4135	1.7220	34CrMo4	708A37	19B	2234	35CD4	35CrMo4	34CrMo4	SCM432; SCRRM3
	40CrMoA	4140;4142	1.7223	41CrMo4	708M40	19A	2244	42CD4TS	41CrMo4	41CrMo4	SCM440
	42CrMo 42CrMnMo	4140	1.7225	42CrMo4	708M40	19A	2244	42CD4	42CrMo4	42CrMo4	SCM440(H)
	-	-	1.7262	15CrMo5	-	-	2216	12CD4	-	12CrMo4	SCM415(H)
	-	ASTM A182 F11;F12	1.7335	13CrMo44	1501- 620Gr.27	-	-	15CD3.5; 15CD4.5	14CrMo44	14CrMo45	-
	-	-	1.7361	32CrMo12	722M24	40B	2240	30CD12	32CrMo12	F.124.A	-
	-	ASTM A182 F.22	1.7380	10CrMo910	1501- 622Gr.31;45	-	2218	12CD9;10	12CrMo9,10	TU.H	-
	-	-	1.7715	14MoV63	1503-660-440	-	-	-	-	13MoCrV6	-
	50CrVA	6150	1.8159	50CrV4	735A50	47	2230	50CV4	50CrV4	51CrV4	SUP10
	-	-	1.8509	41CrAlMo7	905M39	41B	2940	40CAD6,12	41CrAlMo7	41CrAlMo7	-
	-	-	1.8523	39CrMoV139	897M39	40C	-	-	36CrMoV12	-	-

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P	Tool steel · Werkzeugstahl										
	T10	W.110	1.1545	C105W1	-	-	1880	$Y_1$105	C98KU C100KU	F.515 F.516	-
	T12A	W.112	1.1663	C125W	-	-	-	$Y_2$120	C120KU	(C120)	SK2
	CrV;9SiCr	L3	1.2067	100Cr6	BL3	-	-	Y100C6	-	100Cr6	-
	Cr12	D3	1.2080	X210Cr12	BD3	-	-	Z200Cr12	X210Cr13KU X250Cr12KU	X210Cr12	SKD1
	4Cr5MoVSi	H13	1.2344	X40CrMoV5 1	BH13	-	2242	Z40CDV5	X35CrMoV05KU X40CrMoV51KU	X40CrMoV5	SKD61
	Cr6WV	A2	1.2363	X100CrMoV5 1	BA2	-	2260	Z100CDV5	X100CrMoV51KU	X100CrMoV5	SKD12
	CrWMo	-	1.2419	105WCr6	-	-	2140	105WC13	10WCr6 107WCr5KU	105WCr5	SKS31 SKS2 SKS3
	Cr12W	-	1.2436	X210CrW12	-	-	2312	-	X215CrW12 1KU	X210CrW12	SKD2
	5CrNiMo	S1	1.2542	45WCrV7	BS1	-	2710	-	45WCrV8KU	45WCrSi8	-
	3Cr2W8V	H21	1.2581	X30WCrV9 3 X30WCrV93KU	BH21	-	-	Z30WCV9	X28W09KU X30WCrV9 3KU	X30WCrV9	SKD5
	Cr12MoV	-	1.2601	X165CrMoV 12	-	-	2310	-	X165CrMoW12KU	X160CrMoV12	SKD11
	5CrNiMo	L6	1.2713	55NiCrMoV6	-	-	-	55NCDV7	-	F.250.S	SKT4
	V	W210	1.2833	100V1	BW2	-	-	$Y_1$105V	-	-	SKS43
	W6Mo5Cr4V2Co5	-	1.3243	S6-5-2-5	-	-	2723	Z85WDKCV	HS6-5-2-5	HS6-5-2-5	SKH55
	W18Cr4VCo5	T4	1.3255	S18-1-2-5	BT4	-	-	Z80WKCV 10-05-04-01	X78WCo1805KU	HS18-1-1-5	SKH3
	W6Mo5Cr4V2	M2	1.3343	S6-5-2	BM2	-	2722	Z85WDCV 06-05-04-02	X82WMo0605KU	HS6-5-2	SKH9
	-	M7	1.3348	S2-9-2	-	-Z-	2782	Z100WCWV 09-02-04-02	HS2-9-2	HS2-9-2	-
	W18Cr4V	T1	1.3355	S18-0-1	BT1	-	-	Z80WCV 18-04-01	X75W18KU	HS18-0-1	SKH2
	W6Mo5Cr4V3	M3	-	S6-5-3	-	-	-	-	-	-	SKH52
	-	M42	-	-	BM42	-	-	-	-	-	SKH59

ISO	Country and Standard · Standardbezeichnung nach Länder					Main application Hauptanwendung
	China	USA	Germany	Japan	Daido Steel Co., Ltd (Japan)	
	GB	AISI/SAE	DIN	JIS	DAIDO	
P	Plastic die steel · Gesenkstahl					
	-	P20 mod.		-	PX5N	For mass production of large mirror dies. Automobile tail light, front fender of car, video camera, household electrical appliances etc Große hochglänzende Präzisions Gesenke für die Serienproduktion. Automobilteile, Videokameras, elektr. Haushaltsgeräte ect.
	-	-		-	NAK55	High precision mirror die. Video camera, music disc, Cosmetic Containers, transparent covers, transparent films etc Hochglänzende Präzisions Gesenke für Videokameras, Musik CDs, Kosmetik Behälter, Transparente Abdeckungen.
	-	-		-	NAK80	High precision mirror die. Video camera, music disc, Cosmetic Containers, transparent covers, transparent films etc Hochglänzende Präzisions Gesenke für Videokameras, Musik CDs, Kosmetik Behälter, Transparente Abdeckungen und Beläge.
	3Cr13	420 mod.		SUS420J2 mod.	S-STAR	For ultra-mirror corrosion resistant precise dies. Accessories of camera, CD, lens, watch case. Für ultra fein spiegelnde Korrosionsbeständige Gesenke für Zubehör von Kameras. CD, Linsen, Armbanduhren.
	Cold-working die steel · Kaltarbeitsstahl					
	-	02	-	SKS93	YK30	Stamping die, gauge calipers, paper cutter, auxiliary tools Für Gesenkstempel, Meßkaliber, Papierschneidmesser, Werkzeuge
	9CrWMn	01 mod.	-	SKS3 mod.	GOA	Blanking die, gauge calipers, drawing die, taps, Perforated punch. Für Schnittmatritzen, Meßkaliber, Gewindebohrer, Perforationswerkzeuge, Kaltziehsteine
	Cr12MoV	D2	X165CrMoV12	SKD11	DC11	Blanking die, cold forming die, cold drawing die, forming roller, punch Für Schnittmatritzen, Kaltformpreßgesenke, Kaltziehsteine, Formwalzen.
	-	D2 mod.	-	SKD11 mod.	DC53	Blanking die, cold forming die, cold drawing die, forming roll, punch Für Schnittmatritzen, Kaltformpreßgesenke, Kaltziehsteine, Formwalzen.
	Hot-working die steel · Warmarbeitsstahl					
	4Cr5MoSiV1	H13	X40CrMoV51	SKD61	DHA1	Aluminum compression die, connecting parts of compression die, hot stamping die, hot extrusion die, thermal shear cutting blade Aluminium Druckgesenke, Verbindungsstücke für Druckgesenke, Heißpressgesenke, Heiß Extruder Gesenke, warmfeste Schnittmesser ect.
	-	-	-	-	DH21	Long life Aluminum compression die Alu Druckgesenke für lange Lebensdauer
	-	-	-	-	DH31-S	Compression die, Druckgesenke
	-	-	-	-	DH2F	Compression die, plastic die Druckgesenke, Plastik Gesenk

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	China	USA	Germany		Great Britain		Sweden	France	Italy	Spain	Japan
	GB	AISI/ SAE	W.-nr	DIN	BS	EN	SS	AFNOR	UNI	UNE	JIS
M	Stainless steel · Rostfreier Stahl										
	0Cr13; 1Cr12	403	1.4000	X6Cr13	403S17	-	2301	Z6C13	X6Cr13	F.3110	SUS403
	-	-	1.4001	X7Cr14	-	-	-	-	-	F.8401	-
	1Cr13	410	1.4006	X10Cr13	410S21	56A	2302	Z10C14	X12Cr13	F.3401	SUS410
	1Cr17	430	1.4016	X6Cr17	430S15	60	220	Z8C17	X8Cr17	F.3113	SUS430
	2Cr13	410	1.4021	X20Cr13	S62	56B; 56C	-	Z20C13	X20C13	F.3401	SUS410
	-	-	1.4027	G-X20Cr14	420C29	56B	-	Z20C13M	-	-	SCS2
	4Cr13	-	1.4034	X46Cr13	420S45	56D	2304	Z40CM Z38C13M	X40Cr14	F.3405	SUS420J2
	1Cr17Ni2	431	1.4057	X20CrNi172	431S29	57	2321	Z15CNi6.02	X16CNi16	F.3427	SUS431
	Y1Cr17	430F	1.4104	X12CrMoS17	-	-	2383	Z10CF17	X10CrS17	F.3117	SUS430F
	1Cr17Mo	434	1.4113	X6CrMo171	434S17	-	2325	Z8CD17.01	X8CrMo17	-	SUS434
	-	-	1.4313	X5CrNi134	425C11	-	-	Z4CND13.4M	-	-	SCS5
	-	-	1.4408	G-X6CrNiMo1810	316C16	-	-	-	-	F.8414	SCS14
	4Cr9Si2	HW3	1.4718	X45CrSi93	401S45	52	-	Z45CS9	X45CrSi8	F.322	SUH1
	0Cr13Al	405	1.4724	X10CrAl13	403S17	-	-	Z10C13	X10CrAl12	F.311	SUS405
	Cr17	430	1.4742	X10CrAl18	430S15	60	-	Z10CAS18	X8Cr17	F.3113	SUS430
	8Cr20Si2Ni	HNV6	1.4757	X80CrNiSi20	443S65	59	-	Z80CSN20.02	X80CrSiNi20	F.320V	SUH4
	2Cr25N	446	1.4762	X10CrAl24	-	-	2322	Z10CAS24	X16Cr26	-	SUH446
	Austenitic stainless steel · Austenitischer Rostfreier Stahl										
	0Cr18Ni9	304	1.4301	X5CrNi1810	304S15	58E	2332	Z6CN18.09	X5CrNi1810	F.3551; F.3541; F.3504	SUS304
	1Cr18Ni9MoZr	303	1.4305	X10CrNiS189	303S21	58M	2346	Z10CNF18.09	X10CrNiS18.09	F.3508	SUS303
	0Cr19Ni10	304L	1.4306	X2CrNi1911	304S12	-	2352	Z2CN18.10	X2CrNi18.11	F.3503	SCS19
	-	-	1.4308	G-X6CrNi189	304C15	-	-	Z6CN18.10M	-	-	SCS13
	Cr17Ni7	301	1.4310	X12CrNi177	-	-	2331	Z12CN17.07	X12CrNi1707	F.3517	SUS301
	-	304LN	1.4311	X2CrNiN1810	304S62	-	2371	Z2CN18.10	-	-	SUS304LN
	0Cr19Ni9	304	1.4350	X5CrNi189	304S31	58E	-	Z6CN18.09	X5CrNi1810	-	SUS304
	0Cr17Ni11Mo2	316	1.4401	X5CrNiMo1712	316S16	Z6CND17.11	2347	1.4401	X5CrNiMo1712	F.3543	SUS316
	00Cr17Ni13Mo2	316LN	1.4429	X2CrNiMoN17133	-	-	2375	Z2CND17.13	-	-	SUS316LN
	0Cr27Ni12Mo3	316L	1.4435	X2CrNiMo18143	316S12	-	2353	Z2CDN17.13	X2CrNiMo1713	-	SCS16,
	00Cr19Ni13Mo3	317L	1.4438	X2CrNiMo17133	317S12	-	2367	Z2CND19.15	X2CrNiMo18.16	-	SUS317L
	-	329L	1.4460	X8CrNiMo275	-	-	2324	-	-	-	SUS329L; SCH11; SCS11
	1Cr18Ni9Ti	321	1.4541	X6CrNiTi1810	2337	321S12	58B	Z6CNT18.10	X6CrNiTi1811	F.3553	SUS321
	1Cr18Ni11Nb	347	1.4550	X6CrNiNb1810	347S17	58F	2338	Z6CNNb18.1	X6CrNiTi1811	F.3552	SUS347
	Cr18Ni12Mo2Ti	316Ti	1.4571	X6CrNiMoTi17122	320S17	58J	2350	Z6NDT17.12	X6CrNiMoTi17	F.3535	-

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	GB	AISI/ SAE	W.-nr	DIN	BS	EN	SS	AFNOR	UNI	UNE	JIS
	Austenitic stainless steel · Austenitischer Rostfreier Stahl										
	-	-	1.4581	G-X5CrNiMoNb1810	318C7	-	-	Z4CNDNb1812M	XG8CrNiMo18	-	SCS22
	Cr17Ni12Mo3Nb	318	1.4583	X10CrNiMoNb1812	-	-	-	Z6CNDNb1713B	X6CrNiMoTiNb17	-	-
	1Cr23Ni13	309	1.4828	X15CrNiSi2012	309S24	-	-	Z15CNS20.1	-	-	SUH309
	0Cr25Ni20	310S	1.4845	X12CrNi2521	310S24	-	2361	Z12CN2520	X6CrNi2520	F.331	SUH310
	Cr15Ni36W3Ti	330	1.4864	X12NiCrSi3616	-	-	-	Z12CNS35.1	-	-	SUH330
	-	-	1.4865	G-X40NiCrSi3818	330C11	-	-	-	XG50NiCr3919	-	SCH15
	5Cr2Mn9Ni4N	EV8	1.4871	X53CrMnNiN219	349S54; 321S12	- 58B	-	Z52CMN21.0	X53CrMnNiN219	-	SUH35
	1Cr18Ni9Ti	321	1.4878	X12CrNiTi189	321S320	58C	-	Z6CNT18.12	X6CrNiTi1811	F.3523	SU321

ISO	Country and Standard · Standardbezeichnung nach Länder								
	China	USA	Germany	Great Britain	Sweden	France	Italy	Spain	Japan
K	Nodular cast iron · GGG								
	QT400-18	60-40-18	GGG40	400/17	0717-02	FGS370-17	GS370-17	FGE38-17	FCD400
	QT450-10	65-45-12	--	420/12	--	FGS400-12	GS400-12	FGE42-12	FCD450
	QT500-7	70-50-05	GGG50	500/7	0727-02	FGS500-7	GS500-7	FGE50-7	FCD500
	QT600-3	80-60-03	GGG60	600/7	0732-03	FGS600-2	GS600-2	FGE60-2	FCD600
	QT700-2	100-70-03	GGG70	700/2	0737-01	FGS700-2	GS700-2	FGE70-2	FCD700
	QT800-2	120-90-02	GGG80	800/2	0864-03	FGS800-2	GS800-2	FGE80-2	FCD800
	QT900-2	--	--	900/2	--	--	--	--	--
	Grey cast iron · Grauguss								
	--	NO.60	GG40	--	0140	FGL400	--	--	
	HT350	NO.50	GG35	350	0135	FGL350	G35	FG35	FC350
	HT300	NO.45	GG30	300	0130	FGL300	G30	FG30	FC300
	HT250	NO.35	GG25	250	0125	FGL250	G25	FG25	FC250
	HT200	NO.30	GG20	200	0120	FGL200	G20	FG20	FC200
	HT150	NO.20	GG15	150	0115	FGL150	G15	FG15	FC150
	HT100	--	--	100	0110	--	G10	--	FC100

Fitting dimension tolerance · Passtoleranzen

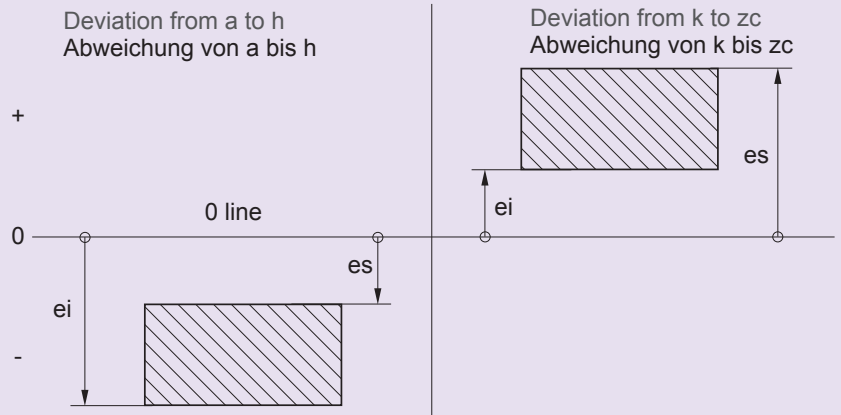
Basic dimensions (mm)		Standard tolerance class of holes · Standard Toleranz Klassen																	
		IT1	IT2	IT3	IT4	IT5	IT6	IT7	IT8	IT9	IT10	IT11	IT12	IT13	IT14	IT15	IT16	IT17	IT18
>	≤	μm											mm						
---	3	0.8	1.2	2	3	4	6	10	14	25	40	60	0.1	0.14	0.25	0.4	0.6	1	1.4
3	6	1	1.5	2.5	4	5	8	12	18	30	48	75	0.12	0.18	0.3	0.48	0.75	1.2	1.8
6	10	1	1.5	2.5	4	6	9	15	22	36	58	90	0.15	0.22	0.36	0.58	0.9	1.5	2.2
10	18	1.2	2	3	5	8	11	18	27	43	70	110	0.18	0.27	0.43	0.7	1.1	1.8	2.7
18	30	1.5	2.5	4	6	9	13	21	33	52	84	130	0.21	0.33	0.52	0.84	1.3	2.1	3.3
30	50	1.5	2.5	4	7	11	16	25	39	62	100	160	0.25	0.39	0.62	1	1.6	2.5	3.9
50	80	2	3	5	8	13	19	30	46	74	120	190	0.3	0.46	0.74	1.2	1.9	3.	4.6
80	120	2.5	4	6	10	15	22	35	54	87	140	220	0.35	0.54	0.87	1.4	2.2	3.5	5.4
120	180	3.5	5	8	12	18	25	40	63	100	160	250	0.4	0.63	1	1.6	2.5	4	6.3
180	250	4.5	7	10	14	20	29	46	72	115	185	290	0.46	0.72	1.15	1.85	2.9	4.6	7.2
250	315	6	8	12	16	23	32	52	81	130	210	320	0.52	0.81	1.3	2.1	3.2	5.2	8.1
315	400	7	9	13	18	25	36	57	89	140	230	360	0.57	0.89	1.4	2.3	3.6	5.7	8.9
400	500	8	10	15	20	27	40	63	97	155	250	400	0.63	0.97	1.55	2.5	4	6.3	9.7
500	630	9	11	16	22	32	44	70	110	175	280	440	0.7	1.1	1.75	2.8	4.4	7	11
630	800	10	13	18	25	36	50	80	125	200	320	500	0.8	1.25	2	3.2	5	8	12.5
800	1000	11	15	21	28	40	56	90	140	230	360	560	0.9	1.4	2.3	3.6	5.6	9	14
1000	1250	13	18	24	33	47	66	105	165	260	420	660	1.05	1.65	2.6	4.2	6.6	10.5	16.5
1250	1600	15	21	29	39	55	78	125	195	310	500	780	1.25	1.95	3.1	5	7.8	12.5	19.5
1600	2000	18	25	35	46	65	92	150	230	370	600	920	1.5	2.3	3.7	6	9.2	15	23
2000	2500	22	30	41	55	78	110	175	280	440	700	1100	1.75	2.8	4.4	7	11	17.5	28
2500	3150	26	36	50	68	96	135	210	330	540	860	1350	2.1	3.3	5.4	8.6	13.5	21	33

Note:
From IT1 to IT5, the standard tolerance with basic dimension more than 500 mm is as trial.
When the basic dimension 1 mm, the tolerances from IT4 to IT8 are invalid.

Bemerkung: Für die Standart Toleranzen IT1 bis IT5 bei Durchmesser über 500mm ist eine Anpassung notwendig. Bei Basis Abmessungen unter 1mm ist das Toleranzfeld IT4 bis IT8 ungültig.

The shaft lower deviation(ei) and upper deviation (es) can be obtained by basic tolerance and standard tolerance (IT) of shaft.

Toleranz Einheitswelle: Die geringste Abweichung (ei) und die größte Abweichung (es) sind als Basis bzw. Standorttoleranzen (IT) in der Tabelle angegeben.

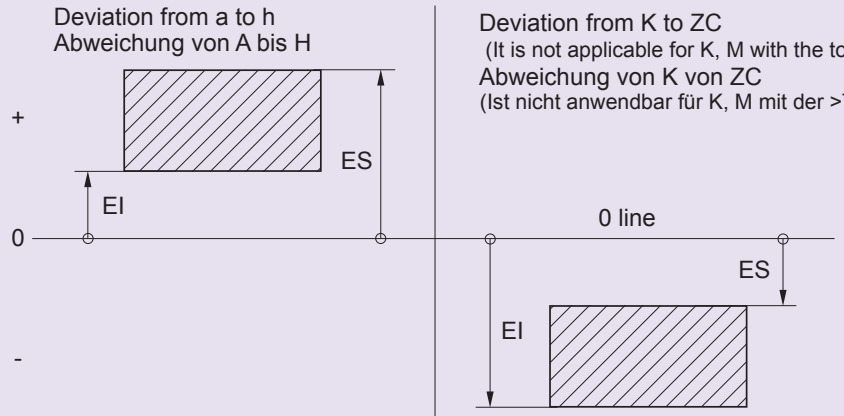


ES= negative (-) basic tolerance of hole
ES= neg(-) Basistoleranz der Bohrung
ei=es-IT

EI= positive (+) basic tolerance of hole
EI= pos(+) Basistoleranz der Bohrung
es=ei+IT

The hole lower deviation(EI) and upper deviation (ES) can be obtained by basic tolerance and standard tolerance (IT) of hole.

Toleranz Einheitsbohrung: Die geringste Abweichung (EI) und die größte Abweichung (ES) sind als Basis bzw. Standarttoleranzen (IT)- Bohrung in der Tabelle angegeben.



EI= postive (+) basic tolerance of hole
EI= pos(+ Basistoleranz der Bohrung
ES=EI+IT

ES=negitive (-) basic tolerance of hole
ES= neg(-) Basistoleranz der Bohrung
EI=ES+IT

For example: for a hole with diameter 3 mm and tolerance H7, we can find that the lower deviation EI=0 in relation to H7 from the basic tolerance table, and the standard tolerance IT=10μm corresponding to H7, thus the upper deviation ES=EI+IT=10μm. Therefore the hole fitting dimension is Ø 3mm = $^{+0.01}_{0}$ mm.

Beispiel: Bei einem Durchmesser von 3mm und einer Toleranz H7 ist bei der Basis Toleranz H7 (EI=0) bei der Standorttoleranz H7 ist es IT=10μm. Die größte Abweichung ist demzufolge: ES=EI+IT=10μm

Die Bohrungstoleranz ist bei einem Ø 3mm = $^{+0.01}_{0}$ mm.

- **Basic deviations value of shaft**
- **Basistoleranzwerte Einheitswelle**

Diameter Durchmesser Ø (mm)		Basic deviation value · Basistoleranzwerte											
		Upper deviation es · Höchstabweichung											
		Standard tolerance class · Standardtoleranzklasse											
>	≤	a	b	c	cd	d	e	ef	f	fg	g	h	js
---	3	-270	-140	-60	-34	-20	-14	-10	-6	-4	-2	0	
3	6	-270	-140	-70	-46	-30	-20	-14	-10	-6	-4	0	
6	10	-280	-150	-80	-56	-40	-25	-18	-13	-8	-5	0	
10	14	-290	-150	-95		-50	-32		-16		-6	0	
14	18												
18	24	-300	-160	-110		-65	-40		-20		-7	0	
24	30												
30	40	-310	-170	-120		-80	-50		-25		-9	0	
40	50	-320	-180	-130									
50	65	-340	-190	-140		-100	-60		-30		-10	0	
65	80	-360	-200	-150									
80	100	-380	-220	-170		-120	-72		-36		-12	0	
100	120	-410	-240	-180									
120	140	-460	-260	-200		-145	-85		-43		-14	0	
140	160	-520	-280	-210									
160	180	-580	-310	-230									
180	200	-660	-340	-240		-170	-100		-50		-15	0	
200	225	-740	-380	-260									
225	250	-820	-420	-280									
250	280	-920	-480	-300		-190	-110		-56		-17	0	
280	315	-1050	-540	-330									
315	355	-1200	-600	-360		-210	-125		-62		-18	0	
355	400	-1350	-680	-400									
400	450	-1500	-760	-440		-230	-135		-68		-20	0	
450	500	-1650	-840	-480									
500	560					-260	-145		-76		-22	0	
560	630												
630	710					-290	-160		-80		-24	0	
710	800												
800	900					-320	-170		-86		-26	0	
900	1000												
1000	1120					-350	-195		-98		-28	0	
1120	1250												
1250	1400					-390	-220		-110		-30	0	
1400	1600												
1600	1800					-430	-240		-120		-32	0	
1800	2000												
2000	2240					-480	-260		-130		-34	0	
2240	2500												
2500	2800					-520	-290		-145		-38	0	
2800	3150												

Die Formel für die Abweichung $=\pm\frac{IT_n}{2}$, ITn ist der IT Wert entsprechend zu "n" zugeordnet. In the formula Deviation $=\pm\frac{IT_n}{2}$, ITn is the IT value corresponding to 'n'.

Note: 1. If basic dimension ≤1mm, the basic deviation a and b are not adopted.

Bemerkungen: 1. Bei Abmessungen ≤ 1mm, sind die Basisabweichungen a und b nicvht berücksichtigt.

µm

Basic deviation value · Basistoleranzwerte Einheitswelle																		
Lower deviationei · geringste Abweichung																		
IT5 IT6	IT7	IT8	IT4 IT7	≤IT3 >IT7	Standard tolerance class · Standart Toleranzklasse													
j			k		m	n	p	r	s	t	u	v	x	y	z	zn	zb	zc
-2	-4	-6	0	0	+2	+4	+6	+10	+14		+18		+20		+26	+32	+40	+60
-2	-4		+1	0	+4	+8	+12	+15	+19		+23		+28		+35	+42	+50	+80
-2	-5		+1	0	+6	+10	+15	+19	+23		+28		+34		+42	+52	+67	+97
-3	-6		+1	0	+7	+12	+18	+23	+28		+33		+40		+50	+64	+90	+130
												+39	+45		+60	+77	+108	+150
-4	-8		+2	0	+8	+15	+22	+28	+35		+41	+47	+54	+63	+73	+98	+136	+188
										+41	+48	+55	+64	+75	+88	+118	+160	+218
-5	-10		+2	0	+9	+17	+26	+34	+43	+48	+60	+68	+80	+94	+112	+148	+200	+274
										+54	+70	+81	+97	+114	+136	+180	+242	+325
-7	-12		+2	0	+11	+20	+32	+41	+53	+66	+87	+102	+122	+144	+172	+226	+300	+405
								+43	+59	+75	+102	+120	+146	+174	+210	+274	+360	+480
-9	-15		+3	0	+13	+23	+37	+51	+71	+91	+124	+146	+178	+214	+258	+335	+445	+585
								+54	+79	+104	+144	+172	+210	+254	+310	+400	+525	+690
-11	-18		+3	0	+15	+27	+43	+63	+92	+122	+170	+202	+248	+300	+365	+470	+620	+800
								+65	+100	+134	+190	+228	+280	+340	+415	+535	+700	+900
								+68	+108	+146	+210	+252	+310	+380	+465	+600	+780	+1000
-13	-21		+4	0	+17	+31	+50	+77	+122	+166	+236	+284	+350	+425	+520	+670	+880	+1150
								+80	+130	+180	+258	+310	+385	+470	+575	+740	+960	+1250
								+84	+140	+196	+284	+340	+425	+520	+640	+820	+1050	+1350
-16	-26		+4	0	+20	+34	+56	+94	+158	+218	+315	+385	+475	+580	+710	+920	+1200	+1550
								+98	+170	+240	+350	+425	+525	+650	+790	+1000	+1300	+1700
-18	-28		+4	0	+21	+37	+62	+108	+190	+268	+390	+475	+590	+730	+900	+1150	+1500	+1900
								+114	+208	+294	+435	+530	+660	+820	+1000	+1300	+1650	+2100
-20	-32		+5	0	+23	+40	+68	+126	+232	+330	+490	+595	+740	+920	+1100	+1450	+1850	+2400
								+132	+252	+360	+540	+660	+820	+1000	+1250	+1600	+2100	+2600
			0	0	+26	+44	+78	+150	+280	+400	+600							
								+155	+310	+450	+660							
			0	0	+30	+50	+88	+175	+340	+500	+740							
								+185	+380	+560	+840							
			0	0	+34	+56	+100	+210	+430	+620	+940							
								+220	+470	+680	+1050							
			0	0	+40	+66	+120	+250	+520	+780	+1150							
								+260	+580	+840	+1300							
			0	0	+48	+78	+140	+300	+640	+960	+1450							
								+330	+720	+1050	+1600							
			0	0	+58	+92	+170	+370	+820	+1200	+1850							
								+400	+920	+1350	+2000							
			0	0	+68	+110	+195	+440	+1000	+1500	+2300							
								+460	+1100	+1650	+2500							
			0	0	+76	+135	+240	+550	+1250	+1900	+2900							
								+580	+1400	+2100	+3200							

- **Basic deviations value of hole**
- **Basistoleranzwerte Einheitsbohrung**

Diameter Durchmesser Ø (mm)		Basic deviation value · Basistoleranzwerte Einheitswelle																				
		Lower deviation EI · geringste Abweichung EI											Upper deviation ES · Höchstabweichung ES								
		Standard tolerance class · Standard Toleranzklasse											IT6	IT7	IT8	≤IT8	>IT8	≤IT8	>IT8	≤IT8	>IT8	≤IT7
>	≤	A	B	C	CD	D	E	EF	F	FG	G	H	JS	J			K		M		N		P to ZC
---	3	+270	+140	+60	+34	+20	+14	+10	+6	+4	+2	0	Die Formel für die Abweichung $=\pm\frac{IT_n}{2}$, ITn ist der IT Wert entsprechend zu "n" zugeordnet. In the formula Deviation $=\pm\frac{IT_n}{2}$, ITn is the IT value corresponding to 'n'.	+2	+4	+6	0	0	-2	-2	-4	-4	If IT ≥IT7, add a Δ value to the relevant value
3	6	+270	+140	+70	+46	+30	+20	+14	+10	+6	+4	0		+5	+6	+10	-1+Δ		-4+Δ	-4	-8+Δ	0	
6	10	+280	+150	+80	+56	+40	+25	+18	+13	+8	+5	0		+5	+8	+12	-1+Δ		-6+Δ	-6	-10+Δ	0	
10	14	+290	+150	+95		+50	+32		+16		+6	0		+6	+10	+15	-1+Δ		-7+Δ	-7	-12+Δ	0	
14	18																						
18	24	+300	+160	+110		+65	+40		+20		+7	0		+8	+12	+20	-2+Δ		-8+Δ	-8	-15+Δ	0	
24	30																						
30	40	+310	+170	+120		+80	+50		+25		+9	0		+10	+14	+24	-2+Δ		-9+Δ	-9	-17+Δ	0	
40	50	+320	+180	+130																			
50	65	+340	+190	+140		+100	+60		+30		+10	0		+13	+18	+28	-2+Δ		-11+Δ	-11	-20+Δ	0	
65	80	+360	+200	+150																			
80	100	+380	+220	+170		+120	+72		+36		+12	0		+16	+22	+34	-3+Δ		-13+Δ	-13	-23+Δ	0	
100	120	+410	+240	+180																			
120	140	+460	+260	+200		+145	+85		+43		+14	0		+18	+26	+41	-3+Δ		-15+Δ	-15	-27+Δ	0	
140	160	+520	+280	+210																			
160	180	+580	+310	+230																			
180	200	+660	+340	+240		+170	+100		+50		+15	0		+22	+30	+47	-4+Δ		-17+Δ	-17	-31+Δ	0	
200	225	+740	+380	+260																			
225	260	+820	+420	+280																			
260	280	+920	+480	+300		+190	+110		+56		+17	0		+25	+36	+55	-4+Δ		-20+Δ	-20	-34+Δ	0	
280	315	+1050	+540	+330																			
315	355	+1200	+600	+360		+210	+125		+62		+18	0		+29	+39	+60	-4+Δ		-21+Δ	-21	-37+Δ	0	
355	400	+1350	+680	+400																			
400	450	+1500	+760	+440		+230	+135		+68		+20	0		+33	+43	+66	-5+Δ		-23+Δ	-23	-40+Δ	0	
450	500	+1650	+840	+480																			
500	560					+260	+145		+76		+22	0					0		-26		-44		Wenn IT ≥IT7, wird der a Δ wert zuaddiert.
560	630																						
630	710					+290	+160		+80		+24	0					0		-30		-50		
710	800																						
800	900					+320	+170		+86		+26	0					0		-34		-56		
900	1000																						
1000	1120					+350	+195		+98		+28	0					0		-40		-66		
1120	1250																						
1250	1400					+390	+220		+110		+30	0					0		-48		-78		
1400	1600																						
1600	1800					+430	+240		+120		+32	0					0		-58		-92		
1800	2000																						
2000	2240					+480	+260		+130		+34	0					0		-68		-110		
2240	2500																						
2500	2800					+520	+290		+145		+38	0					0		-76		-135		
2800	3150																						

µm

Basic deviation value · Basistoleranzwerte Einheitswelle												Δ					
Upper deviation ES · Höchstabweichung ES																	
Standard tolerance class >IT7 · Standard Toleranzklasse >IT7												Standard tolerance class Standard Toleranzklasse					
P	R	S	T	U	V	X	Y	Z	ZA	ZB	ZC	IT3	IT4	IT5	IT6	IT7	IT8
-6	-10	-14		-18		-20		-26	-32	-40	-60	0	0	0	0	0	0
-12	-15	-19		-23		-28		-35	-42	-50	-80	1	1.5	1	3	4	6
-15	-19	-23		-28		-34		-42	-52	-67	-97	1	1.5	2	3	6	7
-18	-23	-28		-33		-40		-50	-64	-90	-130	1	2	3	3	7	9
					-39	-45		-60	-77	-108	-150						
-22	-28	-35		-41	-47	-54	-63	-73	-98	-136	-188	1.5	2	3	4	8	12
			-41	-48	-55	-64	-75	-88	-118	-160	-218						
-26	-34	-43	-48	-60	-68	-80	-94	-112	-148	-200	-274	1.5	3	4	5	9	14
			-54	-70	-81	-97	-114	-136	-180	-242	-325						
-32	-41	-53	-66	-87	-102	-122	-144	-172	-226	-300	-405	2	3	5	6	11	16
	-43	-59	-75	-102	-120	-146	-174	-210	-274	-360	-480						
-37	-51	-71	-91	-124	-146	-178	-214	-258	-335	-445	-585	2	4	5	7	13	19
	-54	-79	-104	-144	-172	-210	-254	-310	-400	-525	-690						
-43	-63	-92	-122	-170	-202	-248	-300	-365	-470	-620	-800	3	4	6	7	15	23
	-65	-100	-134	-190	-228	-280	-340	-415	-535	-700	-900						
	-68	-108	-146	-210	-252	-310	-380	-465	-600	-780	-1000						
-50	-77	-122	-166	-236	-284	-350	-425	-520	-670	-880	-1150	3	4	6	9	17	26
	-80	-130	-180	-258	-310	-385	-470	-575	-740	-960	-1250						
	-84	-140	-196	-284	-340	-425	-520	-640	-820	-1050	-1350						
-56	-94	-158	-218	-315	-385	-475	-580	-710	-920	-1200	-1550	4	4	7	9	20	29
	-98	-170	-240	-350	-425	-525	-650	-790	-1000	-1300	-1700						
-62	-108	-190	-268	-390	-475	-590	-730	-900	-1150	-1500	-1900	4	5	7	11	21	32
	-114	-208	-294	-435	-530	-660	-820	-1000	-1300	-1650	-2100						
-68	-126	-232	-330	-490	-595	-740	-920	-1100	-1450	-1850	-2400	5	5	7	13	23	34
	-132	-252	-360	-540	-660	-820	-1000	-1250	-1600	-2100	-2600						
-78	-150	-280	-400	-600													
	-155	-310	-450	-660													
-88	-175	-340	-500	-740													
	-185	-380	-560	-840													
100	-210 -220	-430 -470	-620 -680	-940 -1050													
-120	-250 -260	-520 -580	-780 -840	-1150 -1300													
-140	-300 -330	-640 -720	-960 -1050	-1450 -1600													
-170	-370	-820	-1200	-1850													
	-400	-920	-1350	-2000													
-195	-440 -460	-1000 -1100	-1500 -1650	-2300 -2500													
-240	-550 -580	-1250 -1400	-1900 -2100	-2900 -3200													

Hardness reference table (conversion of hardness and strength for ferrous metal)
Härte Vergleichstabelle (Konversationstabelle von Härte und Zugfestigkeit für Stahl)

Hardness · Härte				Tensile strength Zugfestigkeit N/mm²
Rockwell hardness · Härte		Vickers hardn. · Härte	Brinell hardn. · Härte	
HRC	HRA	HV	HB	
70.0	86.6	1037	—	—
69.5	86.3	1017	—	—
69.0	86.1	997	—	—
68.5	85.8	978	—	—
68.0	85.5	959	—	—
67.5	85.2	941	—	—
67.0	85.0	923	—	—
66.5	84.7	906	—	—
66.0	84.4	889	—	—
65.5	84.1	872	—	—
65.0	83.9	856	—	—
64.5	83.6	840	—	—
64.0	83.3	825	—	—
63.5	83.1	810	—	—
63.0	82.8	795	—	—
62.5	82.5	780	—	—
62.0	82.2	766	—	—
61.5	82.0	752	—	—
61.0	81.7	739	—	—
60.5	81.4	726	—	—
60.0	81.2	713	—	2555
59.5	80.9	700	—	2500
59.0	80.6	688	—	2450
58.5	80.3	676	—	2395
58.0	80.1	664	—	2345
57.5	79.8	653	—	2295
57.0	79.5	642	—	2250
56.5	79.3	631	—	2205
56.0	79.0	620	—	2160
55.5	78.7	609	—	2115
55.0	78.5	599	—	2075
54.5	78.2	589	—	2035
54.0	77.9	579	—	1995
53.5	77.7	570	—	1955
53.0	77.4	561	—	1920
52.5	77.1	551	—	1885
52.0	76.9	543	—	1850
51.5	76.6	534	—	1815

Hardness · Härte				Tensile strength Zugfestigkeit N/mm²
Rockwell hardness · Härte		Vickers hardn. · Härte	Brinell hardn. · Härte	
HRC	HRA	HV	HB	
51.0	76.3	525	501	1780
50.5	76.1	517	494	1750
50.0	75.8	509	488	1720
49.5	75.5	501	481	1690
49.0	75.3	493	474	1660
48.5	75.0	485	468	1630
48.0	74.7	478	461	1605
47.5	74.5	470	455	1575
47.0	74.2	463	449	1550
46.5	73.9	456	442	1525
46.0	73.7	449	436	1500
45.5	73.4	443	430	1475
45.0	73.2	436	424	1450
44.5	72.9	429	418	1430
44.0	72.6	423	413	1405
43.5	72.4	417	407	1385
43.0	72.1	411	401	1360
42.5	71.8	405	396	1340
42.0	71.6	399	391	1320
41.5	71.3	393	385	1300
41.0	71.1	388	380	1280
40.0	70.8	382	375	1260
40.0	70.5	377	370	1245
39.5	70.3	372	365	1225
39.0	70.0	367	360	1210
38.5	—	362	355	1190
38.0	—	357	350	1175
37.5	—	352	345	1160
37.0	—	347	341	1140
36.5	—	342	336	1125
36.0	—	338	332	1110
35.5	—	333	327	1095
35.0	—	329	323	1080
34.5	—	324	318	1065
34.0	—	320	314	1050
33.5	—	316	310	1035
33.0	—	312	306	1020
32.5	—	308	302	1010

Hardness reference table (conversion of hardness and strength for ferrous metal)
Härte Vergleichstabelle (Konversationstabelle von Härte und Zugfestigkeit für Stahl)

Hardness · Härte				Tensile strength Zugfestigkeit N/mm²		Hardness · Härte				Tensile strength Zugfestigkeit N/mm²
Rockwell hardness · Härte		Vickers hardn. · Härte	Brinell hardn. · Härte			Rockwell hardness · Härte		Vickers hardn. · Härte	Brinell hardn. · Härte	
HRC	HRA	HV	HB			HRC	HRA	HV	HB	
32.0	—	304	298	995		24.0	—	249	245	820
31.5	—	300	294	980		23.5	—	246	242	810
31.0	—	296	291	970		23.0	—	243	240	800
30.5	—	292	287	960		22.5	—	240	237	790
30.0	—	289	283	950		22.0	—	237	234	785
29.5	—	285	280	935		21.5	—	234	232	775
29.0	—	281	276	920		21.0	—	231	229	765
28.5	—	278	273	910		20.5	—	229	227	760
28.0	—	274	269	900		20.0	—	226	225	750
27.5	—	271	266	890		19.5	—	223	222	745
27.0	—	268	263	880		19.0	—	221	220	735
26.5	—	264	260	870		18.5	—	218	218	730
26.0	—	261	257	860		18.0	—	216	216	725
25.5	—	258	254	850		17.5	—	214	214	715
25.0	—	255	251	835		17.0	—	211	211	710
24.5	—	252	248	830						

Note: The conversion values for steel in the table are commonly applicable for the steels with carbon from low to high.
Bemerkung: Die in der Tabelle aufgeführten Werte sind für Kohlenstoffstahl anwendbar.

Comparison table for turning inserts chip breaker · Übersichtstabelle der WSP-Spanbrecher

ISO	Application Anwendung	ZCC CT		Sandvik		Seco		Kennametal		ISCAR		Walter		Mitsubishi		Sumitomo		Tungaloy		Kyocera	
		Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos
Steel · Stahl	Wiper-finishing Wiper-Schlichten	WG		WF WL	WF WK	W-MF2	W-F1	FW MW	FW MW	WF		NF	PF	SW	FW	NLU-W	NLU-W	ASW		WP	
	Finishing Schlichten	DF EF	SF HF	PF QF	PF UF 23	FF1 MF1	FF1 F1	FF FN	11 UF LF	SF	PF SM	NF3 NS6	PF4 PF5	FH FS	SW FJ FV	NSU NLU NFA NFL	NLU NFP NFK	TF TS 17	PF 01	DP GP VF	CF
	Sem-finishing Schli-Mittlere Bearb.	DM EM	HM	PM QM	PM UM	MF2	F2	FN	MF	NF TF SM	14 16 17 19	NS6	PS5	SH SA	SW SV MV	NSX	NSU NSC NSK	TS TM AS	PS	HQ CQ CJ	CK DP GP VF XP
	Medium machining -light roughing Mittlere Bearb.-leichte Schruppbearbeitung	DM PM	HR	PM QM	PR UR	M3 MF3	F2	MN	MF	GN PP NR	17 19	NM4 NM6	PM5	MV MZ MA	MV MW	NGE NGU NUX	NMU NSF	TM DM	PM	GS CS HS PS	HQ XQ GK G
	Wiper-medium			WR WM	WM	W-M3 W-R4 W-R7	W-F2	MW RW	MW	WG		NM	PM	MW		NGU-W				WQ	
	Roughing Schruppen	DR HDR 31		PR QR 31		M5 MR5 MR7		RP UN RN		TNM GN	19	NM9		GH MAT MT		NMU NMX	NMU	TH TR TU		PT GT HT	G St-form
	Single Side rough. Eins. WSP Schruppen			HR QR		R8 RR9 -56 -57 -UX		RH RM RP		NM		NR6 NR8		HA HZ HH HV HX		NMP NHG NHP NHU NHW				HX	
Stainless Steel · Rostfreier Stahl	W.finishing Wiper-Schlichten	WG		WF WL	WF WK	W-MF2		FW MW	FW MW	WF			PF	SW	FW	NLU-W	NLU-W				
	Finishing Schlichten	EF DF	HF	MF	MF UF	FF1 F2 MF1	F1	FF FP	11 UF LF	NF VL	PF SM	NF4	PF4 PF5	FS	FJ FV	NSU NLU	NSU NLU	SS	SS	GU	
	Sem-finishing Schli.Mittl.Bearb.	EF EM	HF HM	MF MM	MF MM UM	MF3	F2	FP	MF	PP TF	14 16 17 19	NM4	PS5	SH MS	SW SV MV	NEX NUP	NSU	SS SM	PS	MS	CK DP GP VF XP
	Medium machining -light rough. Mittlere Bearb. -leichtes Schruppbearbeitung	EM DM	HM	MM	MM UM	R6 56	F2	MP	HP	PP TF	17 19	NM4 NR4	PM5	MS ES MH	MV MW	NGU	NMU	SA S	PM	MS	HQ XQ GK G
	Wiper. medium			WR WM	WM	W-M3		MW RW	MW	WG			PM	MW		NGU -W					
	Roughing Schruppen	ER DR HDR	HR	MR QR PR	MR	R7 R8		MP -P		HTW NR	19	NR4		GH HZ		NMU NMX NHG					
	Single Side roughing Einseitge WSP Schruppen	ER DR HDR		HR QR		-56		RP		NM						NMP NHG NHP NHU NHW	NMP NHG NHP NHU NHW				

Comparison table for turning inserts chip breaker · Übersichtstabelle der WSP-Spanbrecher

ISO		Application Anwendung	ZCC CT		Sandvik		Seco		Kennametal		ISCAR		Walter		Mitsubishi		Sumitomo		Tungaloy		Kyocera	
			Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos	Neg	Pos
Cast iron · Guss	K	Wiper-finishing W.-Schlichten	WG		WF WM	WF	W-MF2	W-F1	FW MW	FW MW	WF						NLU-W	NLU-W				
		Finishing Schlichten	DF	HF	KF	KF	F1	F1	FF FN	11 UF LF	NF SM	14 19		PS5			NSU	NLU			C	
		Sem-finishing Schlichten-Mittl. Bearbeitung	PM	HM	KF KM	KF KM	M3	F2	FN	MF	GN	14 19	NM5	PS5	GH		NUX NGU	NSU	CM		C Stand. form	
		Medium machining-light roughing Mittl. Bearbeitung-leichte Schruppbearbeitung	DR	HM HR	KM QM	KM	M3	F2	UN	HP	GN NR		NM6	PM5			NUZ NGU	NMU	CM		GC ZS	
		Wiper medium					W-M3 W-R4 W-R7		MW	MW	WG		NM	PM			NGU-W					
		Roughing Schruppbearbeitung	DR *NMA	HR	KR QR	KR UR	M5				NR		NR6		GH		NMU	NHG NHU NHW			ZS	
Nonferrite Materials Ne-metalle	N	Finishing Schlichten		LH		AL				LF	NF			PM2								
		Sem-finishing Schlichten-Mittl. Bearbeitung		LH		AL		AL	GP		NF PP	AS						NAG			AH	AH
		Medium machining-light roughing Mittlere Bearbeitung-leichtes Schruppbearbeitung		LH		AL		AL	GG-FS MS	HP	NMS											
Heat resist. super alloys & Ti-alloys Warmf. Legi. & Ti-Legierung	S	Finishing Schlichten	NF		NGP	MF	MF1		FS	GT-HP	SF PF	PF SM		PF4	FJ		NSU	NSU				
		Sem-finishing Schlichten-Mittlere Bearbeitung	NF NM EM		23	MM	MF1 M1		FS MS	GT-MF	SF PF	PF SM		PF5	MJ		NEX NUP	NSU NSK				
		Medium machining-light roughing Mittlere Bearbeitung-leichtes Schruppen	NM EM DM		MF	MM UM	M1		MS	MT-LF	PP TF			PS5	MS		NMU	NSK				
		Roughing Schruppbearbeitung	ER		SR		MR3 MR4		RP		TF HTW NR				GJ							

Coated Cemeted Carbide CVD · beschichtetes Hartmetall CVD

ISO		ZCC CT	Sandvik	Kennametal	Sumitomo	Mitsubishi	Toshiba Tungaloy	Kyocera	Walter	Iscar	SECO
Steel · Stahl	P01	**YBC152**	GC4005	TN7005 KC9110	AC700G	UE6005	T9005	CR7015	WPP01	IC9150	TP1000
		YBC151	GC4205			UE6010		CA5505	WPP05		
	P10	**YBC152**	GC4015	TN7010 KC9110	AC700G	UE6010	T9005	CR7015 CA5505	WAP10	IC9150	TP1000
		YBC151	GC4215		AC2000	UC6010	T9015	CA5025	WPP10	IC9250	TP2000
		YBC252	GC4025						WPP05	IC9015	
		YBC251	GC4225								
	P20	**YBC252**	GC4015	TN7015 TN7025	AC2000	UE6010	T9015	CR5025	WAP20	IC9250	TP2500
		YBC251	GC4215	KCP025 KC9125	AC900G	UE6020	T9025	CR7025	WPP20	IC9015	TP2000
		YBC351	GC4025	KC8050		UC6010				IC9025	
			GC4225							IC9350	
			LC25								
	P30	**YBC252**	GC4025	TN7025 TN7035	AC830P	UE6035	T9025	CR7025 PR630	WAP30	IC9350	TP2500
		YBC251	GC4225	KCP025 KC9140	AC3000	UH6400	T9035		WPP30	IC9025	TP3000
		YBC351	GC4035	KC8050		US735					
			GC4235								
	P40	**YBC351**	GC4035	KC9145	AC830P	UE6035	T9035	PR660	WAP30	IC9350	TP3000
			GC4235		AC3000	UH6400			WPP30		
						US735					
Stainless Steel · Rostfreier Stahl	M10	**YBM151**	GC2015		AC610M	US7020	T6020	CA6015 PR915	WAM10	IC9250	TP200
	M20	**YBM151**	GC2015	TN7025 TN7035	AC610M	US7020	T6020	CA6015 PR930	WAM20	IC9350	TP200
		YBM251	GC2025	TN8025 KC9225	AC630M					IC9025	TP3000
											TP400
	M30	**YBM351**	GC2025	TN7025 TN7035	AC630M	US735	T6030	PR660	WAM20	IC9350	TP3000
			GC2035	TN8025 KC8050						IC9025	TP400
			GC235	KC9225							
	M40	**YBM351**	GC2035	KC9240	AC630M	US735		PR660			TP3000
			GC235		AC3000						
Cast iron · Guss	K01	**YBD052**	GC3005	TN5015	AC410K	UC5005	T5010	CA4115 CA4010	WAK10		
		YBD102	GC3205			UC5105					
		YBD151	GC3210			UC5015					
						UC5115					
	K10	**YBD052**	GC3005	TN5015 KC9315	AC410K	UC5005	T5010	CR4010	WAK10	IC428	TK1000
		YBD102	GC3205		AC700G	UC5105	T5020	CR7015 PR610	WAK20	IC 4028	TK2000
		YBD151	GC3210			UC5015				IC9150	TP1000
		YBD152	GC3015			UC5115				IC9007	
			GC3215								
	K20	**YBD151**	GC3210	TN5015 KC9320	AC900G	UC5015	T5020	CA4120	WAK20	IC428	TK2000
		YBD152	GC3215	KC9325 KC8050		UC5115				IC 4028	TP200
		YBD252								IC9150	TP1000
										IC9007	
	K30	**YBD252**		KC8050					WAK30		

Coated Cemeted Carbide PVD · beschichtetes Hartmetall PVD

ISO		ZCC CT	Sandvik	Kennametal	Sumitomo	Mitsubishi	Toshiba Tungaloy	Kyocera	Walter	Kyocera	Iscar	SECO
Steel · Stahl	P	P01	GC1005					PR915		PR915		
		P10	**YBG102**	GC1525 GC1025	KC5010		VP15TF	AH710	PR930		IC507 IC570 IC907 IC908	
		P20	**YBG202** **YBG205** **YBG201**	GC1525 GC1025	KC5010	AC530U ACZ310	VP15TF VP20MF	AH710	PR930	PR930	IC507 IC570 IC907 IC908	CP250 CP500
		P30	**YBG302**	GC1025 GC2035	KC5025	AC530U	VP20MF UP20M	GH330 GH730 AH330 AH120 AH740	PR660	PR660	IC3028	CP250 CP500 CP600
		P40		GC2035			UP20M	AH120			IC3028	CP600
Stainless Steel · Rostfreier Stahl	M	M10	**YBG102**	GC1005 GC1105 GC1525	KC5010	AC530U	VP15TF		PR660	PR660	IC507 IC520 IC570 IC907 IC908	CP200
		M20	**YBG202** **YBG205** **YBG201**	GC1025 GC1105	KC5010	AC530U	VP15TF VP20MF	GH330 GH730	PR660	PR660	IC507 IC907 IC908 IC3028	CP200 CP250 CP500
		M30	**YBG302**	GC2035	KC5025 KC9245		VP20MF UP20M	AH120		WSM30	IC3028 IC908	CP250 CP500 CP600
		M40		GC2035	KC9245		UP20M	AH140		WSM30		CP600
Cast Iron · Guss	K	K01		GC1005				AH110				
		K10	**YBG102**	GC1005	KC5010		VP15TF	GH110 AH110	PR610	PR610	IC8028	CP200
		K20	**YBG202** **YBG205**		KC5025		VP15TF	AH120			IC908 IC8028	CP200 CP250 CP500
		K30	**YBG302**				VP15TF				IC908	CP500
Heat resist. super all. & Ti-alloys Warmf. Legi. & Ti-Legierung	S	S01		GC1005			VP05RT	AH110				
		S10	**YBG102** **YBG202** **YBG205**	GC1005 GC1105 GC1025	KC5010 TN6010	AC510U EH510Z	VP05RT VP10RT	AH120			IC507 IC907	CP250
		S20	**YBG202** **YBG205**	GC1105 GC1025	KC5010 KC5025 TN6010 TN6025	AC520U EH520Z	VP10RT VP15TF				IC507 IC907 IC3028	CP250 CP600
		S30	**YBG302**		KC9245		VP15TF				IC3028	CP250 CP600
Nonferrite Mat. Ne-metalle	N	N01		CD1810 CD10		DL1000		GH110				
		N10	**YBG102**	CD1810 CD10	KC5410	DL1000				WXN10		
		N20			KC5410							

1

175.32-22 A90
175.32-24 A90
175.32-25 A90
175.32-28 A90

A

APKT-KM B156
APKT-LH B154
APKT-PF B154
APKT-PM B154
APKT-PR B154
APMT_PDER B155
APMT_PDR B155

C

CCGT-SF A92
CCGT-USF A92
CCGW A127
CCGX-LC A94
CCGX-LH A94
CCMT A131
CCMT-EF A93
CCMT-EM A93
CCMT-HF A93
CCMT-HM A93
CCMT-HR A94
CCMW A94
CNEG-NF A55
CNGA A122
CNGA A142
CNGN A143
CNGX A144
CNMA A59
CNMG A59
CNMG-DF A54
CNMG-DM A56
CNMG-DR A57
CNMG-EF A54
CNMG-EM A56
CNMG-ER A58
CNMG-NM A57
CNMG-PM A55
CNMG-SF A54
CNMG-WG A54
CNMM A60
CNMM-DR A58
CNMM-ER A58
CNMM-HDR A58
CPGT A92
CPGT-SF A95
CPGW A95

D

DCGT-SF A96
DCGT-USF A96
DCGW A128
DCGX-LC A94
DCGX-LH A94
DCMT A133
DCMT-EF A97
DCMT-EM A97
DCMT-HF A96
DCMT-HM A97
DCMT-HR A98
DCMW A98
DNEG-NF A62
DNGA A123
DNGA A144
DNGN A145
DNGX A145
DNMA A65
DNMG A66
DNMG-DF A61
DNMG-DM A63
DNMG-DR A64
DNMG-EF A62
DNMG-EM A64
DNMG-ER A66
DNMG-FM A62
DNMG-NM A64
DNMG-PM A62-A63
DNMG-SF A61
DNMM-DR A66
DNMM-ER A66
DNMM-HDR A66
DNMX-WG A61
DPGT-SF A99
DPGT-USF A99
DPMW A99

H

HNEX-DF B46
HNEX-DM B46
HNEX-DR B46

K

KNUX A89

L

LNCX B159
LNE32.53 B158
LNKT-ZR B158
LT****N-A(G) A313
LT****N-BSPT A316
LT****N-GM A312
LT****N-NPT A317
LT****N-UN A315
LT****N-W A314
LT****W-A(G) A313
LT****W-BSPT A316
LT****W-GM A311
LT****W-NPT A317
LT****W-UN A315
LT****W-W A314

M

MPHT B159

O

OFKR-DF B160
OFKR-DM B160
OFKT-DF B160
OFKT-DM B160
OFKT-LH B160
ONHU-PF B161
ONHU-PM B161
ONHU-W B161

P

PNEG-CR B162
PNEG-CM B162

R

RCGT A100
RCGX-LH A100
RCKT-DM B165
RCKT-DR B165
RCMT A100
RCMX A101
RDKW B165
RNGN A150
RNMG A88
ROHX B166

RT****N-A(G) A313
RT****N-A(G)B A328
RT****N-AC A322
RT****N-AP A324
RT****N-BSPT A316
RT****N-BSPTB A331
RT****N-BUT A326
RT****N-GM A312
RT****N-GMB A327
RT****N-NPT A317
RT****N-NPTB A332
RT****N-NPTF A318
RT****N-R A319
RT****N-RD A325
RT****N-STAC A323
RT****N-TR A321
RT****N-UN A315
RT****N-UNB A330
RT****N-W A314
RT****N-WB A329
RT****W-A(G) A313
RT****W-A(G)B A328
RT****W-AC A322
RT****W-AP A324
RT****W-BSPT A316
RT****W-BSPTB A331
RT****W-BUT A326
RT****W-GM A311
RT****W-GMB A327
RT****W-MJ A320
RT****W-NPT A317
RT****W-NPTB A332
RT****W-NPTF A318
RT****W-R A319
RT****W-RD A325
RT****W-STAC A323
RT****W-TR A321
RT****W-UN A315
RT****W-UNB A330
RT****W-UNJ A320
RT****W-W A314
RT****W-WB A329

S

SCGX-LC A103
SCGX-LH A103
SCMT A103
SCMT-EF A102
SCMT-EM A102
SCMT-HF A102
SCMT-HM A102
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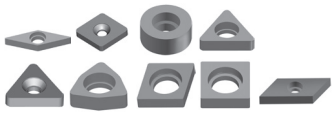
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			CM*x*A/B	CM* x *C	SM* x *	I*M x *	GB*–*M*	DM* x *X	LE M* x *A	L* A	L* B	L* C	L* D	SP*	SPR *	P * *	TM x *	C * RD	C * RH	C* R * T	C* R C	C * AP	D * AP	S * AP	T * AP	V * AP	W * A P	C * BM	D * BM	S * BM	T * BM	S * BS	T * BS	P T* S	W T* P	W H* L	W *RL
D	DCLNR/L			✔										✔	✔				✔			✔												✔		
	DDJNR/L			✔										✔	✔				✔				✔												✔		
	DSBNR/L			✔										✔	✔				✔					✔											✔		
	DTGNR/L			✔										✔	✔				✔						✔										✔		
	DVVNN			✔										✔	✔				✔							✔									✔		
	DVJNR/L			✔										✔	✔				✔							✔									✔		
	DWLNR/L			✔										✔	✔				✔								✔								✔		
P	PCBNR/ L								✔		✔			✔							✔															✔	
	PCLNR/ L								✔		✔			✔							✔															✔	
	PDJNR/ L								✔		✔			✔								✔														✔	
	PDNNR/ L								✔		✔			✔								✔														✔	
	PSBNR/ L								✔		✔			✔										✔												✔	
	PSDNN								✔		✔			✔										✔												✔	
	PSKNR/ L								✔		✔			✔										✔												✔	
	PSSNR/ L								✔		✔			✔										✔												✔	
	PTFNR/ L								✔		✔			✔											✔											✔	
	PTTNR/ L								✔		✔			✔											✔											✔	
	PTGNR/ L								✔		✔			✔											✔											✔	
	PWLNR/ L								✔		✔			✔												✔										✔	
M	MCBNR/ L							✔									✔										✔								✔	
	MCLNR/ L							✔									✔										✔								✔	
	MDJNR/ L							✔									✔											✔							✔	
	MDPNN							✔									✔											✔							✔	
	MSBNR/ L							✔									✔												✔						✔	
	MSRNR/ L							✔									✔												✔						✔	

Clamping system Klemmsystem	Tool Type Werkzeug Typ	Page · Seite	Screw Schraube					Screw Schraube		Lever Kniehebel				Shim pin Rohrstift	Spring Feder	Clampin Stud Passstift		Clamp Pratze				Shim Unterlagen											Wrench Schlüssel			
			CM*x*A/B	CM* x *C	SM* x*	I*M x *	GB*--*M*	DM* x *X	LE M* x *A	L* A	L* B	L* C	L* D	SP*	SPR *	P**	TM x *	C * RD	C * RH	C* R * T	C* R C	C * BM	D * BM	S * BM	T * BM	V * BM	W * BM	R * BM	C * BS	D * BS	V * BS	V * BSC	S * BS	P T* S	W T* P	W H* L	W *RL
M	MSKNR/ L							✓									✓	✓						✓												✓	
	MSDNN							✓									✓	✓						✓												✓	
	MTGNR/ L							✓									✓	✓							✓											✓	
	MTJNR/ L							✓									✓	✓							✓											✓	
	MTFNR/ L							✓									✓	✓							✓											✓	
	MVVNN							✓									✓	✓								✓										✓	
	MVJNR/ L							✓									✓	✓								✓										✓	
	MWLNR/L							✓									✓	✓									✓									✓	
	MRGNR/L							✓									✓	✓										✓								✓	
	MRDNN							✓									✓	✓										✓								✓	
S	SCACR/ L				✓																														✓	
	SCLCR/ L			✓	✓																								✓					✓	✓	
	SDACR/ L			✓	✓																									✓				✓	✓	
	SDJCR/ L			✓	✓																									✓				✓	✓	
	SDNCN			✓	✓																									✓				✓	✓	
	SVJBR/ L			✓	✓																										✓			✓	✓	
	SVABR/ L			✓	✓																										✓			✓	✓	
	SVVBN			✓	✓																										✓			✓	✓	
	SVVCN			✓	✓																											✓		✓	✓	
	SVJCR/ L			✓	✓																											✓		✓	✓	
	SSBCR/ L			✓	✓																												✓	✓	✓	
	SSDCN			✓	✓																												✓	✓	✓	
	SSKCR/ L			✓	✓																												✓	✓	✓	
	SSSCR/ L			✓	✓																												✓	✓	✓	
	STACR/ L				✓																														✓	

Clamping system Klemmsystem	Tool Type Werkzeug Typ	Page · Seite	Screw Schraube					Screw Schraube		Lever Kniehebel				Shim pin Rohrstift	Spring Feder	Clampin Stud Passstift		Clamp Pratze			Shim Unterlagen											Wrench Schlüssel		
			CM*x*A/B	CM* x *C	SM* x*	l*M x *	GB*-*M*	DM* x *X	LE M* x *A	L* A	L* B	L* C	L* D	SP*	SPR *	P * *	TM x *	C * RD	C * RH	C* R * T	C* R C	C * BS	D * BS	V * BS	S * BS	T * BS	R * BS	K*CC	C*CC	T*CC	D*CC	S*CC	R*CC	P T* S	W T* P	W H* L	W *RL
S	STFCR/ L				✓	✓																			✓									✓	✓	
	STGCR/ L				✓	✓																			✓									✓	✓	
	STTCR/ L				✓	✓																			✓									✓	✓	
	SWACR/L					✓																													✓	
	SRDCN				✓	✓																				✓								✓	✓	
	SRGCR/ L				✓	✓																				✓								✓	✓	
C	CKJNR/ L		✓		✓										✓	✓				✓							✓								✓	
	CKNNR/ L		✓		✓										✓	✓				✓							✓								✓	
	CCLNR/ L			✓	✓										✓														✓						✓	
	CTJNR/ L			✓	✓										✓															✓					✓	
	CTUNR/ L			✓	✓										✓															✓					✓	
	CDJNR/ L			✓	✓										✓																✓				✓	
	CSRNR/ L			✓	✓										✓																	✓			✓	
	CSKNR/ L			✓	✓										✓																	✓			✓	
	CSDNN			✓	✓										✓																	✓			✓	
	CRDNN			✓	✓										✓																		✓		✓	
J	JCLNR/ L			✓	✓										✓														✓						✓	
	JDJNR/ L			✓	✓										✓																✓				✓	
	JSDNN			✓	✓										✓																	✓			✓	

Clamping system Klemmsystem	Tool Type Werkzeug Typ	Page · Seite	Screw Schraube					Screw Schraube		Lever Kniehebel				Shim pin Rohrstift	Spring Feder	Clampin Stud Passstift		Clamp Pratze				Shim Unterlagen												Wrench Schlüssel			
			CM*x*A/B	CM* x *C	SM* x*	l*M x *	GB*-.*M*	DM* x *X	LE M* x *A	L* A	L* B	L* C	L* D	SP*	SPR *	P * *	TM x *	C * RD	C * RH	C* R * T	C* R C	C * BS	D * BS	V * BS	S * BS	T * BS	R * BS	T*CC	C*AP	D*AP	S*APB	T*APB	W*APB	P T* S	W T* P	W H* L	W *RL
P	PCLNR/L								✔	✔		✔		✔															✔						✔	
	PDSNR/L								✔		✔			✔																✔					✔	
	PDUNR/L								✔				✔	✔																✔					✔	
	PSKNR/L								✔		✔			✔																	✔				✔	
	PTFNR/L								✔		✔			✔																		✔			✔	
	PWLNR/L								✔	✔	✔			✔																			✔		✔	
S	SCLCR/L				✔	✔																✔												✔	✔	
	SDQCR/L					✔																													✔		
	SDUCR/L					✔																													✔		
	SDZCR/L				✔	✔																	✔												✔	✔	
	SSKCR/L				✔	✔																			✔										✔	✔	
	STFCR/L				✔	✔																				✔									✔	✔	
	SVQCR/L					✔																													✔		
	SVUCR/L					✔																													✔		
	SVQBR/L				✔	✔																		✔											✔	✔	
	SVUBR/L				✔	✔																		✔											✔	✔	
	SCLPR/L					✔																													✔		
	SDQPR/L					✔																													✔		
	SDUPR/L					✔																													✔		
	STUPR/L					✔																													✔		
	SCFCR					✔																													✔		
	SCLCR					✔																													✔		
S	SCLPR/L					✔																													✔		
	SDQPR/L					✔																													✔		
	SDUPR/L					✔																													✔		
	STUPR/L					✔																													✔		
	SVQCR/L					✔																													✔		
	SVUCR/L					✔																													✔		

Clamping system Klemmsystem	Tool Type Werkzeug Typ	Page · Seite	Screw Schraube					Screw Schraube		Lever Kniehebel				Shim pin Rohrstift	Spring Feder	Clampin Stud Passstift		Clamp Pratze				Shim Unterlagen											Wrench Schlüssel			
			CM*x*A/B	CM* x *C	SM* x*	I*M x *	GB*–*M*	DM* x *X	LE M* x *A	L* A	L* B	L* C	L* D	SP*	SPR *	P * *	TM x *	C * RD	C * RH	C* R * T	C* R C	MT*-*M	D * BS	V * BS	S * BS	T * BS	R * BS	K*CC	C*CC	T*CC	D*CC	S*CC	R*CC	P T* S	W T* P	W H* L	W *RL
	QE*D QE*S						✔																											✔	
	QECD						✔																											✔	
	QX*D						✔																											✔	
	QE*S						✔																											✔	
	QE*S*N																																		
	QZS*						✔																											✔	
	QFFD R/L QFGD R/L						✔																											✔	
	QF*D R/L QF*S R/L						✔																											✔	
	QFFD*RR QFQD*RR						✔																											✔	
	QF*D RR QF*S RR						✔																											✔	
	QFFD LL QFGD LL						✔																											✔	
	QF*D LL QF*S LL						✔																											✔	
	QFFD R/L -L QFGD R/L-L						✔																											✔	
	QFHD R/L QFHS R/L QFKD R/L						✔																											✔	
	C*-Q*DR/L						✔																											✔	
	C*X-Q*DR/L						✔																											✔	
	QZQ						✔																											✔	
	GQCR/L					✔																											✔		
	S*-QC*R/L					✔																											✔		
	C*-QZS						✔											✔																✔	
	QZS*						✔											✔																✔	
	SWR/L				✔	✔																✔											✔		
	SNR/L				✔	✔																✔											✔		
	SWR*16B				✔	✔																✔											✔		
	SNR*16B				✔	✔																✔											✔		

Clamping system Klemmsystem	Tool Type Werkzeug Typ	Page Seite	Screw Schraube				Screw Schraube		Wedge Keil		Shim Unterlagen		Clamp Pratze	Cassette Kassette						Wrench Schlüssel			
			SM* x*XA	I*M * x *	GB*-*M*	LO M* x *	DM* x *X	WM*x*	W*R/L	W*N	LLN*R-ZR	S * BS	WD * *	LSE*R/L	LOF*R/L	LSP*R/L	LTP*R/L	WD-*	CBH*R*	W T * IS	W T * P	W H * L	W T * T
	FMA01		✔	✔								✔								✔		✔	
	FMA02			✔																✔			
	FMA03					✔	✔		✔					✔							✔	✔	
	FMA04			✔																✔			
	FMA04					✔	✔		✔						✔						✔	✔	
	FMA07			✔																✔			✔
	FMA07			✔																✔			✔
	FMD02			✔																✔			
	FMD02						✔			✔													✔
	FMD03			✔							✔									✔			✔
	FME02			✔																✔			
	FME03					✔		✔	✔							✔							✔
	FME04			✔							✔									✔			
	FMP01					✔		✔	✔								✔			✔			
	FMP02		✔	✔								✔								✔		✔	

Clamping system Klemmsystem	Tool Type Werkzeug Typ	Page Seite	Screw Schraube				Screw Schraube		Wedge Keil		Shim Unterlagen		Clamp Pratze	Cassette Kassette						Wrench Schlüssel			
			SM* x*XA	I*M * x *	GB*--*M*	LO M* x *	DM* x *X	WM*x*	W*R/L	W*N	LLN*R-ZR	S * BS	WD * *	LSE*R/L	LOF*R/L	LSP*R/L	LTP*R/L	WD-*	CBH*R*	W T * IS	W T * P	W H * L	W T * T
	FMP03			✔							✔									✔			✔
	FMR01			✔																✔			
	FMR02			✔																✔			✔
	FMR03			✔																	✔		
	FMR04			✔									✔								✔		✔
	EMP01			✔																	✔		✔
	EMP02			✔																✔			
	EMP03			✔																✔			
	EMP04			✔																✔			
	EMP05			✔																	✔		
	BMR01			✔																✔	✔		
	BMR02			✔																✔			
	BMR03			✔														✔	✔	✔	✔		✔
	BMR04			✔																	✔		✔
	SMP01			✔																✔			

Clamping system Klemmsystem	Tool Type Werkzeug Typ	Page Seite	Screw Schraube				Screw Schraube		Wedge Keil		Shim Unterlagen		Clamp Pratze	Cassette Kassette						Wrench Schlüssel			
			SM* x*XA	I*M * x *	GB*--*M*	LO M* x *	DM* x *X	WM*x*	W*R/L	W*N	LLN*R-ZR	S * BS	WD * *	LSE*R/L	LOF*R/L	LSP*R/L	LTP*R/L	WD-*	CBH*R*	W T * IS	W T * P	W H * L	W T * T
	SMP03			✔																✔	✔		
	FME03																						
	XMR01			✔																	✔		
	TMP01			✔									✔							✔			✔
	HMP01			✔																✔			
	HMP01 EC			✔	✔															✔		✔	
	CMZ01			✔																✔			
	CMA01			✔																✔			
	CMD01			✔																✔			

Test Report
Versuchsprotokoll

Date

ZCC Cutting Tools Europe GmbH

General	Allgemein	End User / Anwender	Distributor / Händler
Company	Firma		
Contact person	Gesprächspartner		

Machine	Maschine		
Type	Typ		
Producer	Hersteller		
Power (kW)	Leistung (kW)		
Adaptor/Tooling System	Werkzeugaufnahme		
Workpiece	**Werkstück**		
Material	Werkstoff		
Hardness/Tensile Strength	Härte / Zugfestigkeit N/mm²		
Heattreatment/Surface	Wärmebeh./Oberfläche		
Interrupt cutting	Schnittunterbrechungen		

Cutting tools	Werkzeug				
Producer/Supplier	Hersteller (Halter)				
Toolholder/Milling body	Halter Bezeichnung				
Teeth Z	Zähnezahl Z				
Producer/Supplier	Hersteller(Werkzeug)				
Inserts type/Tool Nr.	Platten-Typ/Werkzeug Nr.				
Grade	Schneidstoff Sorte				
Solid carbide tools art	Vollhartmetallwerkzeug Nr.				
Cooling	Kühlmittel int./ext.				
Cutting Data	**Schnittdaten**				
RPM n=U/min	Drehzahl n=U/min				
Cutting speed Vc=m/min	Schnittgeschw. Vc=m/min				
Feed rate f=mm/r	Vorschub f=mm/U				
Feed rate. Vf=mm/min	Vorschubgeschw. Vf=mm/min				
Depth of cut a_p mm	Schnitttiefe a_p mm				
Depth of cut a_e mm	Schnittbreite a_e mm				
Machining length mm	Eingriffslänge mm				
Cutting time T min	Eingriffszeit T min				
Results	**Ergebnis**				
Machined pieces/Edge	Anzahl Werkst. / Schneidkante				
Surface quality	Oberfläche Werkstück				
Flankwear VB	Freiflächenverschleiß VB				
Criteria	Kriterium				
Notch Wear	Kerbverschleiß				
Crater Wear	Kolkverschleiß				
Plastic deformation	Plastische Verformung				
Built-up edge	Aufbauschneidenbildung				
Insert breakage	Plattenbruch				
Cutting edge breakage	Schneidkantenbruch				

Chipforms **Spanformen**

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○ ○ ○ ○

Conclusion / Zusammenfassung

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Sign / Unterschrift .....

NOTIZEN:

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