

- Different tool holders in carbide and steel are available for the QCH-SERIES
- Carbide tool holder reduces vibrations and performs very well in high feed operations and in operations where a big overhang is required.
- All exchangeable heads are available with inner coolant hole (except QCH-ZOHX)
- Different connection are available (M8,M10,M12,M16)

- Verschiede Verlängerungen in Stahl oder Hartmetall sind für die QCH-SERIE verfügbar.
- HM- Verlängerung reduziert Vibrationen und steigert die Performance bei hohen Vorschüben und Anwendungen in denen große Auskraglängen benötigt werden.
- Alle Austauschköpfe sind für die Anwendung mit Innenkühlung ausgelegt (ausgenommen QCH-ZOHX)
- Verschiedene Gewindeanschlüsse sind verfügbar (M8,M10,M12,M16)

QCH SERIES

QCH SERIE



Advantages Vorteile

- Fast tool change reduces setup times
 - Stable force type connection
 - Reduces storage costs
 - Increases flexibility in your machining shop
- Schneller Werkzeugwechsel reduziert Rüstzeit und somit Maschinenstillstand.
 - Stabile Kraftschlussverbindung
 - Verringerung der Lagerkosten
 - Erhöht die Flexibilität in der Fertigung



Areas of Application

**Mold and Die
Automotive Industry
Energy Sector
Aerospace Industry**

Anwendungsgebiete

**Werkzeuge und Formenbau
Automotive
Energiesektor
Luft- & Raumfahrt**

Overview QCH milling program Übersicht QCH Fräswerkzeug

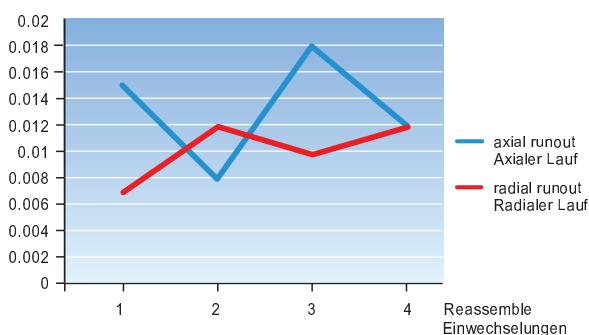


Reassembling with high precision Hohe Wechselgenauigkeit



Test radial runout and axial runout with 2 measuring devices.

Vermessung des axialen und radialen Laufs mit 2 Feinzeigern.



After several times reassembling, the difference between axial- and radial runout is less than 0.02mm

Nach mehreren Auswechselungen ist die Abweichung im radialeb sowie axialen Lauf nur sehr gering (<0.02mm)

Efficient tool Charging
Effizientes Werkzeugwechseln

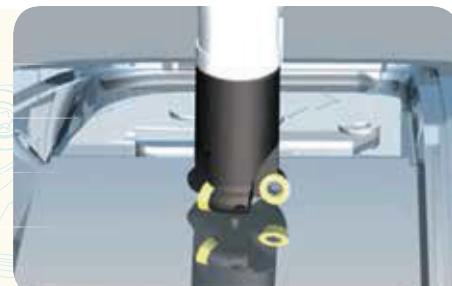
QCH Tools Repalcement
QCH Werkzeugwechsel

Traditional Repalcement
Traditionelles Auswechseln

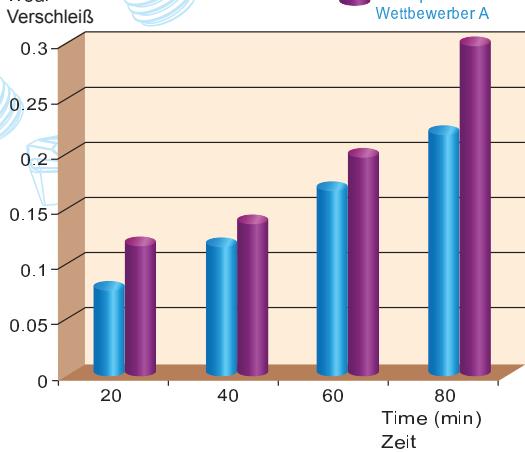


Material Material	1Cr12Ni2MoVNNb-5
Cooling system Kühlsystem	dry cutting trocken
Machine Maschine	CNC (HSK63 adapter)
Cutting data Schnittdaten	$V_c=150\text{m/min}$ $a_p=2\text{mm}$ $f_z=0.2\text{mm/z}$ $a_e=3\text{mm}$
Machining Bearbeitung	bottom and sidewall Grund- und Sietenfläche

Wear
Verschleiß



zcc-ct
Competitor A
Wettbewerber A



Wear comparision
Verschleißvergleich



zcc-ct

Competitor A
Wettbewerber A

after 80 min. profile milling
nach 80 Min. Formfräsen

QCH - XPHT



P M K

B

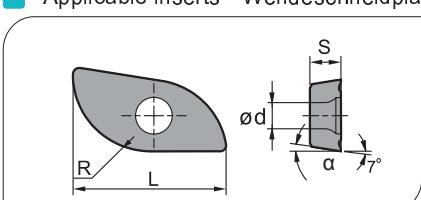
Type Typ	Stock Lager	Dimensions (mm) Abmessungen					Insert WSP	No. of teeth Zähne	Weight Gewicht (kg)	
		ØD	ØD1	L	ap	MD				
QCH	-16-XPHT16-M10	●	16	17	28	16	10	XPHT16R0803-GM	2	0.036
	-20-XPHT20-M12	●	20	19	30	20	12	XPHT20R10T3-GM	2	0.051
	-25-XPHT25-M12	●	25	24	35	25	12	XPHT25R1204-GM	2	0.071
	-30-XPHT30-M16	●	30	29	45	30	16	XPHT30R1506-GM	2	0.140
	-32-XPHT32-M16	●	32	30	45	32	16	XPHT32R1606-GM	2	0.162

Spare parts · Ersatzteile

Diameter Durchmesser Ø D	Screw Schraube	Wrench Schlüssel				WT20IT	
Ø16	I60M2.5x6.5	WT07P	--	--	--		
Ø20	I60M3.5x8TT	WT10IP	--	--	--		
Ø25	I60M4x10	--	WT15S	--	--		
Ø30	I60M5x13.2	--	--	--	--		
Ø32	I60M5x13.2	--	--	--	--	WT20IT	

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

Applicable inserts · Wendeschneidplatten



Workpiece Material Werkstoffe	P Steel Stahl	M Stainless Steel Rostfreier Stahl	K Cast Iron Gussisen	N Non-ferite material Ne Metalle	S Heat-resistant steel Wärmebest. Stahl									
	YBC301	YBC302	YBC401	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	Cermel Cermet	Carbide uncoat. Hartmetall
	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	●	●	●	●	●	●	●	●	●	●	●	●	●	●

Insert WSP	Type Typ	Dimensions (mm) Abmessungen					CVD Coating CVD Beschicht.				PVD Coating PVD Beschicht.			Cermel Cermet	Carbide uncoat. Hartmetall	
		L	Ød	R	S	α	YBC301	YBC302	YBC401	YBM251	YBM253	YBM351	YBD152	YBD252		
	XPHT16R0803-GM	16	3.1	8	3.18	9°									●	
	XPHT20R10T3-GM	20	4.0	10	3.97	9°									●	
	XPHT25R1204-GM	25	4.7	12.5	4.76	9°									●	
	XPHT30R1506-GM	30	5.8	15	6.35	11°									●	
	XPHT32R1606-GM	32	5.8	16	6.35	9°									●	

Applicable tool **B11-B18**
Werkzeug

Tools code key **B26-B27**
Werkzeug ISO

Grade selection guide **B19-B23**
Sortenauswahl

Technical data **B215-B220**
Technische Daten

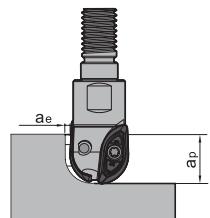
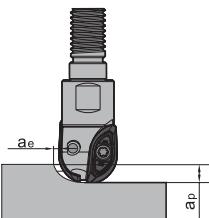
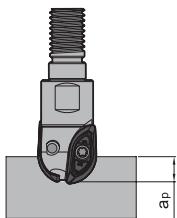
Milling · Fräsen

Indexable Milling Tools · Wendeplattenfräser

■ Recommended Cutting data · Schnittdaten

Diameter range
Durchmesser Bereich Ø16- Ø20

Operations
Anwendung



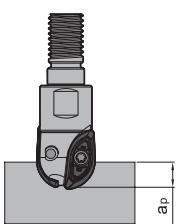
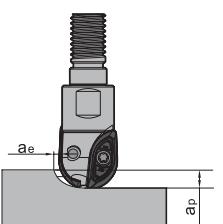
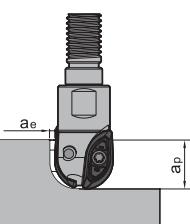
Workpiece material Werkstück-stoff	Cutting data Schnittdaten	Machining of slot Nutenfräsen	Side milling (slight) Schulterfräsen	Side milling (deep) Schulterfräsen	Grade Sorte
Medium carbon steel Kohlenstoffstahl Hardness Härtet 150~250HB	V(m/min)	150~220	150~220	150~220	150~220
	Fz(mm/z)	0.1~0.4	0.1~0.4	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 Härtet 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 Härtet 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 Härtet 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 Härtet 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 Kugelgraphitguss Hardness Härtet 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

YBG302

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

■ Recommended Cutting data · Schnittdaten

**Diameter range
Durchmesser Bereich Ø25, Ø30, Ø32**

Operations Anwendung					
Workpiece material Werkstück- stoff	Cutting data Schnittdaten	Machining of slot Nutenfräsen	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
	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 Grauguss 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 Kugelgraphitguss 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

YBG302

Applicable tool B11-B18
Werkzeug

Tools code key B26-B27
Werkzeug ISO

Grade selection guide B19-B23
Sortenauswahl

Technical data B215-B220
Technische Daten

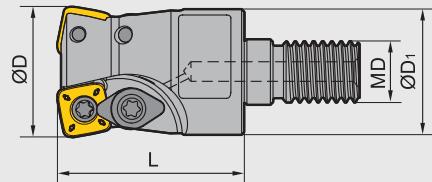
Milling · Fräsen

Indexable Milling Tools · Wendeplattenfräser

QCH - SDMT



P M K



Type Typ	Type Lager	Dimensions (mm) Abmessungen				Insert WSP	No. of teeth Zähne (Z)	Weight Gewicht (kg)	
		ØD	ØD1	L	MD				
QCH	-25-SDMT09-M12-02	●	25	24	35	12	SDMT09T312-DM	2	0.088
	-30-SDMT09-M16-03	●	30	29	45	16		3	0.176
	-32-SDMT12-M16-02	●	32	30	45	16	SDMT120412-DM	2	0.175
	-35-SDMT12-M16-02	●	35	30	45	16		2	0.200
	-35-SDMT09-M16-03	●	35	30	45	16	SDMT09T312-DM	3	0.216

■ Spare parts · Ersatzteile

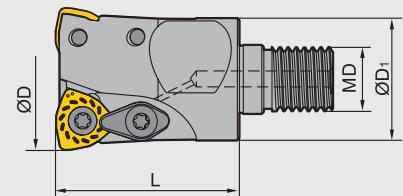
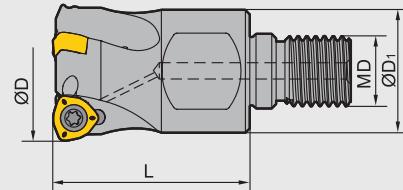
Diameter Durchmesser Ø D	No. of teeth Zähne (Z)	Clamp screw Schraube	Clamp Pratze	Insert Screw WSP-Schraube	Wrench Schlüssel	
						
Ø25	2	I60M3.5x08TT	WD-204	I60M4x8.4	WT10IP	
Ø30	3					
Ø32	2	I60M4x8.4	WD-204	I60M4x8.4	WT15IP	
Ø35	2					
Ø35	3	I60M3.5x08TT	WD-204	I60M4x8.4	WT10IP	

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



QCH - WPGT

P M K



Type Typ	Type Lager	Dimensions (mm) Abmessungen				Insert WSP	No. of teeth Zähne (Z)	Weight Gewicht (kg)	
		ØD	ØD1	L	MD				
QCH	-20-WPGT05-M10-02	●	20	18	30	10	WPGT050315ZSR	2	0.056
	-25-WPGT06-M12-02	●	25	21	35	12	WPGT060415ZSR	2	0.097
	-32-WPGT06-M16-03	●	32	29	43	16	WPGT060415ZSR	3	0.185
	-35-WPGT08-M16-02	●	35	30	45	16	WPGT080615ZSR	2	0.196
	-35-WPGT08-M16-03	●	35	30	45	16	WPGT080615ZSR	3	0.201
	-42-WPGT06-M16-04	●	42	29	43	16	WPGT060415ZSR	4	-

Spare parts · Ersatzteile

Diameter Durchmesser Ø D	No. of teeth Zähne (Z)	Clamp screw Schraube	Clamp Pratze	Wrench Schlüssel	
Ø20	2	I60M3.5x7	--	WT15	
Ø25	2	I60M4x8.4	--	WT15P	
Ø32	3	I60M4x8.4	--	WT15P	
Ø35	2	I60M5x13	WD-208	WT20IT	
Ø35	3	I60M4x8.4	--	WT15P	

Applicable tool B11-B18
Werkzeug

Tools code key B26-B27
Werkzeug ISO

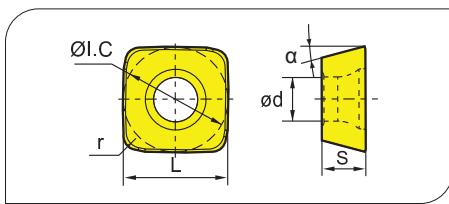
Grade selection guide B19-B23
Sortenauswahl

Technical data B215-B220
Technische Daten

Milling · Fräsen

Indexable Milling Tools · Wendeplattenfräser

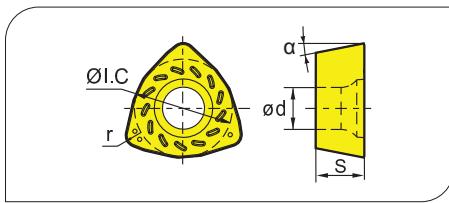
■ Applicable inserts · Wendeschneidplatten



Workpiece Material Werkstoffe	Ideal Machining Condition Gute Bearbeitungsbedingungen						Normal Machining Condition Normale Bearbeitungsbedingungen						Unfavorable Machining Condition Ungünstige Bearbeitungsbedingungen					
	P Steel Stahl	M Stainless Steel Rostfreier Stahl	K Cast iron Gusseisen	N Non-ferrite material Ne Metalle	S Heat-resistant steel Warmfester Stahl	P Steel Stahl	M Stainless Steel Rostfreier Stahl	K Cast iron Gusseisen	N Non-ferrite material Ne Metalle	S Heat-resistant steel Warmfester Stahl	P Steel Stahl	M Stainless Steel Rostfreier Stahl	K Cast iron Gusseisen	N Non-ferrite material Ne Metalle	S Heat-resistant steel Warmfester Stahl			
P Steel Stahl	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
M Stainless 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						CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet Cermet	Carbide un coat. unbe. Hartmetall
		ØI.C	L	ød	S	r	α	YBC301	YBC302	YBC401	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG352	YNG151
SDMT09T312-DM	9.525	9.525	4.0	3.97	1.2	15°		●						●	○	●	●	●			
	SDMT120412-DM	12.7	12.7	4.4	4.76	2.0	15°							●	○	●	●	●			
SDMT09T312-PM	9.525	9.525	1.2	3.97	4.0	15°		○			●					●	○				
	SDMT120412-PM	12.7	12.7	2.0	4.76	4.4	15°	○			●					●	○				

■ Applicable inserts · Wendeschneidplatten



Workpiece Material Werkstoffe	Ideal Machining Condition Gute Bearbeitungsbedingungen						Normal Machining Condition Normale Bearbeitungsbedingungen						Unfavorable Machining Condition Ungünstige Bearbeitungsbedingungen						
	P Steel Stahl	M Stainless Steel Rostfreier Stahl	K Cast iron Gusseisen	N Non-ferrite material Ne Metalle	S Heat-resistant steel Warmfester Stahl	P Steel Stahl	M Stainless Steel Rostfreier Stahl	K Cast iron Gusseisen	N Non-ferrite material Ne Metalle	S Heat-resistant steel Warmfester Stahl	P Steel Stahl	M Stainless Steel Rostfreier Stahl	K Cast iron Gusseisen	N Non-ferrite material Ne Metalle	S Heat-resistant steel Warmfester Stahl	P Steel Stahl	M Stainless Steel Rostfreier Stahl	K Cast iron Gusseisen	N Non-ferrite material Ne Metalle
P Steel Stahl	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
M Stainless 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						CVD Coating CVD Beschicht.						PVD Coating PVD Beschicht.						Cermet Cermet	Carbide un coat. unbe. Hartmetall
		ØI.C	r	S	ød	α	YBC301	YBC302	YBC401	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG352	YNG151	YNG151C
WPGT050315ZSR	7.94	1.5	3.5	4.0	11°		●					●									
	WPGT060415ZSR	9.525	1.5	4.2	4.4	11°		●				●									
WPGT080615ZSR	12.85	1.5	6.35	5.5	11°		●				●										
	WPGT090725ZSR	15	2.5	7	5.5	11°	●				●										
WPGT050315ZSR-PM	7.94	1.5	3.5	4.0	11°		●				○										
	WPGT060415ZSR-PM	9.525	1.5	4.2	4.4	11°	●				○										
WPGT080615ZSR-PM	12.85	1.5	6.35	5.5	11°		●				○										
	WPGT090725ZSR-PM	15.00	2.5	7.00	5.5	11°	●				○										

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

■ Recommended cutting data · Empfohlene Schnittdaten

Workpiece material Werkstück Material		Hardness HB Härte	Grade Sorte	V(m/min)	Ø25		Ø30/32/35	
					Axial cutting depth	f (mm/z)	Axial cutting depth	f (mm/z)
P	Low-carbon steel Soft steel Niedrig legierter Kohlenstoffstahl Baustahl	≤HB180 HB180-280	YBC302/YBM351	170(120-220) 150(100-200)	0.6~1.0	0.8~1.2	0.8~1.2	1.0~1.4
	Hoch-carbon steel; Alloysteel Hoch Leg. Kohlenstoffstahl; Leg. Stahl	HB280-350 ≤HB350	YBC302/YBM351	130(80-180)	0.4~0.8	0.8~1.2	0.6~1.0	1.0~1.4
	Alloy tool steel Leg. Stahl	≤HRC35	YBC302/YBM351	120(80-160)	0.4~0.8	0.6~1.0	0.6~1.0	0.8~1.2
M	Stainless steel Rostfreier Stahl	≤HB270	YBM351	120(80-160)	0.6~1.0	0.6~1.0	0.8~1.2	0.8~1.2
			YBG205	120(80-190)				
K	Cast iron Gusseisen	Tensile strength Zugfestigkeit ≤350MPa	YBG302	150(100-200)	0.6~1.0	1.0~1.4	0.8~1.2	1.2~1.6
	Nodular cast iron Kugelgraphitguss Temperguss	Tensile strength Zugfestigkeit ≤800MPa	YBG302	120(80-160)	0.4~0.8	0.8~1.2	0.6~1.0	1.0~1.4

B

Milling Tools
Fräser

Applicable tool **B11-B18**
Werkzeug

Tools code key **B26-B27**
Werkzeug ISO

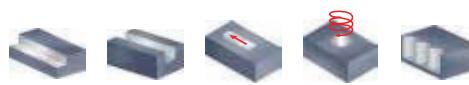
Grade selection guide **B19-B23**
Sortenauswahl

Technical data **B215-B220**
Technische Daten

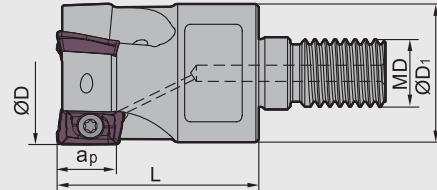
Milling · Fräsen

Indexable Milling Tools · Wendeplattenfräser

QCH - APKT



P M K N



Type Typ	Stock Lager	Dimensions (mm) Abmessungen					Insert WSP	No. of teeth Zähne (Z)	Weight Gewicht (kg)
		ØD	ØD1	L	ap	MD			
QCH	-16-APKT11-M8-02	●	16	12.5	25	10.5	APKT11T3**	2	0.028
	-20-APKT11-M10-03	●	20	18	30	10.5		3	0.059
	-25-APKT11-M12-04	●	25	21	35	10.5		4	0.104
	-32-APKT11-M16-05	●	32	29	43	10.5		5	-
	-40-APKT11-M16-06	●	40	29	43	10.5		6	-
	-25-APKT16-M12-02	●	25	21	38	10.5		2	0.090
	-32-APKT16-M16-03	●	32	29	46	10.5		3	-
	-40-APKT16-M16-04	●	40	29	46	10.5		4	-

Spare parts · Ersatzteile

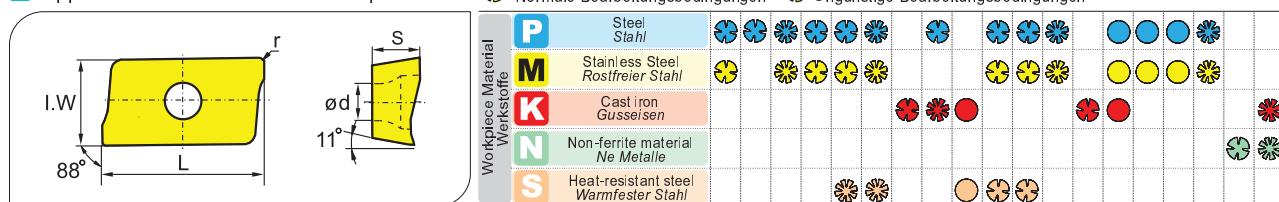
Diameter Durchmesser Ø D	No. of teeth Zähne (Z)	Insert Screw Schraube		Wrench Schlüssel		
				WT08IP	WT15IP	
Ø16	2					
Ø20	3	I60M2.5×6.5T				
Ø25	3					
Ø25	2	I60M4×8.4				
Ø30	3					

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

Milling · Fräsen

Indexable Milling Tools · Wendeplattenfräser

Applicable inserts · Wendeschneidplatten



Insert shape Plattenform	Type Typ	Dimensions (mm) Abmessungen					CVD Coating CVD Beschicht.			PVD Coating PVD Beschicht.			Cermel Cermel	Carbide uncoat. unbe. Hartmetall											
		L	I.W	S	d	r	YBC301	YBC302	YBC401	YBM251	YBM253	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	YC30S	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																●	●		

Applicable tool B11-B18
Werkzeug

Tools code key B26-B27
Werkzeug ISO

Grade selection guide B19-B23
Sortenauswahl

Technical data B215-B220
Technische Daten

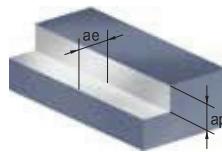
Milling · Fräsen

Indexable Milling Tools · Wendeplattenfräser

■ 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

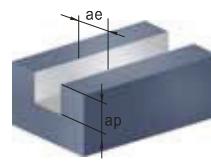


■ Recommended cutting data · Empfohlene Schnittdaten

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	Al alloy Al Leg.	----	YD101	300-		0.2 (0.08-0.4)		≤0.5D
			YD201	300-		0.2 (0.08-0.4)		≤0.5D

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

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)			ae(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	----	YD101	300-	0.2 (0.08-0.3)			D
	Al Leg.	----	YD201	300-	0.2 (0.08-0.3)			D

B

Milling Tools
Fräser

Applicable tool B11-B18
Werkzeug

Tools code key B26-B27
Werkzeug ISO

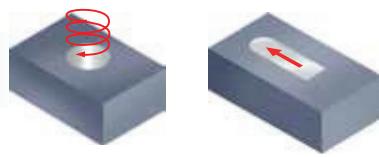
Grade selection guide B19-B23
Sortenauswahl

Technical data B215-B220
Technische Daten

Milling · Fräsen

Indexable Milling Tools · Wendeplattenfräser

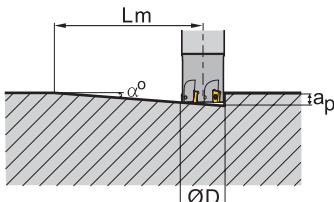
3 Ramp milling, helical interpolation milling 3 Tauchfräsen, Spiral Interpolationsfräsen



■ Recommended cutting data · Empfohlene Schnittdaten

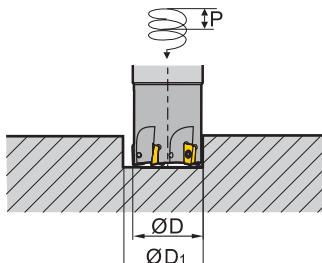
Diameter Durchmesser Ø D (mm)	APKT Ramp milling, helical interpolation milling (Inserts—11) APKT Tauchfräsen, Spiral-Interpolationsfräsen				
	Ramp milling Tauchfräsen		Helical interpolation milling Spiral-Interpolationsfräsen		
	Max. cutting depth Schnitttiefe a_p(mm)	Max. ramp angle Eintauchwinkel 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

● Ramp milling Tauchfräsen

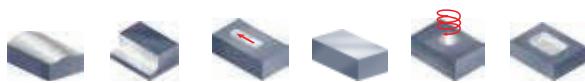


$$L_m = \frac{a_p}{\tan \alpha} \quad (\alpha: \text{Maximum ramp angle})$$

● Helical interpolation milling Spiral-Interpolationsfräsen

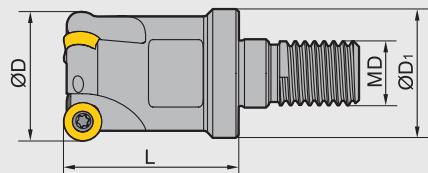


$$\tan \alpha = \frac{P}{\pi D_1} \quad (\alpha: \text{helical angle})$$



QCH - RD

P M K



Type Typ	Stock Lager	Dimensions (mm) Abmessungen				Insert WSP	No. of teeth Zähne (Z)	Weight Gewicht (kg)	Coolant Kühlung
		ØD	ØD ₁	L	MD				
QCH	-16-RDKW0702-M8-02	●	16	15	25	8	RDKW0702MO	2	Internal cooling Innen Kühlung
	-16-RDKW0702-M8-03	●	16	15	25	8		3	
	-20-RDKW0702-M10-03	●	20	19	30	10		3	
	-25-RDKW0702-M12-03	●	25	24	35	12		3	
	-20-RDKW10T3-M10-02	●	20	19	30	10	RDKW10T3MO	2	
	-25-RDKW10T3-M12-02	●	25	24	35	12		2	
	-32-RDKW10T3-M16-03	●	32	30	45	16		3	
	-32-RDKW1605-M16-02	●	32	30	45	16	RDKW1605MO	2	
	-15-RDKW0702-M8-02	○	15	12.5	23	8	RDKW0702MO	2	Internal cooling Innen Kühlung
	-15-RDKW0702-M8-03	○	15	12.5	23	8		3	
	-20-RDKW0702-M10-04	○	20	18	30	10		4	
	-25-RDKW0702-M12-05	○	25	21	35	12		5	
	-20-RDKW1003-M10-02	○	20	18	30	10		2	
	-25-RDKW1003-M12-02	○	25	21	35	12		2	
	-25-RDKW1003-M12-03	○	25	21	35	12		3	
	-30-RDKW1003-M16-04	○	30	29	43	16	RDKW1003MO	4	Internal cooling Innen Kühlung
	-35-RDKW1003-M16-04	○	35	29	43	16		4	
	-42-RDKW1003-M16-05	○	42	29	43	16		5	
	-24-RDKW12T3-M12-02	○	24	21	35	12		2	
	-35-RDKW12T3-M16-03	○	35	29	43	16	RDKW12T3MO	3	
	-42-RDKW12T3-M16-04	○	42	29	43	16		4	
	-32-RDKW1604-M16-02	○	32	29	43	16	RDKW1604MO	2	

Spare parts · Ersatzteile

Insert Durchmesser Ø D	Insert Screw Schraube	Wrench Schlüssel		
RDKW0702MO	I60M2.5x5	WT07IP	--	
RDKW10T3MO	I60M4x8	WT15IP	--	
RDKW1003MO	I60M3.5x7.7	WT15	--	
RDKW12T3MO	I60M3.5x7.7	WT15	--	
RDKW1604MO	I60M4.5x10	WT20	--	
RDKW1605MO	I60M5x13	--	WT20IT	

Applicable tool B11-B18
Werkzeug

Tools code key B26-B27
Werkzeug ISO

Grade selection guide B19-B23
Sortenauswahl

Technical data B215-B220
Technische Daten

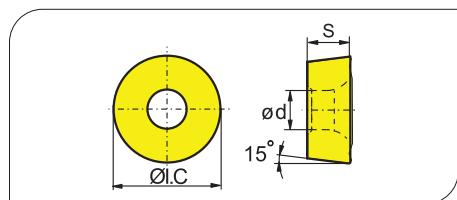
Milling · Fräsen

Indexable Milling Tools · Wendeplattenfräser

B

Milling Tools
Fräser

Applicable inserts · Wendeschneidplatten



Ideal Machining Condition
Gute Bearbeitungsbedingungen

Normal Machining Condition
Normale Bearbeitungsbedingungen

Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen

● Applicable inserts · Wendeschneidplatten

Workpiece Material Werkstück	P Steel Stahl	M Stainless Steel Rostfreier Stahl	K Cast iron Gusseisen	N Non-ferrite material Ne Metalle	S Heat-resistant steel Warmfester Stahl																
	YBC301	YBC302	YBC401	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	Cermet Cermet	Carbide uncoat. unbe. Hartmetall			
	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

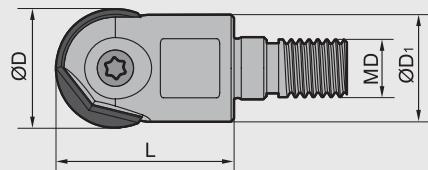
Workpiece material Werkstück Material	Hardness HB Härte	Grade Sorte	V(m/min)	f(mm/z)	a _{pmax} (mm)								
					RDKW07**		RDKW10**		RDKW12**		RDKW16**		
					a _z	a _p	a _z	a _p	a _z	a _p	a _z	a _p	
	Low-carbon steel Soft steel Niedrig legierter Kohlenstoffstahl Baustahl	≤180	YBM351 YBG302	220 (180-300)	0.25 (0.15-0.3)	1.6	3.5	2.3	5	3.3	6	3.9	8
			YBG202 YBM251	270 (200-360)	0.2 (0.1-0.3)	1.6	3.5	2.3	5	3.3	6	3.9	8
	Hoch-carbon steel; Alloysteel Hoch Leg. Kohlenstoffstahl; Leg. Stahl	180-280	YBM351 YBG302	200 (160-280)	0.25 (0.15-0.3)	1.6	3.5	2.3	5	3.3	6	3.9	8
			YBG202 YBM251	240 (180-350)	0.2 (0.1-0.3)	1.6	3.5	2.3	5	3.3	6	3.9	8
	Alloy tool steel Leg. Stahl	280-350	YBM351 YBG302	180 (150-250)	0.25 (0.15-0.3)	1.6	3.5	2.3	5	3.3	6	3.9	8
			YBG202 YBM251	220 (170-340)	0.2 (0.1-0.3)	1.6	3.5	2.3	5	3.3	6	3.9	8
	Stainless steel Rostfreier Stahl	≤270	YBM351 YBG302	150 (100-220)	0.25 (0.1~0.3)	1.6	3.5	2.3	5	3.3	6	3.9	8
			YBG202 YBM251	160 (110-270)	0.2 (0.1-0.3)	1.6	3.5	2.3	5	3.3	6	3.9	8
K	Cast iron Gusseisen	180-250	YBG202 YBM251	210 (120-300)	0.2 (0.1-0.3)	1.6	3.5	2.3	5	3.3	6	3.9	8

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

QCH - ZOHX



P M K N S



Type Typ	Stock Lager	Dimensions (mm) Abmessungen				Insert WSP	Weight Gewicht (kg)
		ØD	ØD ₁	L	MD		
QCH	-16-ZOHX16-M8	●	16	15	28	8	ZOHX1604-**
	-20-ZOHX20-M10	●	20	19	30	10	ZOHX2005-**
	-25-ZOHX25-M12	●	25	24	35	12	ZOHX2506-**
	-30-ZOHX30-M16	●	30	29	45	16	ZOHX3007-**
	-32-ZOHX32-M16	●	32	30	45	16	ZOHX3207-**

B

Milling Tools
Fräser

Spare parts · Ersatzteile

Diameter Durchmesser Ø D	Insert Screw Schraube	Wrench Schlüssel		
Ø16	I70M5x12TT	WT20IP	--	
Ø20	I70M5x16TT	WT20IP	--	
Ø25	I70M6x20TT	WT20IP	--	
Ø30	I70M8x25TT	--	WT30IT	
Ø32	I70M8x25TT	--	WT30IT	

Applicable tool B11-B18
Werkzeug

Tools code key B26-B27
Werkzeug ISO

Grade selection guide B19-B23
Sortenauswahl

Technical data B215-B220
Technische Daten

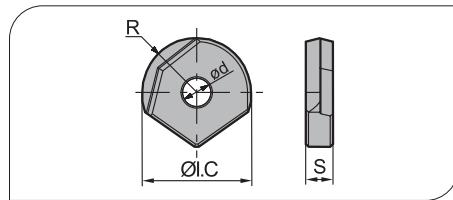
Milling · Fräsen

Indexable Milling Tools · Wendeplattenfräser

B

Milling Tools
Fräser

Applicable inserts · Wendeschneidplatten



Workpiece Material Werkstück Vereinfacht	P Steel Stahl	Ideal Machining Condition Gute Bearbeitungsbedingungen				Normal Machining Condition Normale Bearbeitungsbedingungen				Unfavorable Machining Condition Ungünstige Bearbeitungsbedingungen				Cermel Cermel	Carbide uncoat. unbe. Hartmetall
		ØI.C	ød	R	S	ØI.C	ød	R	S	ØI.C	ød	R	S		
	M Stainless 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				CVD Coating CVD Beschicht.				PVD Coating PVD Beschicht.				Cermel Cermel	Carbide uncoat. unbe. Hartmetall	
		ØI.C	ød	S	R	YBC301	YBC302	YBC401	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205
	ZOHX1604-GF	16	5	4	8										●	
	ZOHX2005-GF	20	5	5	10										●	
	ZOHX2506-GF	25	6	6	12.5										○	
	ZOHX3007-GF	30	8	7	15										●	
	ZOHX3207-GF	32	8	7	16										●	
	ZOHX1604-GM	16	5	4	8										●	
	ZOHX2005-GM	20	5	5	10										●	
	ZOHX2506-GM	25	6	6	12.5										○	
	ZOHX3007-GM	30	8	7	15										●	
	ZOHX3207-GM	32	8	7	16										●	

Recommended cutting data · Empfohlene Schnittdaten

Workpiece material Werkstück Material	Hardness HB Härte	Cutting data Sorte	Diameter (mm) Durchmesser ØD			Grade Sorte
			Ø16, Ø20	Ø25	Ø30, Ø32	
	Carbon steel Niedrig legierter Kohlenstoffstahl Baustahl	HB≤180	V _c (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 Hoch Leg. Kohlenstoffstahl; Leg. Stah	HB180~280	V _c (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 Leg. Stahl	HRC55~65	V _c (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
	Stainless steel Rostfreier Stahl	HB≤270	V _c (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
	Cast iron Gusseisen	HB180~250	V _c (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

Hard alloy toolholder · Hartmetall Verlängerung

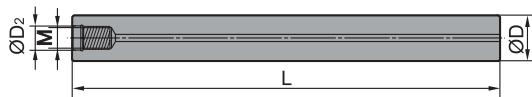


Fig 1

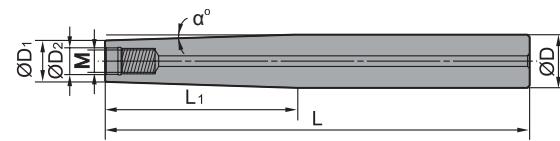


Fig 2

Type Typ	Stock Large	Flg	Dimensions (mm) Abmessungen						
			L	M	ØD ₂	ØD	ØD ₁	L ₁	α°
G16-QCH-M8-100C	○	1	100		8.5	16	--	--	--
G16-QCH-M8-150C	○		150			16	--	--	--
G20-QCH-M8-200C-ZJ90	○	2	200	M8		20	15.5	90	1.3°
G20-QCH-M8-250C-ZJ115	○		250			20	15.5	115	1°
G20-QCH-M8-300C-ZJ135	○		300			20	15.5	135	0.85°
G20-QCH-M10-100C	○	1	100	M10	10.5	20	--	--	--
G20-QCH-M10-150C	○		150			20	--	--	--
G20-QCH-M10-200C	○		200			20	20	--	--
G25-QCH-M10-200C-ZJ90	○	2	200	M10	10.5	25	19.8	90	1.6°
G25-QCH-M10-250C-ZJ115	○		250			25	19.8	115	1.25°
G25-QCH-M10-300C-ZJ135	○		300			25	19.8	135	1.1°
G25-QCH-M12-100C	○	1	100	M12	12.5	25	--	--	--
G25-QCH-M12-150C	○		150			25	--	--	--
G25-QCH-M12-200C	○		200			25	--	--	--
G25-QCH-M12-200C-ZJ90	○	2	200	M12	12.5	32	24.5	90	2.3°
G25-QCH-M12-250C-ZJ115	○		250			32	24.5	115	1.75°
G25-QCH-M12-300C-ZJ135	○		300			32	24.5	135	1.5°
G32-QCH-M16-150C	○	1	150	M16	17	32	--	--	--
G32-QCH-M16-200C	○		200			32	--	--	--
G32-QCH-M16-250C	○		250			32	--	--	--
G32-QCH-M16-300C	○	2	300	M16	17	32	--	--	--
G32-QCH-M16-200C-ZJ90	○		200			32	30	90	0.64°
G32-QCH-M16-250C-ZJ115	○		250			32	30	115	0.5°
G32-QCH-M16-300C-ZJ135	○		300			32	30	135	0.4°

B

Applicable tool
Werkzeug

B11-B18

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Werkzeug ISO

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Sortenauswahl

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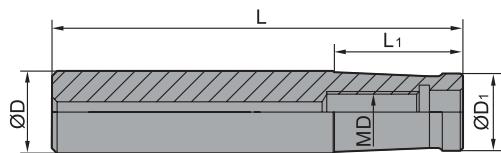
Technical data
Technische Daten

B215-B220

Milling · Fräsen

Indexable Milling Tools · Wendeplattenfräser

Steel toolholder · Stahl Verlängerung



B

Milling Tools
Fräser

Type Typ	Stock Large	Dimensions (mm) Abmessungen				
		ØD	L	L ₁	ØD ₁	MD
G16-QCH-M8-80	○	16	80	25	15	M8
G16-QCH-M8-100	○	16	100	45	15	M8
G20-QCH-M10-90	○	20	90	35	18.5	M10
G20-QCH-M10-105	○	20	105	50	18.5	M10
G25-QCH-M12-90	○	25	90	30	24	M12
G25-QCH-M12-110	○	25	110	50	24	M12
G32-QCH-M16-100	○	32	100	35	28.5	M16
G32-QCH-M16-120	○	32	120	55	28.5	M16
G32-QCH-M16-115	○	32	115	40	30	M16
G32-QCH-M16-135	○	32	135	60	30	M16

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