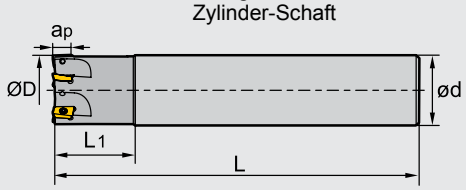
Square shoulder milling tools · Eckfräser

Kr:90°

EMP01 P M K N

Straight shank
Zylinder-Schaft

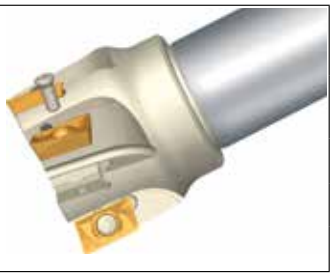


Specification of tools · Werkzeug Beschreibung

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
	012-G16-AP11-01C	●	12	16	85	25	10.5	1	0.1
	016-G16-AP11-02	●	16	16	90	25	10.5	2	0.1
	016-G16-AP11-02C	●	16	16	90	25	10.5	2	0.1
	020-G20-AP11-02	●	20	20	100	30	10.5	2	0.2
	020-G20-AP11-02C	●	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-AP11-03C	●	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
	032-G32-AP11-04C	●	32	32	125	40	10.5	4	0.7
	025-G25-AP16-02	●	25	25	115	35	15.5	2	0.4
	025-G25-AP16-02C	●	25	25	115	35	15.5	2	0.4
	032-G32-AP16-03	●	32	32	125	40	15.5	3	0.7
	032-G32-AP16-03C	●	32	32	125	40	15.5	3	0.7
	040-G32-AP16-03	●	40	32	130	42	15.5	3	0.7
	040-G32-AP16-03C	●	40	32	130	42	15.5	3	0.7
	040-G32-AP16-04	●	40	32	130	42	15.5	4	0.8
	040-G32-AP16-04C	●	40	32	130	42	15.5	4	0.8
	050-G32-AP16-05	●	50	32	135	45	15.5	5	1.0
	050-G32-AP16-05C	●	50	32	135	45	15.5	5	1.0
	063-G32-AP16-06	●	63	32	135	45	15.5	6	1.4
	063-G32-AP16-06C	●	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

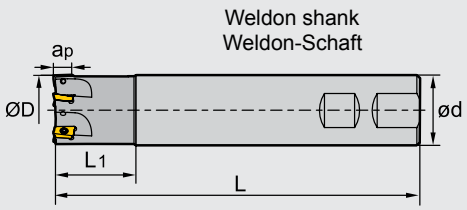


● Ex Stock / ab Lager ○ On demand / auf Anfrage

Square shoulder milling tools · Eckfräser

Kr:90°

EMP01 P M K N

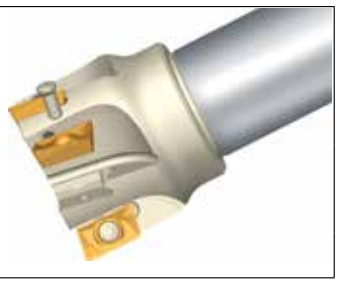


Specification of tools · Werkzeug Beschreibung

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

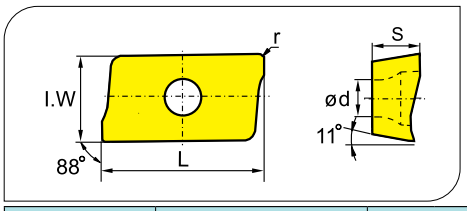


Applicable tool B11-B18
Werkzeug
Tools code key B26-B27
Werkzeug ISO
Grade selection guide B19-B23
Sortenauswahl
Technical data B215-B220
Technische Daten

B

Milling Tools
Fräser

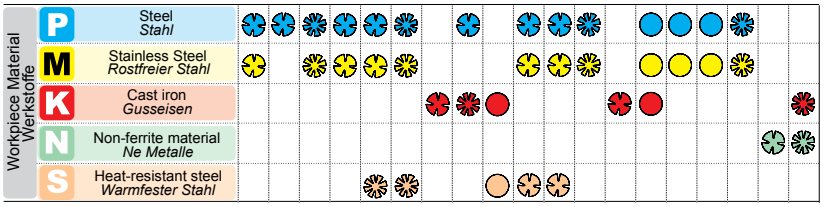
Applicable inserts · Wendeschneidplatten



Ideal Machining Condition
Gute Bearbeitungsbedingungen

Normal Machining Condition
Normale Bearbeitungsbedingungen

Unfavorable Machining Condition
Ungünstige Bearbeitungsbedingungen



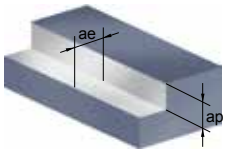
Insert shape Plattenform	Type Typ	Dimensions (mm) Abmessungen					CVD Coating CVD Beschicht.								PVD Coating PVD Beschicht.						Cermet Cermet		Carbide uncoat. unbe. Hartmetall		
		L	I.W	S	d	r	YBC301	YBC302	YBC401	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	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	0.8												○							
	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																		●	●
	APET160402-LH	17.877	9.33	5.76	4.4	0.2																		○	
	APKT160408-LH	17.877	9.33	5.76	4.4	0.8																		●	●
	APET160408PDFR-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)			ae(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 B11-B18
Werkzeug
Tools code key B26-B27
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Sortenauswahl
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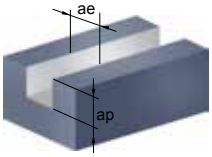
Technische Daten

2 Slot milling
2 Nutenfräsen



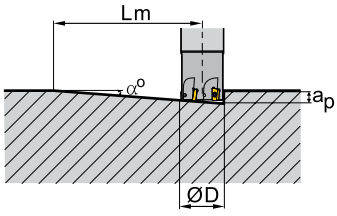
Recommended cutting data · Empfohlene Schnittdaten

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

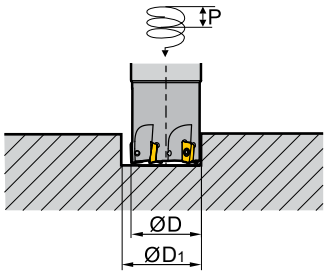

Recommended cutting data · Empfohlene Schnittdaten

- Ramp milling
  Tauchfräsen



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

- Helical interpolation milling
  Spiral-Interpolationsfräsen



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

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

Applicable tool B11-B18
Werkzeug
Tools code key B26-B27
Werkzeug ISO
Grade selection guide B19-B23
Sortenauswahl
Technical data B215-B220
Technische Daten

Case study for EMP01
Bearbeitungsbeispiel für EMP01

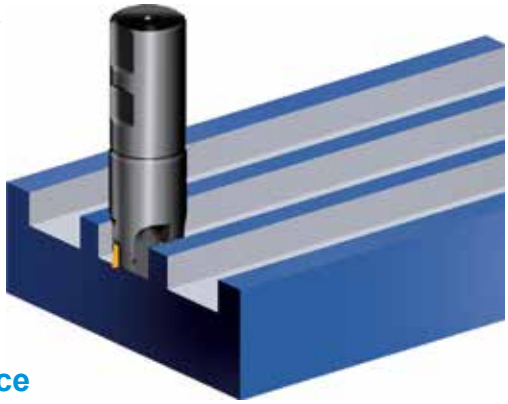
Workpiece material: Cast Steel (HB220)
Werkstück Material:

Cooling system: dry cutting
Kühlsystem: trocken

Machine: vertical machining center
Maschine: vertikales Maschinen-Center

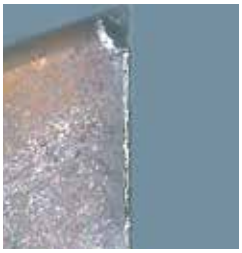
Cutting data:
Schnittdaten:

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	Produkt of competitor Wettbewerbsprodukt
15'		
25'