

## Square shoulder milling tools

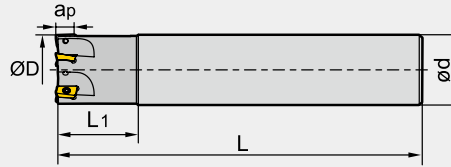
Kr:90°



**EMP01** P M K N



Straight shank



### Specification of tools




Type	Stock	Basic dimensions(mm)					Number of teeth Z	Weight (kg)
		ØD	ød	L	L <sub>1</sub>	ap <sub>max</sub>		
<b>EMP01</b> Straight shank	▲	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
-025-G25-AP11-03	▲	25	25	115	35	10.5	3	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-AP16-04	▲	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

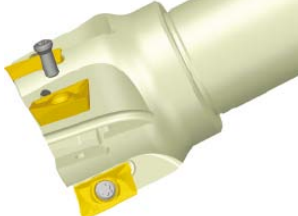
▲Stock available    △Make-to-order

Indexable milling tools

Square shoulder milling tools

### Spare parts

Diameter ØD	Inserts	Screw	Wrench	
				
Ø12-Ø32	AP11	I60M2.5×6.5T	WT08IP	--
Ø25-Ø63	AP16	I60M4×8.4	--	WT15IS



Tools code key → B22-B23

Grade selection guide → B18-B21

Technical data → B192-B198

Square shoulder milling tools

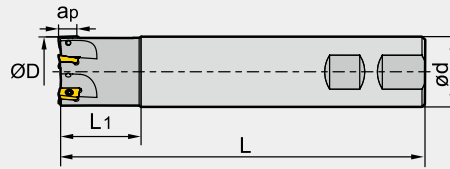
Kr:90°



EMP01 P M K N



Weldon shank



Specification of tools

Type	Stock	Basic dimensions(mm)					Number of teeth Z	Weight (kg)
		ØD	ød	L	L <sub>1</sub>	a <sub>pmax</sub>		
<b>EMP01</b> Weldon shank	▲	12	16	85	25	10.5	1	0.1
-012-XP16-AP11-01	▲	12	16	85	25	10.5	1	0.1
-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
-025-XP25-AP11-03	▲	25	25	115	35	10.5	3	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

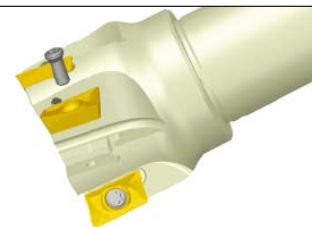
▲Stock available    △Make-to-order

Indexable milling tools

Square shoulder milling tools

Spare parts

Diameter ØD	Inserts	Screw	Wrench	
Ø12-Ø32	AP11	I60M2.5×6.5T	WT08IP	--
Ø25-Ø63	AP16	I60M4×8.4	--	WT15IS

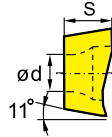
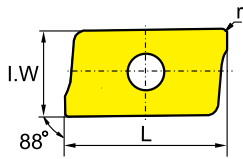


Tools code key  
B22-B23

Grade selection guide  
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Technical data  
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## Selection of inserts



😊 Good working condition    😐 Normal working condition    😞 Bad working condition

Workpiece material	P Steel	M Stainless steel	K Cast iron	N Non-ferrous metal	S Heat resistant alloy, Ti alloy
P Steel	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊
M Stainless steel	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊
K Cast iron	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊
N Non-ferrous metal	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊
S Heat resistant alloy, Ti alloy	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊

Insert shape	Type	Basic dimensions(mm)					CVD Coating					PVD Coating				Cermet		Cemented carbide							
		L	I.W	S	ød	r	YBC301	YBC302	YBM251	YBM253	YBM351	YBD152	YBD252	YBG102	YBG202	YBG205	YBG302	YBG152	YBG252	YNG151	YNG151C	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																★	★		

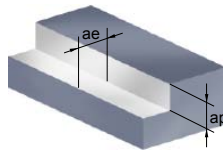
★ Recommended grade (always stock available)    ● Available grade (always stock available)    ○ Make-to-order

Indexable milling tools

Square shoulder milling tools

### ▶▶ Chipbreaker selection

Classification \ Function	For finishing	For semi-finishing	For roughing
<b>P</b>	-PF	-PM	-PR
<b>M</b>	-PF	-PM	-PR
<b>K</b>	-PF	-PM	
<b>N</b>	-LH		

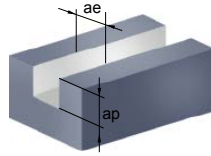


### 1 Square shoulder milling

### ▶▶ Recommended cutting parameters (D: Diameter)

Workpiece material	Hardness HB	Insert grade	Cutting parameters					
			V (m/min)	f (mm/z)			ae(mm)	
				-PF	-PM	-PR		
<b>P</b>	Low-carbon steel, Soft steel	YBM251 YBC301 YBC302	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	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	YBM251 YBC301 YBC302	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	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	YBM251 YBC301 YBC302	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	
<b>M</b>	Stainless steel	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	
<b>K</b>	Cast iron	YBG102	220 (120-250)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	-	≤ 0.5D	
		YBD252	200 (120-320)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	-	≤ 0.5D	
<b>N</b>				-LH				
	Aluminium alloy	---	YD101	300-	0.2 (0.08-0.4)			≤ 0.5D
		---	YD201	300-	0.2 (0.08-0.4)			≤ 0.5D

## 2 Slot milling



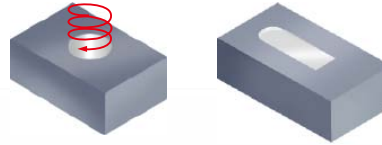
### ➤ Recommended cutting parameters ((D: Diameter))

Workpiece material	Hardness HB	Insert grade	Cutting parameters							
			V (m/min)	f (mm/z)			ae(mm)			
				-PF	-PM	-PR				
<b>P</b> Low-carbon steel, Soft steel	≤ 180	YBM251	190 (170-250)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	0.2 (0.2-0.3)	D			
		YBC301								
		YBC302								
		YBM351						150 (130-210)	0.1 (0.08-0.15)	0.15 (0.1-0.25)
	High-carbon steel, Alloy steel	180-280	YBG202	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		
			YBM251	170 (150-220)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	0.2 (0.2-0.3)	D		
			YBC301							
			YBC302							
			YBM351						140 (110-200)	0.1 (0.08-0.15)
			Alloy tool steel	280-350	YBG202	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
YBM251	150 (130-210)	0.1 (0.08-0.15)			0.15 (0.1-0.25)	0.2 (0.2-0.3)	D			
YBC301										
YBC302										
YBM351			130 (100-180)	0.1 (0.08-0.15)				0.15 (0.1-0.25)	0.2 (0.2-0.3)	D
<b>M</b> Stainless steel	≤ 270	YBG202	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			
		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)
YBG202	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
<b>K</b> Cast iron	180-250	YBG102	130 (80-180)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	-	D			
		YBD252	120 (80-210)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	-	D			
<b>N</b> Aluminium alloy	----				-LH					
		YD101	300-	0.2 (0.08-0.3)			D			
		YD201	300-	0.2 (0.08-0.3)			D			

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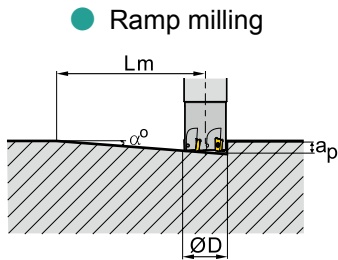
Square shoulder milling tools

3 Ramp milling, helical interpolation milling

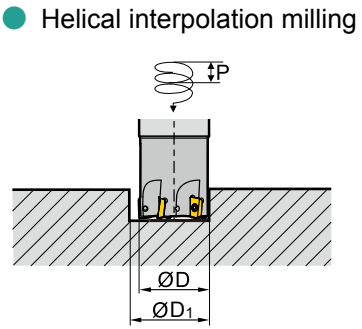


▶▶ Recommended cutting parameters (D: Diameter)

Diameter ØD(mm)	APKT Ramp milling, helical interpolation milling(Inserts—11)				
	Ramp milling			Helical interpolation milling	
	Maximum cutting depth a <sub>p</sub> (mm)	Maximum ramp angle α°	Minimum length L <sub>m</sub> (mm)	Minimum diameter ØD <sub>1</sub> (mm)	Maximum pitch(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



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



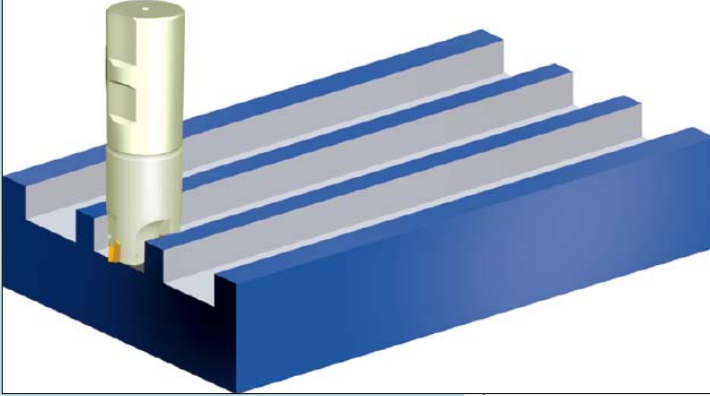
$$\tan \alpha = \frac{P}{\pi D_1} \quad (\alpha: \text{Helical angle})$$

Note: For cutting speed and feed rate per tooth, see square shoulder milling.

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Square shoulder milling tools

## Case for EMP01



Workpiece material: Cast Stee (HB220)  
 Cooling system: Dry cutting  
 Machine: Vertical machining center  
 Cutting parameters:  
 $V_c=180\text{m/min}$   
 $a_p=3\text{mm}$   
 $f_z=0.1\text{mm/z}$



Insert type/grade: APKT160408-PM/YBC301

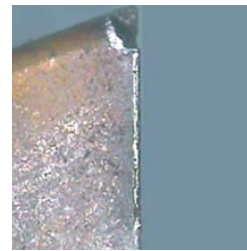
Tool type: EMP01-040-XP32-AP16-04

### ● Abrasion comparison of inserts

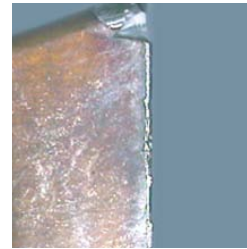
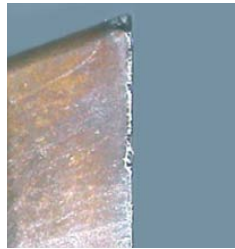
ZCC-CT

Other company product

15'



25'



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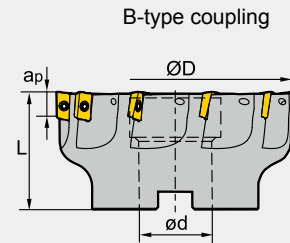
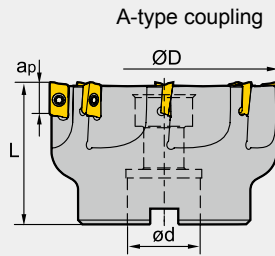
Square shoulder milling tools

**Square shoulder milling tools**

**Kr:90°**



**EMPO2** **P** **M** **K** **N**



➤ **Specification of tools**

Type	Stock	Basic dimensions(mm)				Number of teeth Z	Type of coupling	Weight (kg)
		$\varnothing D$	$\varnothing d$	L	$a_{pmax}$			
<b>EMPO2</b> -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

▲ Stock available    △ Make-to-order

Indexable milling tools

Square shoulder milling tools

➤ **Spare parts**

Diameter $\varnothing D$	Inserts	Screw	Wrench	
$\varnothing 50$ - $\varnothing 100$	AP11	I60M2.5×6.5T	WT08IS	
$\varnothing 50$ - $\varnothing 160$	AP16	I60M4×10	WT15IS	

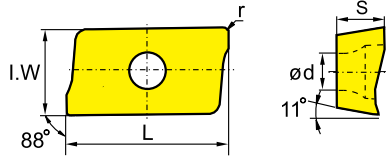
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B192-B198



## Selection of inserts



😊 Good working condition    😐 Normal working condition    😞 Bad working condition

Workpiece material	P Steel	M Stainless steel	K Cast iron	N Non-ferrous metal	S Heat resistant alloy, Ti alloy
P Steel	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊
M Stainless steel	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊
K Cast iron	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊
N Non-ferrous metal	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊
S Heat resistant alloy, Ti alloy	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊

Insert shape	Type	Basic dimensions(mm)					CVD Coating					PVD Coating			Cermet	Cemented carbide										
		L	I.W	S	ød	r	YBC301	YBC302	YBM251	YBM253	YBM351	YBD162	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																	★	★		

★ Recommended grade (always stock available)    ● Available grade (always stock available)    ○ Make-to-order

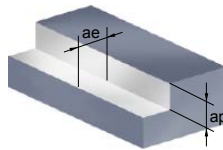


Indexable milling tools

Square shoulder milling tools

➤ Chipbreaker selection

Classification	Function	For finishing	For semi-finishing	For roughing
<b>P</b>		-PF	-PM	-PR
<b>M</b>		-PF	-PM	-PR
<b>K</b>		-PF	-PM	
<b>N</b>		-LH		



Square shoulder milling

➤ Recommended cutting parameters (D: Diameter)

Workpiece material	Hardness HB	Insert grade	Cutting parameters				
			V (m/min)	f (mm/z)			ae(mm)
				-PF	-PM	-PR	
<b>P</b>	Low-carbon steel, Soft steel	YBM251 YBC301 YBC302	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	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	YBM251 YBC301 YBC302	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	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	YBM251 YBC301 YBC302	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
<b>M</b>	Stainless steel	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
<b>K</b>	Cast iron	YBG102	220 (120-250)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	-	≤ 0.5D
		YBD252	200 (120-320)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	-	≤ 0.5D
<b>N</b>	Aluminium alloy				-LH		
		YD101	300-	0.2 (0.08-0.4)			≤ 0.5D
		YD201	300-	0.2 (0.08-0.4)			≤ 0.5D

Indexable milling tools

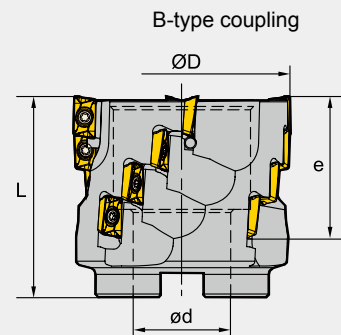
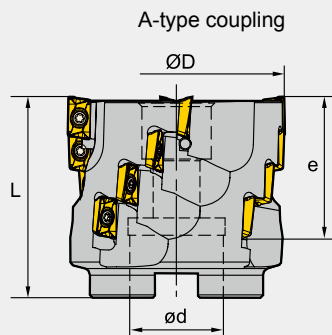
Square shoulder milling tools

## Square shoulder milling tools

Kr:90°



**EMP03** P M K N



### Specification of tools

Type	Stock	Basic dimensions(mm)				Number of flute z	Number of inserts	Type of coupling	Weight (kg)
		ØD	ød	L	e				
<b>EMP03</b> -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

▲ Stock available    △ Make-to-order

### Spare parts

Diameter ØD	Screw	Wrench
	Ø50-Ø100	I60M2.5×6.5T

Tools code key  
B22-B23

Grade selection guide  
B18-B21

Technical data  
B192-B198

Square shoulder milling tools

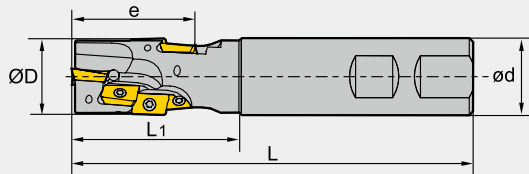
Kr:90°



EMP04 P M K N



Weldon shank



Specification of tools

Type	Stock	Basic dimensions(mm)					Number of flute z	Number of inserts	Weight (kg)
		ØD	ød	L	L1	e			
<b>EMP04</b> -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

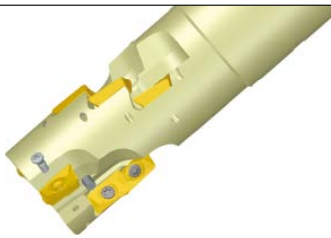
▲Stock available    △Make-to-order

Indexable milling tools

Square shoulder milling tools

Spare parts

Diameter ØD	Screw	Wrench
	Ø20-Ø40	I60M2.5×6.5T

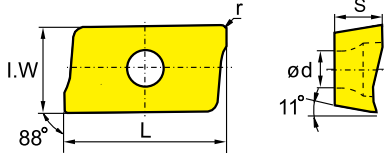


Tools code key  
B22-B23

Grade selection guide  
B18-B21

Technical data  
B192-B198

## Selection of inserts



😊 Good working condition    😐 Normal working condition    😞 Bad working condition

Workpiece material	P Steel	M Stainless steel	K Cast iron	N Non-ferrous metal	S Heat resistant alloy, Ti alloy
P Steel	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊
M Stainless steel	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊
K Cast iron	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊
N Non-ferrous metal	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊
S Heat resistant alloy, Ti alloy	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊	😊😊😊😊😊😊

Insert shape	Type	Basic dimensions(mm)					CVD Coating					PVD Coating					Cermet	Cemented carbide								
		L	I.W	S	ød	r	YBC301	YBC302	YBM251	YBM253	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	0.8		★																		
	APKT11T312-PR	12.24	6.5	3.6	2.8	1.2		★																		
	APKT11T316-PR	12.24	6.5	3.6	2.8	1.6		★																		
	APKT11T304-LH	12.24	6.5	3.6	2.8	0.4																	★	★		
	APKT11T308-LH	12.24	6.5	3.6	2.8	0.8																	★	○		

★ Recommended grade (always stock available)    ● Available grade (always stock available)    ○ Make-to-order

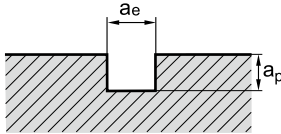
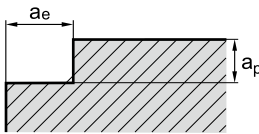
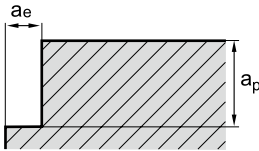
Indexable milling tools

Square shoulder milling tools

## Chipbreaker selection

Classification \ Function	For finishing	For semi-finishing	For roughing
<b>P</b>	-PF	-PM	-PR
<b>M</b>	-PF	-PM	-PR
<b>K</b>	-PF	-PM	
<b>N</b>	-LH		

➤ Recommended cutting parameters

Slot milling	Square shoulder milling	Deep square shoulder milling
		
$a_e = D$ $a_p \leq 0.5D$	$a_e \leq 0.5D$ $a_p \leq 1.2D$	$a_e \leq 0.2D$ $a_p < \text{Cutting length of insert}$

Workpiece material	Hardness HB	Insert grade	Cutting parameters			
			V (m/min)	Square shoulder milling		
				f (mm/z)		
-PF	-PM	-PR				
<b>P</b>	Low-carbon steel, Soft steel	YBM251 YBC301 YBC302	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	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	YBM251 YBC301 YBC302	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	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	YBM251 YBC301 YBC302	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	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)
<b>M</b>	Stainless steel	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	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)
<b>K</b>	Cast iron	YBG102	200 (120-240)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	
		YBD252	180 (120-300)	0.1 (0.08-0.2)	0.2 (0.1-0.3)	
<b>N</b>	Aluminium alloy			-LH		
		YD101	300-		0.2 (0.08-0.4)	
		YD201	300-		0.2 (0.08-0.4)	

Indexable milling tools

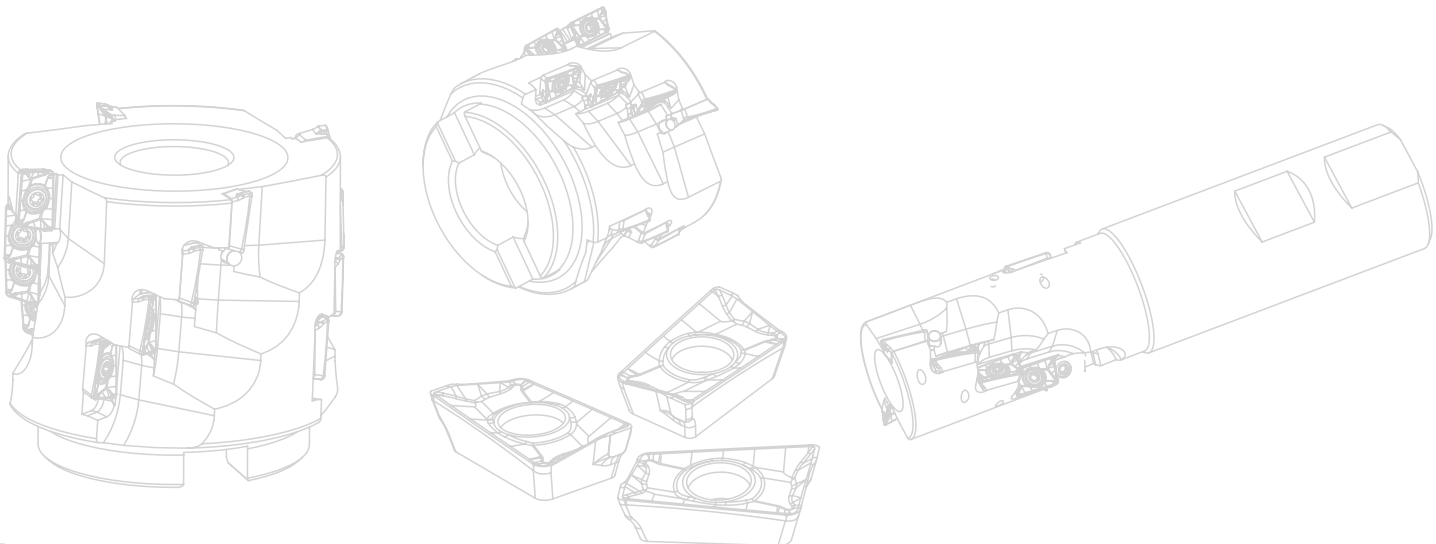
Square shoulder milling tools

## ➤ Recommended cutting parameters

Workpiece material	Hardness HB	Insert grade	Cutting parameters				
			Slot milling, Deep square shoulder milling				
			V (m/min)	f (mm/z)			
-PF	-PM	-PR					
<b>P</b> Low-carbon steel, Soft steel	≤ 180	YBM251	270 (240-350)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	0.2 (0.2-0.3)	
		YBC301					
		YBC302					
		YBM351					
	High-carbon steel, Alloy steel	180-280	YBM251	240 (210-320)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	0.2 (0.2-0.3)
			YBC301				
			YBC302				
			YBM351				
	Alloy tool steel	280-350	YBM251	220 (180-300)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	0.2 (0.2-0.3)
			YBC301				
			YBC302				
			YBM351				
<b>M</b> Stainless steel	≤ 270	YBM251	170 (120-240)	0.1 (0.08-0.15)	0.15 (0.1-0.25)	0.2 (0.2-0.3)	
		YBM351					
		YBG202					
		YBG302					
<b>K</b> Cast iron	180-250	YBG102	200 (120-240)	0.1 (0.08-0.15)	0.15 (0.1-0.25)		
		YBD252					
<b>N</b> Aluminium alloy	---	YD101	300-	-LH			
		YD201		300-	0.2 (0.08-0.3)		

Indexable milling tools

Square shoulder milling tools



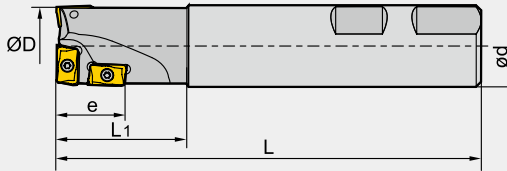
**Square shoulder milling tools** **Kr:90°**



**EMP05** **P** **M** **K**



Weldon shank



➤ **Specification of tools**

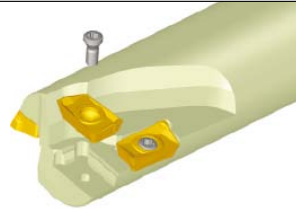


Type	Stock	Basic dimensions(mm)					Number of inserts		Weight (kg)	
		R	ØD	ød	L	L <sub>1</sub>	e	APMT11		APMT16
<b>EMP05</b> -025-XP25	▲		25	25	130	40	20	3	--	0.5
-032-XP32	▲		32	32	140	50	30	--	3	0.8
-040-XP32	▲		40	32	150	60	40	--	4	1.0

▲ Stock available    △ Make-to-order

Indexable milling tools

Square shoulder milling tools

➤ **Spare parts**

Diameter ØD	Inserts	Screw	Wrench	
				
Ø25-Ø40	APMT11	I60M2.5×6.5T	WT08IP	
	APMT16	I60M4×10	WT15IP	

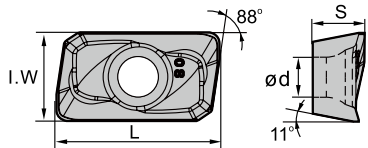
Tools code key **B22-B23**

Grade selection guide **B18-B21**

Technical data **B192-B198**



## Selection of inserts



😊 Good working condition    😐 Normal working condition    😞 Bad working condition

Workpiece material	Steel	Stainless steel	Cast iron	Non-ferrous metal	Heat resistant alloy, Ti alloy
P	😊😊😊😊😊😊😊😊😊😊	😊😊😊😊😊😊😊😊😊😊	😊😊😊😊😊😊😊😊😊😊	😊😊😊😊😊😊😊😊😊😊	😊😊😊😊😊😊😊😊😊😊
M	😊😊😊😊😊😊😊😊😊😊	😊😊😊😊😊😊😊😊😊😊	😊😊😊😊😊😊😊😊😊😊	😊😊😊😊😊😊😊😊😊😊	😊😊😊😊😊😊😊😊😊😊
K	😊😊😊😊😊😊😊😊😊😊	😊😊😊😊😊😊😊😊😊😊	😊😊😊😊😊😊😊😊😊😊	😊😊😊😊😊😊😊😊😊😊	😊😊😊😊😊😊😊😊😊😊
N	😊😊😊😊😊😊😊😊😊😊	😊😊😊😊😊😊😊😊😊😊	😊😊😊😊😊😊😊😊😊😊	😊😊😊😊😊😊😊😊😊😊	😊😊😊😊😊😊😊😊😊😊
S	😊😊😊😊😊😊😊😊😊😊	😊😊😊😊😊😊😊😊😊😊	😊😊😊😊😊😊😊😊😊😊	😊😊😊😊😊😊😊😊😊😊	😊😊😊😊😊😊😊😊😊😊

Insert shape	Type	Basic dimensions(mm)					CVD Coating					PVD Coating			Cermet	Cemented carbide										
		L	I.W	S	ød	r	YBC301	YBC302	YBM251	YBM253	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								●	★	○										

★ Recommended grade (always stock available)    ● Available grade (always stock available)    ○ Make-to-order

Indexable milling tools

Square shoulder milling tools

## 1 Drilling



### Recommended cutting parameters

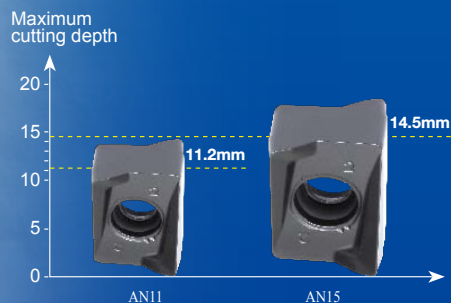
Workpiece material	Hardness HB	Insert grade	Cutting parameters	
			V (m/min)	f (mm/z)
P Low-carbon steel, Soft steel	≤ 180	YBG202	180 (150-220)	0.2 (0.08-0.25)
	180-280	YBG202	160 (130-200)	0.15 (0.08-0.2)
	280-350	YBG202	140 (120-180)	0.12 (0.05-0.2)
M High-carbon steel, Alloy steel	≤ 270	YBG202	80 (50-150)	0.08 (0.03-0.15)
K Alloy tool steel	180-250	YBG202	150 (100-220)	0.15 (0.08-0.2)

## 2 Milling

### Recommended cutting parameters

Workpiece material	Hardness HB	Insert grade	Cutting parameters	
			V (m/min)	f (mm/z)
P Low-carbon steel, Soft steel	≤ 180	YBG202	190 (140-250)	0.08 (0.04-0.15)
	180-280	YBG202	170 (130-250)	0.08 (0.04-0.15)
	280-350	YBG202	150 (110-240)	0.08 (0.04-0.15)
M High-carbon steel, Alloy steel	≤ 270	YBG202	120 (80-190)	0.08 (0.04-0.15)
K Alloy tool steel	180-250	YBG202	120 (80-210)	0.08 (0.04-0.15)

**achieving high quality 90° square shoulding milling**

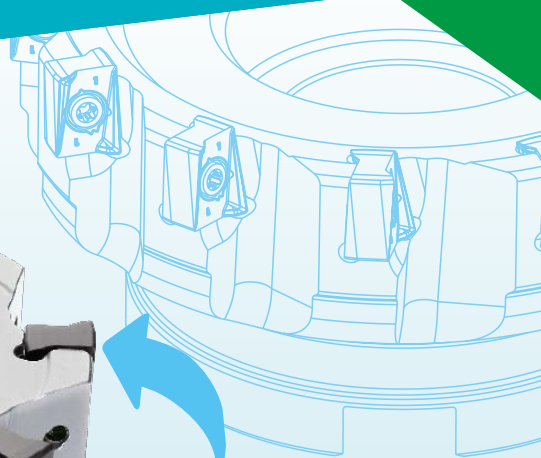


**Kr:90°**

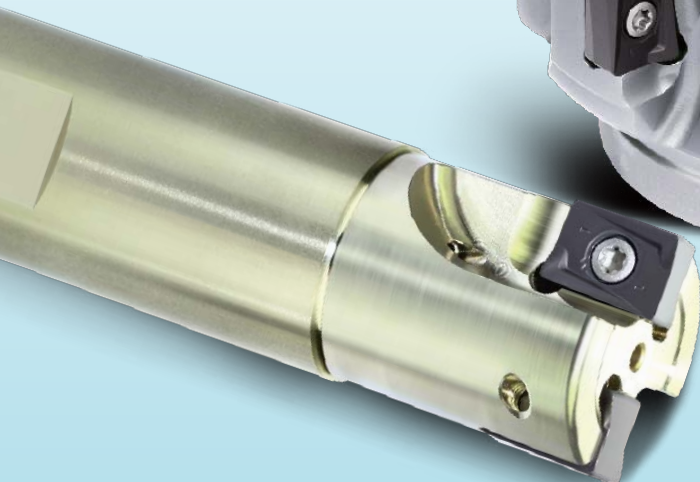
# EMP13

## Series Square Shoulder Mills

Double negative rake angle of the tool body in combination with extra thick insert achieves double positive tool angle, which will help reduce cutting resistance and greatly improve impact resistance.



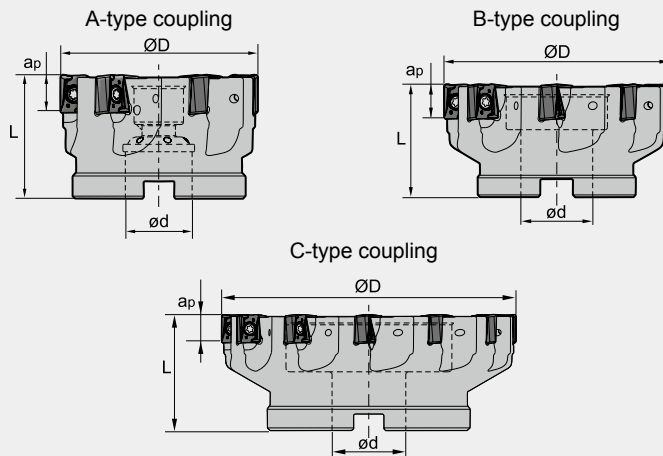
Properly designed cutting edge with high precision control can achieve high quality 90°square shoulder milling.



## Square shoulder milling tools **Kr:90°**



### EMP13 **P K**



#### Specification of tools




Type	Stock	Basic dimensions(mm)				Number of flute z	Type of coupling	Weight (kg)
		ØD	Ød	L	apmax			
<b>EMP13</b> -050-A22-AN11-06	▲	50	22	40	11.2	6	A	0.30
-063-A22-AN11-07	▲	63	22	40	11.2	7	A	0.49
-080-A27-AN11-09	▲	80	27	50	11.2	9	A	1.18
-100-B32-AN11-12	▲	100	32	50	11.2	12	B	1.46
-125-B40-AN11-14	▲	125	40	63	11.2	14	B	2.92
-160-C40-AN11-16	▲	160	40	63	11.2	16	C	4.30
-050-A22-AN15-04	▲	50	22	40	14.5	4	A	0.26
-063-A22-AN15-05	▲	63	22	40	14.5	5	A	0.53
-080-A27-AN15-06	▲	80	27	50	14.5	6	A	1.23
-100-B32-AN15-08	▲	100	32	50	14.5	8	B	1.52
-125-B40-AN15-10	▲	125	40	63	14.5	10	B	3.05
-160-C40-AN15-12	▲	160	40	63	14.5	12	C	4.46

▲Stock available    △Make-to-order

Indexable milling tools

Square shoulder milling tools

#### Spare parts

Diameter ØD	Inserts	Screw	Wrench	
				
Ø50-Ø160	ANGX110504PNR-GM	I60M3X9	WT09IS	
	ANGX110508PNR-GM			
Ø50-Ø160	ANGX150608PNR-GM	I60M4X12	WT15IS	
	ANGX150616PNR-GM			

Tools code key **B22-B23**

Grade selection guide **B18-B21**

Technical data **B192-B198**

**Square shoulder milling tools**

**Kr:90°**



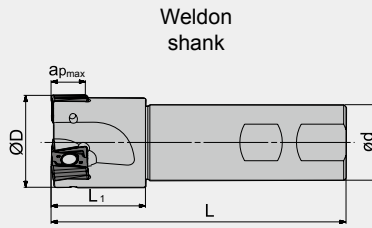
**EMP13** **P** **K**



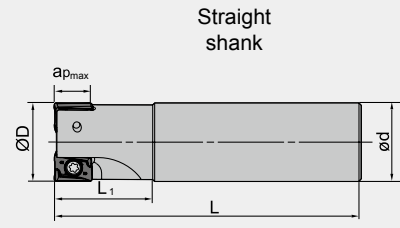
Weldon shank



Straight shank



Weldon shank



Straight shank

Specification of tools

Type	Stock	Basic dimensions(mm)					Number of flute z	Weight (kg)	
		ØD	Ød	L	L1	apmax			
<b>EMP13</b> Weldon shank	▲	-025-XP25-AN11-02	25	25	100	32	11.2	2	0.31
	▲	-032-XP32-AN11-03	32	32	115	40	11.2	3	0.61
	▲	-040-XP32-AN11-04	40	32	125	40	11.2	4	0.75
	▲	-032-XP32-AN15-02	32	32	125	40	14.5	2	0.66
	▲	-040-XP32-AN15-03	40	32	125	40	14.5	3	0.76
Straight shank	▲	-025-G25-AN11-02	25	25	100	32	11.2	2	0.31
	▲	-032-G32-AN11-03	32	32	115	40	11.2	3	0.61
	▲	-040-G32-AN11-04	40	32	125	40	11.2	4	0.75
	▲	-032-G32-AN15-02	32	32	125	40	14.5	2	0.66
	▲	-040-G32-AN15-03	40	32	125	40	14.5	3	0.76

▲Stock available    △Make-to-order

Spare parts

Diameter ØD	Inserts	Screw	Wrench	
Ø25-Ø40	ANGX110504PNR-GM	I60M3X9	WT09IS	
	ANGX110508PNR-GM			
Ø32-Ø40	ANGX150608PNR-GM	I60M4X12	WT15IS	
	ANGX150616PNR-GM			

Tools code key  
B22-B23

Grade selection guide  
B18-B21

Technical data  
B192-B198

Indexable milling tools  
Square shoulder milling tools

## Square shoulder milling tools

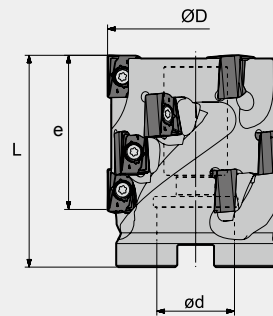
Kr:90°



### EMP13 P K



A-type coupling



### Specification of tools

Type	Stock	Basic dimensions(mm)				Number of grooves	Number of inserts	Type of coupling	Weight (kg)
		ØD	Ød	L	e				
<b>EMP13</b> -050×43-A22-AN11-03	▲	50	22	60	43	3	12	A	0.52
-063×65-A27-AN11-04	▲	63	27	80	64	4	24	A	1.15
-063×53-A27-AN15-03	▲	63	27	75	53	3	12	A	1.14
-080×56-A32-AN15-04	▲	80	32	75	53	4	16	A	1.82

▲ Stock available    △ Make-to-order

Indexable milling tools

Square shoulder milling tools

### Spare parts

Diameter ØD	Inserts	Screw	Wrench	
Ø50-Ø63	ANGX110504PNR-GM	I60M3X9	WT09IS	
Ø63-Ø80	ANGX150608PNR-GM	I60M4X12	WT15IS	

Tools code key [B22-B23](#)

Grade selection guide [B18-B21](#)

Technical data [B192-B198](#)

**Square shoulder milling tools**

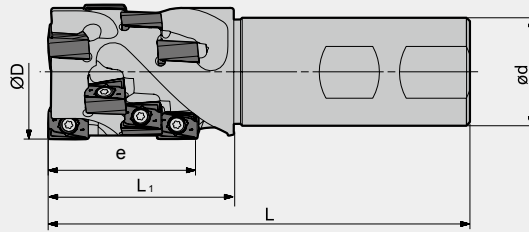
**Kr:90°**



**EMP13** **P** **K**



Weldon shank



➤ **Specification of tools**

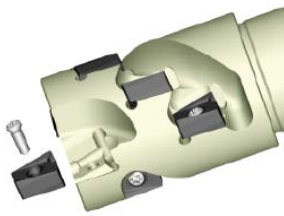


Type	Stock	Basic dimensions(mm)					Number of grooves	Number of inserts	Weight (kg)
		ØD	Ød	L	L <sub>1</sub>	e			
<b>EMP13</b> -032×43-XP32-AN11-02	▲	32	32	115	48	43	2	8	0.61
-040×43-XP32-AN11-03	▲	40	32	125	55	43	3	12	0.79
-040×40-XP32-AN15-02	▲	40	32	115	55	40	2	6	0.79
-050×53-XP40-AN15-02	▲	50	40	145	70	53	2	8	1.53

▲ Stock available    △ Make-to-order

Indexable milling tools

Square shoulder milling tools

➤ **Spare parts**

Diameter ØD	Inserts	Screw	Wrench	
				
Ø32-Ø40	ANGX110504PNR-GM	I60M3X9	WT09IS	
Ø40-Ø50	ANGX150608PNR-GM	I60M4X12	WT15IS	

Tools code key **B22-B23**

Grade selection guide **B18-B21**

Technical data **B192-B198**