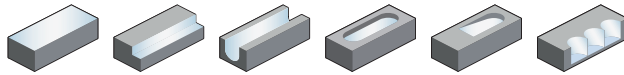


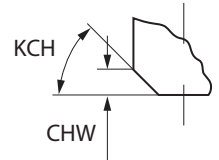
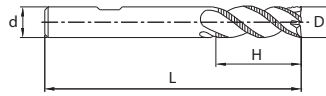
A

End mill long cutting edge General roughing

5602R303GR



- Type of shank: DIN 6535HB
- Centre cutting
- Helix angle 30°



Turning

B

Article	*	Dimensions [mm]						Teeth	Grade
		D	d (h6)	H	L	KCH	CHW		KMG303
5602R303GR-0600		6	6	13	57	45	0.25	3	●
5602R303GR-0800		8	8	19	63	45	0.25	3	●

- Ex stock ○ On demand

* With internal cooling

Milling

C

Application field

P	M	K	N	S	H
✓	✓	✓			

- ✓ Very suitable
- ✓ Suitable

Drilling

D

Technical Information

E

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System code > B268

Cutting data > B436

Nonstandard order > B477

End mill – GM series

Material group	Composition / structure / heat treatment	Brinell hardness HB	Machining group	Starting values for cutting speed v_c [m/min]										
				GM-2BL GM-4BL GM-2BFP					GM-2R GM-4R					
									Slot milling		Shoulder milling			
									\varnothing [mm]	$a_{p\max}$	\varnothing [mm]	$a_{e\max}$		
					$0 < x < 3$	$0,1 \times D$	$0 < x \leq 20$	$< 0,5 \times D$						
					KMG303					KMG303				
					a_e / D					a_e / D				
					1/1	1/10	1/20	f-group	1/1	1/2	1/10	f-group		
P Unalloyed steel	approx. 0,15 % C	annealed	125	1	220	250	5	160	215	275	2			
	approx. 0,45 % C	annealed	190	2	210	240	5	155	205	265	2			
	approx. 0,45 % C	tempered	250	3	155	175	5	115	155	195	2			
	approx. 0,75 % C	annealed	270	4	135	150	5	100	130	165	2			
	approx. 0,75 % C	tempered	300	5	125	140	5	90	120	155	2			
P Low-alloyed steel		annealed	180	6	165	190	5	120	165	210	2			
		tempered	275	7	135	150	5	100	130	165	2			
		tempered	300	8	125	140	5	90	120	155	2			
		tempered	350	9	115	130	5	85	115	145	2			
P High-alloyed steel and high-alloyed tool steel		annealed	200	10	155	175	5	115	155	195	2			
		hardened and tempered	325	11	120	135	5	85	115	150	2			
M Stainless steel	ferritic/martensitic	annealed	200	12	75	80	5	55	70	90	2			
	martensitic	tempered	240	13	65	70	5	45	65	80	2			
	austenitic	quench hardened	180	14	75	85	5	55	75	95	2			
	austenitic-ferritic		230	15	65	70	5	45	65	80	2			
K Grey cast iron	perlitic/ferritic		180	16	165	185	5	120	160	205	2			
	perlitic (martensitic)		260	17	135	150	5	100	130	165	2			
K Cast iron with spheroidal graphite	ferritic		160	18	200	225	5	145	195	250	2			
	perlitic		250	19	155	175	5	115	155	195	2			
K Malleable cast iron	ferritic		130	20	220	250	5	160	215	275	2			
	perlitic		230	21	180	200	5	130	175	220	2			
N Aluminium wrought alloys	cannot be hardened		60	22										
	hardenable	hardened	100	23										
	$\leq 12\% \text{ Si}$, cannot be hardened		75	24										
	$\leq 12\% \text{ Si}$, hardenable	hardened	90	25										
N Cast aluminium alloys	$> 12\% \text{ Si}$, cannot be hardened		130	26										
	machining steel, PB> 1%		110	27										
	CuZn, CuSnZn		90	28										
S Copper and copper alloys (bronze/brass)	CuSn, Pb-free copper, electrolytic copper		100	29										
	Heat-resistant alloys	Fe-based alloys	annealed	200	30									
		hardened	280	31										
	Ni or Co bass	annealed	250	32										
hardened		350	33											
Titanium alloys	cast	320	34											
	pure titanium		R_m 400	35										
H Hardened steel	α and β alloys	hardened	R_m 1050	36										
	hardened and tempered	55 HRC		37										
H Hard cast iron	hardened and tempered	60 HRC		38										
	cast	400		39										
H Hardened cast iron	hardened and tempered	55 HRC		40										
X Non-metallic materials	Thermoplasts			41										
	Thermosetting plastics			42										
	Plastic, glass-fibre reinforced GFRP			43										
	Plastic, carbon fibre reinforced CFRP			44										
	Graphite			45										
	Wood			46										

Note: The given cutting values are guide values, which were determined under ideal conditions.
The values have to be adapted in individual cases.
Feed rate recommendations on page B460.
For examples of material for cutting tool groups view page D22.

Recommended feed rate

Solid carbide milling group 1 – Square shoulder mills PM series

	a_e / D	Feed rate per cutting edge (f_z) [mm]															
		$\emptyset 0,5$	$\emptyset 0,8$	$\emptyset 1$	$\emptyset 2$	$\emptyset 3$	$\emptyset 4$	$\emptyset 5$	$\emptyset 6$	$\emptyset 8$	$\emptyset 10$	$\emptyset 12$	$\emptyset 14$	$\emptyset 16$	$\emptyset 18$	$\emptyset 20$	
P	1/1	0,01	0,02	0,02	0,02	0,02	0,02	0,02	0,03	0,03	0,05	0,07	0,08	0,08	0,09	0,09	0,10
	1/2	0,01	0,03	0,03	0,03	0,03	0,03	0,04	0,04	0,06	0,09	0,10	0,10	0,12	0,12	0,13	
	1/10	0,02	0,05	0,05	0,05	0,05	0,05	0,07	0,07	0,09	0,14	0,16	0,16	0,18	0,18	0,20	
M	1/1	0,01	0,02	0,02	0,02	0,02	0,02	0,03	0,03	0,04	0,05	0,06	0,06	0,07	0,07	0,08	
	1/2	0,01	0,02	0,02	0,02	0,02	0,02	0,04	0,04	0,05	0,07	0,08	0,08	0,10	0,10	0,11	
	1/10	0,02	0,04	0,04	0,04	0,04	0,04	0,05	0,05	0,07	0,11	0,13	0,13	0,15	0,15	0,16	
K	1/1	0,01	0,02	0,02	0,02	0,02	0,02	0,03	0,03	0,05	0,07	0,08	0,08	0,09	0,09	0,10	
	1/2	0,01	0,03	0,03	0,03	0,03	0,03	0,04	0,04	0,06	0,09	0,10	0,10	0,12	0,12	0,13	
	1/10	0,02	0,05	0,05	0,05	0,05	0,05	0,07	0,07	0,09	0,14	0,16	0,16	0,18	0,18	0,20	
H	1/1	0,01	0,02	0,02	0,02	0,02	0,02	0,03	0,03	0,04	0,05	0,06	0,06	0,07	0,07	0,08	
	1/2	0,01	0,02	0,02	0,02	0,02	0,02	0,04	0,04	0,05	0,07	0,08	0,08	0,10	0,10	0,11	
	1/10	0,02	0,04	0,04	0,04	0,04	0,04	0,05	0,05	0,07	0,11	0,13	0,13	0,15	0,15	0,16	

Note: The given cutting values are guide values, which were determined under ideal conditions.
The values have to be adapted in individual cases.

Solid carbide milling group 2 – Square shoulder mills GM series

	a_e / D	Feed rate per cutting edge (f_z) [mm]															
		$\emptyset 0,5$	$\emptyset 0,8$	$\emptyset 1$	$\emptyset 2$	$\emptyset 3$	$\emptyset 4$	$\emptyset 5$	$\emptyset 6$	$\emptyset 8$	$\emptyset 10$	$\emptyset 12$	$\emptyset 14$	$\emptyset 16$	$\emptyset 18$	$\emptyset 20$	
P	1/1	0,01	0,02	0,02	0,02	0,02	0,02	0,03	0,03	0,04	0,06	0,07	0,07	0,08	0,08	0,09	
	1/2	0,01	0,03	0,03	0,03	0,03	0,03	0,04	0,04	0,05	0,08	0,09	0,09	0,10	0,10	0,12	
	1/10	0,02	0,04	0,04	0,04	0,04	0,04	0,06	0,06	0,08	0,12	0,14	0,14	0,16	0,16	0,18	
M	1/1	0,01	0,02	0,02	0,02	0,02	0,02	0,02	0,03	0,03	0,05	0,06	0,06	0,06	0,06	0,07	
	1/2	0,01	0,02	0,02	0,02	0,02	0,02	0,03	0,03	0,04	0,06	0,07	0,07	0,08	0,08	0,09	
	1/10	0,02	0,03	0,03	0,03	0,03	0,03	0,05	0,05	0,06	0,10	0,11	0,11	0,13	0,13	0,15	
K	1/1	0,01	0,02	0,02	0,02	0,02	0,02	0,03	0,03	0,04	0,06	0,07	0,07	0,08	0,08	0,09	
	1/2	0,01	0,03	0,03	0,03	0,03	0,03	0,04	0,04	0,05	0,08	0,09	0,09	0,10	0,10	0,12	
	1/10	0,02	0,04	0,04	0,04	0,04	0,04	0,06	0,06	0,08	0,12	0,14	0,14	0,16	0,16	0,18	

Note: The given cutting values are guide values, which were determined under ideal conditions.
The values have to be adapted in individual cases.

Solid carbide milling group 3 – Square shoulder mills HM series

	a_e / D	Feed rate per cutting edge (f_z) [mm]															
		$\emptyset 0,5$	$\emptyset 0,8$	$\emptyset 1$	$\emptyset 2$	$\emptyset 3$	$\emptyset 4$	$\emptyset 5$	$\emptyset 6$	$\emptyset 8$	$\emptyset 10$	$\emptyset 12$	$\emptyset 14$	$\emptyset 16$	$\emptyset 18$	$\emptyset 20$	
H	1/1	0,01	0,02	0,02	0,02	0,02	0,02	0,02	0,02	0,03	0,05	0,06	0,06	0,06	0,06	0,07	
	1/2	0,01	0,02	0,02	0,02	0,02	0,02	0,03	0,03	0,04	0,06	0,07	0,07	0,08	0,08	0,09	
	1/10	0,02	0,03	0,03	0,03	0,03	0,03	0,05	0,05	0,06	0,10	0,11	0,11	0,13	0,13	0,15	

Note: The given cutting values are guide values, which were determined under ideal conditions.
The values have to be adapted in individual cases.

Solid carbide milling group 4 – Square shoulder mills AL/NM series

	a_e / D	Feed rate per cutting edge (f_z) [mm]															
		$\emptyset 0,5$	$\emptyset 0,8$	$\emptyset 1$	$\emptyset 2$	$\emptyset 3$	$\emptyset 4$	$\emptyset 5$	$\emptyset 6$	$\emptyset 8$	$\emptyset 10$	$\emptyset 12$	$\emptyset 14$	$\emptyset 16$	$\emptyset 18$	$\emptyset 20$	
N	1/1	0,02	0,03	0,03	0,03	0,03	0,03	0,05	0,05	0,06	0,09	0,11	0,11	0,12	0,12	0,14	
	3/4	0,02	0,04	0,04	0,04	0,04	0,04	0,06	0,06	0,08	0,12	0,14	0,14	0,16	0,16	0,18	
	1/10	0,03	0,06	0,06	0,06	0,06	0,06	0,09	0,09	0,12	0,19	0,22	0,22	0,25	0,25	0,28	
	1/20	0,04	0,08	0,08	0,08	0,08	0,08	0,12	0,12	0,16	0,23	0,27	0,27	0,31	0,31	0,35	

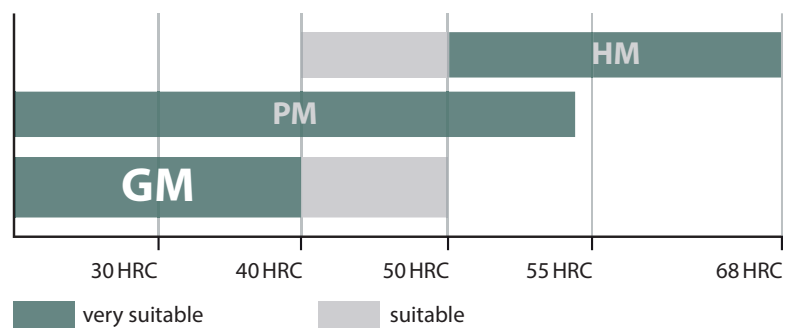
Note: The given cutting values are guide values, which were determined under ideal conditions.
The values have to be adapted in individual cases.

GM series

For general applications

- For machining of steel to max. 50 HRC and cast iron to heat-resistant alloys.
- Sharp cutting edge with high edge stability. Roughing to finishing with long tool life.
- End mills, ball nose cutters, torus mills, rippers and mini cutters.
- Diameter range 0.3–20.0 mm

Application fields for machining of steel



Solid carbide milling System code – DIN-ISO series

5 5 0 1 R 30 2 GM R05 0800

1 2 3 4 5 6 7 8 9 10

A

Turning

Type	
Code	Description
5	Milling cutter

Shank type	
Code	Description
1	Shank
5	DIN 6535 HA
6	Weldon shank DIN 6535 HB
7	Whistle Notch DIN 6535 HE
9	Morse taper shank

B

1

2

Milling

Cutting edge type	
Code	Description
0	Square shoulder mill
6	Ball nose cutter
8	Torus mill

Tool length	
Code	Description
1	DIN 6527 K
2	DIN 6527 L
5	Factory standard ZCC-A
6	Factory standard ZCC-B
8	DIN 6528
9	Factory standard ZCC-D

3

4

C

Drilling

Rotation direction	
Code	Description
R	Right
L	Left

Helix angle	
Code	Description
20	20°
30	30°
3841	38°/41°
45	45°
55	55°
60	60°

Number of teeth	
Code	Description
2	2
...	
M	Indicated when different diameters have a different number of teeth

5

6

7

D

Technical Information

Application	
Code	Description
GM	Semi-finishing
GF	Finishing
HM	Hard machining
MHH	High-speed hard machining
NH	High-performance machining of heat-resistant alloys

Radius [mm]	
Code	Description
R03	0,3
R15	1,5
R30	3,0
...	

Diameter [mm]	
Code	Description
0100	1,0
0800	8,0
2000	20,0
...	

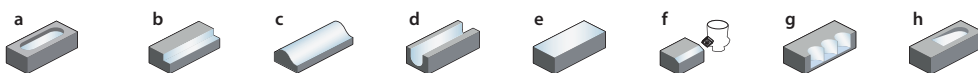
8

9

10

E

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a Groove milling
g Plunge milling
b Square shoulder milling
h Circular milling/Ramping
c Profile milling
d Slot milling
e Face milling
f Chamfer milling

A

Turning

Coated cemented carbide PVD

Grade	Grade description
KMD401	PVD coated carbide substrate for high performance milling application of non-ferrous metals, CFRP and GFRP and organic materials. The DLC layer has very good wear protection and high thermal stability.

B

Milling

KMG303	PVD coated carbide substrate for universal milling application of steel (up to HRC<=48), stainless steel and cast iron.
---------------	---

KMG405	PVD coated carbide substrate for high performance milling application of steel (up to HRC <55), stainless steel, super alloy material and cast iron. High wear resistance and toughness for a wide application field.
---------------	---

C

Drilling

KMG555	PVD coated carbide substrate for hard milling application of steel (HRC 55–68), highest wear resistance and toughness for best cutting result.
---------------	--

KMG309	PVD coated carbide substrate for non ferrous materials. High wear resistance even in abrasive materials.
---------------	--

D

Technical Information

Uncoated cemented carbide













Grade	Grade description
YK30F	Uncoated K30 carbide substrate for steel, stainless steel, cast iron and non ferrous materials.

E

Index

YK40F	Uncoated K20–K30/N20–N30 carbide substrate for cast iron and non ferrous materials.
--------------	---

General machining

Products	Solid carbide cutters	Teeth	Ø	Application						Type	Page
				P	M	K	N	S	H		
GM-2BFP		2	1.0-20.0	✓	✓	✓				Ball nose cutters	B315
GM-2BS		2	0.3-3.0	✓	✓	✓				Mini ball nose cutters	B316
GM-2BP		2	0.5-5.0	✓	✓	✓				Mini ball nose cutters	B317
GM-4B		4	3.0-20.0	✓	✓	✓				Ball nose cutters	B319
GM-4BL		4	3.0-20.0	✓	✓	✓				Ball nose cutters	B320
GM-2R		2	1.0-12.0	✓	✓	✓				Torus mills	B321
GM-4R		4	3.0-12.0	✓	✓	✓				Torus mills	B322
GM-4RL		4	6.0-16.0	✓	✓	✓				Torus mills	B323
5602R303GR		3	6.0-8.0	✓	✓	✓				Rippers	B324
5602R304GR		4	10.0-20.0	✓	✓	✓				Rippers	B325
5602R305GR		5	25.0	✓	✓	✓				Rippers	B326
GM-4W		4	6.0-20.0	✓	✓	✓				Rippers	B327

✓ Very suitable ✓ Suitable

Machining high hardness steel

HM-2E		2	1.0-20.0						✓	End mills	B354
HM-2EFP		2	6.0-20.0						✓	End mills	B355
HM-2EP		2	0.5-5.0						✓	Mini end mills	B356
HM-2ES		2	0.3-3.0						✓	Mini end mills	B358
HM-4E		4	1.0-20.0						✓	End mills	B359
HM-4EL		4	3.0-20.0						✓	End mills	B360
HM-4EFP		4	6.0-20.0						✓	End mills	B361
5502R55MHH		4-8	3.0-20.0						✓	End mills	B362

✓ Very suitable ✓ Suitable

A

Turning

B

Milling

C

Drilling

D

Technical Information

E

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