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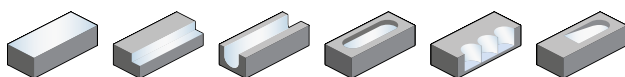
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End mill

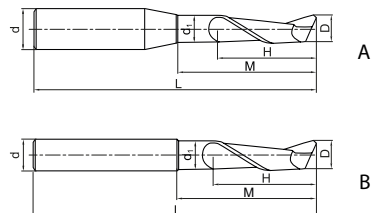
General machining of Al and Al alloys

New

ALP-1EP



- Factory standard
- Centre cutting
- Helix angle 23°



Article	*	Dimensions [mm]						Teeth	Geometry	Grade	
		D	d (h5)	d ₁	H	M	L			KMD401	YK40F
ALP-1EP-D2.0-M08S		2	4	1,8	6	8	45	1	A	○	○
ALP-1EP-D2.0-M12S		2	4	1,8	6	12	45	1	A	○	○
ALP-1EP-D3.0-M12S		3	4	2,8	8	12	45	1	A	○	○
ALP-1EP-D3.0-M18S		3	4	2,8	8	18	45	1	A	○	○
ALP-1EP-D4.0-M16S		4	4	3,8	10	16	45	1	B	○	○
ALP-1EP-D4.0-M24S		4	4	3,8	10	24	45	1	B	○	○
ALP-1EP-D2.0-M08		2	6	1,8	6	8	45	1	A	●	●
ALP-1EP-D2.0-M12		2	6	1,8	6	12	45	1	A	●	●
ALP-1EP-D3.0-M12		3	6	2,8	8	12	45	1	A	●	●
ALP-1EP-D3.0-M18		3	6	2,8	8	18	45	1	A	●	●
ALP-1EP-D4.0-M16		4	6	3,8	10	16	45	1	A	●	●
ALP-1EP-D4.0-M24		4	6	3,8	10	24	55	1	A	●	●
ALP-1EP-D5.0-M20		5	6	4,8	13	20	55	1	A	●	●
ALP-1EP-D5.0-M30		5	6	4,8	13	30	65	1	A	●	●
ALP-1EP-D6.0-M24		6	6	5,8	16	24	55	1	B	●	●
ALP-1EP-D6.0-M36		6	6	5,8	16	36	75	1	B	●	●
ALP-1EP-D8.0-M32		8	8	7,7	22	32	75	1	B	●	●
ALP-1EP-D8.0-M48		8	8	7,7	22	48	90	1	B	●	●
ALP-1EP-D10.0-M40		10	10	9,6	27	40	80	1	B	●	●
ALP-1EP-D10.0-M60		10	10	9,6	27	60	100	1	B	●	●

● Ex stock ○ On demand

* With internal cooling

Application field

P	M	K	N	S	H
			✓		

✓ Very suitable

✓ Suitable

End mill – AL series, ALP/ALG series

Material group		Composition / structure / heat treatment		Brinell hardness HB	Machining group	Starting values for cutting speed v_c [m/min]								
						ALP-1EP				AL-1E AL-2E AL-3E (W) ALG-2E				
						Slot milling		Shoulder milling		Slot milling		Shoulder milling		
						$\varnothing$ [mm]	$a_{p\max}$	$\varnothing$ [mm]	$a_{e\max}$	$\varnothing$ [mm]	$a_{p\max}$	$\varnothing$ [mm]	$a_{e\max}$	
						$0 < x < 6$	1xD	$0 < x \leq 12$	$< 1 \times D$	$0 < x < 12$	0.5xD	$0 < x \leq 20$	$< 0.5 \times D$	
$6 \leq x \leq 12$	1.5xD			$12 \leq x \leq 20$	1.0xD									
				YK40F / KMD401				YK30F / YK40F						
				a_e / D										
1/1	1/2	1/10	f-group	1/1	1/2	1/10	f-group							
P	Unalloyed steel	approx. 0,15 % C	annealed	125	1									
		approx. 0,45 % C	annealed	190	2									
		approx. 0,45 % C	tempered	250	3									
		approx. 0,75 % C	annealed	270	4									
		approx. 0,75 % C	tempered	300	5									
	Low-alloyed steel		annealed	180	6									
			tempered	275	7									
			tempered	300	8									
			tempered	350	9									
	High-alloyed steel and high-alloyed tool steel		annealed	200	10									
		hardened and tempered	325	11										
M	Stainless steel	ferritic/martensitic	annealed	200	12									
		martensitic	tempered	240	13									
		austenitic	quench hardened	180	14									
		austenitic-ferritic		230	15									
K	Grey cast iron	perlitic/ferritic		180	16									
		perlitic (martensitic)		260	17									
	Cast iron with spheroidal graphite	ferritic		160	18									
		perlitic		250	19									
	Malleable cast iron	ferritic		130	20									
		perlitic		230	21									
N	Aluminium wrought alloys	cannot be hardened		60	22	300	345	375	12	920	1100	1200	4	
		hardenable	hardened	100	23	250	290	315	12	555	660	720	4	
	Cast aluminium alloys	$\leq 12\%$ Si, cannot be hardened		75	24	250	280	315	12	370	440	480	4	
		$\leq 12\%$ Si, hardenable	hardened	90	25	210	240	265	12	460	550	600	4	
		$> 12\%$ Si, cannot be hardened		130	26	180	210	225	12	140	165	180	4	
	Copper and copper alloys (bronze/brass)	machining steel, PB> 1%		110	27	280	320	350	12	280	330	360	4	
		CuZn, CuSnZn		90	28	310	360	390	12	325	385	420	4	
CuSn, Pb-free copper, electrolytic copper		100	29	280	320	350	12	280	330	360	4			
S	Heat-resistant alloys	Fe-based alloys	annealed	200	30									
			hardened	280	31									
		Ni or Co bass	annealed	250	32									
			hardened	350	33									
			cast	320	34									
	Titanium alloys	pure titanium		R_m 400	35									
		α and β alloys	hardened	R_m 1050	36									
H	Hardened steel		hardened and tempered	55 HRC	37									
			hardened and tempered	60 HRC	38									
	Hard cast iron		cast	400	39									
	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 8 – High feed mills AL series, ALP/ALG series

	a_e / D	Feed rate per cutting edge (f_z) [mm]																	
		Ø 6	Ø 8	Ø 10	Ø 12	Ø 14	Ø 16	Ø 18	Ø 20										
N	1/1	0,04	0,05	0,08	0,09	0,11	0,13	0,16	0,18										
	3/4	0,05	0,07	0,10	0,12	0,14	0,16	0,20	0,23										
	1/10	0,08	0,11	0,16	0,19	0,22	0,25	0,31	0,36										

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 12 – ALP-1EP single-edged cutters

	a_e / D	Feed rate per cutting edge (f_z) [mm]																	
		Ø 2	Ø 3	Ø 4	Ø 5	Ø 6	Ø 8	Ø 10											
N	1/1	0,03	0,05	0,07	0,09	0,11	0,14	0,18											
	1/2	0,04	0,07	0,10	0,13	0,15	0,20	0,25											
	1/10	0,06	0,11	0,15	0,19	0,23	0,29	0,38											

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

A

GM – 2 E L P – D12 R0.5 – M08

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Application	
Code	Description
GR	General roughing
GM	Semi-finishing
GF	Finishing
PM	High-performance machining
HM	Hard machining
HH	High-speed hard machining
NM	General machining of non-ferrous metals
AL	General machining of Al and Al alloys
ALP	High-performance machining of Al and Al alloys
ALG	General machining of Al and Al alloys
UM	HSC/HPC machining
VSM	General machining of heat-resistant alloys

Number of teeth

1

2

Cutting edge type	
Code	Description
E	Square shoulder mill with protective chamfer
F	Square shoulder mill with sharp cutting edges
B	Ball nose cutter
R	Torus mill
W	Ripper
H	High-feed mill

3

Cutting edge length	
Code	Description
L	Long
X	Extra long
F	Short

4

Type	
Code	Description
S	Mini diameter
P	Ground neck
C	Conical neck

5

Diameter [mm]	
Code	Description
D3.0	3,0
D8.0	8,0
D20.0	20,0
...	

6

Radius [mm]	
Code	Description
R0.5	0,5
R1.0	1,5
R3.0	3,0
...	

7

Features	
Code	Description
G	Spiral angle 30°
M	Neck length [mm]
S	Thin shank
AIR	For aerospace industry

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a Groove milling



b Square shoulder milling



c Profile milling



d Slot milling



e Face milling



f Chamfer milling

g Plunge milling

h Circular milling/Ramping