

## End mill – HM series

Material group	Composition / structure / heat treatment	Brinell hardness HB	Machining group	Starting values for cutting speed $v_c$ [m/min]									
				HM-2E HM-2EP HM-2ES HM-4E					HM-2EFP HM-4EL HM-4EFP				
				Shoulder milling					Shoulder milling				
				$\emptyset$ [mm]	$a_e$ max				$\emptyset$ [mm]	$a_e$ max			
		$0 < x \leq 20$		$0,05 \times D$				$0 < x \leq 20$		$0,05 \times D$			
KMG555					KMG555								
$a_e / D$				$a_e / D$									
1/1	1/2	1/10	f-group	1/1	1/2	1/10	f-group	1/1	1/2	1/10	f-group		
P Unalloyed steel	ca. 0,15 % C	annealed	125	1									
	ca. 0,45 % C	annealed	190	2									
	ca. 0,45 % C	tempered	250	3									
	ca. 0,75 % C	annealed	270	4									
	ca. 0,75 % C	tempered	300	5									
P 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									
K Cast iron with spheroidal graphite	ferritic		160	18									
	perlitic		250	19									
K Malleable cast iron	ferritic		130	20									
	perlitic		230	21									
N Aluminium wrought alloys	cannot be hardened		60	22									
	hardenable	hardened	100	23									
	$\leq 12\%$ Si, cannot be hardened		75	24									
	Cast aluminium alloys	$\leq 12\%$ Si, hardenable	hardened	90	25								
		$> 12\%$ Si, cannot be hardened		130	26								
Copper and copper alloys (bronze/brass)	machining steel, PB $>$ 1%		110	27									
	CuZn, CuSnZn		90	28									
	CuSn, Pb-free copper, electrolytic copper		100	29									
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									
	$\alpha$ and $\beta$ alloys	hardened	$R_m$ 1050	36									
H Hardened steel		hardened and tempered	55 HRC	37	55	100	125	3	50	95	115	3	
		hardened and tempered	60 HRC	38	55	95	120	3	50	95	110	3	
H Hard cast iron		cast	400	39	70	125	160	3	65	120	145	3	
H Hardened cast iron		hardened and tempered	55 HRC	40	55	100	125	3	50	95	115	3	
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 B444.  
 For examples of material for cutting tool groups view page D22.

