

## 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		Shoulder milling		Shoulder milling			
				$\emptyset$ [mm]	$a_e$ max	$\emptyset$ [mm]	$a_e$ max	$\emptyset$ [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		
<b>P</b> 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									
<b>P</b> Low-alloyed steel		annealed	180	6									
		tempered	275	7									
		tempered	300	8									
		tempered	350	9									
<b>P</b> High-alloyed steel and high-alloyed tool steel		annealed	200	10									
		hardened and tempered	325	11									
<b>M</b> Stainless steel		ferritic/martensitic	200	12									
		martensitic	240	13									
		austenitic	180	14									
		austenitic-ferritic	230	15									
<b>K</b> Grey cast iron		perlitic/ferritic	180	16									
		perlitic (martensitic)	260	17									
<b>K</b> Cast iron with spheroidal graphite		ferritic	160	18									
		perlitic	250	19									
<b>K</b> Malleable cast iron		ferritic	130	20									
		perlitic	230	21									
<b>N</b> Aluminium wrought alloys		cannot be hardened	60	22									
		hardenable	100	23									
	<b>N</b> Cast aluminium alloys	$\leq 12\% \text{ Si}$ , cannot be hardened		75	24								
		$\leq 12\% \text{ Si}$ , hardenable	hardened	90	25								
<b>N</b> Copper and copper alloys (bronze/brass)	$> 12\% \text{ Si}$ , cannot be hardened		130	26									
		machining steel, PB $>$ 1%	110	27									
		CuZn, CuSnZn	90	28									
<b>S</b> Heat-resistant alloys		CuSn, Pb-free copper, electrolytic copper	100	29									
	<b>S</b> Heat-resistant alloys	Fe-based alloys	annealed	200	30								
			hardened	280	31								
	<b>S</b> Heat-resistant alloys	Ni or Co bass	annealed	250	32								
			hardened	350	33								
cast			320	34									
<b>S</b> Titanium alloys		pure titanium	$R_m$ 400	35									
		$\alpha$ and $\beta$ alloys	hardened	$R_m$ 1050	36								
<b>H</b> 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	
<b>H</b> Hard cast iron		cast	400	39	70	125	160	3	65	120	145	3	
<b>H</b> Hardened cast iron		hardened and tempered	55 HRC	40	55	100	125	3	50	95	115	3	
<b>X</b> 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.

