

Speeds and Feeds



HSS Co8 Cobalt End Mills Uncoated 4-Flute and 6-Flute

ISO	VDI 3323	Material Description	Composition / Structure / Heat Treatment	HB	HRc	Ae	Ap	Parameter	Side Cutting												
									* The feedrate in long tools should be reduced by approximately 50%												
									1/4" 4-Flute	5/16" 4-Flute	3/8" 4-Flute	7/16" 4-Flute	1/2" 4-Flute	9/16" 4-Flute	5/8" 4-Flute	3/4" 4-Flute	1" 4-Flute	3/4" 6-Flute	1" 6-Flute		
P	1	Non-alloy steel	About 0.15% C	Annealed	125		0.1D	1.5D	SFM	120	115	110	115	120	120	115	125	120	125	120	
									IPT	.0010	.0014	.0018	.0023	.0025	.0028	.0032	.0032	.0039	.0021	.0026	
									RPM	1800	1400	1100	1000	900	800	700	630	450	630	450	
			IPM	7	8	8	9	9	9	9	8	7	8	7							
	2		About 0.45% C	Annealed	190	13	0.1D	1.5D	SFM	105	90	90	95	105	105	90	100	105	100	105	105
									IPT	.0009	.0014	.0017	.0021	.0022	.0025	.0027	.0030	.0038	.0020	.0025	
									RPM	1600	1100	900	850	800	700	560	500	400	500	400	
			IPM	6	6	6	7	7	7	6	6	6	6	6							
	3		About 0.45% C	Quenched & Tempered	250	25	0.1D	1.5D	SFM	80	80	80	80	80	80	75	80	80	80	80	80
									IPT	.0008	.0013	.0016	.0018	.0020	.0022	.0022	.0025	.0032	.0017	.0022	
									RPM	1200	950	800	720	630	560	450	400	310	400	310	
			IPM	4	5	5	5	5	5	4	4	4	4	4							
	4		About 0.75% C	Annealed	270	28	0.1D	1.5D	SFM	80	80	80	80	80	80	75	80	80	80	80	80
									IPT	.0008	.0013	.0016	.0018	.0020	.0022	.0022	.0025	.0032	.0017	.0022	
									RPM	1200	950	800	720	630	560	450	400	310	400	310	
			IPM	4	5	5	5	5	5	4	4	4	4	4							
	5		About 0.75% C	Quenched & Tempered	300	32	0.1D	1.5D	SFM	50	45	45	50	50	50	45	50	45	50	45	
									IPT	.0006	.0013	.0017	.0017	.0019	.0021	.0027	.0030	.0028	.0020	.0019	
									RPM	800	560	450	430	400	350	280	250	180	250	180	
			IPM	2	3	3	3	3	3	3	3	2	3	2							
	6		Annealed	180	10	0.1D	1.5D	SFM	105	90	90	95	105	105	90	100	105	100	105		
								IPT	.0009	.0014	.0017	.0021	.0022	.0025	.0027	.0030	.0038	.0020	.0025		
								RPM	1600	1100	900	850	800	700	560	500	400	500	400		
			IPM	6	6	6	7	7	7	6	6	6	6	6							
7	Quenched & Tempered	275	29	0.1D	1.5D	SFM	80	80	80	80	80	80	75	80	80	80	80				
						IPT	.0008	.0013	.0016	.0018	.0020	.0022	.0022	.0025	.0032	.0017	.0022				
						RPM	1200	950	800	720	630	560	450	400	310	400	310				
	IPM	4	5	5	5	5	5	4	4	4	4	4									
8	Quenched & Tempered	300	32	0.1D	1.5D	SFM	50	45	45	50	50	50	45	50	45	50	45				
						IPT	.0006	.0013	.0017	.0017	.0019	.0021	.0027	.0030	.0028	.0020	.0019				
						RPM	800	560	450	430	400	350	280	250	180	250	180				
	IPM	2	3	3	3	3	3	3	3	2	3	2									



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									1/4" 4-Flute	5/16" 4-Flute	3/8" 4-Flute	7/16" 4-Flute	1/2" 4-Flute	9/16" 4-Flute	5/8" 4-Flute	3/4" 4-Flute	1" 4-Flute	3/4" 6-Flute	1" 6-Flute	
P	9	Low alloy steel	Quenched & Tempered		350	38	0.1D	1.5D	SFM	50	45	45	50	50	50	45	50	45	50	45
									IPT	.0006	.0013	.0017	.0017	.0019	.0021	.0027	.0030	.0028	.0020	.0019
									RPM	800	560	450	430	400	350	280	250	180	250	180
									IPM	2	3	3	3	3	3	3	2	3	2	
	10	High alloyed steel, and tool steel	Annealed	200	15	0.1D	1.5D	SFM	105	90	90	95	105	105	90	100	105	100	105	
								IPT	.0009	.0014	.0017	.0021	.0022	.0025	.0027	.0030	.0038	.0020	.0025	
								RPM	1600	1100	900	850	800	700	560	500	400	500	400	
								IPM	6	6	6	7	7	7	6	6	6	6	6	
	11.1	High alloyed steel, and tool steel	Quenched & Tempered	325	35	0.1D	1.5D	SFM	50	45	45	50	50	50	45	50	45	50	45	
IPT								.0006	.0013	.0017	.0017	.0019	.0021	.0027	.0030	.0028	.0020	.0019		
RPM								800	560	450	430	400	350	280	250	180	250	180		
IPM								2	3	3	3	3	3	3	3	2	3	2		
N	21	Aluminum-wrought alloy	Not Curable		60	0.1D	1.5D	SFM	365	325	305	320	325	325	325	355	315	355	315	
								IPT	.0008	.0014	.0019	.0021	.0022	.0024	.0026	.0029	.0035	.0019	.0024	
								RPM	5600	4000	3100	2800	2500	2200	2000	1800	1200	1800	1200	
								IPM	19	23	24	23	22	21	21	21	17	21	17	
	22	Aluminum-wrought alloy	Curable	Hardened	100	0.1D	1.5D	SFM	365	325	305	320	325	325	325	355	315	355	315	
								IPT	.0008	.0014	.0019	.0021	.0022	.0024	.0026	.0029	.0035	.0019	.0024	
								RPM	5600	4000	3100	2800	2500	2200	2000	1800	1200	1800	1200	
								IPM	19	23	24	23	22	21	21	21	17	21	17	
	23	Aluminum-cast, alloyed	≤ 12% Si, Not Curable		75	0.1D	1.5D	SFM	365	325	305	320	325	325	325	355	315	355	315	
								IPT	.0008	.0014	.0019	.0021	.0022	.0024	.0026	.0029	.0035	.0019	.0024	
								RPM	5600	4000	3100	2800	2500	2200	2000	1800	1200	1800	1200	
								IPM	19	23	24	23	22	21	21	21	17	21	17	
24	Aluminum-cast, alloyed	≤ 12% Si, Curable	Hardened	90	0.1D	1.5D	SFM	365	325	305	320	325	325	325	355	315	355	315		
							IPT	.0008	.0014	.0019	.0021	.0022	.0024	.0026	.0029	.0035	.0019	.0024		
							RPM	5600	4000	3100	2800	2500	2200	2000	1800	1200	1800	1200		
							IPM	19	23	24	23	22	21	21	21	17	21	17		
25	Aluminum-cast, alloyed	> 12% Si, Not Curable		130	0.1D	1.5D	SFM	365	325	305	320	325	325	325	355	315	355	315		
							IPT	.0008	.0014	.0019	.0021	.0022	.0024	.0026	.0029	.0035	.0019	.0024		
							RPM	5600	4000	3100	2800	2500	2200	2000	1800	1200	1800	1200		
							IPM	19	23	24	23	22	21	21	21	17	21	17		