



List 440: Ball End - Multiple Flute - General Purpose - Regular Pitch

Side Milling

Hardness	<145 Brinell	<20 HRC	20-30 HRC	30-40 HRC	-									
Work Material	Mild Steels Carbon Steels Cast Iron	Medium Carbon Steels Hard Brass and Bronze Cast Iron	High Carbon Steel Titanium Alloys Medium Strength Stainless Effects	Heat Resistant High Alloys Austenitic Alloys Tool Steels	Aluminum Aluminum Alloys									
Cutting Speed	100-130 SFM	60-75 SFM	40-55 SFM	26-40 SFM	190-330 SFM									
Depth of Cut	<table border="1"> <thead> <tr> <th>Dia</th> <th>a_a</th> <th>a_r</th> </tr> </thead> <tbody> <tr> <td>1/2 ≤ D ≤ 1</td> <td>1.5D</td> <td>0.5D</td> </tr> <tr> <td>1-1/4 ≤ D ≤ 2</td> <td>1.0D</td> <td>0.5D</td> </tr> </tbody> </table>					Dia	a _a	a _r	1/2 ≤ D ≤ 1	1.5D	0.5D	1-1/4 ≤ D ≤ 2	1.0D	0.5D
Dia	a _a	a _r												
1/2 ≤ D ≤ 1	1.5D	0.5D												
1-1/4 ≤ D ≤ 2	1.0D	0.5D												
Mill Dia.	Speed RPM	Feed in/min	Speed RPM	Feed in/min	Speed RPM	Feed in/min	Speed RPM	Feed in/min	Speed RPM	Feed in/min				
1/2	875	3.9	500	2.7	365	1.7	250	1.1	2,000	12.6				
5/8	700	4.4	420	3.1	300	1.9	200	1.3	1,600	14.1				
3/4	590	4.1	350	3.1	250	2.0	170	1.2	1,350	13.9				
1	500	5.0	250	2.9	180	1.8	125	1.3	1,000	14.2				
1-1/4	350	5.0	200	3.3	150	2.3	100	1.4	800	15.9				
1-1/2	300	5.0	175	3.3	120	1.9	80	1.3	650	14.3				
2	250	4.3	130	2.7	90	1.6	65	1.2	500	11.7				

Slotting

Hardness	<145 Brinell	<20 HRC	20-30 HRC	30-40 HRC	-								
Work Material	Mild Steels Carbon Steels Cast Iron	Medium Carbon Steels Hard Brass and Bronze Cast Iron	High Carbon Steel Titanium Alloys Medium Strength Stainless Effects	Heat Resistant High Alloys Austenitic Alloys Tool Steels	Aluminum Aluminum Alloys								
Cutting Speed	80-150 SFM	50-65 SFM	30-50 SFM	16-32 SFM	80-390 SFM								
Depth of Cut	<table border="1"> <thead> <tr> <th># of Flutes</th> <th>a_a</th> </tr> </thead> <tbody> <tr> <td>4FL</td> <td>1/4D</td> </tr> <tr> <td>6FL</td> <td>1/6D</td> </tr> <tr> <td>8FL</td> <td>1/8D</td> </tr> </tbody> </table>					# of Flutes	a _a	4FL	1/4D	6FL	1/6D	8FL	1/8D
# of Flutes	a _a												
4FL	1/4D												
6FL	1/6D												
8FL	1/8D												
Mill Dia.	Speed RPM	Feed in/min	Speed RPM	Feed in/min	Speed RPM	Feed in/min	Speed RPM	Feed in/min	Speed RPM	Feed in/min			
1/2	1,000	10.5	450	3.3	315	2.1	200	1.1	2,500	21.0			
5/8	800	8.5	355	3.0	250	2.0	160	0.9	2,000	16.7			
3/4	710	8.5	315	2.8	225	2.0	140	0.9	1,800	16.9			
1	500	7.0	224	2.2	160	1.6	100	0.9	1,250	14.1			
1-1/4	400	5.3	180	1.7	125	1.1	80	0.7	1,000	10.5			
1-1/2	315	4.0	140	1.1	100	0.8	63	0.5	800	8.0			
2	250	3.9	112	1.1	80	0.8	50	0.5	630	7.8			

In case of deeper operation, slow down feed by 20-50%.

