

Micro End Mill Recommended Cutting Data 3MVS / 3MVR Series - Inch

Workpiece Material Group	ISO	Hardness	Coolant ● Preferred ○ Possible x Not Possible			vc - SFM	Application	End Mill Diameter (inch)							
			Max.	Air	MMS			.015	.031	.047	.062	.078	.093	.109	.125
								fz - in/tooth							
Alloy Steels 4140, 4145	P	28 to 44 Rc	●	●	○	275	Slotting	.00005	.00010	.00015	.00020	.00025	.00030	.00035	.00040
							Roughing	.00017	.00035	.00053	.00069	.00087	.00104	.00122	.00140
							Finishing	.00032	.00067	.00102	.00134	.00168	.00201	.00235	.00270
Die / Tool Steels A2, D2, H13, P20	P	28 to 44 Rc	●	●	○	225	Slotting	.00005	.00010	.00015	.00020	.00025	.00030	.00035	.00040
							Roughing	.00017	.00035	.00053	.00069	.00087	.00104	.00122	.00140
							Finishing	.00032	.00067	.00102	.00134	.00168	.00201	.00235	.00270
Stainless Steel - Easy to Machine 430F, 301, 303, 410, 416 Annealed, 420F, 430	M	up to 28 Rc	●	x	○	325	Slotting	.00005	.00010	.00015	.00020	.00025	.00030	.00035	.00040
							Roughing	.00017	.00035	.00053	.00069	.00087	.00104	.00122	.00140
							Finishing	.00032	.00067	.00102	.00134	.00168	.00201	.00235	.00270
Stainless Steel - Moderately Difficult 301, 302, 303 High Tensile, 304, 304L, 305, 420, 15-5PH, 17-4PH, 17-7PH	M	up to 28 Rc	●	x	○	225	Slotting	.00005	.00010	.00015	.00020	.00025	.00030	.00035	.00040
							Roughing	.00017	.00035	.00053	.00069	.00087	.00104	.00122	.00140
							Finishing	.00032	.00067	.00102	.00134	.00168	.00201	.00235	.00270
Stainless Steel - Difficult to Machine 302B, 304B, 309, 310, 316, 316B, 316L, 316Ti, 317, 317L, 321, PH13-8Mo, Nitronics	M	over 28 Rc	●	x	○	200	Slotting	.00005	.00010	.00015	.00020	.00025	.00030	.00035	.00040
							Roughing	.00017	.00035	.00053	.00069	.00087	.00104	.00122	.00140
							Finishing	.00032	.00067	.00102	.00134	.00168	.00201	.00235	.00270
High Temp Alloys Nimonic, Inconel, Monel, Hastelloy	S	up to 42 Rc	●	x	x	95	Slotting	.00004	.00007	.00011	.00015	.00019	.00022	.00026	.00030
							Roughing	.00004	.00009	.00014	.00018	.00023	.00027	.00032	.00036
							Finishing	.00008	.00017	.00026	.00034	.00043	.00051	.00060	.00069
Titanium Alloys 6Al-4V, 5Al-2.5 Sn, 6Al-2 Sn-4Zr-6Mo, 3Al-8V-6Cr-4Mo-4Zr, 10V-2Fe-3Al, 13V-11Cr-3Al	S	up to 42 Rc	●	x	x	180	Slotting	.00004	.00007	.00011	.00015	.00019	.00022	.00026	.00030
							Roughing	.00004	.00009	.00014	.00018	.00023	.00027	.00032	.00036
							Finishing	.00008	.00017	.00026	.00034	.00043	.00051	.00060	.00069
Hardened Steels	H	45 to 50 Rc	●	●	○	200	Slotting	.00004	.00007	.00011	.00015	.00019	.00022	.00026	.00030
							Roughing	.00009	.00018	.00027	.00036	.00045	.00054	.00063	.00072
							Finishing	.00017	.00034	.00052	.00068	.00086	.00102	.00120	.00138
Hardened Steels	H	50 to 55 Rc	●	●	○	180	Slotting	.00001	.00002	.00004	.00005	.00006	.00007	.00009	.00010
							Roughing	.00004	.00009	.00014	.00018	.00023	.00027	.00032	.00036
							Finishing	.00008	.00017	.00026	.00034	.00043	.00051	.00060	.00069
Hardened Steels	H	> 55 Rc	●	●	○	150	Slotting	.00001	.00002	.00004	.00005	.00006	.00007	.00009	.00010
							Roughing	.00004	.00009	.00014	.00018	.00023	.00027	.00032	.00036
							Finishing	.00008	.00017	.00026	.00034	.00043	.00051	.00060	.00069

Depth of Cut Per Application - 1.5x, 3x, & 5x Reach Tools		
Application	Depth of Cut	
	Radial	Axial
Slotting	1 x Dia.	.25 x Dia.
Roughing	.25 x Dia.	.5 - 1 x Dia.
Finishing	.05 x Dia.	.5 - 1 x Dia.

Depth of Cut Per Application - 8x Reach Tools		
Application	Depth of Cut	
	Radial	Axial
Slotting	1 x Dia.	.2 x Dia.
Roughing	.2 x Dia.	.5 - 1 x Dia.
Finishing	.05 x Dia.	.5 - 1 x Dia.




Depth of Cut Per Application - 10x Reach Tools		
Application	Depth of Cut	
	Radial	Axial
Slotting	1 x Dia.	.15 x Dia.
Roughing	.15 x Dia.	.5 - 1 x Dia.
Finishing	.05 x Dia.	.5 - 1 x Dia.

Spindle Maximum - Should the calculated spindle speed be more than your actual spindle maximum, use this formula:

$$\text{Spindle Maximum} = \frac{\text{Calculated Feed} \times \text{Spindle Maximum}}{\text{Calculated Speed}}$$

Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

Micro End Mill Recommended Cutting Data 3MVS / 3MVR Series - Metric

Workpiece Material Group	ISO	Hardness	Coolant ● Preferred ○ Possible x Not Possible			vc-m/min	Application	End Mill Diameter (mm)					
								0.5	1.0	1.5	2.0	2.5	3
								Max.	Air	MMS	fz - mm/tooth		
Alloy Steels 4140, 4145	P	28 to 44 Rc	●	●	○	85	Slotting	.002	.003	.005	.006	.008	.010
							Roughing	.006	.011	.017	.022	.028	.034
							Finishing	.011	.022	.032	.043	.054	.065
Die / Tool Steels A2, D2, H13, P20	P	28 to 44 Rc	●	●	○	70	Slotting	.002	.003	.005	.006	.008	.010
							Roughing	.006	.011	.017	.022	.028	.034
							Finishing	.011	.022	.032	.043	.054	.065
Stainless Steel - Easy to Machine 430F, 301, 303, 410, 416 Annealed, 420F, 430	M	up to 28 Rc	●	x	○	100	Slotting	.002	.003	.005	.006	.008	.010
							Roughing	.006	.011	.017	.022	.028	.034
							Finishing	.011	.022	.032	.043	.054	.065
Stainless Steel - Moderately Difficult 301, 302, 303 High Tensile, 304, 304L, 305, 420, 15-5PH, 17-4PH, 17-7PH	M	up to 28 Rc	●	x	○	70	Slotting	.002	.003	.005	.006	.008	.010
							Roughing	.006	.011	.017	.022	.028	.034
							Finishing	.011	.022	.032	.043	.054	.065
Stainless Steel - Difficult to Machine 302B, 304B, 309, 310, 316, 316B, 316L, 316Ti, 317, 317L, 321, PH13-8Mo, Nitronics	M	over 28 Rc	●	x	○	60	Slotting	.002	.003	.005	.006	.008	.010
							Roughing	.006	.011	.017	.022	.028	.034
							Finishing	.011	.022	.032	.043	.054	.065
High Temp Alloys Nimonic, Inconel, Monel, Hastelloy	S	up to 42 Rc	●	x	x	30	Slotting	.001	.002	.004	.005	.006	.007
							Roughing	.001	.003	.004	.006	.007	.009
							Finishing	.003	.006	.008	.011	.014	.017
Titanium Alloys 6Al-4V, 5Al-2.5 Sn, 6Al-2 Sn-4Zr-6Mo, 3Al-8V-6Cr4Mo-4Zr, 10V-2Fe-3Al, 13V-11Cr-3Al	S	up to 42 Rc	●	x	x	55	Slotting	.001	.002	.004	.005	.006	.007
							Roughing	.001	.003	.004	.006	.007	.009
							Finishing	.003	.006	.008	.011	.014	.017
Hardened Steels	H	45 to 50 Rc	●	●	○	60	Slotting	.001	.002	.004	.005	.006	.007
							Roughing	.003	.006	.009	.012	.014	.017
							Finishing	.006	.011	.017	.022	.028	.033
Hardened Steels	H	50 to 55 Rc	●	●	○	55	Slotting	.0004	.001	.001	.002	.002	.002
							Roughing	.001	.003	.004	.006	.007	.009
							Finishing	.003	.006	.008	.011	.014	.017
Hardened Steels	H	> 55 Rc	●	●	○	45	Slotting	.0004	.001	.001	.002	.002	.002
							Roughing	.001	.003	.004	.006	.007	.009
							Finishing	.003	.006	.008	.011	.014	.017

Depth of Cut Per Application - 12x Reach Tools		
Application	Depth of Cut	
	Radial	Axial
Slotting	1 x Dia.	.12 x Dia.
Roughing	.1 x Dia.	.5 - 1 x Dia.
Finishing	.05 x Dia.	.5 - 1 x Dia.

Depth of Cut Per Application - 15x Reach Tools		
Application	Depth of Cut	
	Radial	Axial
Slotting	1 x Dia.	.07 x Dia.
Roughing	.1 x Dia.	.5 - 1 x Dia.
Finishing	.05 x Dia.	.5 - 1 x Dia.

Spindle Maximum - Should the calculated spindle speed be more than your actual spindle maximum, use this formula:

$$\frac{\text{Calculated Feed} \times \text{Spindle Maximum}}{\text{Calculated Speed}}$$

Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

For product information, call your local distributor.