



Where **high performance** is the **standard**®

NEW

TuffCut® 3MV

Micro Variable Helix

Series 3MVS

Series 3MVR



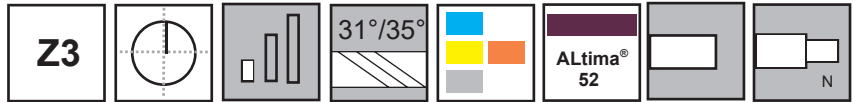
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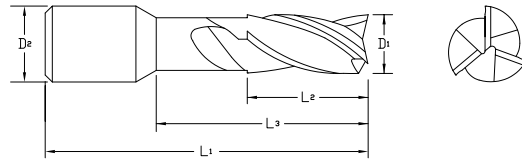


TuffCut® Series 3MVS

Designed for high performance micro milling on any ferrous material, especially material used in medical and aerospace manufacturing.



- Variable helix
- Stub length
- Square end
- Neck relief options
- ALtima® 52 coated
- Common shanks



ALtima® 52		Diameter			Shank Diameter		OAL		Flute Length		Neck Length	
Tool Number	EDP	D1			D2		L1		L2		L3	
		Fraction	mm	Decimal	Inch	mm	Inch	mm	Inch	mm	Inch	mm
3MVS0156AH	39000	1/64		.0156	1/8		1-1/2		.023			
3MVS0156N5AH	39002	1/64		.0156	1/8		2-1/2		.023		.078	
3MVS0156N8AH	39003	1/64		.0156	1/8		2-1/2		.023		.125	
3MVSM0050AH	39004		0.5	.0196		4.0		50		0.75		
3MVS0312AH	39006	1/32		.0312	1/8		1-1/2		.047			
3MVS0312N3AH	39008	1/32		.0312	1/8		1-1/2		.047		.093	
3MVS0312N5AH	39009	1/32		.0312	1/8		2-1/2		.047		.156	
3MVS0312N8AH	39010	1/32		.0312	1/8		2-1/2		.047		.250	
3MVS0312N10AH	39011	1/32		.0312	1/8		2-1/2		.047		.312	
3MVS0312N12AH	39012	1/32		.0312	1/8		2-1/2		.047		.375	
3MVS0312N15AH	39013	1/32		.0312	1/8		2-1/2		.047		.480	
3MVSM0100AH	39014		1.0	.0394		4.0		50		1.50		
3MVSM0100N5AH	39016		1.0	.0394		4.0		50		1.50		5
3MVSM0100N8AH	39017		1.0	.0394		4.0		50		1.50		8
3MVS0468AH	39018	3/64		.0468	1/8		1-1/2		.070			
3MVS0468N5AH	39020	3/64		.0468	1/8		2-1/2		.070		.250	
3MVS0468N8AH	39021	3/64		.0468	1/8		2-1/2		.070		.375	
3MVS0468N10AH	39022	3/64		.0468	1/8		2-1/2		.070		.480	
3MVSM0150AH	39023		1.5	.0591		4.0		50		2.25		
3MVS0625AH	39025	1/16		.0625	1/8		1-1/2		.094			
3MVS0625N3AH	39027	1/16		.0625	1/8		1-1/2		.094		.187	
3MVS0625N5AH	39028	1/16		.0625	1/8		2-1/2		.094		.312	
3MVS0625N8AH	39029	1/16		.0625	1/8		2-1/2		.094		.500	
3MVS0625N10AH	39030	1/16		.0625	1/8		2-1/2		.094		.625	
3MVS0625N12AH	39031	1/16		.0625	1/8		2-1/2		.094		.750	

Inch	
D1	Tolerance
.0156 - .1250	+0/-0.0008

mm	
D1	Tolerance
0.5 - 3.0	+0/-0.020

Inch	
D2	Tolerance (h6)
.1250	+0/-0.00031

mm	
D2	Tolerance (h6)
4.0	+0/-0.008

ALtima® 52		Diameter			Shank Diameter		OAL		Flute Length		Neck Length	
		D1			D2		L1		L2		L3	
Tool Number	EDP	Fraction	mm	Decimal	Inch	mm	Inch	mm	Inch	mm	Inch	mm
3MVS0625N15AH	39032	1/16		.0625	1/8		2-1/2		.094		.950	
3MVS0781AH	39033	5/64		.0781	1/8		1-1/2		.117			
3MVS0781N5AH	39035	5/64		.0781	1/8		2-1/2		.117		.406	
3MVS0781N8AH	39036	5/64		.0781	1/8		2-1/2		.117		.625	
3MVS0781N10AH	39037	5/64		.0781	1/8		2-1/2		.117		.800	
3MVSM0200AH	39038		2.0	.0787		4.0		50		3.00		
3MVSM0200N5AH	39040		2.0	.0787		4.0		50		3.00		10
3MVSM0200N8AH	39041		2.0	.0787		4.0		50		3.00		16
3MVS0938AH	39042	3/32		.0938	1/8		1-1/2		.141			
3MVS0938N3AH	39044	3/32		.0938	1/8		1-1/2		.141		.279	
3MVS0938N5AH	39045	3/32		.0938	1/8		2-1/2		.141		.500	
3MVS0938N8AH	39046	3/32		.0938	1/8		2-1/2		.141		.750	
3MVS0938N10AH	39047	3/32		.0938	1/8		2-1/2		.141		.950	
3MVS0938N12AH	39048	3/32		.0938	1/8		2-1/2		.141		1.125	
3MVS0938N15AH	39049	3/32		.0938	1/8		2-1/2		.141		1.400	
3MVSM0250AH	39050		2.5	.0984		4.0		50		3.75		
3MVS1094AH	39052	7/64		.1094	1/8		1-1/2		.164			
3MVS1094N5AH	39054	7/64		.1094	1/8		2-1/2		.164		.570	
3MVS1094N8AH	39055	7/64		.1094	1/8		2-1/2		.164		.900	
3MVSM0300AH	39056		3.0	.1181		4.0		50		4.50		
3MVSM0300N5AH	39058		3.0	.1181		4.0		50		4.50		15
3MVSM0300N8AH	39059		3.0	.1181		4.0		50		4.50		24
3MVS1250AH	39060	1/8		.1250	1/8		1-1/2		.188			
3MVS1250N3AH	39062	1/8		.1250	1/8		1-1/2		.188		.375	
3MVS1250N5AH	39063	1/8		.1250	1/8		2-1/2		.188		.625	
3MVS1250N8AH	39064	1/8		.1250	1/8		2-1/2		.188		1.000	
3MVS1250N10AH	39065	1/8		.1250	1/8		2-1/2		.188		1.250	

Safety Note

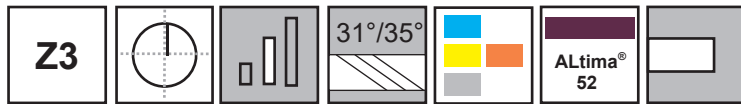
Always wear the appropriate personal protective equipment such as safety glasses and protective clothing when using solid carbide or HSS cutting tools. Machines should be fully guarded.

⚠️WARNING: This product can expose you to chemicals including nickel, cobalt, and lead, which are known to the State of California to cause cancer, and chemicals including lead which are known to the State of California to cause birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

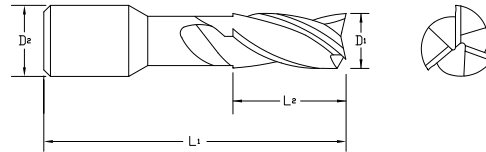


TuffCut® Series 3MVR

Designed for high performance micro milling on any ferrous material, especially material used in medical and aerospace manufacturing.



- Variable helix
- Standard length
- Square end
- ALtima® 52 coated
- Common shanks



ALtima® 52		Diameter			Shank Diameter		OAL		Flute Length	
Tool Number	EDP	D1			D2		L1		L2	
		Fraction	mm	Decimal	Inch	mm	Inch	mm	Inch	mm
3MVR0156AH	39001	1/64		.0156	1/8		1-1/2		.047	
3MVRM0050AH	39005		0.5	.0196		4.0		50		1.50
3MVR0312AH	39007	1/32		.0312	1/8		1-1/2		.094	
3MVRM0100AH	39015		1.0	.0394		4.0		50		3.00
3MVR0468AH	39019	3/64		.0468	1/8		1-1/2		.140	
3MVRM0150AH	39024		1.5	.0591		4.0		50		4.50
3MVR0625AH	39026	1/16		.0625	1/8		1-1/2		.188	
3MVR0781AH	39034	5/64		.0781	1/8		1-1/2		.234	
3MVRM0200AH	39039		2.0	.0787		4.0		50		6.00
3MVR0938AH	39043	3/32		.0938	1/8		1-1/2		.281	
3MVRM0250AH	39051		2.5	.0984		4.0		50		7.50
3MVR1094AH	39053	7/64		.1094	1/8		1-1/2		.328	
3MVRM0300AH	39057		3.0	.1181		4.0		50		9.00
3MVR1250AH	39061	1/8		.1250	1/8		1-1/2		.375	

Inch	
D1	Tolerance
.0156 - .1250	+0/- .0008

mm	
D1	Tolerance
0.5 - 3.0	+0/- .020

Inch	
D2	Tolerance (h6)
.1250	+0/- .00031

mm	
D2	Tolerance (h6)
4.0	+0/- .008

Also Available General Purpose Micro End Mills:



M.A. Ford® Series 111

- 4 Flute
- Center cutting
- Standard lengths
- Sizes from .0050" and 0.2mm
- Uncoated
- 30° helix, square end



M.A. Ford® Series 121

- 2 Flute
- Center cutting
- Standard lengths
- Sizes from .0050" and 0.2mm
- Uncoated
- 30° helix, square end



M.A. Ford® Series 164

- 2 Flute
- Center cutting
- Stub lengths
- Sizes from .0050" and 0.2mm
- Uncoated
- 30° helix, square end



M.A. Ford® Series 150

- 2 Flute, Ball Nose
- Center cutting
- Standard lengths
- Sizes from .0150" and 0.4mm
- Uncoated
- 30° helix



M.A. Ford® Series 163

- 4 Flute
- Center cutting
- Stub lengths
- Sizes from .0050" and 1.0mm
- Uncoated
- 30° helix, square end



Recommended Cutting Data 3MVS/3MVR Series - Inch

Workpiece Material Group	I S O	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-6Cr4Mo-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.

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:
 (Calculated Feed x Spindle Maximum)/Calculated Speed.

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

Recommended Cutting Data 3MVS/3MVR Series - Metric

Workpiece Material Group	ISO	Hardness	Coolant			vc-m/min	Application	End Mill Diameter (mm)					
			● Preferred ○ Possible x Not Possible					0.5	1.0	1.5	2.0	2.5	3
			Max.	Air	MMS								
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-6Cr-4Mo-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 - 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.

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:
 (Calculated Feed x Spindle Maximum)/Calculated Speed.

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



Also available:



Where **high performance** is the **standard**

M.A. Ford® Mfg. Co., Inc.
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Davenport, IA 52806
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Fax: 563-386-7660 or 800-892-9522
e-mail: sales@maford.com
www.maford.com

WB3MV2018

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