










Coatings

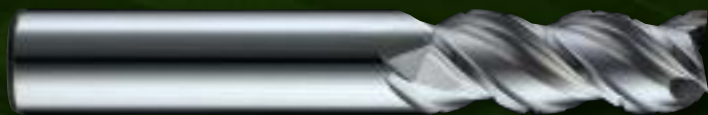
All of our tools are available in a variety of application specific surface treatments and coatings. Please see individual tool listings for stocked treatments and coatings. Other treatments and coatings are available upon request. These surface treatments and coatings are designed to enhance performance as well as the life of the tool. The chart below is a handy reference outlining the surface treatment and coating composition as well as the suggested application. If the material you are preparing to machine is not listed, please give us a call and we can help.

	Code No.	Coating No.	Characteristics	Application
	C-1*	88	A general purpose coating which has excellent wear resistance, reduces friction and prevents galling.	Most ferrous materials. Although it's unlikely, galling may occur in titanium and titanium alloys. (Not recommended for aluminum).
	C-4	89	An extremely hard coating which has outstanding wear resistance, reduces friction and prevents galling.	Most ferrous, non-ferrous and non-metallic materials. Very effective at higher speeds. Although it's unlikely galling may occur in titanium and titanium alloys.
	C-5	86	A thin hard coating that improves lubricity and increases oxidation resistance. Specifically designed for machining abrasive and gummy materials.	Suitable for machining aluminum alloys, high silica aluminum, cast iron, high temperature alloys, stainless steel and glass filled plastics. Not recommended for machining carbon steels.
	C-6*	06	Outstanding self-lubricating properties, Silver/Gray in color.	For machining aluminum, (silcon content less than 10%), copper and titanium.
	C-7*	83	A very hard coating recommended for harder alloys which has very good wear resistance, reduces friction and prevents galling.	Titanium, titanium alloys, nickel-base alloys, stainless steel and cast iron. Effective at higher speed. Not recommended for wrought aluminum, copper or brass.
	C-10	70	Excellent coating that provides high oxidation resistance and high temperature wear resistance.	Very effective in wet/dry milling of steels, cast iron, aerospace inconel and titanium alloys.
	C-11	85	An extremely hard coating very similar to C7 with outstanding wear resistance. C-11 has a higher aluminum content which makes it harder and smoother than C7.	Very effective in the same materials as C7. Excellent for small depths of cut and excels in high speed and dry machining applications.
	C-19	19	Multilayer, extremely hard, smooth temperature resistant.	Hard Machining 50-70 HRC, Dry Machining.
	C-21*	61	Synthetic diamond. Low co-efficient of friction. Approximately three times harder than C4.	High abrasive applications, graphite, fiberglass, ceramics and composites.
	00		No Coating	

*Available as Non-Stock Standard

Triple Threat™ Three Flute Rougher/Finisher, Inch

High Performance Carbide



The Triple Threat™ tool is a multi-patented three flute high performance carbide end mill designed to finish and rough in aluminum and non-ferrous metals. The high shear, 45 degree helix and improved inter-flute geometries enhanced chip evacuation and permit increased chip loads as well as aggressive feed rates.

Materials		Aluminum Alloys	Aluminum Cast	Aluminum	Copper	Brass	Magnesium
Diameter	Description	6061, 7075	Sand & Permanent Mold	>10% Silicon High Silicon Based	Cast, Wrought	Yellow, Red Leaded Brass	Cast, Wrought
	SFM	800 - Max	250 - 600	600 - 1000	700 - 1000	500 - 900	500 - 900
1/4"	HP	0.0032	0.0030	0.0026	0.0026	0.0026	0.0026
	LP	0.0041	0.0041	0.0036	0.0036	0.0036	0.0036
	FINISH	0.0049	0.0055	0.0045	0.0045	0.0045	0.0045
5/16"	HP	0.0038	0.0035	0.0030	0.0030	0.0030	0.0030
	LP	0.0048	0.0047	0.0041	0.0041	0.0041	0.0041
	FINISH	0.0059	0.0062	0.0056	0.0056	0.0056	0.0056
3/8"	HP	0.0048	0.0045	0.0039	0.0039	0.0039	0.0036
	LP	0.0061	0.0061	0.0055	0.0055	0.0055	0.0055
	FINISH	0.0074	0.0082	0.0068	0.0068	0.0068	0.0068
1/2"	HP	0.0075	0.0075	0.0065	0.0065	0.0065	0.0065
	LP	0.0095	0.0095	0.0085	0.0085	0.0085	0.0085
	FINISH	0.0115	0.0115	0.0095	0.0095	0.0095	0.0095
5/8"	HP	0.0080	0.0076	0.0066	0.0066	0.0066	0.0066
	LP	0.0102	0.0102	0.0091	0.0091	0.0091	0.0086
	FINISH	0.0102	0.0102	0.0091	0.0091	0.0091	0.0091
3/4"	HP	0.0085	0.0080	0.0070	0.0070	0.0070	0.0070
	LP	0.0115	0.0115	0.0103	0.0103	0.0103	0.0103
	FINISH	0.0140	0.0155	0.0128	0.0128	0.0128	0.0128
1"	HP	0.0135	0.0128	0.0111	0.0111	0.0111	0.0111
	LP	0.0171	0.0171	0.0153	0.0153	0.0153	0.0153
	FINISH	0.0207	0.0230	0.0190	0.0190	0.0190	0.0190

HP = HEAVY PERIPHERAL

Axial Depth up to
Effective Length of Cut
Radial width .3 x Diameter

FINISH = FINISH OPERATION

Axial Depth up to
Effective Length of Cut
Radial width .02 x Diameter

LP = LIGHT PERIPHERAL

Axial Depth up to
Effective Length of Cut
Radial width .01 x Diameter

Note! Horsepower will be the limiting factor with larger diameter end mills.

Horsepower = IPM x RDC x ADC x PC

IPM = Inches Per Minute

RDC = Radial Depth of Cut (Width)

ADC = Axial Depth of Cut (Depth)

PC = Power Constants (Aluminum = (0.25))

Example Slotting = 3/4 diameter x 3/8 @ 150 IPM

HP = 150 IPM x .750 RDC x .375 ADC x PC of 0.25

HP = 10.8 @ cutter/80%Efficiency = 12.8 @ Spindle Motor

Triple Threat™ Three Flute Rougher/Finisher, Metric

High Performance Carbide



The Triple Threat™ tool is a multi-patented three flute high performance carbide end mill designed to finish and rough in aluminum and non-ferrous metals. The high shear, 45 degree helix and improved inter-flute geometries enhanced chip evacuation and permit increased chip loads as well as aggressive feed rates.

Feeds and Speeds Chart with Chip-Load per/tooth in Inches

Materials		Aluminum Alloys	Aluminum Cast	Aluminum	Copper	Brass	Magnesium
Diameter	Description	6061, 7075	Sand & Permanent Mold	>10%Silicon High Silicon Based	Cast, Wrought	Yellow, Red Leaded Brass	Cast, Wrought
	SFM	800 - Max	250 - 600	600 - 1000	700 - 1000	500 - 900	500 - 900
6	HP	0.003	0.003	0.003	0.003	0.003	0.003
	LP	0.004	0.004	0.004	0.004	0.004	0.004
	Finish	0.005	0.006	0.005	0.005	0.005	0.005
8	HP	0.004	0.004	0.003	0.003	0.003	0.003
	LP	0.005	0.005	0.004	0.004	0.004	0.004
	Finish	0.006	0.006	0.006	0.006	0.006	0.006
10	HP	0.005	0.005	0.004	0.004	0.004	0.004
	LP	0.006	0.006	0.006	0.006	0.006	0.006
	Finish	0.007	0.008	0.007	0.007	0.007	0.007
12	HP	0.008	0.008	0.007	0.007	0.007	0.007
	LP	0.010	0.010	0.009	0.009	0.009	0.009
	Finish	0.012	0.012	0.010	0.010	0.010	0.010
16	HP	0.008	0.008	0.007	0.007	0.007	0.007
	LP	0.010	0.010	0.009	0.009	0.009	0.009
	Finish	0.010	0.010	0.009	0.009	0.009	0.009
18	HP	0.009	0.008	0.007	0.007	0.007	0.007
	LP	0.012	0.012	0.010	0.010	0.010	0.010
	Finish	0.014	0.016	0.013	0.013	0.013	0.013
20	HP	0.009	0.008	0.007	0.007	0.007	0.007
	LP	0.012	0.012	0.011	0.011	0.011	0.011
	Finish	0.015	0.016	0.014	0.014	0.014	0.014
25	HP	0.014	0.013	0.011	0.011	0.011	0.011
	LP	0.017	0.017	0.015	0.015	0.015	0.015
	Finish	0.021	0.023	0.019	0.019	0.019	0.019

HP = HEAVY PERIPHERAL

Axial Depth up to
Effective Length of Cut
Radial width .3 x Diameter

FINISH = FINISH OPERATION

Axial Depth up to
Effective Length of Cut
Radial width .02 x Diameter

LP = LIGHT PERIPHERAL

Axial Depth up to
Effective Length of Cut
Radial width .01 x Diameter

Note! Horsepower will be the limiting factor with larger diameter end mills.

Horsepower = IPM x RDC x ADC x PC

IPM = Inches Per Minute

RDC = Radial Depth of Cut (Width)

ADC = Axial Depth of Cut (Depth)

PC = Power Constants (Aluminum = (0.25))

Example Slotting = 3/4 diameter x 3/8 @ 150 IPM

HP = 150 IPM x .750 RDC x .375 ADC x PC of 0.25

HP = 10.8 @ cutter/80%Efficiency = 12.8 @ Spindle Motor

Triple Threat™ Three Flute Rougher/Finisher, With Chip Breakers, Inch High Performance Carbide



The Triple Threat™ tool is a multi-patented three flute high performance carbide end mill designed to finish and rough in aluminum and non-ferrous metals. The high shear, 45 degree helix and improved inter-flute geometries enhanced chip evacuation and permit increased chip loads as well as aggressive feed rates.

Materials		Aluminum Alloys	Aluminum Cast	Aluminum	Copper	Brass	Magnesium
Diameter	Description	6061, 7075	Sand & Permanent Mold	>10%Silicon High Silicon Based	Cast, Wrought	Yellow, Red Leaded Brass	Cast, Wrought
	SFM	800 - Max	250 - 600	600 - 1000	700 - 1000	500 - 900	500 - 900
1/4"	HP	0.0037	0.0035	0.0030	0.0030	0.0030	0.0030
	LP	0.0047	0.0047	0.0041	0.0041	0.0041	0.0041
	Finish	0.0056	0.0063	0.0052	0.0052	0.0052	0.0052
5/16"	HP	0.0044	0.0040	0.0035	0.0035	0.0035	0.0035
	LP	0.0055	0.0054	0.0047	0.0047	0.0047	0.0047
	Finish	0.0068	0.0071	0.0064	0.0064	0.0064	0.0064
3/8"	HP	0.0055	0.0052	0.0045	0.0045	0.0045	0.0041
	LP	0.0070	0.0070	0.0063	0.0063	0.0063	0.0063
	Finish	0.0085	0.0094	0.0078	0.0078	0.0078	0.0078
1/2"	HP	0.0086	0.0086	0.0075	0.0075	0.0075	0.0075
	LP	0.0109	0.0109	0.0098	0.0098	0.0098	0.0098
	Finish	0.0132	0.0132	0.0109	0.0109	0.0109	0.0109
5/8"	HP	0.0092	0.0087	0.0076	0.0076	0.0076	0.0076
	LP	0.0117	0.0117	0.0105	0.0105	0.0105	0.0099
	Finish	0.0117	0.0117	0.0105	0.0105	0.0105	0.0105
3/4"	HP	0.0098	0.0092	0.0081	0.0081	0.0081	0.0081
	LP	0.0132	0.0132	0.0118	0.0118	0.0118	0.0118
	Finish	0.0161	0.0178	0.0147	0.0147	0.0147	0.0147
1"	HP	0.0155	0.0147	0.0128	0.0128	0.0128	0.0128
	LP	0.0197	0.0197	0.0176	0.0176	0.0176	0.0176
	Finish	0.0238	0.0265	0.0219	0.0219	0.0219	0.0219

HP = HEAVY PERIPHERAL

Axial Depth up to
Effective Length of Cut
Radial width .3 x Diameter

FINISH = FINISH OPERATION

Axial Depth up to
Effective Length of Cut
Radial width .02 x Diameter

LP = LIGHT PERIPHERAL

Axial Depth up to
Effective Length of Cut
Radial width .01 x Diameter

Note! Horsepower will be the limiting factor with larger diameter end mills.

Horsepower = IPM x RDC x ADC x PC

IPM = Inches Per Minute

RDC = Radial Depth of Cut (Width)

ADC = Axial Depth of Cut (Depth)

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HP = 10.8 @ cutter/80%Efficiency = 12.8 @ Spindle Motor

Triple Threat™ Three Flute Rougher/Finisher, With Chip Breakers, Metric

High Performance Carbide



The Triple Threat™ tool is a multi-patented three flute high performance carbide end mill designed to finish and rough in aluminum and non-ferrous metals. The high shear, 45 degree helix and improved inter-flute geometries enhanced chip evacuation and permit increased chip loads as well as aggressive feed rates.

- 45 Degree Helix for Enhanced Chip Evacuation
- Plain Cylindrical Shank
- Three Flutes Permit High Machine Productivity
- Stocked Stub, Regular and Reduced Neck
- Available Upon Request:
 - Coolant Grooves
 - Additional Coatings
 - Additional Radius

Feeds and Speeds Chart with Chip-Load per/tooth in Inches

Materials		Aluminum Alloys	Aluminum Cast	Aluminum	Copper	Brass	Magnesium
Diameter	Description	6061, 7075	Sand & Permanent Mold	>10%Silicon High Silicon Based	Cast, Wrought	Yellow, Red Leaded Brass	Cast, Wrought
	SFM	800 - Max	250 - 600	600 - 1000	700 - 1000	500 - 900	500 - 900
6	HP	0.004	0.003	0.003	0.003	0.003	0.003
	LP	0.005	0.005	0.004	0.004	0.004	0.004
	Finish	0.006	0.006	0.005	0.005	0.005	0.005
8	HP	0.004	0.004	0.003	0.003	0.003	0.003
	LP	0.006	0.005	0.005	0.005	0.005	0.005
	Finish	0.007	0.007	0.006	0.006	0.006	0.006
10	HP	0.006	0.005	0.004	0.004	0.004	0.004
	LP	0.007	0.007	0.006	0.006	0.006	0.006
	Finish	0.009	0.009	0.008	0.008	0.008	0.008
12	HP	0.009	0.009	0.007	0.007	0.007	0.007
	LP	0.011	0.011	0.010	0.010	0.010	0.010
	Finish	0.013	0.013	0.011	0.011	0.011	0.011
16	HP	0.009	0.009	0.008	0.008	0.008	0.008
	LP	0.012	0.012	0.010	0.010	0.010	0.010
	Finish	0.012	0.012	0.010	0.010	0.010	0.010
18	HP	0.010	0.009	0.008	0.008	0.008	0.008
	LP	0.013	0.013	0.012	0.012	0.012	0.012
	Finish	0.016	0.018	0.015	0.015	0.015	0.015
20	HP	0.010	0.010	0.009	0.009	0.009	0.009
	LP	0.014	0.014	0.013	0.013	0.013	0.013
	Finish	0.017	0.019	0.016	0.016	0.016	0.016
25	HP	0.016	0.015	0.013	0.013	0.013	0.013
	LP	0.020	0.020	0.018	0.018	0.018	0.018
	Finish	0.024	0.026	0.022	0.022	0.022	0.022

HP = HEAVY PERIPHERAL

Axial Depth up to
Effective Length of Cut
Radial width .3 x Diameter

FINISH = FINISH OPERATION

Axial Depth up to
Effective Length of Cut
Radial width .02 x Diameter

LP = LIGHT PERIPHERAL

Axial Depth up to
Effective Length of Cut
Radial width .01 x Diameter

Note! Horsepower will be the limiting factor with larger diameter end mills.

Horsepower = IPM x RDC x ADC x PC

IPM = Inches Per Minute

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ADC = Axial Depth of Cut (Depth)

PC = Power Constants (Aluminum = (0.25))

Example Slotting = 3/4 diameter x 3/8 @ 150 IPM

HP = 150 IPM x .750 RDC x .375 ADC x PC of 0.25

HP = 10.8 @ cutter/80%Efficiency = 12.8 @ Spindle Motor

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The ALDH is the rougher of choice when optimum material removal rates are the objective. The combination of progressive geometries result in a cutting tool intended for full engagement cuts at increased feed rates. Slotting cuts of 1x the diameter or more are normally recommended. 50% greater IPM versus competitors 2 flute design is a conservative starting point.

Carbide Feeds and Speeds Chart for Non-Ferrous Materials

ALDH Materials		Aluminum Alloys	Aluminum Cast	Aluminum	Copper	Brass	Magnesium
Diameter	Description	6061, 7075	Sand & Permanent Mold	>10% Silicon High Silicon Based	Cast, Wrought	Yellow, Red, Leaded Brass	Cast, Wrought
	SFM	800 - Max	250 - 600	600 - 1000	700 - 1000	500 - 900	500 - 900
1/4"	S	0.0034	0.0032	0.0028	0.0028	0.0028	0.0028
	HP	0.0043	0.0043	0.0038	0.0038	0.0038	0.0038
	LP	0.0051	0.0057	0.0048	0.0048	0.0048	0.0048
3/8"	S	0.0051	0.0048	0.0042	0.0042	0.0042	0.0042
	HP	0.0064	0.0064	0.0058	0.0058	0.0058	0.0058
	LP	0.0077	0.0086	0.0071	0.0071	0.0071	0.0071
1/2"	S	0.0080	0.0080	0.0070	0.0070	0.0070	0.0070
	HP	0.0100	0.0100	0.0090	0.0090	0.0090	0.0090
	LP	0.0120	0.0120	0.0100	0.0100	0.0100	0.0100
5/8"	S	0.0086	0.0081	0.0071	0.0071	0.0071	0.0071
	HP	0.0107	0.0107	0.0096	0.0096	0.0096	0.0096
	LP	0.0128	0.0143	0.0119	0.0119	0.0119	0.0119
3/4"	S	0.0091	0.0086	0.0075	0.0075	0.0075	0.0075
	HP	0.0122	0.0122	0.0109	0.0109	0.0109	0.0109
	LP	0.0146	0.0162	0.0135	0.0135	0.0135	0.0135
1"	S	0.0144	0.0136	0.0119	0.0119	0.0119	0.0119
	HP	0.0180	0.0180	0.0162	0.0162	0.0162	0.0162
	LP	0.0216	0.0240	0.0200	0.0200	0.0200	0.0200

S = SLOTTING
 Axial Depth up to
 1.0 x Diameter
 Radial width .5 x Diameter

LP = LIGHT PERIPHERAL
 Axial Depth up to
 Effective Length of Cut
 Radial width .02 x Diameter

HP = HEAVY PERIPHERAL
 Axial Depth up to
 1.5 – 2.0 x Diameter
 Radial width .3 x Diameter

Note! Horsepower will be the limiting factor with larger diameter end mills.

Horsepower = IPM x RDC x ADC x PC
IPM = Inches Per Minute
RDC = Radial Depth of Cut (Width)
ADC = Axial Depth of Cut (Depth)
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Example Slotting = 3/4 diameter x 3/8 @ 150 IPM
HP = 150 IPM x .750 RDC x .375 ADC x PC of 0.25
HP = 10.8 @ cutter/80%Efficiency = 12.8 @ Spindle Motor

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ALDH-C Three Flute

Technical Chart



ALDH-C series combines the performance of the ALDH series with a truncated knuckle form to manage chips and Horse Power. It is designed for freer cutting without sacrificing work piece surface finishes. This unique O.D. form also aids in chip control and management in gummy, non-ferrous materials. The tools are available from stock in stub and standard lengths with coatings to match your particular applications.

Carbide Feeds and Speeds Chart for Non-Ferrous Materials

ALDH-C Materials		Aluminum Alloys	Aluminum Cast	Aluminum	Copper	Brass	Magnesium
Diameter	Description	6061, 7075	Sand & Permanent Mold	>10% Silicon High Silicon Based	Cast, Wrought	Yellow, Red, Leaded Brass	Cast, Wrought
	SFM	800 - Max	250 - 600	600 - 1000	700 - 1000	500 - 900	500 - 900
1/4"	S	0.0034	0.0032	0.0028	0.0028	0.0028	0.0028
	HP	0.0043	0.0043	0.0038	0.0038	0.0038	0.0038
	LP	0.0051	0.0057	0.0048	0.0048	0.0048	0.0048
3/8"	S	0.0051	0.0048	0.0042	0.0042	0.0042	0.0042
	HP	0.0064	0.0064	0.0058	0.0058	0.0058	0.0058
	LP	0.0077	0.0086	0.0071	0.0071	0.0071	0.0071
1/2"	S	0.0080	0.0080	0.0070	0.0070	0.0070	0.0070
	HP	0.0100	0.0100	0.0090	0.0090	0.0090	0.0090
	LP	0.0120	0.0120	0.0100	0.0100	0.0100	0.0100
5/8"	S	0.0086	0.0081	0.0071	0.0071	0.0071	0.0071
	HP	0.0107	0.0107	0.0096	0.0096	0.0096	0.0096
	LP	0.0128	0.0143	0.0119	0.0119	0.0119	0.0119
3/4"	S	0.0091	0.0086	0.0075	0.0075	0.0075	0.0075
	HP	0.0122	0.0122	0.0109	0.0109	0.0109	0.0109
	LP	0.0146	0.0162	0.0135	0.0135	0.0135	0.0135
1"	S	0.0144	0.0136	0.0119	0.0119	0.0119	0.0119
	HP	0.0180	0.0180	0.0162	0.0162	0.0162	0.0162
	LP	0.0216	0.0240	0.0200	0.0200	0.0200	0.0200

S = SLOTTING
Axial Depth up to
1.0 x Diameter
Radial width .5 x Diameter

LP = LIGHT PERIPHERAL
Axial Depth up to
Effective Length of Cut
Radial width .02 x Diameter

HP = HEAVY PERIPHERAL
Axial Depth up to
1.5 – 2.0 x Diameter
Radial width .3 x Diameter

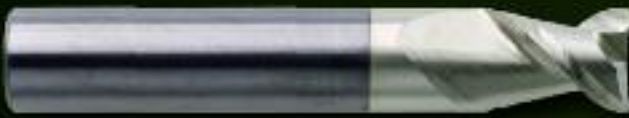
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HP = 150 IPM x .750 RDC x .375 ADC x PC of 0.25
HP = 10.8 @ cutter/80%Efficiency = 12.8 @ Spindle Motor

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ARF Two Flute Series

High Performance Carbide



- Rough and Finish
- Higher Helix Aids in Chip Removal
- High Performance Carbide
- Available Upon Request:
 - Radius Ends
 - Coolant Groves
 - Additional Coatings

The ARF Series is a time-honored workhorse in our aluminum cutting tool family. Designed as a 2 flute, rougher/finisher, this tool can pull “double duty” in your aluminum and non-ferrous applications. The high helix angle provides exceptional shearing action and chip removal. Available in lengths ranging from stub for aggressive roughing, to extended lengths for tall side milling cuts.

Carbide Feeds and Speeds Chart for Non-Ferrous Materials

ARF Materials		Aluminum Alloys	Aluminum Cast	Aluminum	Copper	Brass	Magnesium
Diameter	Description	6061, 7075	Sand & Permanent Mold	>10% Silicon High Silicon Based	Cast, Wrought	Yellow, Red, Leaded Brass	Cast, Wrought
	SFM	800 - Max	250 - 600	600 - 1000	700 - 1000	500 - 900	500 - 900
1/8"	S	0.0022	0.0020	0.0018	0.0018	0.0018	0.0018
	HP	0.0029	0.0029	0.0026	0.0026	0.0026	0.0026
	LP	0.0035	0.0038	0.0032	0.0032	0.0032	0.0032
1/4"	S	0.0034	0.0032	0.0028	0.0028	0.0028	0.0028
	HP	0.0043	0.0043	0.0038	0.0038	0.0038	0.0038
	LP	0.0051	0.0057	0.0048	0.0048	0.0048	0.0048
5/16"	S	0.0038	0.0036	0.0031	0.0031	0.0031	0.0031
	HP	0.0050	0.0050	0.0045	0.0045	0.0045	0.0045
	LP	0.0061	0.0067	0.0056	0.0056	0.0056	0.0056
3/8"	S	0.0051	0.0048	0.0042	0.0042	0.0042	0.0042
	HP	0.0064	0.0064	0.0058	0.0058	0.0058	0.0058
	LP	0.0077	0.0086	0.0071	0.0071	0.0071	0.0071
7/16"	S	0.0061	0.0058	0.0050	0.0050	0.0050	0.0050
	HP	0.0076	0.0076	0.0069	0.0069	0.0069	0.0069
	LP	0.0091	0.0102	0.0085	0.0085	0.0085	0.0085
1/2"	S	0.0080	0.0080	0.0070	0.0070	0.0070	0.0070
	HP	0.0100	0.0100	0.0090	0.0090	0.0090	0.0090
	LP	0.0120	0.0120	0.0100	0.0100	0.0100	0.0100
5/8"	S	0.0086	0.0081	0.0071	0.0071	0.0071	0.0071
	HP	0.0107	0.0107	0.0096	0.0096	0.0096	0.0096
	LP	0.0128	0.0143	0.0119	0.0119	0.0119	0.0119
3/4"	S	0.0091	0.0086	0.0075	0.0075	0.0075	0.0075
	HP	0.0122	0.0122	0.0109	0.0109	0.0109	0.0109
	LP	0.0146	0.0162	0.0135	0.0135	0.0135	0.0135
1"	S	0.0144	0.0136	0.0119	0.0119	0.0119	0.0119
	HP	0.0180	0.0180	0.0162	0.0162	0.0162	0.0162
	LP	0.0216	0.0240	0.0200	0.0200	0.0200	0.0200

S = SLOTTING
 Axial Depth up to
 1.0 x Diameter
 Radial width .5 x Diameter

LP = LIGHT PERIPHERAL
 Axial Depth up to
 Effective Length of Cut
 Radial width .015 x Diameter

HP = HEAVY PERIPHERAL
 Axial Depth up to
 1.5 – 2.0 x Diameter
 Radial width .25 x Diameter

Note! Horsepower will be the limiting factor with larger diameter end mills.

Horsepower = IPM x RDC x ADC x PC
IPM = Inches Per Minute
RDC = Radial Depth of Cut (Width)
ADC = Axial Depth of Cut (Depth)
PC = Power Constants (Aluminum = (0.25))
Example Slotting = 3/4 diameter x 3/8 @ 150 IPM
HP = 150 IPM x .750 RDC x .375 ADC x PC of 0.25
HP = 10.8 @ cutter/80%Efficiency = 12.8 @ Spindle Motor

For additional support and for maximum optimization of your Data Flute tools, call us toll free at 800.447.1476 and ask to speak to our Technical Support Department.



HSM Two Flute, Reduced Neck

Technical Chart



The HSM is a 2 flute rougher/finisher that uses the geometries of the ARF series and couples them with an extended reach design. The stub flute length, in conjunction with a wide range of reach lengths, makes the HSM series a great choice for roughing in aluminum and other non-ferrous materials in hard to reach depths of cuts.

Carbide Feeds and Speeds Chart for Non-Ferrous Materials

HSM Materials		Aluminum Alloys	Aluminum Cast	Aluminum	Copper	Brass	Magnesium
Diameter	Description	6061, 7075	Sand & Permanent Mold	>10% Silicon High Silicon Based	Cast, Wrought	Yellow, Red, Leaded Brass	Cast, Wrought
	SFM	800 - Max	250 - 600	600 - 1000	700 - 1000	500 - 900	500 - 900
1/4"	S	0.0034	0.0032	0.0028	0.0028	0.0028	0.0028
	HP	0.0043	0.0043	0.0038	0.0038	0.0038	0.0038
	LP	0.0051	0.0057	0.0048	0.0048	0.0048	0.0048
3/8"	S	0.0051	0.0048	0.0042	0.0042	0.0042	0.0042
	HP	0.0064	0.0064	0.0058	0.0058	0.0058	0.0058
	LP	0.0077	0.0086	0.0071	0.0071	0.0071	0.0071
1/2"	S	0.0080	0.0080	0.0070	0.0070	0.0070	0.0070
	HP	0.0100	0.0100	0.0090	0.0090	0.0090	0.0090
	LP	0.0120	0.0120	0.0100	0.0100	0.0100	0.0100
5/8"	S	0.0086	0.0081	0.0071	0.0071	0.0071	0.0071
	HP	0.0107	0.0107	0.0096	0.0096	0.0096	0.0096
	LP	0.0128	0.0143	0.0119	0.0119	0.0119	0.0119
3/4"	S	0.0091	0.0086	0.0075	0.0075	0.0075	0.0075
	HP	0.0122	0.0122	0.0109	0.0109	0.0109	0.0109
	LP	0.0146	0.0162	0.0135	0.0135	0.0135	0.0135
1"	S	0.0144	0.0136	0.0119	0.0119	0.0119	0.0119
	HP	0.0180	0.0180	0.0162	0.0162	0.0162	0.0162
	LP	0.0216	0.0240	0.0200	0.0200	0.0200	0.0200

S = SLOTTING

Axial Depth up to
1.0 x Diameter
Radial width .5 x Diameter

LP = LIGHT PERIPHERAL

Axial Depth up to
Effective Length of Cut
Radial width .015 x Diameter

HP = HEAVY PERIPHERAL

Axial Depth up to
1.5 - 2.0 x Diameter
Radial width .25 x Diameter

Note! Horsepower will be the limiting factor with larger diameter end mills.

Horsepower = IPM x RDC x ADC x PC

IPM = Inches Per Minute

RDC = Radial Depth of Cut (Width)

ADC = Axial Depth of Cut (Depth)

PC = Power Constants (Aluminum = (0.25))

Example Slotting = 3/4 diameter x 3/8 @ 150 IPM

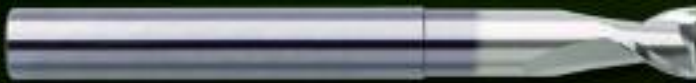
HP = 150 IPM x .750 RDC x .375 ADC x PC of 0.25

HP = 10.8 @ cutter/80%Efficiency = 12.8 @ Spindle Motor

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HVM-2, Two Flute

Technical Chart



The High Velocity Machining Series (HVM) is designed to perform at the level that its name suggests. By using shallow depths of cut, at very high speeds, this extended reach design will rough in non-ferrous applications from peripheral cuts to deep pockets. This tool is ideal for the machine tool that has ample RPM and feed rate capabilities, but may have some horsepower or torque restrictions.

Carbide Feeds and Speeds Chart for Non-Ferrous Materials

HVM-2 Materials		Aluminum Alloys	Aluminum Cast	Aluminum	Copper	Brass	Magnesium
Diameter	Description	6061, 7075	Sand & Permanent Mold	>10% Silicon High Silicon Based	Cast, Wrought	Yellow, Red, Leaded Brass	Cast, Wrought
	SFM	800 - Max	250 - 600	600 - 1000	700 - 1000	500 - 900	500 - 900
1/4"	S	0.0034	0.0032	0.0028	0.0028	0.0028	0.0028
	HP	0.0043	0.0043	0.0038	0.0038	0.0038	0.0038
	LP	0.0051	0.0057	0.0048	0.0048	0.0048	0.0048
3/8"	S	0.0051	0.0048	0.0042	0.0042	0.0042	0.0042
	HP	0.0064	0.0064	0.0058	0.0058	0.0058	0.0058
	LP	0.0077	0.0086	0.0071	0.0071	0.0071	0.0071
1/2"	S	0.0080	0.0080	0.0070	0.0070	0.0070	0.0070
	HP	0.0100	0.0100	0.0090	0.0090	0.0090	0.0090
	LP	0.0120	0.0120	0.0100	0.0100	0.0100	0.0100
5/8"	S	0.0086	0.0081	0.0071	0.0071	0.0071	0.0071
	HP	0.0107	0.0107	0.0096	0.0096	0.0096	0.0096
	LP	0.0128	0.0143	0.0119	0.0119	0.0119	0.0119
3/4"	S	0.0091	0.0086	0.0075	0.0075	0.0075	0.0075
	HP	0.0122	0.0122	0.0109	0.0109	0.0109	0.0109
	LP	0.0146	0.0162	0.0135	0.0135	0.0135	0.0135
1"	S	0.0144	0.0136	0.0119	0.0119	0.0119	0.0119
	HP	0.0180	0.0180	0.0162	0.0162	0.0162	0.0162
	LP	0.0216	0.0240	0.0200	0.0200	0.0200	0.0200

S = SLOTTING
Axial Depth up to
1.0 x Diameter
Radial width .5 x Diameter

LP = LIGHT PERIPHERAL
Axial Depth up to
Effective Length of Cut
Radial width .02 x Diameter

HP = HEAVY PERIPHERAL
Axial Depth up to
1.5 – 2.0 x Diameter
Radial width .3 x Diameter

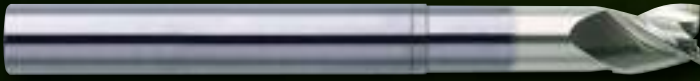
Note! Horsepower will be the limiting factor with larger diameter end mills.

Horsepower = IPM x RDC x ADC x PC
IPM = Inches Per Minute
RDC = Radial Depth of Cut (Width)
ADC = Axial Depth of Cut (Depth)
PC = Power Constants (Aluminum = (0.25))
Example Slotting = 3/4 diameter x 3/8 @ 150 IPM
HP = 150 IPM x .750 RDC x .375 ADC x PC of 0.25
HP = 10.8 @ cutter/80%Efficiency = 12.8 @ Spindle Motor

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HVM-3, Three Flute with Reduced Neck and Radius

Technical Chart



Our High Velocity Machining-3 Series (HVM-3) builds on the successes of our HVM-2 tools. The HVM-3 can really shine in applications where the machines may not achieve the high RPMs for which the HVM-2 was designed, but have the torque and horsepower to take advantage of the 50% increase in tooth passage (3:2) of our HVM-3. The HVM-3 is available in a number of stocked radii.

Carbide Feeds and Speeds Chart for Non-Ferrous Materials

HVM-3 Materials		Aluminum Alloys	Aluminum Cast	Aluminum	Copper	Brass	Magnesium
Diameter	Description	6061, 7075	Sand & Permanent Mold	>10% Silicon High Silicon Based	Cast, Wrought	Yellow, Red, Leaded Brass	Cast, Wrought
	SFM	800 - Max	250 - 600	600 - 1000	700 - 1000	500 - 900	500 - 900
1/4"	S	0.0034	0.0032	0.0028	0.0028	0.0028	0.0028
	HP	0.0043	0.0043	0.0038	0.0038	0.0038	0.0038
	LP	0.0051	0.0057	0.0048	0.0048	0.0048	0.0048
3/8"	S	0.0051	0.0048	0.0042	0.0042	0.0042	0.0042
	HP	0.0064	0.0064	0.0058	0.0058	0.0058	0.0058
	LP	0.0077	0.0086	0.0071	0.0071	0.0071	0.0071
1/2"	S	0.0080	0.0080	0.0070	0.0070	0.0070	0.0070
	HP	0.0100	0.0100	0.0090	0.0090	0.0090	0.0090
	LP	0.0120	0.0120	0.0100	0.0100	0.0100	0.0100
5/8"	S	0.0086	0.0081	0.0071	0.0071	0.0071	0.0071
	HP	0.0107	0.0107	0.0096	0.0096	0.0096	0.0096
	LP	0.0128	0.0143	0.0119	0.0119	0.0119	0.0119
3/4"	S	0.0091	0.0086	0.0075	0.0075	0.0075	0.0075
	HP	0.0122	0.0122	0.0109	0.0109	0.0109	0.0109
	LP	0.0146	0.0162	0.0135	0.0135	0.0135	0.0135
1"	S	0.0144	0.0136	0.0119	0.0119	0.0119	0.0119
	HP	0.0180	0.0180	0.0162	0.0162	0.0162	0.0162
	LP	0.0216	0.0240	0.0200	0.0200	0.0200	0.0200

S = SLOTTING
Axial Depth up to
1.0 x Diameter
Radial width .5 x Diameter

LP = LIGHT PERIPHERAL
Axial Depth up to
Effective Length of Cut
Radial width .02 x Diameter

HP = HEAVY PERIPHERAL
Axial Depth up to
1.5 – 2.0 x Diameter
Radial width .3 x Diameter

Note! Horsepower will be the limiting factor with larger diameter end mills.

Horsepower = IPM x RDC x ADC x PC
IPM = Inches Per Minute
RDC = Radial Depth of Cut (Width)
ADC = Axial Depth of Cut (Depth)
PC = Power Constants (Aluminum = (0.25))
Example Slotting = 3/4 diameter x 3/8 @ 150 IPM
HP = 150 IPM x .750 RDC x .375 ADC x PC of 0.25
HP = 10.8 @ cutter/80%Efficiency = 12.8 @ Spindle Motor

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HVMag-3 Three Flute, Inch and Metric

High Performance Carbide



Our HVMag-3 is a 3 flute tool, with field tested, patented geometries designed specifically for the newer generation of high speed machining centers. We have produced an exceptionally well-balanced tool, with superior chip flow. This tool is best used for speeds up to 20,000 rpm and feed rates of up to 1,000 inches per minute. Best performance is achieved in spindles designed for high speed, three flute tools and machining.

HVMag-3 Materials		Aluminum Alloys	Aluminum Cast	Aluminum	Copper	Brass	Magnesium
Diameter	Description	6061, 7075	Sand & Permanent Mold	>10% Silicon High Silicon Based	Cast, Wrought	Yellow, Red, Leaded Brass	Cast, Wrought
	SFM	800 - Max	250 - 600	600 - 1000	700 - 1000	500 - 900	500 - 900
3/8"	S	0.0051	0.0048	0.0042	0.0042	0.0042	0.0042
	HP	0.0064	0.0064	0.0058	0.0058	0.0058	0.0058
	LP	0.0077	0.0086	0.0071	0.0071	0.0071	0.0071
1/2"	S	0.0080	0.0080	0.0070	0.0070	0.0070	0.0070
	HP	0.0100	0.0100	0.0090	0.0090	0.0090	0.0090
	LP	0.0120	0.0120	0.0100	0.0100	0.0100	0.0100
5/8"	S	0.0086	0.0081	0.0071	0.0071	0.0071	0.0071
	HP	0.0107	0.0107	0.0096	0.0096	0.0096	0.0096
	LP	0.0128	0.0143	0.0119	0.0119	0.0119	0.0119
3/4"	S	0.0091	0.0086	0.0075	0.0075	0.0075	0.0075
	HP	0.0122	0.0122	0.0109	0.0109	0.0109	0.0109
	LP	0.0146	0.0162	0.0135	0.0135	0.0135	0.0135
1"	S	0.0144	0.0136	0.0119	0.0119	0.0119	0.0119
	HP	0.0180	0.0180	0.0162	0.0162	0.0162	0.0162
	LP	0.0216	0.0240	0.0200	0.0200	0.0200	0.0200

S = SLOTTING

Axial Depth up to
1.0 x Diameter
Radial width .5 x Diameter

LP = LIGHT PERIPHERAL

Axial Depth up to
Effective Length of Cut
Radial width .02 x Diameter

HP = HEAVY PERIPHERAL

Axial Depth up to
1.5 – 2.0 x Diameter
Radial width .3 x Diameter

Note! Horsepower will be the limiting factor with larger diameter end mills.

Note: Vibration analysis for high speed machining is recommended.

Horsepower = IPM x RDC x ADC x PC

IPM = Inches Per Minute

RDC = Radial Depth of Cut (Width)

ADC = Axial Depth of Cut (Depth)

PC = Power Constants (Aluminum = (0.25))

Example Slotting = 3/4 diameter x 3/8 @ 150 IPM

HP = 150 IPM x .750 RDC x .375 ADC x PC of 0.25

HP = 10.8 @ cutter/80%Efficiency = 12.8 @ Spindle Motor

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ARF-BN, Two Flute Ball Mill

Technical Chart



The ARF-BN combines the proven geometry of our ARF two flute series with a precision ground, full, ball-nose radius. The high helix and high clearance angles provide a freer cutting ball with superior shearing properties. The ball nose is also ground with a vibration protection margin. When your non-ferrous applications require contour or 3-D work, the ARF-BN should be your tool of choice.

Carbide Feeds and Speeds Chart for Non-Ferrous Materials

ARF-BN Materials		Aluminum Alloys	Aluminum Cast	Aluminum	Copper	Brass	Magnesium
Diameter	Description	6061, 7075	Sand & Permanent Mold	>10% Silicon High Silicon Based	Cast, Wrought	Yellow, Red, Leaded Brass	Cast, Wrought
	SFM	800 - Max	250 - 600	600 - 1000	700 - 1000	500 - 900	500 - 900
1/4"	S	0.0026	0.0024	0.0020	0.0020	0.0020	0.0020
	HP	0.0034	0.0034	0.0030	0.0030	0.0030	0.0030
	LP	0.0043	0.0048	0.0043	0.0043	0.0043	0.0043
5/16"	S	0.0028	0.0027	0.0022	0.0022	0.0022	0.0022
	HP	0.0040	0.0040	0.0035	0.0035	0.0035	0.0035
	LP	0.0050	0.0056	0.0050	0.0050	0.0050	0.0050
3/8"	S	0.0038	0.0036	0.0030	0.0030	0.0030	0.0030
	HP	0.0051	0.0051	0.0045	0.0045	0.0045	0.0045
	LP	0.0064	0.0071	0.0064	0.0064	0.0064	0.0064
7/16"	S	0.0046	0.0043	0.0036	0.0036	0.0036	0.0036
	HP	0.0061	0.0061	0.0053	0.0053	0.0053	0.0053
	LP	0.0076	0.0085	0.0076	0.0076	0.0076	0.0076
1/2"	S	0.0060	0.0060	0.0050	0.0050	0.0050	0.0050
	HP	0.0080	0.0080	0.0070	0.0070	0.0070	0.0070
	LP	0.0100	0.0100	0.0090	0.0090	0.0090	0.0090
5/8"	S	0.0064	0.0061	0.0050	0.0050	0.0050	0.0050
	HP	0.0086	0.0086	0.0075	0.0075	0.0075	0.0075
	LP	0.0107	0.0119	0.0107	0.0107	0.0107	0.0107
3/4"	S	0.0068	0.0064	0.0054	0.0054	0.0054	0.0054
	HP	0.0097	0.0097	0.0085	0.0085	0.0085	0.0085
	LP	0.0122	0.0135	0.0122	0.0122	0.0122	0.0122
1"	S	0.0108	0.0102	0.0085	0.0085	0.0085	0.0085
	HP	0.0144	0.0144	0.0126	0.0126	0.0126	0.0126
	LP	0.0180	0.0200	0.0180	0.0180	0.0180	0.0180

S = SLOTTING
Axial Depth up to
1.0 x Diameter
Radial width .5 x Diameter

LP = LIGHT PERIPHERAL
Axial Depth up to
Effective Length of Cut
Radial width .015 x Diameter

HP = HEAVY PERIPHERAL
Axial Depth up to
1.5 - 2.0 x Diameter
Radial width .25 x Diameter

Note! Horsepower will be the limiting factor with larger diameter end mills.

Horsepower = IPM x RDC x ADC x PC
IPM = Inches Per Minute
RDC = Radial Depth of Cut (Width)
ADC = Axial Depth of Cut (Depth)
PC = Power Constants (Aluminum = (0.25))
Example Slotting = 3/4 diameter x 3/8 @ 150 IPM
HP = 150 IPM x .750 RDC x .375 ADC x PC of 0.25
HP = 10.8 @ cutter/80%Efficiency = 12.8 @ Spindle Motor

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HSM-BN, Two Flute Ball Mill

Technical Chart



The HSM-BN is a two flute rougher/finisher that couples ARF geometries with an extended reach design. The tool provides all the advantages of the ARF's high helix, high clearance and anti-vibration margin, in a necked tool with a stub length of cut. This is your "go to" tool for extended reach, aluminum applications that call for a ball nose.

Carbide Feeds and Speeds Chart for Non-Ferrous Materials

HSM-BN Materials		Aluminum Alloys	Aluminum Cast	Aluminum	Copper	Brass	Magnesium
Diameter	Description	6061, 7075	Sand & Permanent Mold	>10% Silicon High Silicon Based	Cast, Wrought	Yellow, Red, Leaded Brass	Cast, Wrought
	SFM	800 - Max	250 - 600	600 - 1000	700 - 1000	500 - 900	500 - 900
1/4"	S	0.0034	0.0032	0.0028	0.0028	0.0028	0.0028
	HP	0.0043	0.0043	0.0038	0.0038	0.0038	0.0038
	LP	0.0051	0.0057	0.0048	0.0048	0.0048	0.0048
3/8"	S	0.0051	0.0048	0.0042	0.0042	0.0042	0.0042
	HP	0.0064	0.0064	0.0058	0.0058	0.0058	0.0058
	LP	0.0077	0.0086	0.0071	0.0071	0.0071	0.0071
1/2"	S	0.0080	0.0080	0.0070	0.0070	0.0070	0.0070
	HP	0.0100	0.0100	0.0090	0.0090	0.0090	0.0090
	LP	0.0120	0.0120	0.0100	0.0100	0.0100	0.0100
5/8"	S	0.0086	0.0081	0.0071	0.0071	0.0071	0.0071
	HP	0.0107	0.0107	0.0096	0.0096	0.0096	0.0096
	LP	0.0128	0.0143	0.0119	0.0119	0.0119	0.0119
3/4"	S	0.0091	0.0086	0.0075	0.0075	0.0075	0.0075
	HP	0.0122	0.0122	0.0109	0.0109	0.0109	0.0109
	LP	0.0146	0.0162	0.0135	0.0135	0.0135	0.0135
1"	S	0.0144	0.0136	0.0119	0.0119	0.0119	0.0119
	HP	0.0180	0.0180	0.0162	0.0162	0.0162	0.0162
	LP	0.0216	0.0240	0.0200	0.0200	0.0200	0.0200

S = SLOTTING

Axial Depth up to
1.0 x Diameter
Radial width .5 x Diameter

LP = LIGHT PERIPHERAL

Axial Depth up to
Effective Length of Cut
Radial width .015 x Diameter

HP = HEAVY PERIPHERAL

Axial Depth up to
1.5 - 2.0 x Diameter
Radial width .25 x Diameter

Note! Horsepower will be the limiting factor with larger diameter end mills.

Horsepower = IPM x RDC x ADC x PC

IPM = Inches Per Minute

RDC = Radial Depth of Cut (Width)

ADC = Axial Depth of Cut (Depth)

PC = Power Constants (Aluminum = (0.25))

Example Slotting = 3/4 diameter x 3/8 @ 150 IPM

HP = 150 IPM x .750 RDC x .375 ADC x PC of 0.25

HP = 10.8 @ cutter/80%Efficiency = 12.8 @ Spindle Motor

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HVM-BN Two Flute Ball Mill with Reduced Neck

Technical Chart



This is a new series that provides HVM geometry in a 2 flute, precision ground, ball nose configuration. The HVM has a slower helix than our HSM. This helix angle can be more appropriate in applications where operators are seeking to limit or control vertical cutting forces in the Z direction.

Carbide Feeds and Speeds Chart for Non-Ferrous Materials

HVM-BN Materials		Aluminum Alloys	Aluminum Cast	Aluminum	Copper	Brass	Magnesium
Diameter	Description	6061, 7075	Sand & Permanent Mold	>10% Silicon High Silicon Based	Cast, Wrought	Yellow, Red, Leaded Brass	Cast, Wrought
	SFM	800 - Max	250 - 600	600 - 1000	700 - 1000	500 - 900	500 - 900
1/4"	S	0.0034	0.0032	0.0028	0.0028	0.0028	0.0028
	HP	0.0043	0.0043	0.0038	0.0038	0.0038	0.0038
	LP	0.0051	0.0057	0.0048	0.0048	0.0048	0.0048
3/8"	S	0.0051	0.0048	0.0042	0.0042	0.0042	0.0042
	HP	0.0064	0.0064	0.0058	0.0058	0.0058	0.0058
	LP	0.0077	0.0086	0.0071	0.0071	0.0071	0.0071
1/2"	S	0.0080	0.0080	0.0070	0.0070	0.0070	0.0070
	HP	0.0100	0.0100	0.0090	0.0090	0.0090	0.0090
	LP	0.0120	0.0120	0.0100	0.0100	0.0100	0.0100
5/8"	S	0.0086	0.0081	0.0071	0.0071	0.0071	0.0071
	HP	0.0107	0.0107	0.0096	0.0096	0.0096	0.0096
	LP	0.0128	0.0143	0.0119	0.0119	0.0119	0.0119
3/4"	S	0.0091	0.0086	0.0075	0.0075	0.0075	0.0075
	HP	0.0122	0.0122	0.0109	0.0109	0.0109	0.0109
	LP	0.0146	0.0162	0.0135	0.0135	0.0135	0.0135
1"	S	0.0144	0.0136	0.0119	0.0119	0.0119	0.0119
	HP	0.0180	0.0180	0.0162	0.0162	0.0162	0.0162
	LP	0.0216	0.0240	0.0200	0.0200	0.0200	0.0200

S = SLOTTING

Axial Depth up to
1.0 x Diameter
Radial width .5 x Diameter

LP = LIGHT PERIPHERAL

Axial Depth up to
Effective Length of Cut
Radial width .02 x Diameter

HP = HEAVY PERIPHERAL

Axial Depth up to
1.5 – 2.0 x Diameter
Radial width .3 x Diameter

Note! Horsepower will be the limiting factor with larger diameter end mills.

Horsepower = IPM x RDC x ADC x PC
IPM = Inches Per Minute
RDC = Radial Depth of Cut (Width)
ADC = Axial Depth of Cut (Depth)
PC = Power Constants (Aluminum = (0.25))
Example Slotting = 3/4 diameter x 3/8 @ 150 IPM
HP = 150 IPM x .750 RDC x .375 ADC x PC of 0.25
HP = 10.8 @ cutter/80%Efficiency = 12.8 @ Spindle Motor

For additional support and for maximum optimization of your Data Flute tools, call us toll free at 800.447.1476 and ask to speak to our Technical Support Department.



The AFI 3 flute Aluminum mill is the perfect choice for your finishing applications. The polished O.D. cylindrical margin along with material specific geometries generates an excellent surface finish. The addition of a Wiper Flat brings this series of tool to the perfect choice. The AFI series is available in stub, standard, medium, long and extra long length of cut.

Carbide Feeds and Speeds Chart for Non-Ferrous Materials

AFI Materials		Aluminum Alloys	Aluminum Cast	Aluminum	Copper	Brass	Magnesium
Diameter	Description	6061, 7075	Sand & Permanent Mold	>10% Silicon High Silicon Based	Cast, Wrought	Yellow, Red, Leaded Brass	Cast, Wrought
	SFM	800 - Max	250 - 600	600 - 1000	700 - 1000	500 - 900	500 - 900
1/4"	S	0.0026	0.0026	0.0021	0.0021	0.0021	0.0021
	HP	0.0034	0.0034	0.0030	0.0030	0.0030	0.0030
	LP	0.0043	0.0043	0.0038	0.0038	0.0038	0.0038
3/8"	S	0.0038	0.0038	0.0032	0.0032	0.0032	0.0032
	HP	0.0051	0.0051	0.0045	0.0045	0.0045	0.0045
	LP	0.0064	0.0064	0.0058	0.0058	0.0058	0.0058
1/2"	S	0.0060	0.0060	0.0050	0.0050	0.0050	0.0050
	HP	0.0080	0.0080	0.0070	0.0070	0.0070	0.0070
	LP	0.0100	0.0100	0.0090	0.0090	0.0090	0.0090
5/8"	S	0.0064	0.0064	0.0053	0.0053	0.0053	0.0053
	HP	0.0086	0.0086	0.0075	0.0075	0.0075	0.0075
	LP	0.0107	0.0107	0.0096	0.0096	0.0096	0.0096
3/4"	S	0.0068	0.0073	0.0061	0.0061	0.0061	0.0061
	HP	0.0097	0.0097	0.0085	0.0085	0.0085	0.0085
	LP	0.0122	0.0128	0.0115	0.0115	0.0115	0.0115
1"	S	0.0108	0.0108	0.0090	0.0090	0.0090	0.0090
	HP	0.0144	0.0144	0.0126	0.0126	0.0126	0.0126
	LP	0.0180	0.0180	0.0162	0.0162	0.0162	0.0162

S = SLOTTING
Axial Depth up to
1.0 x Diameter
Radial width .5 x Diameter

LP = LIGHT PERIPHERAL
Axial Depth up to
Effective Length of Cut
Radial width .015 x Diameter

HP = HEAVY PERIPHERAL
Axial Depth up to
1.5 – 2.0 x Diameter
Radial width .25 x Diameter

Note! Horsepower will be the limiting factor with larger diameter end mills.

Horsepower = IPM x RDC x ADC x PC
IPM = Inches Per Minute
RDC = Radial Depth of Cut (Width)
ADC = Axial Depth of Cut (Depth)
PC = Power Constants (Aluminum = (0.25))
Example Slotting = 3/4 diameter x 3/8 @ 150 IPM
HP = 150 IPM x .750 RDC x .375 ADC x PC of 0.25
HP = 10.8 @ cutter/80%Efficiency = 12.8 @ Spindle Motor

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The Aluminum Multi-Flute Series (AMF) features patented geometries with a flute form that reduces unwanted harmonics. The AMF provides unparalleled surface finishes at superior feed rates in aluminum and other non-ferrous materials. This tool can also profile in some peripheral roughing applications. With its special geometry for process dampening, the AMF is a perfect choice for straight wall finishing.

AMF Materials		Aluminum Alloys	Aluminum Cast	Aluminum	Copper	Brass
Diameter	Description	6061, 7075	Sand & Permanent Mold	>10% Silicon High Silicon Based	Cast, Wrought	Yellow, Red, Leaded Brass
	SFM	800 - Max	250 - 600	600 - 1000	700 - 1000	500 - 900
1/4"	HP	0.0026	0.0026	0.0021	0.0021	0.0021
	LP	0.0034	0.0034	0.0030	0.0030	0.0030
	F	0.0043	0.0043	0.0038	0.0038	0.0038
3/8"	HP	0.0038	0.0038	0.0032	0.0032	0.0032
	LP	0.0051	0.0051	0.0045	0.0045	0.0045
	F	0.0064	0.0064	0.0058	0.0058	0.0058
1/2"	HP	0.0060	0.0060	0.0050	0.0050	0.0050
	LP	0.0080	0.0080	0.0070	0.0070	0.0070
	F	0.0100	0.0100	0.0090	0.0090	0.0090
5/8"	HP	0.0064	0.0064	0.0053	0.0053	0.0053
	LP	0.0086	0.0086	0.0075	0.0075	0.0075
	F	0.0107	0.0107	0.0096	0.0096	0.0096
3/4"	HP	0.0073	0.0073	0.0061	0.0061	0.0061
	LP	0.0097	0.0097	0.0085	0.0085	0.0085
	F	0.0128	0.0128	0.0115	0.0115	0.0115
1"	HP	0.0108	0.0108	0.0090	0.0090	0.0090
	LP	0.0144	0.0144	0.0126	0.0126	0.0126
	F	0.0180	0.0180	0.0162	0.0162	0.0162

HP = HEAVY PERIPHERAL

Axial Depth up to
Effective Length of Cut
Radial width .2 x Diameter

F = FINISH

Axial Depth up to
Effective Length of Cut
Radial width .02 x Diameter

LP = LIGHT PERIPHERAL

Axial Depth up to
Effective Length of Cut
Radial width .1 x Diameter

Note! Horsepower will be the limiting factor with larger diameter end mills.

Horsepower = IPM x RDC x ADC x PC

IPM = Inches Per Minute

RDC = Radial Depth of Cut (Width)

ADC = Axial Depth of Cut (Depth)

PC = Power Constants (Aluminum = (0.25))

Example Slotting = 3/4 diameter x 3/8 @ 150 IPM

HP = 150 IPM x .750 RDC x .375 ADC x PC of 0.25

HP = 10.8 @ cutter/80%Efficiency = 12.8 @ Spindle Motor

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MH-RO Multi-Flute Series

Technical Chart



The MH-RO series is a form relief design intended for peripheral roughing in carbon steels and cast iron. The multi-flute design allows for increased feed rates while not requiring massive amounts of horsepower. The tools are available from stock in stub and standard length with coatings for your ferrous machining applications.

Feeds and Speeds Chart with Chip-Load per/tooth

Diameter	Description	Carbon Steels	Alloy Steel	Stainless Steel 300 Series	Stainless Steel 400 Series	Precipitation Stainless Steels	Gray Cast Iron	Ductile Cast Iron	High Temp Alloys	Titanium Pure	Titanium Cast/Wrought
		10XX, 11XX, 13XX, 15XX	40XX, 41XX, 42XX, 43XX, 44XX, 46XX, 86XX, Series	304, 304L, 316, 316L, 312	420, 420F, 416, 440C	15/5PH, 16-6PH, 17/4PH, AM-XX Series	Gray	Ductile	Inconel 625/718, A286, Haynes	Pure	Cast/Wrought 6AL4V, ASTM 1,2,3, Alpha - Beta
	SFM < 32Rc	200 - 450	150 - 300	150 - 350	200 - 450	80 - 250	250 - 450	120 - 350	70 - 120	140 - 220	140 - 200
	SFM > 32Rc	100 - 250	80 - 200	80 - 200	100 - 250	90 - 125	130 - 300	80 - 140	40 - 90	90 - 160	90 - 160
3/8"	S	0.0021	0.0018	0.0020	0.0020	0.0018	0.0018	0.0018	0.0014	0.0020	0.0018
	HP	0.0025	0.0021	0.0025	0.0025	0.0021	0.0021	0.0021	0.0018	0.0025	0.0021
	LP	0.0029	0.0025	0.0027	0.0027	0.0025	0.0025	0.0025	0.0021	0.0027	0.0025
1/2"	S	0.0030	0.0025	0.0028	0.0028	0.0025	0.0025	0.0025	0.0020	0.0028	0.0025
	HP	0.0035	0.0030	0.0035	0.0035	0.0030	0.0030	0.0030	0.0025	0.0035	0.0030
	LP	0.0040	0.0035	0.0038	0.0038	0.0035	0.0035	0.0035	0.0030	0.0038	0.0035
5/8"	S	0.0038	0.0031	0.0035	0.0035	0.0031	0.0031	0.0031	0.0025	0.0035	0.0031
	HP	0.0044	0.0038	0.0044	0.0044	0.0038	0.0038	0.0038	0.0031	0.0044	0.0038
	LP	0.0050	0.0044	0.0048	0.0048	0.0044	0.0044	0.0044	0.0038	0.0048	0.0044
3/4"	S	0.0045	0.0038	0.0042	0.0042	0.0038	0.0038	0.0038	0.0030	0.0042	0.0038
	HP	0.0053	0.0045	0.0053	0.0053	0.0045	0.0045	0.0045	0.0038	0.0053	0.0045
	LP	0.0060	0.0053	0.0057	0.0057	0.0053	0.0053	0.0053	0.0045	0.0057	0.0053
1"	S	0.0060	0.0050	0.0056	0.0056	0.0050	0.0050	0.0050	0.0040	0.0056	0.0050
	HP	0.0070	0.0060	0.0070	0.0070	0.0060	0.0060	0.0060	0.0050	0.0070	0.0060
	LP	0.0080	0.0070	0.0076	0.0076	0.0070	0.0070	0.0070	0.0060	0.0076	0.0070

S = SLOTTING
Axial Depth up to
1.0 x Diameter

HP = HEAVY PERIPHERAL
Axial Depth up to
1.0 x Diameter
Radial width .5 x Diameter

LP = LIGHT PERIPHERAL
Axial Depth up to
1.5 x Diameter
Radial width .2 x Diameter

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SSDH Four Flute

Technical Chart



The SSDH series achieves superior chip flow and evacuation through the introduction of chip-release flute form technology, and a unique inter-flute helical transition all within a patent pending design. A premium, rupture resistant substrate is the foundation to which these progressive geometries are applied. The end result is a brute of an end mill, capable of ultra aggressive metal removal rates in ferrous material ranging from low carbon steel to high nickel alloys. This all adds up to cycle time reductions and improved machine tool productivity.

Feeds and Speeds Chart with Chip-Load per/tooth

Diameter	Description	Carbon Steels	Alloy Steel	Stainless Steel 300 Series	Stainless Steel 400 Series	Precipitation Stainless Steels	Gray Cast Iron	Ductile Cast Iron	High Temp Alloys	Titanium Pure	Titanium Cast/Wrought
		10XX, 11XX, 13XX, 15XX	40XX, 41XX, 42XX, 43XX, 44XX, 46XX, 86XX, Series	304, 304L, 316, 316L, 312	420, 420F, 416, 440C	15/5PH, 16-6PH, 17/4PH, AM-XX Series	Gray	Ductile	Inconel 625/718, A286, Haynes	Pure	Cast/Wrought 6AL4V, ASTM 1,2,3, Alpha - Beta
	SFM < 32Rc	200 - 450	150 - 300	150 - 350	200 - 450	80 - 250	250 - 450	120 - 350	70 - 120	140 - 220	140 - 200
	SFM > 32Rc	100 - 250	80 - 200	80 - 200	100 - 250	90 - 125	130 - 300	80 - 140	40 - 90	90 - 160	90 - 160
1/4"	S	0.0015	0.0014	0.0014	0.0014	0.0013	0.0013	0.0013	0.0010	0.0014	0.0013
	HP	0.0018	0.0018	0.0018	0.0018	0.0015	0.0015	0.0015	0.0013	0.0018	0.0015
	LP	0.0020	0.0019	0.0019	0.0019	0.0018	0.0018	0.0018	0.0015	0.0019	0.0018
5/16"	S	0.0018	0.0017	0.0017	0.0017	0.0015	0.0015	0.0015	0.0012	0.0017	0.0015
	HP	0.0021	0.0021	0.0021	0.0021	0.0018	0.0018	0.0018	0.0015	0.0021	0.0018
	LP	0.0024	0.0023	0.0023	0.0023	0.0021	0.0021	0.0021	0.0018	0.0023	0.0021
3/8"	S	0.0023	0.0021	0.0021	0.0021	0.0019	0.0019	0.0019	0.0015	0.0021	0.0019
	HP	0.0026	0.0026	0.0026	0.0026	0.0023	0.0023	0.0023	0.0019	0.0026	0.0023
	LP	0.0030	0.0029	0.0029	0.0029	0.0026	0.0026	0.0026	0.0023	0.0029	0.0026
1/2"	S	0.0030	0.0028	0.0028	0.0028	0.0025	0.0025	0.0025	0.0020	0.0028	0.0025
	HP	0.0035	0.0035	0.0035	0.0035	0.0030	0.0030	0.0030	0.0025	0.0035	0.0030
	LP	0.0040	0.0038	0.0038	0.0038	0.0035	0.0035	0.0035	0.0030	0.0038	0.0035
5/8"	S	0.0038	0.0035	0.0035	0.0035	0.0031	0.0031	0.0031	0.0025	0.0035	0.0031
	HP	0.0044	0.0044	0.0044	0.0044	0.0038	0.0038	0.0038	0.0031	0.0044	0.0038
	LP	0.0050	0.0048	0.0048	0.0048	0.0044	0.0044	0.0044	0.0038	0.0048	0.0044
3/4"	S	0.0045	0.0042	0.0042	0.0042	0.0038	0.0038	0.0038	0.0030	0.0042	0.0038
	HP	0.0053	0.0053	0.0053	0.0053	0.0045	0.0045	0.0045	0.0038	0.0053	0.0045
	LP	0.0060	0.0057	0.0057	0.0057	0.0053	0.0053	0.0053	0.0045	0.0057	0.0053
1"	S	0.0060	0.0056	0.0056	0.0056	0.0050	0.0050	0.0050	0.0040	0.0056	0.0050
	HP	0.0070	0.0070	0.0070	0.0070	0.0060	0.0060	0.0060	0.0050	0.0070	0.0060
	LP	0.0080	0.0076	0.0076	0.0076	0.0070	0.0070	0.0070	0.0060	0.0076	0.0070

S = SLOTTING
Axial Depth up to
1.0 x Diameter

HP = HEAVY PERIPHERAL
Axial Depth up to
1.5 x Diameter
Radial width .5 x Diameter

LP = LIGHT PERIPHERAL
Axial Depth up to
2.0 x Diameter
Radial width .15 x Diameter

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SSDH-C Four Flute

Technical Chart



SSDH-C series combines the aggressive roughing geometries of the SSDH series with a truncated knuckle O.D. form. This unique design allows for freer cutting and better chip control while maintaining the work piece surface finishes. These tools are stocked in stub and regular lengths and coated to match your particular application.

Feeds and Speeds Chart with Chip-Load per/tooth

Diameter	Description	Carbon Steels	Alloy Steel	Stainless Steel 300 Series	Stainless Steel 400 Series	Precipitation Stainless Steels	Gray Cast Iron	Ductile Cast Iron	High Temp Alloys	Titanium Pure	Titanium Cast/Wrought
		10XX, 11XX, 13XX, 15XX	40XX, 41XX, 42XX, 43XX, 44XX, 46XX, 86XX, Series	304, 304L, 316, 316L, 312	420, 420F, 416, 440C	15/5PH, 16-6PH, 17/4PH, AM-XX Series	Gray	Ductile	Inconel 625/718, A286, Haynes	Pure	Cast/Wrought 6AL4V, ASTM 1,2,3, Alpha - Beta
	SFM < 32Rc	200 - 450	150 - 300	150 - 350	200 - 450	80 - 250	250 - 450	120 - 350	70 - 120	140 - 220	140 - 200
	SFM > 32Rc	100 - 250	80 - 200	80 - 200	100 - 250	90 - 125	130 - 300	80 - 140	40 - 90	90 - 160	90 - 160
1/4"	S	0.0015	0.0014	0.0014	0.0014	0.0013	0.0013	0.0013	0.0010	0.0014	0.0013
	HP	0.0018	0.0018	0.0018	0.0018	0.0015	0.0015	0.0015	0.0013	0.0018	0.0015
	LP	0.0020	0.0019	0.0019	0.0019	0.0018	0.0018	0.0018	0.0015	0.0019	0.0018
5/16"	S	0.0018	0.0017	0.0017	0.0017	0.0015	0.0015	0.0015	0.0012	0.0017	0.0015
	HP	0.0021	0.0021	0.0021	0.0021	0.0018	0.0018	0.0018	0.0015	0.0021	0.0018
	LP	0.0024	0.0023	0.0023	0.0023	0.0021	0.0021	0.0021	0.0018	0.0023	0.0021
3/8"	S	0.0023	0.0021	0.0021	0.0021	0.0019	0.0019	0.0019	0.0015	0.0021	0.0019
	HP	0.0026	0.0026	0.0026	0.0026	0.0023	0.0023	0.0023	0.0019	0.0026	0.0023
	LP	0.0030	0.0029	0.0029	0.0029	0.0026	0.0026	0.0026	0.0023	0.0029	0.0026
1/2"	S	0.0030	0.0028	0.0028	0.0028	0.0025	0.0025	0.0025	0.0020	0.0028	0.0025
	HP	0.0035	0.0035	0.0035	0.0035	0.0030	0.0030	0.0030	0.0025	0.0035	0.0030
	LP	0.0040	0.0038	0.0038	0.0038	0.0035	0.0035	0.0035	0.0030	0.0038	0.0035
5/8"	S	0.0038	0.0035	0.0035	0.0035	0.0031	0.0031	0.0031	0.0025	0.0035	0.0031
	HP	0.0044	0.0044	0.0044	0.0044	0.0038	0.0038	0.0038	0.0031	0.0044	0.0038
	LP	0.0050	0.0048	0.0048	0.0048	0.0044	0.0044	0.0044	0.0038	0.0048	0.0044
3/4"	S	0.0045	0.0042	0.0042	0.0042	0.0038	0.0038	0.0038	0.0030	0.0042	0.0038
	HP	0.0053	0.0053	0.0053	0.0053	0.0045	0.0045	0.0045	0.0038	0.0053	0.0045
	LP	0.0060	0.0057	0.0057	0.0057	0.0053	0.0053	0.0053	0.0045	0.0057	0.0053
1"	S	0.0060	0.0056	0.0056	0.0056	0.0050	0.0050	0.0050	0.0040	0.0056	0.0050
	HP	0.0070	0.0070	0.0070	0.0070	0.0060	0.0060	0.0060	0.0050	0.0070	0.0060
	LP	0.0080	0.0076	0.0076	0.0076	0.0070	0.0070	0.0070	0.0060	0.0076	0.0070

S = SLOTTING

Axial Depth up to
1.0 x Diameter

HP = HEAVY PERIPHERAL

Axial Depth up to
1.0 x Diameter
Radial width .5 x Diameter

LP = LIGHT PERIPHERAL

Axial Depth up to
1.5 x Diameter
Radial width .2 x Diameter

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SS-3, Three Flute

Technical Chart



The SS series 3 flute end mill remains the workhorse when roughing in ferrous alloy applications. A standard corner radius protects the tool corner and enhances tool life in aggressive roughing applications. The SS series is offered in stub, standard, medium length and reduced neck.

- Standard Corner Radius to Protect Corners
- Roughing and Finishing Capabilities
- Available in Stub, Standard, Medium and Reduced Neck
- Available Upon Request:
 - Radius Ends
 - Coolant Grooves
 - Additional Coatings

Feeds and Speeds Chart with Chip-Load per/tooth

Diameter	Description	Carbon Steels 10XX, 11XX, 13XX, 15XX	Alloy Steel 40XX, 41XX, 42XX, 43XX, 44XX, 46XX, 86XX, Series	Stainless Steel 300 Series 304, 304L, 316, 316L, 312	Stainless Steel 400 Series 420, 420F, 416, 440C	Precipitation Stainless Steels 15/5PH, 16-6PH, 17/4PH, AM-XX Series	Gray Cast Iron Gray	Ductile Cast Iron Ductile	High Temp Alloys Inconel 625/718, A286, Haynes	Titanium Pure Pure	Titanium Cast/Wrought 6AL4V, ASTM 1,2,3, Alpha - Beta
	SFM < 32Rc	200 - 450	150 - 300	150 - 350	200 - 450	80 - 250	250 - 450	120 - 350	70 - 120	140 - 220	140 - 200
	SFM > 32Rc	100 - 250	80 - 200	80 - 200	100 - 250	90 - 125	130 - 300	80 - 140	40 - 90	90 - 160	90 - 160
1/8"	S	0.0007	0.0006	0.0007	0.0007	0.0006	0.0006	0.0006	0.0005	0.0007	0.0006
	HP	0.0008	0.0007	0.0008	0.0008	0.0007	0.0007	0.0007	0.0006	0.0008	0.0007
	LP	0.0010	0.0008	0.0009	0.0009	0.0008	0.0008	0.0008	0.0007	0.0009	0.0008
1/4"	S	0.0014	0.0012	0.0013	0.0013	0.0012	0.0012	0.0012	0.0010	0.0013	0.0012
	HP	0.0017	0.0014	0.0017	0.0017	0.0014	0.0014	0.0014	0.0012	0.0017	0.0014
	LP	0.0019	0.0017	0.0018	0.0018	0.0017	0.0017	0.0017	0.0014	0.0018	0.0017
5/16"	S	0.0018	0.0015	0.0017	0.0017	0.0015	0.0015	0.0015	0.0012	0.0017	0.0015
	HP	0.0021	0.0018	0.0021	0.0021	0.0018	0.0018	0.0018	0.0015	0.0021	0.0018
	LP	0.0024	0.0021	0.0023	0.0023	0.0021	0.0021	0.0021	0.0018	0.0023	0.0021
3/8"	S	0.0021	0.0018	0.0020	0.0020	0.0018	0.0018	0.0018	0.0014	0.0020	0.0018
	HP	0.0025	0.0021	0.0025	0.0025	0.0021	0.0021	0.0021	0.0018	0.0025	0.0021
	LP	0.0029	0.0025	0.0027	0.0027	0.0025	0.0025	0.0025	0.0021	0.0027	0.0025
1/2"	S	0.0030	0.0025	0.0028	0.0028	0.0025	0.0025	0.0025	0.0020	0.0028	0.0025
	HP	0.0035	0.0030	0.0035	0.0035	0.0030	0.0030	0.0030	0.0025	0.0035	0.0030
	LP	0.0040	0.0035	0.0038	0.0038	0.0035	0.0035	0.0035	0.0030	0.0038	0.0035
5/8"	S	0.0038	0.0031	0.0035	0.0035	0.0031	0.0031	0.0031	0.0025	0.0035	0.0031
	HP	0.0044	0.0038	0.0044	0.0044	0.0038	0.0038	0.0038	0.0031	0.0044	0.0038
	LP	0.0050	0.0044	0.0048	0.0048	0.0044	0.0044	0.0044	0.0038	0.0048	0.0044
3/4"	S	0.0045	0.0038	0.0042	0.0042	0.0038	0.0038	0.0038	0.0030	0.0042	0.0038
	HP	0.0053	0.0045	0.0053	0.0053	0.0045	0.0045	0.0045	0.0038	0.0053	0.0045
	LP	0.0060	0.0053	0.0057	0.0057	0.0053	0.0053	0.0053	0.0045	0.0057	0.0053
1"	S	0.0060	0.0050	0.0056	0.0056	0.0050	0.0050	0.0050	0.0040	0.0056	0.0050
	HP	0.0070	0.0060	0.0070	0.0070	0.0060	0.0060	0.0060	0.0050	0.0070	0.0060
	LP	0.0080	0.0070	0.0076	0.0076	0.0070	0.0070	0.0070	0.0060	0.0076	0.0070

S = SLOTTING Axial Depth up to .5 x Diameter
HP = HEAVY PERIPHERAL Axial Depth up to Effective Length of Cut Radial width .5 x Diameter
LP = LIGHT PERIPHERAL Axial Depth up to Effective Length of Cut Radial width .15 x Diameter

For additional support and for maximum optimization of your Data Flute tools, call us toll free at 800.447.1476 and ask to speak to our Technical Support Department.

SS-C Three Flute

Technical Chart



When machining a material that is gummy in nature, the 3 flute SS-C is the tool of choice. SS-C combines the proven SS family geometries with a truncated knuckle form that aids in chip size and form. Stub and standard lengths are available from stock.

Feeds and Speeds Chart with Chip-Load per/tooth

Materials		Carbon Steels	Alloy Steel	Stainless Steel 300 Series	Stainless Steel 400 Series	Precipitation Stainless Steels	Gray Cast Iron	Ductile Cast Iron	High Temp Alloys	Titanium Pure	Titanium Cast/Wrought
Diameter	Description	10XX, 11XX, 13XX, 15XX	40XX, 41XX, 42XX, 43XX, 44XX, 46XX, 86XX, Series	304, 304L, 316, 316L, 312	420, 420F, 416, 440C	15/5PH, 16-6PH, 17/4PH, AM-XX Series	Gray	Ductile	Inconel 625/718, A286, Haynes	Pure	Cast/Wrought 6AL4V, ASTM 1,2,3, Alpha - Beta
		SFM < 32Rc SFM > 32Rc	200 - 450 150 - 300	150 - 350 80 - 200	200 - 450 100 - 250	80 - 250 90 - 125	250 - 450 130 - 300	120 - 350 80 - 140	70 - 120 40 - 90	140 - 220 90 - 160	140 - 200 90 - 160
1/8"	S	0.0007	0.0006	0.0007	0.0007	0.0006	0.0006	0.0006	0.0005	0.0007	0.0006
	HP	0.0008	0.0007	0.0008	0.0008	0.0007	0.0007	0.0007	0.0006	0.0008	0.0007
	LP	0.0010	0.0008	0.0009	0.0009	0.0008	0.0008	0.0008	0.0007	0.0009	0.0008
1/4"	S	0.0014	0.0012	0.0013	0.0013	0.0012	0.0012	0.0012	0.0010	0.0013	0.0012
	HP	0.0017	0.0014	0.0017	0.0017	0.0014	0.0014	0.0014	0.0012	0.0017	0.0014
	LP	0.0019	0.0017	0.0018	0.0018	0.0017	0.0017	0.0017	0.0014	0.0018	0.0017
5/16"	S	0.0018	0.0015	0.0017	0.0017	0.0015	0.0015	0.0015	0.0012	0.0017	0.0015
	HP	0.0021	0.0018	0.0021	0.0021	0.0018	0.0018	0.0018	0.0015	0.0021	0.0018
	LP	0.0024	0.0021	0.0023	0.0023	0.0021	0.0021	0.0021	0.0018	0.0023	0.0021
3/8"	S	0.0021	0.0018	0.0020	0.0020	0.0018	0.0018	0.0018	0.0014	0.0020	0.0018
	HP	0.0025	0.0021	0.0025	0.0025	0.0021	0.0021	0.0021	0.0018	0.0025	0.0021
	LP	0.0029	0.0025	0.0027	0.0027	0.0025	0.0025	0.0025	0.0021	0.0027	0.0025
1/2"	S	0.0030	0.0025	0.0028	0.0028	0.0025	0.0025	0.0025	0.0020	0.0028	0.0025
	HP	0.0035	0.0030	0.0035	0.0035	0.0030	0.0030	0.0030	0.0025	0.0035	0.0030
	LP	0.0040	0.0035	0.0038	0.0038	0.0035	0.0035	0.0035	0.0030	0.0038	0.0035
5/8"	S	0.0038	0.0031	0.0035	0.0035	0.0031	0.0031	0.0031	0.0025	0.0035	0.0031
	HP	0.0044	0.0038	0.0044	0.0044	0.0038	0.0038	0.0038	0.0031	0.0044	0.0038
	LP	0.0050	0.0044	0.0048	0.0048	0.0044	0.0044	0.0044	0.0038	0.0048	0.0044
3/4"	S	0.0045	0.0038	0.0042	0.0042	0.0038	0.0038	0.0038	0.0030	0.0042	0.0038
	HP	0.0053	0.0045	0.0053	0.0053	0.0045	0.0045	0.0045	0.0038	0.0053	0.0045
	LP	0.0060	0.0053	0.0057	0.0057	0.0053	0.0053	0.0053	0.0045	0.0057	0.0053
1"	S	0.0060	0.0050	0.0056	0.0056	0.0050	0.0050	0.0050	0.0040	0.0056	0.0050
	HP	0.0070	0.0060	0.0070	0.0070	0.0060	0.0060	0.0060	0.0050	0.0070	0.0060
	LP	0.0080	0.0070	0.0076	0.0076	0.0070	0.0070	0.0070	0.0060	0.0076	0.0070

S = SLOTTING
Axial Depth up to
.5 x Diameter

HP = HEAVY PERIPHERAL
Axial Depth up to
Effective Length of Cut
Radial width .5 x Diameter

LP = LIGHT PERIPHERAL
Axial Depth up to
Effective Length of Cut
Radial width .15 x Diameter

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SS-BN-3 Three Flute Ball Nose

Technical Chart



The SS-BN series is a great choice if your application requires 3-D, radius or contour work but with the added challenge of deep reaching cuts. The tools have a precision ground full radius and are stock with stub, regular and reduced neck.

Feeds and Speeds Chart with Chip-Load per/tooth

Materials		Carbon Steels	Alloy Steel	Stainless Steel 300 Series	Stainless Steel 400 Series	Precipitation Stainless Steels	Gray Cast Iron	Ductile Cast Iron	High Temp Alloys	Titanium Pure	Titanium Cast/Wrought
Diameter	Description	10XX, 11XX, 12XX, 13XX	40XX, 41XX, 42XX, 43XX, 44XX, 46XX, 86XX, Series	304, 304L, 316, 316L, 312	420, 420F, 416, 440L,	15-5PH, 16-6PH, 17-4PH, AM-XX Series	Gray	Ductile	Inconel 625/718, A286, Haynes	Pure	Cast/Wrought 6AL4V, ASTM 1,2,3, Alpha - Beta
		SFM < 32Rc SFM > 32Rc	200 - 450 150 - 300	150 - 350 80 - 200	200 - 450 100 - 250	80 - 250 90 - 125	250 - 450 130 - 300	120 - 350 80 - 140	70 - 120 40 - 90	140 - 220 90 - 160	140 - 200 90 - 160
1/8"	S	0.0007	0.0006	0.0007	0.0007	0.0006	0.0006	0.0006	0.0005	0.0007	0.0006
	HP	0.0008	0.0007	0.0008	0.0008	0.0007	0.0007	0.0007	0.0006	0.0008	0.0007
	LP	0.0010	0.0008	0.0009	0.0009	0.0008	0.0008	0.0008	0.0007	0.0009	0.0008
1/4"	S	0.0014	0.0012	0.0013	0.0013	0.0012	0.0012	0.0012	0.0010	0.0013	0.0012
	HP	0.0017	0.0014	0.0017	0.0017	0.0014	0.0014	0.0014	0.0012	0.0017	0.0014
	LP	0.0019	0.0017	0.0018	0.0018	0.0017	0.0017	0.0017	0.0014	0.0018	0.0017
5/16"	S	0.0018	0.0015	0.0017	0.0017	0.0015	0.0015	0.0015	0.0012	0.0017	0.0015
	HP	0.0021	0.0018	0.0021	0.0021	0.0018	0.0018	0.0018	0.0015	0.0021	0.0018
	LP	0.0024	0.0021	0.0023	0.0023	0.0021	0.0021	0.0021	0.0018	0.0023	0.0021
3/8"	S	0.0021	0.0018	0.0020	0.0020	0.0018	0.0018	0.0018	0.0014	0.0020	0.0018
	HP	0.0025	0.0021	0.0025	0.0025	0.0021	0.0021	0.0021	0.0018	0.0025	0.0021
	LP	0.0029	0.0025	0.0027	0.0027	0.0025	0.0025	0.0025	0.0021	0.0027	0.0025
1/2"	S	0.0030	0.0025	0.0028	0.0028	0.0025	0.0025	0.0025	0.0020	0.0028	0.0025
	HP	0.0035	0.0030	0.0035	0.0035	0.0030	0.0030	0.0030	0.0025	0.0035	0.0030
	LP	0.0040	0.0035	0.0038	0.0038	0.0035	0.0035	0.0035	0.0030	0.0038	0.0035
5/8"	S	0.0038	0.0031	0.0035	0.0035	0.0031	0.0031	0.0031	0.0025	0.0035	0.0031
	HP	0.0044	0.0038	0.0044	0.0044	0.0038	0.0038	0.0038	0.0031	0.0044	0.0038
	LP	0.0050	0.0044	0.0048	0.0048	0.0044	0.0044	0.0044	0.0038	0.0048	0.0044
3/4"	S	0.0045	0.0038	0.0042	0.0042	0.0038	0.0038	0.0038	0.0030	0.0042	0.0038
	HP	0.0053	0.0045	0.0053	0.0053	0.0045	0.0045	0.0045	0.0038	0.0053	0.0045
	LP	0.0060	0.0053	0.0057	0.0057	0.0053	0.0053	0.0053	0.0045	0.0057	0.0053
1"	S	0.0060	0.0050	0.0056	0.0056	0.0050	0.0050	0.0050	0.0040	0.0056	0.0050
	HP	0.0070	0.0060	0.0070	0.0070	0.0060	0.0060	0.0060	0.0050	0.0070	0.0060
	LP	0.0080	0.0070	0.0076	0.0076	0.0070	0.0070	0.0070	0.0060	0.0076	0.0070

S = SLOTTING
Axial Depth up to
.5 x Diameter

HP = HEAVY PERIPHERAL
Axial Depth up to
Effective Length of Cut
Radial width .5 x Diameter

LP = LIGHT PERIPHERAL
Axial Depth up to
Effective Length of Cut
Radial width .15 x Diameter

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SS-BN-C Three Flute Ball Nose

Technical Chart



The SS-BN-C incorporates the chipbreaker design which allows you to take advantage of this advanced design in contour, modeling and 3-D work without jeopardizing work piece finish.

Feeds and Speeds Chart with Chip-Load per/tooth

Materials		Carbon Steels	Alloy Steel	Stainless Steel 300 Series	Stainless Steel 400 Series	Precipitation Stainless Steels	Gray Cast Iron	Ductile Cast Iron	High Temp Alloys	Titanium Pure	Titanium Cast/Wrought	
Diameter	Description	10XX, 11XX, 12XX, 13XX	40XX, 41XX, 42XX, 43XX, 44XX, 46XX, 86XX, Series	304, 304L, 316, 316L, 312	420, 420F, 416, 440L,	15-5PH, 16-6PH, 17-4PH, AM-XX Series	Gray	Ductile	Inconel 625/718, A286, Haynes	Pure	Cast/Wrought 6AL4V, ASTM 1,2,3, Alpha - Beta	
		SFM < 32Rc SFM > 32Rc	200 - 450 150 - 300	100 - 250 80 - 200	150 - 350 80 - 200	200 - 450 100 - 250	80 - 250 90 - 125	250 - 450 130 - 300	120 - 350 80 - 140	70 - 120 40 - 90	140 - 220 90 - 160	140 - 200 90 - 160
1/8"	S	0.0007	0.0006	0.0007	0.0007	0.0006	0.0006	0.0006	0.0005	0.0007	0.0006	
	HP	0.0008	0.0007	0.0008	0.0008	0.0007	0.0007	0.0007	0.0006	0.0008	0.0007	
	LP	0.0010	0.0008	0.0009	0.0009	0.0008	0.0008	0.0008	0.0007	0.0009	0.0008	
1/4"	S	0.0014	0.0012	0.0013	0.0013	0.0012	0.0012	0.0012	0.0010	0.0013	0.0012	
	HP	0.0017	0.0014	0.0017	0.0017	0.0014	0.0014	0.0014	0.0012	0.0017	0.0014	
	LP	0.0019	0.0017	0.0018	0.0018	0.0017	0.0017	0.0017	0.0014	0.0018	0.0017	
5/16"	S	0.0018	0.0015	0.0017	0.0017	0.0015	0.0015	0.0015	0.0012	0.0017	0.0015	
	HP	0.0021	0.0018	0.0021	0.0021	0.0018	0.0018	0.0018	0.0015	0.0021	0.0018	
	LP	0.0024	0.0021	0.0023	0.0023	0.0021	0.0021	0.0021	0.0018	0.0023	0.0021	
3/8"	S	0.0021	0.0018	0.0020	0.0020	0.0018	0.0018	0.0018	0.0014	0.0020	0.0018	
	HP	0.0025	0.0021	0.0025	0.0025	0.0021	0.0021	0.0021	0.0018	0.0025	0.0021	
	LP	0.0029	0.0025	0.0027	0.0027	0.0025	0.0025	0.0025	0.0021	0.0027	0.0025	
1/2"	S	0.0030	0.0025	0.0028	0.0028	0.0025	0.0025	0.0025	0.0020	0.0028	0.0025	
	HP	0.0035	0.0030	0.0035	0.0035	0.0030	0.0030	0.0030	0.0025	0.0035	0.0030	
	LP	0.0040	0.0035	0.0038	0.0038	0.0035	0.0035	0.0035	0.0030	0.0038	0.0035	
5/8"	S	0.0038	0.0031	0.0035	0.0035	0.0031	0.0031	0.0031	0.0025	0.0035	0.0031	
	HP	0.0044	0.0038	0.0044	0.0044	0.0038	0.0038	0.0038	0.0031	0.0044	0.0038	
	LP	0.0050	0.0044	0.0048	0.0048	0.0044	0.0044	0.0044	0.0038	0.0048	0.0044	
3/4"	S	0.0045	0.0038	0.0042	0.0042	0.0038	0.0038	0.0038	0.0030	0.0042	0.0038	
	HP	0.0053	0.0045	0.0053	0.0053	0.0045	0.0045	0.0045	0.0038	0.0053	0.0045	
	LP	0.0060	0.0053	0.0057	0.0057	0.0053	0.0053	0.0053	0.0045	0.0057	0.0053	
1"	S	0.0060	0.0050	0.0056	0.0056	0.0050	0.0050	0.0050	0.0040	0.0056	0.0050	
	HP	0.0070	0.0060	0.0070	0.0070	0.0060	0.0060	0.0060	0.0050	0.0070	0.0060	
	LP	0.0080	0.0070	0.0076	0.0076	0.0070	0.0070	0.0070	0.0060	0.0076	0.0070	

S = SLOTTING
Axial Depth up to
.5 x Diameter

HP = HEAVY PERIPHERAL
Axial Depth up to
Effective Length of Cut
Radial width .5 x Diameter

LP = LIGHT PERIPHERAL
Axial Depth up to
Effective Length of Cut
Radial width .15 x Diameter

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SS-4, Four Flute

Technical Chart



The SS 4 flute has the same proven geometries as the original, but with an additional flute for increased productivity. A standard corner radius protects the tool corner and enhances tool life in aggressive roughing applications. The SS series is offered in stub, standard, medium and reduced neck.

- Standard Corner Radius to Protect Corners
- Roughing and Finishing Capabilities
- Available in Stub, Standard, Medium and Reduced Neck
- Available Upon Request:
 - Radius Ends
 - Coolant Grooves
 - Additional Coatings

Feeds and Speeds Chart with Chip-Load per/tooth

Diameter	Description	Carbon Steels 10XX, 11XX, 13XX, 15XX	Alloy Steel 40XX, 41XX, 42XX, 43XX, 44XX, 46XX, 86XX, Series	Stainless Steel 300 Series 304, 304L, 316, 316L, 312	Stainless Steel 400 Series 420, 420F, 416, 440C	Precipitation Stainless Steels 15/5PH,16-6PH 17/4PH, AM-XX Series	Gray Cast Iron Gray	Ductile Cast Iron Ductile	High Temp Alloys Inconel 625/718, A286, Haynes	Titanium Pure Pure	Titanium Cast/Wrought 6AL4V, ASTM 1,2,3, Alpha - Beta
	SFM < 32Rc	200 - 450	150 - 300	150 - 350	200 - 450	80 - 250	250 - 450	120 - 350	70 - 120	140 - 220	140 - 200
	SFM > 32Rc	100 - 250	80 - 200	80 - 200	100 - 250	90 - 125	130 - 300	80 - 140	40 - 90	90 - 160	90 - 160
1/8"	S	0.0007	0.0006	0.0007	0.0007	0.0006	0.0006	0.0006	0.0005	0.0007	0.0006
	HP	0.0008	0.0007	0.0008	0.0008	0.0007	0.0007	0.0007	0.0006	0.0008	0.0007
	LP	0.0010	0.0008	0.0009	0.0009	0.0008	0.0008	0.0008	0.0007	0.0009	0.0008
1/4"	S	0.0014	0.0012	0.0013	0.0013	0.0012	0.0012	0.0012	0.0010	0.0013	0.0012
	HP	0.0017	0.0014	0.0017	0.0017	0.0014	0.0014	0.0014	0.0012	0.0017	0.0014
	LP	0.0019	0.0017	0.0018	0.0018	0.0017	0.0017	0.0017	0.0014	0.0018	0.0017
5/16"	S	0.0018	0.0015	0.0017	0.0017	0.0015	0.0015	0.0015	0.0012	0.0017	0.0015
	HP	0.0021	0.0018	0.0021	0.0021	0.0018	0.0018	0.0018	0.0015	0.0021	0.0018
	LP	0.0024	0.0021	0.0023	0.0023	0.0021	0.0021	0.0021	0.0018	0.0023	0.0021
3/8"	S	0.0021	0.0018	0.0020	0.0020	0.0018	0.0018	0.0018	0.0014	0.0020	0.0018
	HP	0.0025	0.0021	0.0025	0.0025	0.0021	0.0021	0.0021	0.0018	0.0025	0.0021
	LP	0.0029	0.0025	0.0027	0.0027	0.0025	0.0025	0.0025	0.0021	0.0027	0.0025
1/2"	S	0.0030	0.0025	0.0028	0.0028	0.0025	0.0025	0.0025	0.0020	0.0028	0.0025
	HP	0.0035	0.0030	0.0035	0.0035	0.0030	0.0030	0.0030	0.0025	0.0035	0.0030
	LP	0.0040	0.0035	0.0038	0.0038	0.0035	0.0035	0.0035	0.0030	0.0038	0.0035
5/8"	S	0.0038	0.0031	0.0035	0.0035	0.0031	0.0031	0.0031	0.0025	0.0035	0.0031
	HP	0.0044	0.0038	0.0044	0.0044	0.0038	0.0038	0.0038	0.0031	0.0044	0.0038
	LP	0.0050	0.0044	0.0048	0.0048	0.0044	0.0044	0.0044	0.0038	0.0048	0.0044
3/4"	S	0.0045	0.0038	0.0042	0.0042	0.0038	0.0038	0.0038	0.0030	0.0042	0.0038
	HP	0.0053	0.0045	0.0053	0.0053	0.0045	0.0045	0.0045	0.0038	0.0053	0.0045
	LP	0.0060	0.0053	0.0057	0.0057	0.0053	0.0053	0.0053	0.0045	0.0057	0.0053
1"	S	0.0060	0.0050	0.0056	0.0056	0.0050	0.0050	0.0050	0.0040	0.0056	0.0050
	HP	0.0070	0.0060	0.0070	0.0070	0.0060	0.0060	0.0060	0.0050	0.0070	0.0060
	LP	0.0080	0.0070	0.0076	0.0076	0.0070	0.0070	0.0070	0.0060	0.0076	0.0070

S = SLOTTING Axial Depth up to .5 x Diameter
HP = HEAVY PERIPHERAL Axial Depth up to Effective Length of Cut Radial width .5 x Diameter
LP = LIGHT PERIPHERAL Axial Depth up to Effective Length of Cut Radial width .15 x Diameter

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SS-C Four Flute

Technical Chart



The SS-C four flute enable a 25% increase in feed rates. SS-C four flute is the tool of choice when periphery machining tuff gummy material. The geometries of the SS style tool along with the truncated knuckle form helps control the chip form and is freer cutting than traditional roughers.

Feeds and Speeds Chart with Chip-Load per/tooth

Materials		Carbon Steels	Alloy Steel	Stainless Steel 300 Series	Stainless Steel 400 Series	Precipitation Stainless Steels	Gray Cast Iron	Ductile Cast Iron	High Temp Alloys	Titanium Pure	Titanium Cast/Wrought
Diameter	Description	10XX, 11XX, 13XX, 15XX	40XX, 41XX, 42XX, 43XX, 44XX, 46XX, 86XX, Series	304, 304L, 316, 316L, 312	420, 420F, 416, 440C	15/5PH, 16-6PH, 17/4PH, AM-XX Series	Gray	Ductile	Inconel 625/718, A286, Haynes	Pure	Cast/Wrought 6AL4V, ASTM 1,2,3, Alpha - Beta
		SFM < 32Rc SFM > 32Rc	200 - 450 150 - 300	150 - 350 80 - 200	200 - 450 100 - 250	80 - 250 90 - 125	250 - 450 130 - 300	120 - 350 80 - 140	70 - 120 40 - 90	140 - 220 90 - 160	140 - 200 90 - 160
1/8"	S	0.0007	0.0006	0.0007	0.0007	0.0006	0.0006	0.0006	0.0005	0.0007	0.0006
	HP	0.0008	0.0007	0.0008	0.0008	0.0007	0.0007	0.0007	0.0006	0.0008	0.0007
	LP	0.0010	0.0008	0.0009	0.0009	0.0008	0.0008	0.0008	0.0007	0.0009	0.0008
1/4"	S	0.0014	0.0012	0.0013	0.0013	0.0012	0.0012	0.0012	0.0010	0.0013	0.0012
	HP	0.0017	0.0014	0.0017	0.0017	0.0014	0.0014	0.0014	0.0012	0.0017	0.0014
	LP	0.0019	0.0017	0.0018	0.0018	0.0017	0.0017	0.0017	0.0014	0.0018	0.0017
5/16"	S	0.0018	0.0015	0.0017	0.0017	0.0015	0.0015	0.0015	0.0012	0.0017	0.0015
	HP	0.0021	0.0018	0.0021	0.0021	0.0018	0.0018	0.0018	0.0015	0.0021	0.0018
	LP	0.0024	0.0021	0.0023	0.0023	0.0021	0.0021	0.0021	0.0018	0.0023	0.0021
3/8"	S	0.0021	0.0018	0.0020	0.0020	0.0018	0.0018	0.0018	0.0014	0.0020	0.0018
	HP	0.0025	0.0021	0.0025	0.0025	0.0021	0.0021	0.0021	0.0018	0.0025	0.0021
	LP	0.0029	0.0025	0.0027	0.0027	0.0025	0.0025	0.0025	0.0021	0.0027	0.0025
1/2"	S	0.0030	0.0025	0.0028	0.0028	0.0025	0.0025	0.0025	0.0020	0.0028	0.0025
	HP	0.0035	0.0030	0.0035	0.0035	0.0030	0.0030	0.0030	0.0025	0.0035	0.0030
	LP	0.0040	0.0035	0.0038	0.0038	0.0035	0.0035	0.0035	0.0030	0.0038	0.0035
5/8"	S	0.0038	0.0031	0.0035	0.0035	0.0031	0.0031	0.0031	0.0025	0.0035	0.0031
	HP	0.0044	0.0038	0.0044	0.0044	0.0038	0.0038	0.0038	0.0031	0.0044	0.0038
	LP	0.0050	0.0044	0.0048	0.0048	0.0044	0.0044	0.0044	0.0038	0.0048	0.0044
3/4"	S	0.0045	0.0038	0.0042	0.0042	0.0038	0.0038	0.0038	0.0030	0.0042	0.0038
	HP	0.0053	0.0045	0.0053	0.0053	0.0045	0.0045	0.0045	0.0038	0.0053	0.0045
	LP	0.0060	0.0053	0.0057	0.0057	0.0053	0.0053	0.0053	0.0045	0.0057	0.0053
1"	S	0.0060	0.0050	0.0056	0.0056	0.0050	0.0050	0.0050	0.0040	0.0056	0.0050
	HP	0.0070	0.0060	0.0070	0.0070	0.0060	0.0060	0.0060	0.0050	0.0070	0.0060
	LP	0.0080	0.0070	0.0076	0.0076	0.0070	0.0070	0.0070	0.0060	0.0076	0.0070

S = SLOTTING
Axial Depth up to
.5 x Diameter

HP = HEAVY PERIPHERAL
Axial Depth up to
Effective Length of Cut
Radial width .5 x Diameter

LP = LIGHT PERIPHERAL
Axial Depth up to
Effective Length of Cut
Radial width .15 x Diameter

For additional support and for maximum optimization of your Data Flute tools, call us toll free at 800.447.1476 and ask to speak to our Technical Support Department.

SS-BN-4 Four Flute Ball Mill

Technical Chart



Contour, radius and 3-D modeling in an extended reach application are a breeze with 4 flute SS-BN-RN series. Due to aggressive gash angles which allow for heavier chip loads as well as better chip evacuation when milling with the ball. This series is offered with stub, regular and extended neck.

Feeds and Speeds Chart with Chip-Load per/tooth

Materials		Carbon Steels	Alloy Steel	Stainless Steel 300 Series	Stainless Steel 400 Series	Precipitation Stainless Steels	Gray Cast Iron	Ductile Cast Iron	High Temp Alloys	Titanium Pure	Titanium Cast/Wrought	
Diameter	Description	10XX, 11XX, 12XX, 13XX	40XX, 41XX, 42XX, 43XX, 44XX, 46XX, 86XX, Series	304, 304L, 316, 316L, 312	420, 420F, 416, 440L,	15-5PH, 16-6PH, 17-4PH, AM-XX Series	Gray	Ductile	Inconel 625/718, A286, Haynes	Pure	Cast/Wrought 6AL4V, ASTM 1,2,3, Alpha - Beta	
		SFM < 32Rc SFM > 32Rc	200 - 450 100 - 250	150 - 300 80 - 200	150 - 350 80 - 200	200 - 450 100 - 250	80 - 250 90 - 125	250 - 450 130 - 300	120 - 350 80 - 140	70 - 120 40 - 90	140 - 220 90 - 160	140 - 200 90 - 160
1/8"	S	0.0007	0.0006	0.0007	0.0007	0.0006	0.0006	0.0006	0.0005	0.0007	0.0006	
	HP	0.0008	0.0007	0.0008	0.0008	0.0007	0.0007	0.0007	0.0006	0.0008	0.0007	
	LP	0.0010	0.0008	0.0009	0.0009	0.0008	0.0008	0.0008	0.0007	0.0009	0.0008	
1/4"	S	0.0014	0.0012	0.0013	0.0013	0.0012	0.0012	0.0012	0.0010	0.0013	0.0012	
	HP	0.0017	0.0014	0.0017	0.0017	0.0014	0.0014	0.0014	0.0012	0.0017	0.0014	
	LP	0.0019	0.0017	0.0018	0.0018	0.0017	0.0017	0.0017	0.0014	0.0018	0.0017	
5/16"	S	0.0018	0.0015	0.0017	0.0017	0.0015	0.0015	0.0015	0.0012	0.0017	0.0015	
	HP	0.0021	0.0018	0.0021	0.0021	0.0018	0.0018	0.0018	0.0015	0.0021	0.0018	
	LP	0.0024	0.0021	0.0023	0.0023	0.0021	0.0021	0.0021	0.0018	0.0023	0.0021	
3/8"	S	0.0021	0.0018	0.0020	0.0020	0.0018	0.0018	0.0018	0.0014	0.0020	0.0018	
	HP	0.0025	0.0021	0.0025	0.0025	0.0021	0.0021	0.0021	0.0018	0.0025	0.0021	
	LP	0.0029	0.0025	0.0027	0.0027	0.0025	0.0025	0.0025	0.0021	0.0027	0.0025	
1/2"	S	0.0030	0.0025	0.0028	0.0028	0.0025	0.0025	0.0025	0.0020	0.0028	0.0025	
	HP	0.0035	0.0030	0.0035	0.0035	0.0030	0.0030	0.0030	0.0025	0.0035	0.0030	
	LP	0.0040	0.0035	0.0038	0.0038	0.0035	0.0035	0.0035	0.0030	0.0038	0.0035	
5/8"	S	0.0038	0.0031	0.0035	0.0035	0.0031	0.0031	0.0031	0.0025	0.0035	0.0031	
	HP	0.0044	0.0038	0.0044	0.0044	0.0038	0.0038	0.0038	0.0031	0.0044	0.0038	
	LP	0.0050	0.0044	0.0048	0.0048	0.0044	0.0044	0.0044	0.0038	0.0048	0.0044	
3/4"	S	0.0045	0.0038	0.0042	0.0042	0.0038	0.0038	0.0038	0.0030	0.0042	0.0038	
	HP	0.0053	0.0045	0.0053	0.0053	0.0045	0.0045	0.0045	0.0038	0.0053	0.0045	
	LP	0.0060	0.0053	0.0057	0.0057	0.0053	0.0053	0.0053	0.0045	0.0057	0.0053	
1"	S	0.0060	0.0050	0.0056	0.0056	0.0050	0.0050	0.0050	0.0040	0.0056	0.0050	
	HP	0.0070	0.0060	0.0070	0.0070	0.0060	0.0060	0.0060	0.0050	0.0070	0.0060	
	LP	0.0080	0.0070	0.0076	0.0076	0.0070	0.0070	0.0070	0.0060	0.0076	0.0070	

S = SLOTTING
Axial Depth up to
.5 x Diameter

HP = HEAVY PERIPHERAL
Axial Depth up to
Effective Length of Cut
Radial width .5 x Diameter

LP = LIGHT PERIPHERAL
Axial Depth up to
Effective Length of Cut
Radial width .15 x Diameter

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SS-BN-C Four Flute Ball Nose

Technical Chart



The 4 flute SS-BN-C series combines the ultra-effective design of the SS geometry with a truncated knuckle form. This design is best utilized in gummy material applications as it helps manage chip size and flow.

Feeds and Speeds Chart with Chip-Load per/tooth

Materials		Carbon Steels	Alloy Steel	Stainless Steel 300 Series	Stainless Steel 400 Series	Precipitation Stainless Steels	Gray Cast Iron	Ductile Cast Iron	High Temp Alloys	Titanium Pure	Titanium Cast/Wrought
Diameter	Description	10XX, 11XX, 12XX, 13XX	40XX, 41XX, 42XX, 43XX, 44XX, 46XX, 86XX, Series	304, 304L, 316, 316L, 312	420, 420F, 416, 440L,	15-5PH, 16-6PH, 17-4PH, AM-XX Series	Gray	Ductile	Inconel 625/718, A286, Haynes	Pure	Cast/Wrought 6AL4V, ASTM 1,2,3, Alpha - Beta
		SFM < 32Rc SFM > 32Rc	200 - 450 150 - 300	150 - 350 80 - 200	200 - 450 100 - 250	80 - 250 90 - 125	250 - 450 130 - 300	120 - 350 80 - 140	70 - 120 40 - 90	140 - 220 90 - 160	140 - 200 90 - 160
1/8"	S	0.0007	0.0006	0.0007	0.0007	0.0006	0.0006	0.0006	0.0005	0.0007	0.0006
	HP	0.0008	0.0007	0.0008	0.0008	0.0007	0.0007	0.0007	0.0006	0.0008	0.0007
	LP	0.0010	0.0008	0.0009	0.0009	0.0008	0.0008	0.0008	0.0007	0.0009	0.0008
1/4"	S	0.0014	0.0012	0.0013	0.0013	0.0012	0.0012	0.0012	0.0010	0.0013	0.0012
	HP	0.0017	0.0014	0.0017	0.0017	0.0014	0.0014	0.0014	0.0012	0.0017	0.0014
	LP	0.0019	0.0017	0.0018	0.0018	0.0017	0.0017	0.0017	0.0014	0.0018	0.0017
5/16"	S	0.0018	0.0015	0.0017	0.0017	0.0015	0.0015	0.0015	0.0012	0.0017	0.0015
	HP	0.0021	0.0018	0.0021	0.0021	0.0018	0.0018	0.0018	0.0015	0.0021	0.0018
	LP	0.0024	0.0021	0.0023	0.0023	0.0021	0.0021	0.0021	0.0018	0.0023	0.0021
3/8"	S	0.0021	0.0018	0.0020	0.0020	0.0018	0.0018	0.0018	0.0014	0.0020	0.0018
	HP	0.0025	0.0021	0.0025	0.0025	0.0021	0.0021	0.0021	0.0018	0.0025	0.0021
	LP	0.0029	0.0025	0.0027	0.0027	0.0025	0.0025	0.0025	0.0021	0.0027	0.0025
1/2"	S	0.0030	0.0025	0.0028	0.0028	0.0025	0.0025	0.0025	0.0020	0.0028	0.0025
	HP	0.0035	0.0030	0.0035	0.0035	0.0030	0.0030	0.0030	0.0025	0.0035	0.0030
	LP	0.0040	0.0035	0.0038	0.0038	0.0035	0.0035	0.0035	0.0030	0.0038	0.0035
5/8"	S	0.0038	0.0031	0.0035	0.0035	0.0031	0.0031	0.0031	0.0025	0.0035	0.0031
	HP	0.0044	0.0038	0.0044	0.0044	0.0038	0.0038	0.0038	0.0031	0.0044	0.0038
	LP	0.0050	0.0044	0.0048	0.0048	0.0044	0.0044	0.0044	0.0038	0.0048	0.0044
3/4"	S	0.0045	0.0038	0.0042	0.0042	0.0038	0.0038	0.0038	0.0030	0.0042	0.0038
	HP	0.0053	0.0045	0.0053	0.0053	0.0045	0.0045	0.0045	0.0038	0.0053	0.0045
	LP	0.0060	0.0053	0.0057	0.0057	0.0053	0.0053	0.0053	0.0045	0.0057	0.0053
1"	S	0.0060	0.0050	0.0056	0.0056	0.0050	0.0050	0.0050	0.0040	0.0056	0.0050
	HP	0.0070	0.0060	0.0070	0.0070	0.0060	0.0060	0.0060	0.0050	0.0070	0.0060
	LP	0.0080	0.0070	0.0076	0.0076	0.0070	0.0070	0.0070	0.0060	0.0076	0.0070

S = SLOTTING
Axial Depth up to
.5 x Diameter

HP = HEAVY PERIPHERAL
Axial Depth up to
Effective Length of Cut
Radial width .5 x Diameter

LP = LIGHT PERIPHERAL
Axial Depth up to
Effective Length of Cut
Radial width .15 x Diameter

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SSI-4 Four Flute, Inch

Technical Chart



The SSI-4 is the foundation on which our variably indexed family of ferrous rougher/finishers was built. The SSI-4 is a proven, performance driven, ferrous rougher that has the geometry to successfully venture into finishing territory as well. Now updated and expanded to over 70 stocked sizes, we hope that the SSI-4 will be the “go-to” tool for most of your ferrous alloy applications.

Feeds and Speeds Chart SSI-4 Flute

Diameter	Materials Description	Carbon Steels	Alloy Steel	Stainless Steel 300 Series	Stainless Steel 400 Series	Precipitation Stainless Steels	Gray Cast Iron	Ductile Cast Iron	High Temp Alloys	Titanium Pure	Titanium Cast/Wrought
		10XX, 11XX, 12XX, 13XX	40XX, 41XX, 42XX, 43XX, 44XX, 46XX, 86XX, Series	304, 304L, 316, 316L, 312	420, 420F, 416, 440C	15-5PH, 16-6PH, 17-4PH, AM-XX Series	Gray	Ductile	Inconel 625/718, A286, Haynes	Pure	Cast/Wrought 6AL4V, ASTM 1,2,3, Alpha - Beta
	SFM < 32Rc SFM > 32Rc	200 - 450 100 - 250	150 - 300 80 - 200	150 - 350 80 - 200	200 - 450 100 - 250	80 - 250 90 - 125	250 - 450 130 - 300	120 - 350 80 - 140	70 - 120 40 - 90	140 - 220 90 - 160	140 - 250 90 - 160
1/8"	S	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0007	0.0010	0.0010
	HP	0.0012	0.0012	0.0012	0.0012	0.0012	0.0012	0.0012	0.0011	0.0014	0.0014
	LP	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0012	0.0016	0.0016
	F	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0021	0.0028	0.0028
1/4"	S	0.0014	0.0013	0.0014	0.0014	0.0013	0.0013	0.0013	0.0009	0.0014	0.0013
	HP	0.0016	0.0015	0.0016	0.0016	0.0015	0.0015	0.0015	0.0012	0.0016	0.0015
	LP	0.0019	0.0017	0.0019	0.0019	0.0017	0.0017	0.0017	0.0014	0.0019	0.0017
	F	0.0035	0.0031	0.0035	0.0035	0.0031	0.0031	0.0031	0.0025	0.0035	0.0031
5/16"	S	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0011	0.0013	0.0013
	HP	0.0016	0.0016	0.0016	0.0016	0.0016	0.0016	0.0016	0.0016	0.0016	0.0016
	LP	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019
	F	0.0033	0.0033	0.0033	0.0033	0.0033	0.0033	0.0033	0.0033	0.0033	0.0033
3/8"	S	0.0018	0.0018	0.0018	0.0018	0.0018	0.0018	0.0018	0.0015	0.0018	0.0018
	HP	0.0021	0.0021	0.0021	0.0021	0.0021	0.0021	0.0021	0.0021	0.0021	0.0021
	LP	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025
	F	0.0045	0.0045	0.0045	0.0045	0.0045	0.0045	0.0045	0.0045	0.0045	0.0045
1/2"	S	0.0028	0.0025	0.0025	0.0025	0.0024	0.0025	0.0025	0.0018	0.0028	0.0022
	HP	0.0033	0.0029	0.0029	0.0029	0.0027	0.0029	0.0029	0.0024	0.0033	0.0029
	LP	0.0037	0.0033	0.0033	0.0033	0.0030	0.0033	0.0033	0.0026	0.0037	0.0035
	F	0.0066	0.0059	0.0059	0.0059	0.0055	0.0059	0.0059	0.0047	0.0066	0.0063
5/8"	S	0.0030	0.0030	0.0030	0.0030	0.0028	0.0030	0.0030	0.0025	0.0030	0.0030
	HP	0.0051	0.0051	0.0051	0.0051	0.0047	0.0051	0.0051	0.0040	0.0051	0.0051
	LP	0.0079	0.0079	0.0079	0.0079	0.0065	0.0079	0.0079	0.0060	0.0079	0.0079
	F	0.0142	0.0142	0.0142	0.0142	0.0120	0.0142	0.0142	0.0108	0.0142	0.0142
3/4"	S	0.0038	0.0035	0.0035	0.0035	0.0030	0.0038	0.0038	0.0028	0.0030	0.0035
	HP	0.0049	0.0045	0.0045	0.0045	0.0038	0.0045	0.0045	0.0036	0.0038	0.0045
	LP	0.0055	0.0050	0.0050	0.0050	0.0042	0.0050	0.0050	0.0050	0.0042	0.0050
	F	0.0086	0.0089	0.0089	0.0089	0.0081	0.0089	0.0086	0.0080	0.0081	0.0086
1"	S	0.0045	0.0042	0.0042	0.0042	0.0050	0.0050	0.0050	0.0035	0.0056	0.0050
	HP	0.0055	0.0052	0.0052	0.0052	0.0059	0.0059	0.0059	0.0043	0.0066	0.0059
	LP	0.0065	0.0065	0.0065	0.0065	0.0065	0.0065	0.0065	0.0053	0.0073	0.0065
	F	0.0105	0.0105	0.0105	0.0105	0.0105	0.0105	0.0105	0.0085	0.0117	0.0105

S = SLOTTING

Axial Depth up to
1.0 x Diameter

HP = HEAVY PERIPHERAL

Axial Depth up to
1.5 x Diameter
Radial width .5 x Diameter

LP = LIGHT PERIPHERAL

Axial Depth up to
2.0 x Diameter
Radial width .15 x Diameter

F = FINISH

Axial Depth up to Length Of Cut
2.5 X Diameter Reduce SFM by 20%
Radial width .015 x Diameter

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SSI-4 Four Flute, Metric

Technical Chart



The SSI-4 is the foundation on which our variably indexed family of ferrous rougher/finishers was built. The SSI-4 is a proven, performance driven, ferrous rougher that has the geometry to successfully venture into finishing territory as well. Now updated and expanded to over 70 stocked sizes, we hope the SSI-4 will be the “go-to” tool for most of your ferrous alloy applications.

Feeds and Speeds Chart with Chip-Load per/tooth in Inches

Materials	Carbon Steels	Alloy Steel	Stainless Steel 300 Series	Stainless Steel 400 Series	Precipitation Stainless Steels	Gray Cast Iron	Ductile Cast Iron	High Temp Alloys	Titanium Pure	Titanium Cast/Wrought	
Diameter	Description	10XX, 11XX, 13XX, 15XX	40XX, 41XX, 42XX, 43XX, 44XX, 46XX, 86XX, Series	304, 304L, 316, 316L, 312	420, 420F, 416, 440C	15/5PH, 16-6PH, 17/4PH, AM-XX Series	Gray	Ductile	Inconel 625/718, A286, Haynes	Pure	Cast/Wrought 6AL4V, ASTM 1,2,3, Alpha - Beta
	SFM < 32Rc SFM > 32Rc	200 - 450 100 - 250	150 - 300 80 - 200	150 - 350 80 - 200	200 - 450 100 - 250	80 - 250 90 - 125	250 - 450 130 - 300	120 - 350 80 - 140	70 - 120 40 - 90	140 - 220 90 - 160	140 - 200 90 - 160
3mm	S	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0007	0.0010	0.0010
	HP	0.0012	0.0012	0.0012	0.0012	0.0012	0.0012	0.0012	0.0011	0.0014	0.0014
	LP	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0012	0.0016	0.0016
	F	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0021	0.0028	0.0028
4mm	S	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0007	0.0010	0.0010
	HP	0.0012	0.0012	0.0012	0.0012	0.0012	0.0012	0.0012	0.0011	0.0014	0.0014
	LP	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0012	0.0016	0.0016
	F	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0021	0.0028	0.0028
5mm	S	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0009	0.0013	0.0013
	HP	0.0016	0.0016	0.0016	0.0016	0.0016	0.0016	0.0016	0.0014	0.0018	0.0018
	LP	0.0017	0.0017	0.0017	0.0017	0.0017	0.0017	0.0017	0.0016	0.0021	0.0021
	F	0.0031	0.0031	0.0031	0.0031	0.0031	0.0031	0.0031	0.0027	0.0036	0.0036
6mm	S	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0011	0.0013	0.0013
	HP	0.0016	0.0016	0.0016	0.0016	0.0016	0.0016	0.0016	0.0016	0.0016	0.0016
	LP	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019
	F	0.0033	0.0033	0.0033	0.0033	0.0033	0.0033	0.0033	0.0033	0.0033	0.0033
8mm	S	0.0014	0.0014	0.0014	0.0014	0.0013	0.0013	0.0013	0.0009	0.0014	0.0013
	HP	0.0016	0.0016	0.0016	0.0016	0.0015	0.0015	0.0015	0.0012	0.0016	0.0015
	LP	0.0019	0.0019	0.0019	0.0019	0.0017	0.0017	0.0017	0.0014	0.0019	0.0017
	F	0.0035	0.0031	0.0035	0.0035	0.0031	0.0031	0.0031	0.0025	0.0035	0.0031
10mm	S	0.0018	0.0018	0.0018	0.0018	0.0018	0.0018	0.0018	0.0015	0.0018	0.0018
	HP	0.0021	0.0021	0.0021	0.0021	0.0021	0.0021	0.0021	0.0021	0.0021	0.0021
	LP	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025
	F	0.0045	0.0045	0.0045	0.0045	0.0045	0.0045	0.0045	0.0045	0.0045	0.0045
12mm and 14mm	S	0.0028	0.0025	0.0025	0.0025	0.0024	0.0025	0.0025	0.0018	0.0028	0.0022
	HP	0.0033	0.0029	0.0029	0.0029	0.0027	0.0029	0.0029	0.0024	0.0033	0.0029
	LP	0.0037	0.0033	0.0033	0.0033	0.0030	0.0033	0.0033	0.0026	0.0037	0.0035
	F	0.0066	0.0059	0.0059	0.0059	0.0056	0.0059	0.0059	0.0047	0.0066	0.0063
16mm and 18mm	S	0.0030	0.0030	0.0030	0.0030	0.0028	0.0030	0.0030	0.0025	0.0030	0.0030
	HP	0.0051	0.0051	0.0051	0.0051	0.0047	0.0051	0.0051	0.0040	0.0051	0.0051
	LP	0.0079	0.0079	0.0079	0.0079	0.0065	0.0079	0.0079	0.0060	0.0079	0.0079
	F	0.0142	0.0142	0.0142	0.0142	0.0120	0.0142	0.0142	0.0108	0.0142	0.0142
20mm	S	0.0038	0.0035	0.0035	0.0035	0.0030	0.0038	0.0038	0.0028	0.0030	0.0035
	HP	0.0049	0.0045	0.0045	0.0045	0.0038	0.0045	0.0045	0.0036	0.0038	0.0045
	LP	0.0055	0.0050	0.0050	0.0050	0.0042	0.0050	0.0050	0.0050	0.0042	0.0050
	F	0.0086	0.0089	0.0089	0.0089	0.0081	0.0089	0.0086	0.0080	0.0081	0.0086
25mm	S	0.0045	0.0042	0.0042	0.0042	0.0050	0.0050	0.0045	0.0035	0.0056	0.0050
	HP	0.0055	0.0052	0.0052	0.0052	0.0059	0.0059	0.0059	0.0043	0.0066	0.0059
	LP	0.0065	0.0065	0.0065	0.0065	0.0065	0.0065	0.0065	0.0053	0.0073	0.0065
	F	0.0105	0.0105	0.0105	0.0105	0.0105	0.0105	0.0105	0.0085	0.0117	0.0105

S = SLOTTING
Axial Depth up to
1.0 x Diameter

HP = HEAVY PERIPHERAL
Axial Depth up to
1.5 x Diameter
Radial width 50% x Diameter

LP = LIGHT PERIPHERAL
Axial Depth up to
2.0 x Diameter
Radial width 15% x Diameter

F = FINISH
Axial Depth up to Length of Cut
2.5 x Diameter Reduce SFM by 20%
Radial width 1% to 2% x Diameter

SSI-5 Five Flute, Inch

Technical Chart



The SSI-5 is the all terrain vehicle of our ferrous alloy series tools. It can "chew up the road" in most roughing applications and at the same time provide smooth, high speed cruising well into finishing range. The SSI-5 will appeal to those who demand high performance and seek to minimize tool changes in a wide range of operations. This series has the addition of a Radius Program from stock.

Feeds and Speeds Chart SSI-5 Flute

Diameter	Materials Description	Carbon Steels	Alloy Steel	Stainless Steel 300 Series	Stainless Steel 400 Series	Precipitation Stainless Steels	Gray Cast Iron	Ductile Cast Iron	High Temp Alloys	Titanium Pure	Titanium Cast/Wrought
		10XX, 11XX, 12XX, 13XX	40XX, 41XX, 42XX, 43XX, 44XX, 46XX, 86XX, Series	304, 304L, 316, 316L, 312	420, 420F, 416, 440L,	15-5PH, 16-6PH, 17-4PH, AM-XX Series	Gray	Ductile	Inconel 625/718, A286, Haynes	Pure	Cast/Wrought 6AL4V, ASTM 1,2,3, Alpha - Beta
	SFM < 32Rc	200 - 450	150 - 300	150 - 350	200 - 450	80 - 250	250 - 450	120 - 350	70 - 120	140 - 220	140 - 200
	SFM > 32Rc	100 - 250	80 - 200	80 - 200	100 - 250	90 - 125	130 - 300	80 - 140	40 - 90	90 - 160	90 - 160
1/8"	S	0.0008	0.0008	0.0008	0.0008	0.0008	0.0006	0.0008	0.0007	0.0008	0.0010
	HP	0.0012	0.0011	0.0012	0.0012	0.0011	0.0008	0.0012	0.0011	0.0011	0.0014
	LP	0.0013	0.0013	0.0013	0.0013	0.0013	0.0009	0.0013	0.0012	0.0013	0.0016
	F	0.0024	0.0023	0.0024	0.0024	0.0023	0.0017	0.0024	0.0021	0.0023	0.0028
1/4"	S	0.0014	0.0011	0.0014	0.0014	0.0011	0.0007	0.0013	0.0009	0.0011	0.0013
	HP	0.0016	0.0013	0.0016	0.0016	0.0013	0.0009	0.0015	0.0012	0.0013	0.0015
	LP	0.0019	0.0016	0.0019	0.0019	0.0016	0.0011	0.0017	0.0014	0.0016	0.0017
	F	0.0035	0.0028	0.0035	0.0035	0.0028	0.0020	0.0031	0.0025	0.0028	0.0031
5/16"	S	0.0013	0.0011	0.0013	0.0013	0.0011	0.0009	0.0013	0.0011	0.0011	0.0013
	HP	0.0016	0.0013	0.0016	0.0016	0.0013	0.0013	0.0016	0.0016	0.0013	0.0016
	LP	0.0019	0.0015	0.0019	0.0019	0.0015	0.0015	0.0019	0.0019	0.0015	0.0019
	F	0.0033	0.0027	0.0033	0.0033	0.0027	0.0027	0.0033	0.0033	0.0027	0.0033
3/8"	S	0.0018	0.0015	0.0018	0.0018	0.0015	0.0012	0.0018	0.0015	0.0015	0.0018
	HP	0.0021	0.0017	0.0021	0.0021	0.0017	0.0017	0.0021	0.0021	0.0017	0.0021
	LP	0.0025	0.0020	0.0025	0.0025	0.0020	0.0020	0.0025	0.0025	0.0020	0.0025
	F	0.0045	0.0036	0.0045	0.0045	0.0036	0.0036	0.0045	0.0045	0.0036	0.0045
1/2"	S	0.0028	0.0022	0.0025	0.0025	0.0022	0.0014	0.0025	0.0018	0.0022	0.0022
	HP	0.0033	0.0026	0.0029	0.0029	0.0026	0.0019	0.0029	0.0024	0.0026	0.0029
	LP	0.0037	0.0029	0.0033	0.0033	0.0029	0.0021	0.0033	0.0026	0.0029	0.0035
	F	0.0066	0.0053	0.0059	0.0059	0.0053	0.0038	0.0059	0.0047	0.0053	0.0063
5/8"	S	0.0030	0.0024	0.0030	0.0030	0.0024	0.0020	0.0030	0.0025	0.0024	0.0030
	HP	0.0051	0.0041	0.0051	0.0051	0.0041	0.0032	0.0051	0.0040	0.0041	0.0051
	LP	0.0079	0.0063	0.0079	0.0079	0.0063	0.0048	0.0079	0.0060	0.0063	0.0079
	F	0.0142	0.0113	0.0142	0.0142	0.0113	0.0086	0.0142	0.0108	0.0113	0.0142
3/4"	S	0.0038	0.0024	0.0035	0.0035	0.0024	0.0022	0.0038	0.0028	0.0024	0.0035
	HP	0.0049	0.0030	0.0045	0.0045	0.0030	0.0029	0.0045	0.0036	0.0030	0.0045
	LP	0.0055	0.0034	0.0050	0.0050	0.0034	0.0040	0.0050	0.0050	0.0034	0.0050
	F	0.0086	0.0065	0.0089	0.0089	0.0065	0.0064	0.0086	0.0080	0.0065	0.0086
1"	S	0.0045	0.0045	0.0042	0.0042	0.0045	0.0028	0.0050	0.0035	0.0045	0.0050
	HP	0.0055	0.0053	0.0052	0.0052	0.0053	0.0034	0.0059	0.0043	0.0053	0.0059
	LP	0.0065	0.0059	0.0065	0.0065	0.0059	0.0042	0.0065	0.0053	0.0059	0.0065
	F	0.0105	0.0094	0.0105	0.0105	0.0094	0.0068	0.0105	0.0085	0.0094	0.0105

S = SLOTTING

Axial Depth up to
1.0 x Diameter

HP = HEAVY PERIPHERAL

Axial Depth up to
1.5 x Diameter
Radial width .25 x Diameter

LP = LIGHT PERIPHERAL

Axial Depth up to
2.0 x Diameter
Radial width .15 x Diameter

F = FINISH

Axial Depth up to Length Of Cut
2.5 X Diameter Reduce SFM by 20%
Radial width .015 x Diameter

For additional support and for maximum optimization of your Data Flute tools, call us toll free at 800.447.1476 and ask to speak to our Technical Support Department.



SSI-5 Five Flute, Metric

Technical Chart



The SSI-5 is the all terrain vehicle of our ferrous alloy series tools. It can “chew up the road” in most roughing applications and at the same time provide smooth, high speed cruising well into finishing range. The SSI-5 will appeal to those who demand high performance and seek to minimize tool changes in a wide range of operations.

Feeds and Speeds Chart with Chip-Load per/tooth in Inches

Diameter	Materials Description	Carbon Steels	Alloy Steel	Stainless Steel 300 Series	Stainless Steel 400 Series	Precipitation Stainless Steels	Gray Cast Iron	Ductile Cast Iron	High Temp Alloys	Titanium Pure	Titanium Cast/Wrought
		10XX, 11XX, 13XX, 15XX	40XX, 41XX, 42XX, 43XX, 44XX, 46XX, 86XX, Series	304, 304L, 316, 316L, 312	420, 420F, 416, 440C	15/5PH, 16-6PH, 17/4PH, AM-XX Series	Gray	Ductile	Inconel 625/718, A286, Haynes	Pure	Cast/Wrought 6AL4V, ASTM 1,2,3, Alpha - Beta
	SFM < 32Rc	200 - 450	150 - 300	150 - 350	200 - 450	80 - 250	250 - 450	120 - 350	70 - 120	140 - 220	140 - 200
	SFM > 32Rc	100 - 250	80 - 200	80 - 200	100 - 250	90 - 125	130 - 300	80 - 140	40 - 90	90 - 160	90 - 160
3mm	S	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0007	0.0010	0.0010
	HP	0.0012	0.0012	0.0012	0.0012	0.0012	0.0012	0.0012	0.0011	0.0014	0.0014
	LP	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0012	0.0016	0.0016
	F	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0021	0.0027	0.0027
4mm	S	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0008	0.0007	0.0010	0.0010
	HP	0.0012	0.0012	0.0012	0.0012	0.0012	0.0012	0.0012	0.0011	0.0014	0.0014
	LP	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0012	0.0016	0.0016
	F	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0024	0.0021	0.0027	0.0027
5mm	S	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0009	0.0013	0.0013
	HP	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0014	0.0018	0.0018
	LP	0.0017	0.0017	0.0017	0.0017	0.0017	0.0017	0.0017	0.0015	0.0020	0.0020
	F	0.0031	0.0031	0.0031	0.0031	0.0031	0.0031	0.0031	0.0027	0.0036	0.0036
6mm	S	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0011	0.0013	0.0013
	HP	0.0016	0.0016	0.0016	0.0016	0.0016	0.0016	0.0016	0.0016	0.0016	0.0016
	LP	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019
	F	0.0032	0.0032	0.0032	0.0032	0.0032	0.0032	0.0032	0.0032	0.0032	0.0032
8mm	S	0.0014	0.0014	0.0014	0.0014	0.0013	0.0013	0.0013	0.0009	0.0014	0.0013
	HP	0.0016	0.0016	0.0016	0.0016	0.0015	0.0015	0.0015	0.0012	0.0016	0.0015
	LP	0.0019	0.0019	0.0019	0.0019	0.0017	0.0017	0.0017	0.0014	0.0019	0.0017
	F	0.0034	0.0030	0.0034	0.0034	0.0030	0.0030	0.0030	0.0025	0.0034	0.0030
10mm	S	0.0018	0.0018	0.0018	0.0018	0.0018	0.0018	0.0018	0.0015	0.0018	0.0018
	HP	0.0021	0.0021	0.0021	0.0021	0.0021	0.0021	0.0021	0.0021	0.0021	0.0021
	LP	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025
	F	0.0044	0.0044	0.0044	0.0044	0.0044	0.0044	0.0044	0.0044	0.0044	0.0044
12mm and 14mm	S	0.0027	0.0025	0.0025	0.0025	0.0024	0.0025	0.0025	0.0018	0.0027	0.0022
	HP	0.0032	0.0028	0.0028	0.0028	0.0026	0.0028	0.0028	0.0024	0.0032	0.0028
	LP	0.0036	0.0032	0.0032	0.0032	0.0029	0.0032	0.0032	0.0025	0.0036	0.0034
	F	0.0065	0.0058	0.0058	0.0058	0.0055	0.0058	0.0058	0.0046	0.0065	0.0062
16mm and 18mm	S	0.0029	0.0029	0.0029	0.0029	0.0027	0.0029	0.0029	0.0025	0.0029	0.0029
	HP	0.0050	0.0050	0.0050	0.0050	0.0046	0.0050	0.0050	0.0039	0.0050	0.0050
	LP	0.0077	0.0077	0.0077	0.0077	0.0064	0.0077	0.0077	0.0059	0.0077	0.0077
	F	0.0139	0.0139	0.0139	0.0139	0.0118	0.0139	0.0139	0.0106	0.0139	0.0139
20mm	S	0.0037	0.0034	0.0034	0.0034	0.0029	0.0037	0.0037	0.0027	0.0029	0.0034
	HP	0.0048	0.0044	0.0044	0.0044	0.0037	0.0044	0.0044	0.0035	0.0037	0.0044
	LP	0.0054	0.0049	0.0049	0.0049	0.0041	0.0049	0.0049	0.0049	0.0041	0.0049
	F	0.0084	0.0087	0.0087	0.0087	0.0079	0.0087	0.0084	0.0078	0.0079	0.0084
25mm	S	0.0044	0.0041	0.0041	0.0041	0.0049	0.0049	0.0044	0.0034	0.0055	0.0049
	HP	0.0054	0.0051	0.0051	0.0051	0.0058	0.0058	0.0058	0.0042	0.0065	0.0058
	LP	0.0064	0.0064	0.0064	0.0064	0.0064	0.0064	0.0064	0.0052	0.0072	0.0064
	F	0.0103	0.0103	0.0103	0.0103	0.0103	0.0103	0.0103	0.0083	0.0115	0.0103

S = SLOTTING
Axial Depth up to
1.0 x Diameter

HP = HEAVY PERIPHERAL
Axial Depth up to
1.5 x Diameter
Radial width 50% x Diameter

LP = LIGHT PERIPHERAL
Axial Depth up to
2.0 x Diameter
Radial width 15% x Diameter

F = FINISH
Axial Depth up to Length of Cut
2.5 x Diameter Reduce SFM by 20%
Radial width 1% to 2% x Diameter

SVI Five Flute

Technical Chart



The SVI is a patented, five flute tool with both variable indexing and variable helixes. These features combine to provide the highest levels of protection against unwanted chatter and harmonics. The SVI-5 is the perfect tool for ramping at up to 3 degrees and helical interpolation of up to 3 degrees.

Feeds and Speeds Chart with Chip-Load per/tooth

Diameter	Description	Carbon Steels	Alloy Steel	Stainless Steel 300 Series	Stainless Steel 400 Series	Precipitation Stainless Steels	Gray Cast Iron	Ductile Cast Iron	High Temp Alloys	Titanium Pure	Titanium Cast/Wrought
		10XX, 11XX, 13XX, 15XX	40XX, 41XX, 42XX, 43XX, 44XX, 46XX, 86XX, Series	304, 304L, 316, 316L, 312	420, 420F, 416, 440C	15-5PH, 16-6PH, 17-4PH, AM-XX Series	Gray	Ductile	Inconel 625/718, A286, Haynes	Pure	Cast/Wrought 6AL4V, ASTM 1,2,3, Alpha - Beta
	SFM < 32Rc	200 - 450	150 - 300	150 - 350	200 - 450	80 - 250	250 - 450	120 - 350	70 - 120	140 - 220	140 - 200
	SFM > 32Rc	100 - 250	80 - 200	80 - 200	100 - 250	90 - 125	130 - 300	80 - 140	40 - 90	90 - 160	90 - 160
1/4"	S	0.0014	0.0014	0.0014	0.0014	0.0014	0.0014	0.0014	0.0009	0.0014	0.0013
	HP	0.0016	0.0016	0.0016	0.0016	0.0016	0.0016	0.0016	0.0012	0.0016	0.0015
	LP	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019	0.0014	0.0019	0.0017
	F	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0035	0.0025	0.0035	0.0031
5/16"	S	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0011	0.0013	0.0013
	HP	0.0016	0.0016	0.0016	0.0016	0.0016	0.0016	0.0016	0.0016	0.0016	0.0016
	LP	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019
	F	0.0033	0.0033	0.0033	0.0033	0.0033	0.0033	0.0033	0.0033	0.0033	0.0033
3/8"	S	0.0018	0.0018	0.0018	0.0018	0.0018	0.0018	0.0018	0.0015	0.0018	0.0018
	HP	0.0021	0.0021	0.0021	0.0021	0.0021	0.0021	0.0021	0.0021	0.0021	0.0021
	LP	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025
	F	0.0045	0.0045	0.0045	0.0045	0.0045	0.0045	0.0045	0.0045	0.0045	0.0045
1/2"	S	0.0028	0.0028	0.0028	0.0028	0.0028	0.0028	0.0028	0.0018	0.0028	0.0022
	HP	0.0033	0.0033	0.0033	0.0033	0.0033	0.0033	0.0033	0.0024	0.0033	0.0029
	LP	0.0037	0.0037	0.0037	0.0037	0.0037	0.0037	0.0037	0.0026	0.0037	0.0035
	F	0.0066	0.0066	0.0066	0.0066	0.0066	0.0066	0.0066	0.0047	0.0066	0.0063
5/8"	S	0.0030	0.0030	0.0030	0.0030	0.0030	0.0030	0.0030	0.0025	0.0030	0.0030
	HP	0.0051	0.0051	0.0051	0.0051	0.0051	0.0051	0.0051	0.0040	0.0051	0.0051
	LP	0.0079	0.0079	0.0079	0.0079	0.0079	0.0079	0.0079	0.0060	0.0079	0.0079
	F	0.0142	0.0142	0.0142	0.0142	0.0142	0.0142	0.0142	0.0108	0.0142	0.0142
3/4"	S	0.0038	0.0038	0.0038	0.0038	0.0038	0.0038	0.0038	0.0028	0.0030	0.0035
	HP	0.0049	0.0049	0.0049	0.0049	0.0049	0.0049	0.0049	0.0036	0.0038	0.0045
	LP	0.0055	0.0055	0.0055	0.0055	0.0055	0.0055	0.0055	0.0050	0.0042	0.0050
	F	0.0086	0.0086	0.0086	0.0086	0.0086	0.0086	0.0086	0.0080	0.0081	0.0086
1"	S	0.0045	0.0045	0.0045	0.0045	0.0045	0.0045	0.0045	0.0035	0.0056	0.0050
	HP	0.0055	0.0055	0.0055	0.0055	0.0055	0.0055	0.0055	0.0043	0.0066	0.0059
	LP	0.0065	0.0065	0.0065	0.0065	0.0065	0.0065	0.0065	0.0053	0.0073	0.0065
	F	0.0105	0.0105	0.0105	0.0105	0.0105	0.0105	0.0105	0.0085	0.0117	0.0105

S = SLOTTING
Axial Depth up to
1.0 x Diameter

HP = HEAVY PERIPHERAL
Axial Depth up to
1.5 x Diameter
Radial width .25 x Diameter

LP = LIGHT PERIPHERAL
Axial Depth up to
2.0 x Diameter
Radial width .15 x Diameter

F = FINISH
Axial Depth up to Length Of Cut
2.5 X Diameter Reduce SFM by 20%
Radial width .015 x Diameter

For additional support and for maximum optimization of your Data Flute tools, call us toll free at 800.447.1476 and ask to speak to our Technical Support Department.

MH Multi-Flute

High Performance Carbide



Our MH series is the tool of choice for finishing and light profile roughing in ferrous materials. The odd number of flutes disrupts unwanted harmonics. Our medium helix provides an optimum shear angle to aid chip evacuation. We have a full offering of stub, standard, medium, long and extra long lengths of cut.

- High Performance Carbide
- Eccentric Primary
- 45 Degree Helix
- Available in Stub, Standard, Medium, Long and Extra Long
- Available Upon Request:
 - Additional Coatings
 - Haimer Safe-Lock
 - Coolant Grooves

Initial Speeds (SFM) and Feeds (Chip-Load per/tooth)

Diameter	Description	Carbon Steels	Alloy Steel	Stainless Steel 300 Series	Stainless Steel 400 Series	Precipitation Stainless Steels	Gray Cast Iron	Ductile Cast Iron	High Temp Alloys	Titanium Pure	Titanium Cast/Wrought
		10XX, 11XX, 12XX, 13XX	40XX, 41XX, 42XX, 43XX, 44XX, 46XX, 86XX, Series	304, 304L, 316, 316L, 312	420, 420F, 416, 440C	15-5PH, 16-6PH, 17-4PH, AM-XX Series	Gray	Ductile	Inconel 625/718, A286, Haynes	Pure	Cast/Wrought 6AL4V, ASTM 1,2,3, Alpha - Beta
	SFM < 32Rc	200 - 450	150 - 300	150 - 350	200 - 450	80 - 250	250 - 450	120 - 350	70 - 120	140 - 220	140 - 200
	SFM > 32Rc	100 - 250	80 - 200	80 - 200	100 - 250	90 - 125	130 - 300	80 -140	40 - 90	90 - 160	90 - 160
1/8"	HP	0.0008	0.0007	0.0007	0.0007	0.0007	0.0007	0.0007	0.0005	0.0007	0.0007
	LP	0.0011	0.0010	0.0010	0.0010	0.0010	0.0010	0.0010	0.0007	0.0010	0.0010
	F	0.0014	0.0013	0.0013	0.0013	0.0013	0.0013	0.0013	0.0010	0.0013	0.0013
1/4"	HP	0.0017	0.0014	0.0014	0.0014	0.0014	0.0014	0.0014	0.0010	0.0014	0.0014
	LP	0.0021	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019	0.0014	0.0019	0.0019
	F	0.0028	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0020	0.0025	0.0025
5/16"	HP	0.0021	0.0018	0.0018	0.0018	0.0018	0.0018	0.0018	0.0012	0.0018	0.0018
	LP	0.0034	0.0031	0.0031	0.0031	0.0031	0.0031	0.0031	0.0025	0.0031	0.0031
	F	0.0034	0.0031	0.0031	0.0031	0.0031	0.0031	0.0031	0.0025	0.0031	0.0031
3/8"	HP	0.0025	0.0021	0.0021	0.0021	0.0021	0.0021	0.0021	0.0014	0.0021	0.0021
	LP	0.0032	0.0029	0.0029	0.0029	0.0029	0.0029	0.0029	0.0021	0.0029	0.0029
	F	0.0041	0.0038	0.0038	0.0038	0.0038	0.0038	0.0038	0.0030	0.0038	0.0038
1/2"	HP	0.0035	0.0030	0.0030	0.0030	0.0030	0.0030	0.0030	0.0020	0.0030	0.0030
	LP	0.0045	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0030	0.0040	0.0040
	F	0.0055	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0040	0.0050	0.0050
5/8"	HP	0.0042	0.0036	0.0036	0.0036	0.0036	0.0036	0.0036	0.0024	0.0036	0.0036
	LP	0.0053	0.0048	0.0048	0.0048	0.0048	0.0048	0.0048	0.0036	0.0048	0.0048
	F	0.0065	0.0059	0.0059	0.0059	0.0059	0.0059	0.0059	0.0048	0.0059	0.0059
3/4"	HP	0.0050	0.0043	0.0043	0.0043	0.0043	0.0043	0.0043	0.0029	0.0043	0.0043
	LP	0.0064	0.0057	0.0057	0.0057	0.0057	0.0057	0.0057	0.0043	0.0057	0.0057
	F	0.0078	0.0071	0.0071	0.0071	0.0071	0.0071	0.0071	0.0057	0.0071	0.0071
1"	HP	0.0090	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0060	0.0080	0.0080
	LP	0.0090	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0060	0.0080	0.0080
	F	0.0110	0.0100	0.0100	0.0100	0.0100	0.0100	0.0100	0.0080	0.0100	0.0100
1-1/4"	HP	0.0079	0.0068	0.0068	0.0068	0.0068	0.0068	0.0068	0.0045	0.0068	0.0068
	LP	0.0101	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090	0.0068	0.0090	0.0090
	F	0.0124	0.0113	0.0113	0.0113	0.0113	0.0113	0.0113	0.0090	0.0113	0.0113

HP = HEAVY PERIPHERAL
Axial Depth up to
1.0 x Diameter
Radial width .2 x Diameter

LP = LIGHT PERIPHERAL
Axial Depth up to
Effective Length of Cut
Radial width .05 x Diameter

F = FINISH
Axial Depth up to
Effective Length Of Cut
Radial width .02 x Diameter

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MH-CR Multi-Flute

Technical Chart



The MHCR series features our MH series as the platform to which a precision ground corner radius is applied, in a wide array of diameters and lengths, radii range from .030-.187". All of the tools are available from stock, which means no waiting for an altered tool.

Initial Speeds (SFM) and Feeds (Chip-Load per/tooth)

Diameter	Materials Description	Carbon Steels	Alloy Steel	Stainless Steel 300 Series	Stainless Steel 400 Series	Precipitation Stainless Steels	Gray Cast Iron	Ductile Cast Iron	High Temp Alloys	Titanium Pure	Titanium Cast/Wrought
		10XX, 11XX, 12XX, 13XX	40XX, 41XX, 42XX, 43XX, 44XX, 46XX, 86XX, Series	304, 304L, 316, 316L, 312	420, 420F, 416, 440C	15-5PH, 16-6PH, 17-4PH, AM-XX Series	Gray	Ductile	Inconel 625/718, A286, Haynes	Pure	Cast/Wrought 6AL4V, ASTM 1,2,3, Alpha - Beta
	SFM < 32Rc SFM > 32Rc	200 - 450 100 - 250	150 - 300 80 - 200	150 - 350 80 - 200	200 - 450 100 - 250	80 - 250 90 - 125	250 - 450 130 - 300	120 - 350 80 - 140	70 - 120 40 - 90	140 - 220 90 - 160	140 - 200 90 - 160
1/4"	HP	0.0017	0.0014	0.0014	0.0014	0.0014	0.0014	0.0014	0.0010	0.0014	0.0014
	LP	0.0021	0.0019	0.0019	0.0019	0.0019	0.0019	0.0019	0.0014	0.0019	0.0019
	F	0.0028	0.0025	0.0025	0.0025	0.0025	0.0025	0.0025	0.0020	0.0025	0.0025
5/16"	HP	0.0021	0.0018	0.0018	0.0018	0.0018	0.0018	0.0018	0.0012	0.0018	0.0018
	LP	0.0034	0.0031	0.0031	0.0031	0.0031	0.0031	0.0031	0.0025	0.0031	0.0031
	F	0.0034	0.0031	0.0031	0.0031	0.0031	0.0031	0.0031	0.0025	0.0031	0.0031
3/8"	HP	0.0025	0.0021	0.0021	0.0021	0.0021	0.0021	0.0021	0.0014	0.0021	0.0021
	LP	0.0032	0.0029	0.0029	0.0029	0.0029	0.0029	0.0029	0.0021	0.0029	0.0029
	F	0.0041	0.0038	0.0038	0.0038	0.0038	0.0038	0.0038	0.0030	0.0038	0.0038
1/2"	HP	0.0035	0.0030	0.0030	0.0030	0.0030	0.0030	0.0030	0.0020	0.0030	0.0030
	LP	0.0045	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0030	0.0040	0.0040
	F	0.0055	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0040	0.0050	0.0050
5/8"	HP	0.0042	0.0036	0.0036	0.0036	0.0036	0.0036	0.0036	0.0024	0.0036	0.0036
	LP	0.0053	0.0048	0.0048	0.0048	0.0048	0.0048	0.0048	0.0036	0.0048	0.0048
	F	0.0065	0.0059	0.0059	0.0059	0.0059	0.0059	0.0059	0.0048	0.0059	0.0059
3/4"	HP	0.0050	0.0043	0.0043	0.0043	0.0043	0.0043	0.0043	0.0029	0.0043	0.0043
	LP	0.0064	0.0057	0.0057	0.0057	0.0057	0.0057	0.0057	0.0043	0.0057	0.0057
	F	0.0078	0.0071	0.0071	0.0071	0.0071	0.0071	0.0071	0.0057	0.0071	0.0071
1"	HP	0.0090	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0060	0.0080	0.0080
	LP	0.0090	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0060	0.0080	0.0080
	F	0.0110	0.0100	0.0100	0.0100	0.0100	0.0100	0.0100	0.0080	0.0100	0.0100
1-1/4"	HP	0.0079	0.0068	0.0068	0.0068	0.0068	0.0068	0.0068	0.0045	0.0068	0.0068
	LP	0.0101	0.0090	0.0090	0.0090	0.0090	0.0090	0.0090	0.0068	0.0090	0.0090
	F	0.0124	0.0113	0.0113	0.0113	0.0113	0.0113	0.0113	0.0090	0.0113	0.0113

HP = HEAVY PERIPHERAL

Axial Depth up to
1.0 x Diameter
Radial width .2 x Diameter

LP = LIGHT PERIPHERAL

Axial Depth up to
Effective Length of Cut
Radial width .05 x Diameter

F = FINISH

Axial Depth up to
Effective Length Of Cut
Radial width .02 x Diameter

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The introduction of the TiW series was designed for thin wall machining of Titanium Aerospace Structures with walls 3 times or more the diameter in depth of wall. The TiW series has patented geometries which improve Process Dampening in machining thin wall structures.

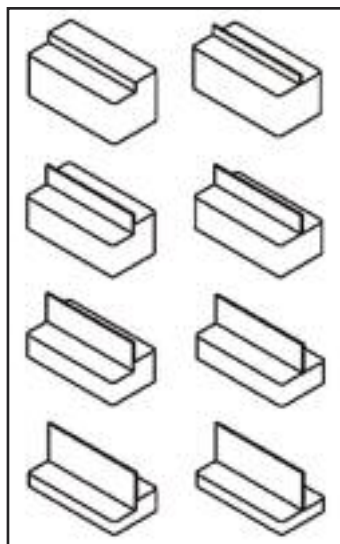
Feeds and Speeds Chart with Chip-Load per/tooth

Materials	Titanium	
	Pure	Cast/ Wrought
		Titanium Cast/ Wrought
		Cast/ Wrought 6AL4V, ASTM 1,2,3, Alpha - Beta
Description	Pure	
LP	140 - 220	140 - 200
F	300 - 400	300 - 400
Diameter		
1/2"	LP	0.0037 0.0035
	F	0.0066 0.0063
5/8"	LP	0.0079 0.0079
	F	0.0142 0.0142
3/4"	LP	0.0042 0.0050
	F	0.0081 0.0086
1"	LP	0.0073 0.0065
	F	0.0117 0.0105

R = LIGHT PERIPHERAL
Axial Depth up to Length Of Cut
Radial Width .2 x Diameter

F = FINISH
Axial Depth up to Length Of Cut
Radial Width .02 x Diameter

Step-Cutting Rules of Thumb for Titanium

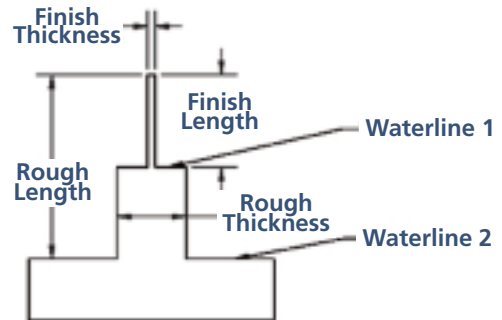


**Waterline
Machining Approach**

- Step-Cutting for Finishing Ribs
- Length (L) / Thickness (T)
- Rough (R), Finish (F)
- Maintain an 8/1 L/T Ratio

EXAMPLE:

1" LR / .130" TR = 7.7
.5" LF / .060" TF = 8.33



For additional support and for maximum optimization of your Data Flute tools, call us toll free at 800.447.1476 and ask to speak to our Technical Support Department.



Data Flute is pleased to introduce its all new MC Series. This is a 15 degree helix, multi-flute tool designed primarily for cobalt chrome and other similar materials used in medical implants. Our MC Series is intended to run at accelerated feeds and speeds with light radial depths of cut. The geometry is also excellent for finishing walls in a variety of materials <54RC.

High performance Carbide Feeds and Speeds Chart

Materials			Carbon Steels	Alloy Steel	Stainless Steel 300 Series	Stainless Steel 400 Series	Precipitation Stainless Steel	High Temp Alloys	Cobalt Chrome	
Description			10XX, 11XX, 12XX, 13XX	40XX, 41XX, 42XX, 43XX, 44XX, 46XX, 86XX, Series	304, 304L, 316, 316L, 312	420, 420F, 416, 440C	15-5PH, 16-6PH, 17-4PH, AM-XX Series	Inconel 625/718, A286, Haynes	Cobalt Chrome	
SFM < 32Rc			200 - 450	150 - 300	150 - 350	200 - 450	80 - 250	70 - 120	140 - 250	
SFM > 32Rc			100 - 250	80 - 200	80 - 200	100 - 250	90 - 125	40 - 90	90 - 160	
Diameter	High Speed	SFM Finishing	400 - 900	300 - 600	300 - 600	400 - 450	160 - 500	140 - 300	250 - 500	
		Radial	Chip Thickness	0.0004	0.0004	0.0005	0.0005	0.0006	0.0004	0.0006
1/8"	LP	.008 Radial	Center Line Feed	0.0015	0.0015	0.0017	0.0017	0.002	0.0015	0.002
	F	.005 Radial	Center Line Feed	0.002	0.002	0.0025	0.0025	0.003	0.002	0.003
		Radial	Chip Thickness	0.0005	0.0005	0.0006	0.0006	0.0007	0.0005	0.0007
1/4"	LP	.010 Radial	Center Line Feed	0.0025	0.0025	0.0030	0.003	0.0035	0.0025	0.0035
	F	.005 Radial	Center Line Feed	0.0035	0.0035	0.0042	0.0042	0.0049	0.0035	0.0049
		Radial	Chip Thickness	0.0005	0.0005	0.0006	0.0006	0.0007	0.0005	0.0007
5/16"	LP	.010 Radial	Center Line Feed	0.0028	0.0028	0.0032	0.0032	0.0038	0.0028	0.0038
	F	.005 Radial	Center Line Feed	0.004	0.004	0.0047	0.0047	0.0055	0.004	0.0055
		Radial	Chip Thickness	0.0005	0.0005	0.0006	0.0006	0.0007	0.0005	0.0007
3/8"	LP	.010 Radial	Center Line Feed	0.003	0.003	0.0035	0.0035	0.0043	0.003	0.0043
	F	.005 Radial	Center Line Feed	0.0043	0.0043	0.005	0.005	0.006	0.0043	0.006
		Radial	Chip Thickness	0.0005	0.0005	0.0006	0.0006	0.0007	0.0005	0.0007
1/2"	LP	.010 Radial	Center Line Feed	0.0035	0.0035	0.0042	0.0042	0.0049	0.0035	0.0049
	F	.005 Radial	Center Line Feed	0.005	0.005	0.006	0.006	0.007	0.005	0.007
		Radial	Chip Thickness	0.0005	0.0005	0.0006	0.0006	0.0007	0.0005	0.0007
5/8"	LP	.012 Radial	Center Line Feed	0.0036	0.0036	0.0043	0.0043	0.0049	0.0036	0.0049
	F	.0062 Radial	Center Line Feed	0.005	0.005	0.006	0.006	0.007	0.005	0.007
		Radial	Chip Thickness	0.0007	0.0007	0.0006	0.0006	0.0007	0.0005	0.0007
3/4"	LP	.015 Radial	Center Line Feed	0.0048	0.0048	0.0042	0.0042	0.0048	0.0035	0.0048
	F	.0075 Radial	Center Line Feed	0.007	0.007	0.0060	0.006	0.007	0.005	0.007
		Radial	Chip Thickness	0.0007	0.0007	0.0006	0.0006	0.0007	0.0005	0.0007
1"	LP	.020 Radial	Center Line Feed	0.0048	0.0048	0.0042	0.0042	0.0048	0.0035	0.0048
	F	.010 Radial	Center Line Feed	0.007	0.007	0.0060	0.006	0.007	0.005	0.007

LP = LIGHT PERIPHERAL

Axial Depth up to < 2.0 x Diameter
Radial with .02 x Diameter

F = FINISH

Axial Depth up to Length Of Cut > 2.0 x Diameter
Radial with < .010 x Diameter

Example 1/2 Diameter .010 Radial @ 400 SFM = 3056 RPM, .0035 center line feed x 10 Flutes = 106 IPM

Chip Load Values based on Chip Thinning. Plus / Minus 15% Chip Thinning value based on Part, Finish, Fixture and Machine.



The AMA series is designed for outstanding performance in nickel and cobalt based high temperature alloys, as well as other difficult to machine materials. The corrosion and heat resistance of the nickel and cobalt based metals give rise to corresponding machining challenges. Examples of frequently encountered nickel based alloys include Waspalloy, Hastelloy, Inconel 718 and Inconel 625. Cobalt based alloys include, but are not limited to, Stellite, Haynes 188 and Haynes 230.

Carbide Feeds and Speeds Chart for High Temp Alloys

Materials		Iron Based	Iron-Nickel Based	Nickel-Iron Based	Cobalt Based
DESCRIPTION		A286, Discaloy, Incoloy 801, ASTM A297	Hastelloy X, N-155, Inconel 718	Inconel 600/625, Rene Alloys, Waspalloy, Monel, Invar	Stellite, Haynes 188, Haynes 230, AiResist 13
SFM < 32 Rc		70 - 120	70 - 120	60 - 110	60 - 110
SFM > 32 Rc		40 - 90	40 - 90	40 - 90	40 - 90
1/8	S	0.0006	0.0006	0.0005	0.0005
	HP	0.0008	0.0008	0.0007	0.0007
	LP	0.0010	0.0010	0.0008	0.0008
	F	0.0018	0.0018	0.0014	0.0014
3/16	S	0.0007	0.0007	0.0006	0.0006
	HP	0.0010	0.0010	0.0008	0.0008
	LP	0.0011	0.0011	0.0009	0.0009
	F	0.0020	0.0020	0.0016	0.0016
1/4"	S	0.0009	0.0009	0.0007	0.0007
	HP	0.0012	0.0012	0.0010	0.0010
	LP	0.0014	0.0014	0.0011	0.0011
	F	0.0025	0.0025	0.0020	0.0020
5/16"	S	0.0011	0.0011	0.0009	0.0009
	HP	0.0016	0.0016	0.0013	0.0013
	LP	0.0019	0.0019	0.0015	0.0015
	F	0.0033	0.0033	0.0026	0.0026
3/8"	S	0.0015	0.0015	0.0012	0.0012
	HP	0.0021	0.0021	0.0017	0.0017
	LP	0.0025	0.0025	0.0020	0.0020
	F	0.0045	0.0045	0.0036	0.0036
1/2"	S	0.0018	0.0018	0.0014	0.0014
	HP	0.0024	0.0024	0.0019	0.0019
	LP	0.0026	0.0026	0.0021	0.0021
	F	0.0047	0.0047	0.0038	0.0038
5/8"	S	0.0025	0.0025	0.0020	0.0020
	HP	0.0036	0.0036	0.0029	0.0029
	LP	0.0050	0.0050	0.0040	0.0040
	F	0.0080	0.0080	0.0064	0.0064
3/4"	S	0.0028	0.0028	0.0022	0.0022
	HP	0.0040	0.0040	0.0032	0.0032
	LP	0.0053	0.0053	0.0042	0.0042
	F	0.0085	0.0085	0.0068	0.0068
1"	S	0.0035	0.0035	0.0028	0.0028
	HP	0.0043	0.0043	0.0034	0.0034
	LP	0.0060	0.0060	0.0048	0.0048
	F	0.0108	0.0108	0.0086	0.0086

S = SLOTTING
Axial Depth up to
1.0 x Diameter

HP = HEAVY PERIPHERAL
Axial Depth up to
1.5 – 2.0 x Diameter
Radial width .3 x Diameter

LP = LIGHT PERIPHERAL
Axial Depth up to
Effective Length of Cut
Radial width .02 x Diameter

FINISH = FINISH OPERATION
Axial Depth up to
Effective Length of Cut
Radial width .02 x Diameter

Feeds and Speeds Chart Explanation

The Feeds and Speeds Chart below provides an exercise on how to use the charts found with each series after Type and Diameter of tool is determined.

1. RPM and IPM are dependent upon material being machined.
2. Locate material that will be machined (Precipitation Stainless Steel in example below).
3. Determine starting SFM (80in example below).
4. Determine RPM based upon material and SFM. Multiply SFM by 3.82 divided by Tool Diameter=Starting RPMs.
5. Determine IPM based upon RPM and application (HP, LP or Finishing in example below). Multiply RPM by Chip Load per/Tooth by No. of Flutes=Starting IPM.
6. Based upon material and SFM selected, the application below would have a starting RPM of 611 with a starting feedrate of 12.22 IPM.

As always, should you have any questions, or if you are unsure of starting parameters for your application, **call us toll free at 800-447-1476** and ask to speak to our Technical Support Department.

Speed (SFM) and Feed (Chip-Load per/tooth (cpt))

$$\text{RPM} = \text{SFM} \times 3.82 / \text{Tool Diameter}$$

$$\text{RPM} = 80 \times 3.82 / .500$$

$$\text{RPM} = 611$$

$$\text{IPM} = \text{RPM} \times \text{CPT} \times \# \text{ of Flutes}$$

$$\text{IPM} = 611 \times .004 \times 5$$

$$\text{IPM} = 12.22$$

MH Series, 5 Flute

Initial Speeds (SFM) and Feeds (Chip-Load per/tooth)

Diameter	Materials Description	Carbon Steels	Alloy Steel	Stainless Steel 300 Series	Stainless Steel 400 Series	Precipitation Stainless Steels	Gray Cast Iron	Ductile Cast Iron	High Temp Alloys	Titanium Pure	Titanium Cast/Wrought
		10XX, 11XX, 12XX, 13XX	40XX, 41XX, 42XX, 43XX, 44XX, 46XX, 86XX, Series	304, 304L, 316, 316L, 312	420, 420F, 416, 440C	15-5PH, 16-6PH, 17-4PH, AM-XX Series	Gray	Ductile	Inconel 625/718, A286, Haynes	Pure	Cast/Wrought 6AL4V, ASTM 1,2,3, Alpha - Beta
1/2"	SFM < 32Rc	200 - 450	150 - 300	150 - 350	200 - 450	80 - 250	250 - 450	120 - 350	70 - 120	140 - 220	140 - 200
	SFM > 32Rc	100 - 250	80 - 200	80 - 200	100 - 250	50 - 125	130 - 300	80 - 140	40 - 90	90 - 160	90 - 160
	HP	0.0035	0.0030	0.0030	0.0030	0.0030	0.0030	0.0030	0.0020	0.0030	0.0030
	LP	0.0045	0.0040	0.0040	0.0040	0.0040	0.0040	0.0040	0.0030	0.0040	0.0040
	F	0.0055	0.0050	0.0050	0.0050	0.0050	0.0050	0.0050	0.0040	0.0050	0.0050

HP = HEAVY PERIPHERAL

Axial Depth up to

1.0 x Diameter

Radial width .2 x Diameter

LP = LIGHT PERIPHERAL

Axial Depth up to

Effective Length of Cut

Radial width .05 x Diameter

F = FINISH

Axial Depth up to

Effective Length Of Cut

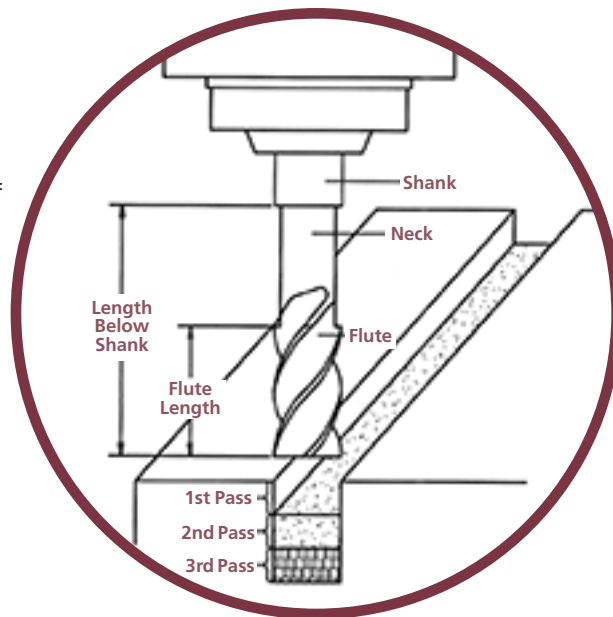
Radial width .02 x Diameter

Neck Relieved Tool Application and Trouble Shooting Guide

Neck Relieved Tool Application

Deep Pocket and Slot Milling with Neck Relieved Series End Mills

Necked end mills for extended reach minimize tool deflection. The rigidity of these end mills enable multiple passes at faster feed rates. The appropriate depths of cut per pass are as follows: One half (1/2) times the diameter in ferrous materials and one (1) times the diameter in non-ferrous materials. The diagram at right shows 3 passes. The number of passes will vary, depending on depth of the pocket. Call us with your specific application.



Trouble Shooting Guide

PROBLEM	CAUSE	SOLUTION	PROBLEM	CAUSE	SOLUTION
Chipping	Feed too fast. Loose tool. Loose workpiece. Tool not rigid enough.	Reduce feed rate. Tighten screws. Tighten clamps. Try shorter length end mill.	Short Tool Life (Dull Teeth)	Cutting friction too great. Improper cutting angle.	Regrind more frequently. Adjust primary clearance angle.
Rapid Wear	Speed too fast. Hard metal. Feed rate too slow. Improper cutting angle. Primary relief angle too small.	Use slower speed. Add coating. Increase feed rate. Adjust cutting angle. Use larger relief angle.	Chip Packing	Cutting amount too great. Not enough chip room. Insufficient coolant.	Modify feed or speed rates. Use different end mill. Use additional coolant. Use air flow.
Breakage	Feed rate too fast. Cutting amount too large. Flute length too long. Too much wear.	Decrease feed rate. Take smaller cut per tooth. Try shorter flute length. Regrind sooner.	Rough Surface Finish	Feed rate too fast. Speed rate too slow. Too much wear. No end tooth concavity.	Decrease feed rate. Increase feed rate. Regrind sooner. Add more dish to bottom teeth.
Chattering	Feed and speed too fast. Machine and holder not rigid enough. Relief angle too great. Workpiece too loose. Cut too deep. Flute length too long.	Adjust feed and speed rates. Use appropriate machine or holder. Use smaller relief angle. Refixture part. Use shallower cut. Try shorter flute length.	Burring	Primary relief wearing. Improper cutting angle.	Regrind more frequently. Adjust cutting angle.

Tool Recommendation by Application

Bold = New Series / (M) = Metric Offering

Application	Suitable	Highly Recommendation
Roughing//Slotting in Aluminum and Other Non-Ferrous Materials	ARF SERIES HSM SERIES HVM SERIES	TT SERIES (M) TT-C SERIES (M) ALDH ALDH-C
Finish Milling in Aluminum and Other Non-Ferrous Materials	ARF SERIES HSM SERIES	AFI SERIES AMF SERIES (Multi-Flute)
Extended Reach Applications in Aluminum and Other Non-Ferrous Materials	AFI-L SERIES ARF-L SERIES HVM SERIES HSM SERIES	TT-RN (M) TT-C-RN (M) ALDH-RN ALDH-C SERIES
Roughing/Slotting in Carbon Steels, Cast Iron and Other Ferrous Materials	MHRO SERIES SS-3 SERIES SS-4 SERIES SS-C-3 SERIES SS-C-4 SERIES	SSDH SERIES SSDH-C SERIES SSI-4 SERIES (M) SSI-C-4 SERIES (M) SSI-5 SERIES (M) SVI-5 Series
Vibration Reduction Series		
Finish Milling in Carbon Steels, Cast Iron and Other Ferrous Materials	SS-3 SERIES SS-4 SERIES	MH SERIES SSI-5 SERIES (M) MC-SERIES (Multi-Flute)
Roughing/Slotting in Alloys Steels, Stainless Steels and Exotics	SS-3 SERIES SS-4 SERIES SS-C-3 SERIES SS-C-4 SERIES	SSDH SERIES SSDH-C SERIES SSI-4 SERIES (M) SSI-C-4 SERIES (M) SSI-5 SERIES (M) SVI-5 Series
Vibration Reduction Series		
Finish Milling in Alloys Steels, Stainless Steels and Exotics	SS-3 SERIES SS-4 SERIES (M)	MH SERIES SSI-5 SERIES (M) SVI-5 Series MC- SERIES
Vibration Reduction Series		

Continued next page

Tool Recommendation by Application Continued

Bold = New Series / (M) = Metric Offering

Application	Suitable	Highly Recommendation
High Speed Machining Aluminum 18,000 Plus	HVM SERIES	HVMag-2 SERIES
High Speed Machining Aluminum <18,000	HVM SERIES HSM SERIES	TT SERIES (M) TT-C SERIES (M) HVMag-3 SERIES
High Speed Machining Ferrous and Titanium Materials <i>Vibration Reduction Series</i>	MH SERIES SSI-5 SERIES (M)	MC SERIES (Multi-Flute) <i>SVI-5 Series</i> TIM SERIES
Cobalt Chrome/<55RC Materials		MC SERIES (Multi-Flute)
Thin Wall Machining in Titanium		TIW SERIES
Die Mold/Modeling Roughing <45RC		SS-BN-4 SSI-BN-4
Die Mold/Modeling Roughing >45RC	SS-BN-4 SSI-BN-4	DMBN

Standard Tolerances

Our state of the art equipment is designed to ensure consistency and accuracy tool after tool. Our standard cutting tools are manufactured to the following tolerances:

Cutting Diameter on Standard End Mills:

+ .000 / - .002"

Shank Diameter:

+ .000 / - .0003"

Ball Nose Radius:

+ .000 / - .001"

Length of Cut

+ .030 / - .000"

Length Below Shank

+ .030 / - .000"

Overall Length

+ .062 / - .062"

Cutting Diameter on Roughing End Mills:

+ .000 / - .005"

Runout Tolerance:

.0005" maximum shank to cutting diameter on all series except long length and extra long length