FULLERTON TOOL COMPANY

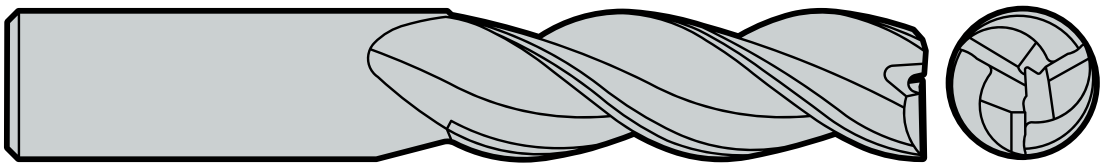
TECHNICAL GUIDE

TECHNICAL GUIDE
END MILLS

COATING SELECTION GUIDE

Applicable for Interrupted Cuts - Milling

3833 AlumaMill G3™



The 3833 AlumaMill G3 is a 3-flute, high performance end mill designed for roughing and finishing aluminum and non-ferrous materials. It excels in aggressive plunging and ramping speed environments and was designed for fast material removal and multi-purpose machining. Its flute shape and relief form generates superior wall finishes, while its unique wiper geometry produces excellent floor finishes. The 3833 AlumMill G3 is stocked uncoated and with FC-5 coating.

NUMBER OF FLUTES	3 FLUTES
FINISH	UNCOATED, FC-5
CUTTING TYPE	CENTER
CUTTING DIRECTION	RIGHT HAND
SPIRAL DIRECTION	RIGHT HAND
HELIX ANGLE	37.5 DEGREES
SHANK TOLERANCE	h6
CUTTER TOLERANCE	+.0000"/-.0005" I+0.000MM/-0.013MM

STANDARD OFFERING	**SIZE RANGE**
IMPERIAL	.125" - 1.00"
METRIC	3.00MM - 25.00MM

FAQs

What applications are these tools recommended for?
The 3833 Series Alumamill G3 is recommended for high efficiency machining of Aluminums, Brass, and Copper.

What are the key characteristics of the G3?
Cylindrical Margin, Wiper Flat, Engineered Edge Prep, uncoated or FC5

What radial engagement is best for the Alumamill G3?
The G3 runs best less than 30% radial engagement using HEM techniques.

Can you ramp with the G3?
Yes, 3° degree ramp angle is recommended.

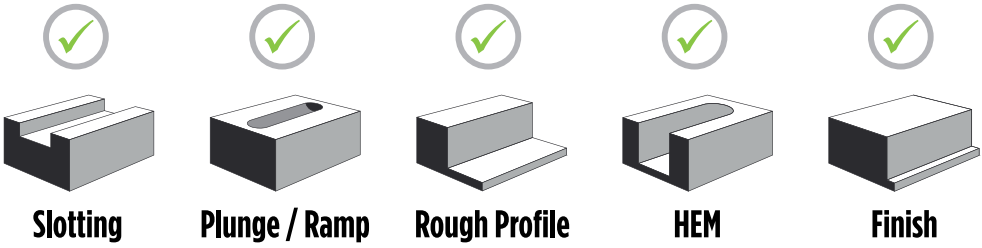
Contact Engineering at 800.248.8315 or engineering@fullertontool.com

FULLERTON SPEEDS / FEEDS

		High Si Aluminum (>10%)					Low Si Aluminum (<10%)				
		Slotting	Plunge Ramp	Rough Profile	HEM	Finish	Slotting	Plunge Ramp	Rough Profile	HEM	Finish
SFM (ft/min)		800	800	800	800	800	1,500	1,500	2,000	2,500	2,500
Axial Depth		< (1xD)	full	< (2xD)	< (2xD)	< (2xD)	< (1xD)	full	< (2xD)	< (2xD)	< (2xD)
Radial Width		full	full	(.25-.3)xD	(.1-.25)xD	(.05-.08)xD	full	full	(.25-.3)xD	(.1-.25)xD	(.05-.08)xD
1/8"	3mm	.0010	.0020	.0010	.0010	.0030	.0010	.0020	.0010	.0010	.0030
1/4"	6mm	.0015	.0020	.0020	.0020	.0035	.0015	.0020	.0020	.0020	.0035
3/8"	10mm	.0035	.0040	.0045	.0045	.0055	.0035	.0040	.0045	.0045	.0055
1/2"	12mm	.0050	.0050	.0055	.0055	.0065	.0050	.0050	.0055	.0055	.0065
3/4"	20mm	.0060	.0085	.0080	.0080	.0090	.0060	.0085	.0080	.0080	.0090
1"	25mm	.0080	.0100	.0100	.0100	.0110	.0080	.0100	.0100	.0100	.0110

		Plastics Recommended in Unique Situations					Brass & Copper (600-900) SFM (ft/min)				
		Slotting	Plunge Ramp	Rough Profile	HEM	Finish	Slotting	Plunge Ramp	Rough Profile	HEM	Finish
SFM (ft/min)		1,000	1,000	1,200	1,400	1,400	800	800	800	800	800
Axial Depth		< (1xD)	full	< (2xD)	< (2xD)	< (2xD)	< (1xD)	full	< (2xD)	< (2xD)	< (2xD)
Radial Width		full	full	(.25-.3)xD	(.1-.25)xD	(.05-.08)xD	full	full	(.25-.3)xD	(.1-.25)xD	(.05-.08)xD
1/8"	3mm	.0030	.0035	.0030	.0030	.0035	.0030	.0035	.0020	.0020	.0025
1/4"	6mm	.0060	.0065	.0060	.0060	.0065	.0040	.0045	.0030	.0030	.0035
3/8"	10mm	.0080	.0085	.0080	.0080	.0085	.0050	.0055	.0040	.0040	.0045
1/2"	12mm	.0100	.0105	.0100	.0100	.0105	.0060	.0065	.0045	.0045	.0055
3/4"	20mm	.0140	.0145	.0140	.0140	.0145	.0080	.0085	.0060	.0060	.0075
1"	25mm	.0180	.0185	.0180	.0180	.0185	.0100	.0110	.0070	.0070	.0085

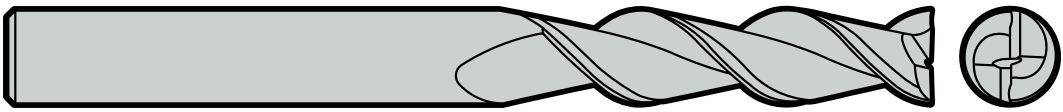
Multiply by 25.4 for metric.



HEM: High Efficiency Machining

Not Recommended for Graphite, Cast Iron, Hardened Steels > 48RC, Steels, Stainless Steels, Super Alloys (Nickel based, Inconel), or Titanium. Plastics Recommended in Unique Situations. The parameters listed for tool series that are stocked uncoated are based on running an uncoated tool. If a coating is applied to the tools, the SFM can be increased by approximately 25%. All speed and feed recommendations should be considered only as a starting point. Start with conservative speeds and feeds while analyzing the rigidity of the process. Then cautiously progress incrementally to achieve optimum performance.

3825 AlumaMill™



The 3825 AlumaMill is a 2-flute, high performance end mill designed for aggressive material removal rates in aluminum and non-ferrous materials. Its high polish and unique cylindrical margin design produces superior wall finishes. The 3825 AlumaMill is stocked uncoated and with FC-19 coating.

NUMBER OF FLUTES	2 FLUTES
FINISH	UNCOATED, FC-19
CUTTING TYPE	CENTER
CUTTING DIRECTION	RIGHT HAND
SPIRAL DIRECTION	RIGHT HAND
HELIX ANGLE	45 DEGREES
SHANK TOLERANCE	h6
CUTTER TOLERANCE	+.0000"/-.0005" I+0.000MM/-0.013MM

STANDARD OFFERING	**SIZE RANGE**
IMPERIAL	.125" - 1.00"
METRIC	3.00MM - 19.00MM

FAQs

What applications are these tools recommended for?
The 3825 Series Alumamill is recommended for high efficiency machining of Aluminums, Brass, and Copper.

What are the key characteristics of the 3825?
Cylindrical Margin, Engineered Edge Prep, uncoated or FC19

What radial engagement is best for the 3825?
The 3825 can be used in full slotting and also HEM milling techniques.

When do you apply the 3825 vs the 3833?
The 3825 should be used when longer ADOC is needed and when HEM techniques cannot be used.

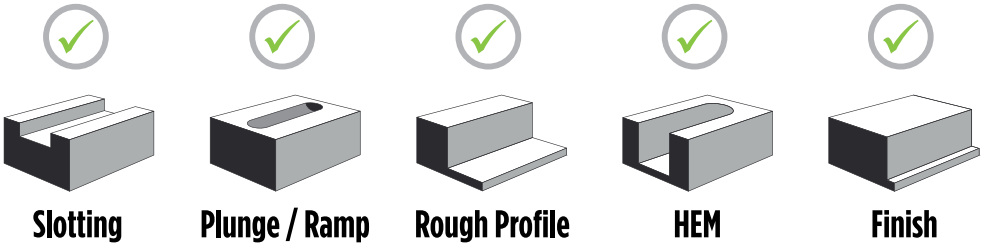
Contact Engineering at 800.248.8315 or engineering@fullertontool.com

FULLERTON SPEEDS / FEEDS

		High Si Aluminum (>10%)					Low Si Aluminum (<10%)				
		Slotting	Plunge Ramp	Rough Profile	HEM	Finish	Slotting	Plunge Ramp	Rough Profile	HEM	Finish
SFM (ft/min)		800	800	900	1500	1,500	1,500	1,500	2,000	2,500	2,500
Axial Depth		< (1xD)	full	< (2xD)	< (2xD)	< (2xD)	< (1xD)	full	< (2xD)	< (2xD)	< (2xD)
Radial Width		full	full	(.25-.3)xD	(.1-.25)xD	(.05-.08)xD	full	full	(.25-.3)xD	(.1-.25)xD	(.05-.08)xD
1/8"	3mm	.0010	.0020	.0010	.0010	.0030	.0010	.0012	.0010	.0010	.0012
1/4"	6mm	.0015	.0020	.0020	.0020	.0035	.0030	.0033	.0030	.0030	.0033
3/8"	10mm	.0035	.0040	.0045	.0045	.0055	.0045	.0050	.0045	.0045	.0050
1/2"	12mm	.0050	.0050	.0055	.0055	.0065	.0060	.0070	.0060	.0060	.0070
3/4"	20mm	.0060	.0085	.0080	.0080	.0090	.0080	.0095	.0080	.0080	.0095
1"	25mm	.0080	.0100	.0100	.0100	.0110	.0100	.0110	.0100	.0100	.0110

		Plastics Recommended in Unique Situations					Brass & Copper (600-900) SFM (ft/min)				
		Slotting	Plunge Ramp	Rough Profile	HEM	Finish	Slotting	Plunge Ramp	Rough Profile	HEM	Finish
SFM (ft/min)		1,000	1,000	1,200	1,400	1,400	800	800	1,000	1,500	1,500
Axial Depth		< (1xD)	full	< (2xD)	< (2xD)	< (2xD)	< (1xD)	full	< (2xD)	< (2xD)	< (2xD)
Radial Width		full	full	(.25-.3)xD	(.1-.25)xD	(.05-.08)xD	full	full	(.25-.3)xD	(.1-.25)xD	(.05-.08)xD
1/8"	3mm	.0030	.0035	.0030	.0030	.0035	.0030	.0035	.0030	.0030	.0035
1/4"	6mm	.0060	.0065	.0060	.0060	.0065	.0060	.0065	.0060	.0060	.0065
3/8"	10mm	.0080	.0085	.0080	.0080	.0085	.0080	.0085	.0080	.0080	.0085
1/2"	12mm	.0100	.0105	.0100	.0100	.0105	.0100	.0105	.0100	.0100	.0105
3/4"	20mm	.0140	.0145	.0140	.0140	.0145	.0140	.0145	.0140	.0140	.0145
1"	25mm	.0180	.0185	.0180	.0180	.0185	.0180	.0185	.0180	.0180	.0185

Multiply by 25.4 for metric.



Slotting **Plunge / Ramp** **Rough Profile** **HEM** **Finish**

HEM: High Efficiency Machining

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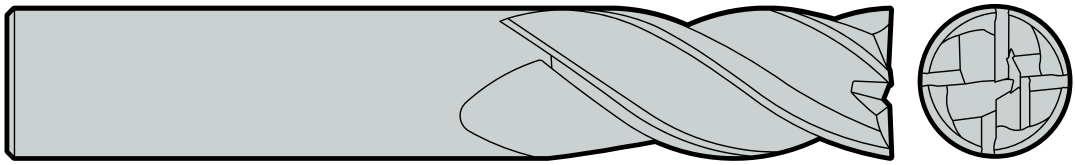
3500 FURY



The 3500 Fury is a 4-flute, high performance end mill that excels in stainless steels, super alloys, and titanium. It performs exceptionally in high-speed machining and full diameter milling as well as produces excellent surface finishes. Its tool versatility results in increased productivity, less tool changes, and longer tool life. The 3500 Fury is stocked with FC-20 coating.

NUMBER OF FLUTES	4 FLUTES
FINISH	FC-20
CUTTING TYPE	CENTER
CUTTING DIRECTION	RIGHT HAND
SPIRAL DIRECTION	RIGHT HAND
HELIX ANGLE	VARIABLE
SHANK TOLERANCE	h6
CUTTER TOLERANCE	+.0000"/-.002" | +0.00MM/-0.05MM

STANDARD OFFERING	**SIZE RANGE**
IMPERIAL	.125" - 1.00"
METRIC	3.00MM - 25.00MM

FAQs

What applications are these tools recommended for?
The 3500 Series Fury is recommended for high efficiency machining of Steels and Stainless Steels. It also works well in high temp alloys.

What are the key characteristics of the Fury?
Variable Index, Variable Helix, Engineered Edge Prep, FC20

What radial engagement is best for the Fury?
The Fury runs best less than 20% radial engagement using HEM techniques.

Can you run the Fury dry?
Yes, Fullerton's FC20 runs very well dry in certain materials. You can run at higher speeds in steels and stainless steels. Use air blast to clear chips from cut zone.

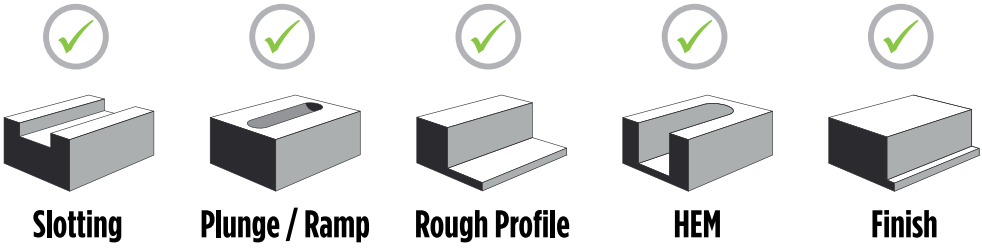
Contact Engineering at 800.248.8315 or engineering@fullertontool.com

FULLERTON SPEEDS / FEEDS

		Cast Iron					Hardened Steels > 48 RC					Steels				
		Slotting	Plunge Ramp	Rough Profile	HEM	Finish	Slotting	Plunge Ramp	Rough Profile	HEM	Finish	Slotting	Plunge Ramp	Rough Profile	HEM	Finish
SFM (ft/min)		525	525	525	525	525	100	100	125	170	170	500	500	500	800	800
Axial Depth		< (1xD)	full	< (2xD)	< (2xD)	< (2xD)	< (1xD)	full	< (2xD)	< (2xD)	< (2xD)	< (1xD)	full	< (2xD)	< (2xD)	< (2xD)
Radial Width		full	full	(.25-.3)xD	(.1-.25)xD	(.05-.08)xD	full	full	(.25-.3)xD	(.1-.25)xD	(.05-.08)xD	full	full	(.25-.3)xD	(.1-.25)xD	(.05-.08)xD
1/8"	3mm	.0005	.0007	.0005	.0005	.0007	.0006	.0007	.0006	.0006	.0007	.0006	.0006	.0007	.0007	.0009
1/4"	6mm	.0010	.0012	.0010	.0010	.0012	.0012	.0014	.0012	.0012	.0014	.0012	.0012	.0015	.0015	.0018
3/8"	10mm	.0020	.0020	.0020	.0020	.0020	.0018	.0020	.0018	.0018	.0020	.0018	.0018	.0020	.0020	.0022
1/2"	12mm	.0025	.0028	.0025	.0025	.0028	.0020	.0022	.0020	.0020	.0022	.0020	.0020	.0022	.0022	.0024
3/4"	20mm	.0030	.0035	.0030	.0030	.0035	.0024	.0026	.0024	.0024	.0026	.0022	.0022	.0026	.0026	.0028
1"	25mm	.0035	.0045	.0035	.0035	.0045	.0025	.0027	.0025	.0025	.0027	.0025	.0025	.0028	.0028	.0030

		Stainless Steels					Super Alloys (Nickel Based, Inconel)					Titanium				
		Slotting	Plunge Ramp	Rough Profile	HEM	Finish	Slotting	Plunge Ramp	Rough Profile	HEM	Finish	Slotting	Plunge Ramp	Rough Profile	HEM	Finish
SFM (ft/min)		325	325	350	500	500	90	90	110	170	170	200	200	240	300	300
Axial Depth		< (1xD)	full	< (2xD)	< (2xD)	< (2xD)	< (1xD)	full	< (2xD)	< (2xD)	< (2xD)	< (1xD)	full	< (2xD)	< (2xD)	< (2xD)
Radial Width		full	full	(.25-.3)xD	(.1-.25)xD	(.05-.08)xD	full	full	(.25-.3)xD	(.1-.25)xD	(.05-.08)xD	full	full	(.25-.3)xD	(.1-.25)xD	(.05-.08)xD
1/8"	3mm	.0004	.0007	.0007	.0007	.0010	.0004	.0004	.0004	.0008	.0008	.0004	.0004	.0004	.0010	.0010
1/4"	6mm	.0010	.0010	.0013	.0015	.0015	.0008	.0008	.0008	.0010	.0010	.0008	.0008	.0008	.0018	.0018
3/8"	10mm	.0013	.0012	.0020	.0024	.0026	.0013	.0013	.0013	.0020	.0020	.0012	.0012	.0012	.0025	.0025
1/2"	12mm	.0015	.0013	.0022	.0026	.0028	.0019	.0019	.0019	.0025	.0025	.0016	.0016	.0016	.0035	.0035
3/4"	20mm	.0018	.0015	.0030	.0028	.0032	.0025	.0025	.0025	.0040	.0040	.0020	.0020	.0020	.0045	.0045
1"	25mm	.0020	.0016	.0035	.0030	.0035	.0027	.0027	.0027	.0045	.0045	.0028	.0028	.0028	.0050	.0050

Multiply by 25.4 for metric.



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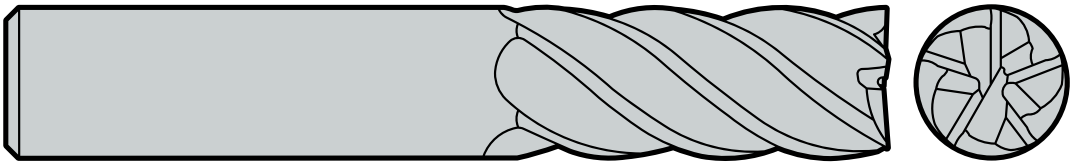
3412 FANTOM 2.0



The Fantom 2.0 is a high performance end mill designed to excel in difficult to machine materials like steels, stainless steels, super alloys, and titanium. Its variable index and eccentric relief provide a stable, robust cutter that allows heavier chip loads and its enhanced edge strength increases productivity and lowers costs per part.

NUMBER OF FLUTES	5 FLUTES
FINISH	FC-20
CUTTING TYPE	CENTER
CUTTING DIRECTION	RIGHT HAND
SPIRAL DIRECTION	RIGHT HAND
HELIX ANGLE	VARIABLE
SHANK TOLERANCE	h6
CUTTER TOLERANCE	+.0000"/-.002" | +0.00MM/-0.05MM

STANDARD OFFERING	**SIZE RANGE**
IMPERIAL	.125" - 1.00"
METRIC	3.00MM - 25.00MM

FAQs

What applications are these tools recommended for?
The 3412 Series Fantom 2.0 is recommended for machining Titanium and High Temp Alloys. It also works well in stainless steels.

What are the key characteristics of the Fantom 2.0?
5 Flutes, Variable Helix, Eccentric Relief, Engineered Edge Prep, FC20.

What radial engagement is best for the Fantom 2.0?
The Fantom 2.0 runs best less than 20% radial engagement using HEM techniques.

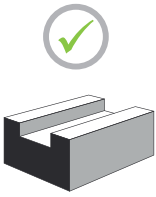
What do you gain from Eccentric Relief?
Eccentric Relief protects the cutting edge giving better tool life in harder to machine materials.

FULLERTON SPEEDS / FEEDS

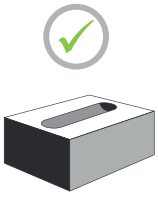
		Cast Iron					Hardened Steels > 48 RC					Steels				
		Slotting	Plunge Ramp	Rough Profile	HEM	Finish	Slotting	Plunge Ramp	Rough Profile	HEM	Finish	Slotting	Plunge Ramp	Rough Profile	HEM	Finish
SFM (ft/min)		525	525	525	525	525	100	100	125	170	170	500	500	500	800	800
Axial Depth		< (1xD)	full	< (2xD)	< (2xD)	< (2xD)	< (1xD)	full	< (2xD)	< (2xD)	< (2xD)	< (1xD)	full	< (2xD)	< (2xD)	< (2xD)
Radial Width		full	full	(.25-.3)xD	(.1-.25)xD	(.05-.08)xD	full	full	(.25-.3)xD	(.1-.25)xD	(.05-.08)xD	full	full	(.25-.3)xD	(.1-.25)xD	(.05-.08)xD
1/8"	3mm	.0010	.0012	.0010	.0010	.0012	.0007	.0008	.0005	.0005	.0010	.0010	.0012	.0010	.0010	.0012
1/4"	6mm	.0018	.0018	.0018	.0018	.0018	.0014	.0014	.0010	.0010	.0015	.0018	.0018	.0018	.0018	.0018
3/8"	10mm	.0027	.0027	.0027	.0027	.0027	.0020	.0026	.0020	.0020	.0026	.0027	.0035	.0035	.0035	.0035
1/2"	12mm	.0035	.0035	.0035	.0035	.0035	.0026	.0030	.0025	.0025	.0030	.0035	.0039	.0039	.0039	.0039
3/4"	20mm	.0043	.0043	.0043	.0043	.0043	.0033	.0033	.0030	.0030	.0033	.0043	.0043	.0043	.0043	.0043
1"	25mm	.0050	.0050	.0050	.0050	.0050	.0039	.0039	.0040	.0040	.0045	.0050	.0050	.0050	.0050	.0050

		Stainless Steels					Super Alloys (Nickel Based, Inconel)					Titanium				
		Slotting	Plunge Ramp	Rough Profile	HEM	Finish	Slotting	Plunge Ramp	Rough Profile	HEM	Finish	Slotting	Plunge Ramp	Rough Profile	HEM	Finish
SFM (ft/min)		325	325	350	500	500	90	90	110	170	170	200	200	240	300	300
Axial Depth		< (1xD)	full	< (2xD)	< (2xD)	< (2xD)	< (1xD)	full	< (2xD)	< (2xD)	< (2xD)	< (1xD)	full	< (2xD)	< (2xD)	< (2xD)
Radial Width		full	full	(.25-.3)xD	(.1-.25)xD	(.05-.08)xD	full	full	(.25-.3)xD	(.1-.25)xD	(.05-.08)xD	full	full	(.25-.3)xD	(.1-.25)xD	(.05-.08)xD
1/8"	3mm	.0004	.0008	.0004	.0004	.0008	.0006	.0007	.0006	.0006	.0007	.0003	.0004	.0003	.0003	.0004
1/4"	6mm	.0010	.0014	.0010	.0010	.0014	.0008	.0010	.0008	.0008	.0010	.0008	.0010	.0008	.0008	.0010
3/8"	10mm	.0012	.0022	.0012	.0012	.0022	.0010	.0015	.0010	.0010	.0015	.0010	.0015	.0010	.0010	.0015
1/2"	12mm	.0015	.0030	.0015	.0015	.0030	.0015	.0020	.0015	.0015	.0020	.0015	.0020	.0015	.0015	.0020
3/4"	20mm	.0030	.0035	.0030	.0030	.0035	.0025	.0030	.0025	.0025	.0030	.0020	.0025	.0020	.0020	.0025
1"	25mm	.0040	.0045	.0040	.0040	.0045	.0035	.0040	.0035	.0035	.0040	.0032	.0035	.0032	.0032	.0035

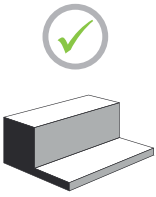
Multiply by 25.4 for metric.



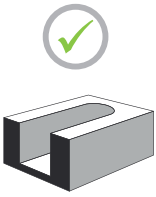
Slotting



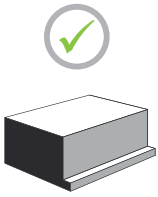
Plunge / Ramp



Rough Profile



HEM



Finish

HEM: High Efficiency Machining

Not Recommended for High Si Aluminum (>10%), Low Si Aluminum (<10%), Composites, Plastics, Brass & Copper, or Graphite. The parameters listed for tool series that are stocked uncoated are based on running an uncoated tool. If a coating is applied to the tools, the SFM can be increased by approximately 25%. All speed and feed recommendations should be considered only as a starting point. Start with conservative speeds and feeds while analyizing the rigidity of the process. Then cautiously progress incrementally to achieve optimum performance.

3600 FORCE

The 3600 Force is a high performance end mill available with 5, 7, or 9-flutes. It produces excellent surface finishes and chip control and its optimized geometry allows for high feed rates in stainless steels, super alloys, and titanium. The 3600 Force is stocked with FC-20 coating.

NUMBER OF FLUTES	5, 7, 9 FLUTES
FINISH	FC-20
CUTTING TYPE	CENTER
CUTTING DIRECTION	RIGHT HAND
SPIRAL DIRECTION	RIGHT HAND
HELIX ANGLE	VARIABLE
SHANK TOLERANCE	h6
CUTTER TOLERANCE	+.0000"/-.002" | +0.00MM/-0.05MM

STANDARD OFFERING	**SIZE RANGE**
IMPERIAL	.250" - 1.00"
METRIC	6.00MM - 25.00MM

FAQs

What applications are these tools recommended for?
The 3600 Series Force is recommended for high efficiency finishing of Steels and Stainless Steels. It also works well in high temp alloys.

What are the key characteristics of the Force?
5,7,9 Flutes,Variable Index, Variable Helix, Engineered Edge Prep, FC20

What radial engagement is best for the Force?
The Force runs best less than 8% radial engagement using HEM techniques.

Can you use full axial engagement?
Yes, with 7% radial engagement or less.

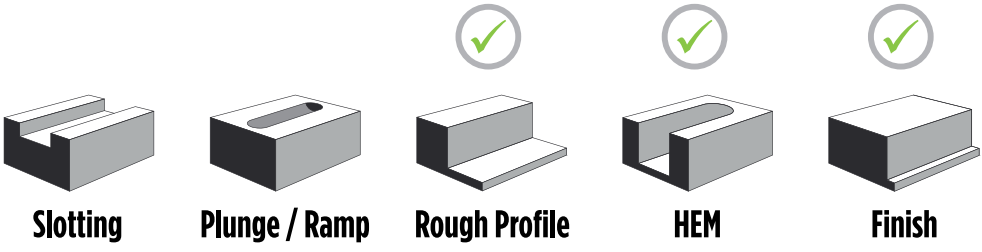
Contact Engineering at 800.248.8315 or engineering@fullertontool.com

FULLERTON SPEEDS / FEEDS

		Cast Iron					Hardened Steels > 48 RC					Steels				
		Slotting	Plunge Ramp	Rough Profile	HEM	Finish	Slotting	Plunge Ramp	Rough Profile	HEM	Finish	Slotting	Plunge Ramp	Rough Profile	HEM	Finish
SFM (ft/min)				250	525	525			120	170	170			200	800	800
Axial Depth		< (1xD)	full	< (2xD)	< (2xD)	< (2xD)	< (1xD)	full	< (2xD)	< (2xD)	< (2xD)	< (1xD)	full	< (2xD)	< (2xD)	< (2xD)
Radial Width		full	full	(.25-.3)xD	(.1-.25)xD	(.05-.08)xD	full	full	(.25-.3)xD	(.1-.25)xD	(.05-.08)xD	full	full	(.25-.3)xD	(.1-.25)xD	(.05-.08)xD
1/8"	3mm			.0005	.0005	.0007			.0006	.0006	.0007			.0007	.0007	.0009
1/4"	6mm			.0010	.0010	.0012			.0012	.0012	.0014			.0015	.0015	.0018
3/8"	10mm			.0020	.0020	.0020			.0018	.0018	.0020			.0020	.0020	.0022
1/2"	12mm			.0025	.0025	.0028			.0020	.0020	.0022			.0022	.0022	.0024
3/4"	20mm			.0030	.0030	.0035			.0024	.0024	.0026			.0026	.0026	.0028
1"	25mm			.0035	.0035	.0045			.0025	.0025	.0027			.0028	.0028	.0030

		Stainless Steels					Super Alloys (Nickel Based, Inconel)					Titanium				
		Slotting	Plunge Ramp	Rough Profile	HEM	Finish	Slotting	Plunge Ramp	Rough Profile	HEM	Finish	Slotting	Plunge Ramp	Rough Profile	HEM	Finish
SFM (ft/min)				220	500	500			20	170	170			60	500	500
Axial Depth		< (1xD)	full	< (2xD)	< (2xD)	< (2xD)	< (1xD)	full	< (2xD)	< (2xD)	< (2xD)	< (1xD)	full	< (2xD)	< (2xD)	< (2xD)
Radial Width		full	full	(.25-.3)xD	(.1-.25)xD	(.05-.08)xD	full	full	(.25-.3)xD	(.1-.25)xD	(.05-.08)xD	full	full	(.25-.3)xD	(.1-.25)xD	(.05-.08)xD
1/8"	3mm			.0007	.0007	.0010			.0004	.0004	.0008			.0004	.0004	.0010
1/4"	6mm			.0013	.0015	.0015			.0008	.0008	.0010			.0008	.0008	.0018
3/8"	10mm			.0020	.0024	.0026			.0013	.0013	.0020			.0012	.0012	.0025
1/2"	12mm			.0022	.0026	.0028			.0019	.0019	.0025			.0016	.0016	.0035
3/4"	20mm			.0030	.0028	.0032			.0025	.0025	.0040			.0020	.0020	.0045
1"	25mm			.0035	.0030	.0035			.0027	.0027	.0045			.0028	.0028	.0050

Multiply by 25.4 for metric.

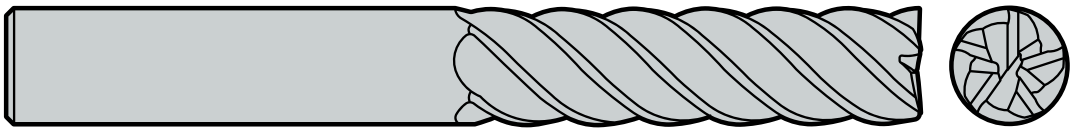


HEM: High Efficiency Machining

Not Recommended for Low Si Aluminum (<10%), Composites, Plastics, Brass & Copper, Graphite, or Cast Iron. High Si Aluminum Recommended in Unique Situations.
The parameters listed for tool series that are stocked uncoated are based on running an uncoated tool. If a coating is applied to the tools, the SFM can be increased by approximately 25%. All speed and feed recommendations should be considered only as a starting point. Start with conservative speeds and feeds while analyzing the rigidity of the process. Then cautiously progress incrementally to achieve optimum performance.

3845

Falcon™



The 3845 Falcon Finisher is a 5-flute, high performance end mill with eccentric relief which produces superior part finishes at extraordinary feed rates. The 3845 Falcon Finisher is stocked uncoated and with TiAlN coating.

NUMBER OF FLUTES	5 FLUTES
FINISH	UNCOATED, TIALN
CUTTING TYPE	CENTER
CUTTING DIRECTION	RIGHT HAND
SPIRAL DIRECTION	RIGHT HAND
HELIX ANGLE	45 DEGREES
SHANK TOLERANCE	h6
CUTTER TOLERANCE	+.0000"/-.002" | +0.00MM/-0.05MM

STANDARD OFFERING	**SIZE RANGE**
IMPERIAL	.250" - 1.00"
METRIC	6.00MM - 25.00MM

FAQs

What applications are these tools recommended for?
The 3845 series Falcon Finisher is recommended for superior part finishes at high feed rates.

What are the key characteristics of the Falcon?
45 Degree Helix, Eccentric Relief, TiAlN Coated, Square End.

What radial engagement is best for the Falcon?
The Falcon should be ran at less than 5% radial engagement.

Can you get a Falcon with a corner radius?
Yes, we can alter a standard tool to add a corner radius with our FAST Quote system.

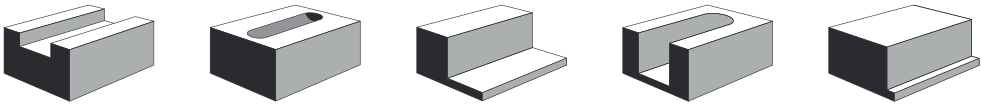
Contact Engineering at 800.248.8315 or engineering@fullertontool.com

FULLERTON SPEEDS / FEEDS

		Cast Iron					Hardened Steels > 48 RC					Steels				
		Slotting	Plunge Ramp	Rough Profile	HEM	Finish	Slotting	Plunge Ramp	Rough Profile	HEM	Finish	Slotting	Plunge Ramp	Rough Profile	HEM	Finish
SFM (ft/min)					500	520				275	300				400	500
Axial Depth		< (1xD)	full	< (2xD)	< (2xD)	< (2xD)	< (1xD)	full	< (2xD)	< (2xD)	< (2xD)	< (1xD)	full	< (2xD)	< (2xD)	< (2xD)
Radial Width		full	full	(.25-.3)xD	(.1-.25)xD	(.05-.08)xD	full	full	(.25-.3)xD	(.1-.25)xD	(.05-.08)xD	full	full	(.25-.3)xD	(.1-.25)xD	(.05-.08)xD
1/8"	3mm				.0008	.0009				.0006	.0007				.0010	.0009
1/4"	6mm				.0016	.0018				.0013	.0014				.0017	.0018
3/8"	10mm				.0025	.0027				.0018	.0020				.0023	.0027
1/2"	12mm				.0030	.0035				.0024	.0026				.0033	.0035
3/4"	20mm				.0035	.0043				.0030	.0033				.0040	.0043
1"	25mm				.0040	.0050				.0035	.0039				.0045	.0050

		Stainless Steels					Super Alloys (Nickel Based, Inconel)					Titanium				
		Slotting	Plunge Ramp	Rough Profile	HEM	Finish	Slotting	Plunge Ramp	Rough Profile	HEM	Finish	Slotting	Plunge Ramp	Rough Profile	HEM	Finish
SFM (ft/min)					350	350				125	125				250	260
Axial Depth		< (1xD)	full	< (2xD)	< (2xD)	< (2xD)	< (1xD)	full	< (2xD)	< (2xD)	< (2xD)	< (1xD)	full	< (2xD)	< (2xD)	< (2xD)
Radial Width		full	full	(.25-.3)xD	(.1-.25)xD	(.05-.08)xD	full	full	(.25-.3)xD	(.1-.25)xD	(.05-.08)xD	full	full	(.25-.3)xD	(.1-.25)xD	(.05-.08)xD
1/8"	3mm				.0006	.0007				.0005	.0006				.0005	.0006
1/4"	6mm				.0010	.0015				.0010	.0012				.0010	.0012
3/8"	10mm				.0012	.0023				.0012	.0018				.0012	.0018
1/2"	12mm				.0020	.0029				.0018	.0023				.0018	.0023
3/4"	20mm				.0030	.0038				.0025	.0030				.0025	.0030
1"	25mm				.0040	.0046				.0030	.0036				.0030	.0036

Multiply by 25.4 for metric.



Slotting | **Plunge / Ramp** | **Rough Profile** | **HEM** | **Finish**

HEM: High Efficiency Machining

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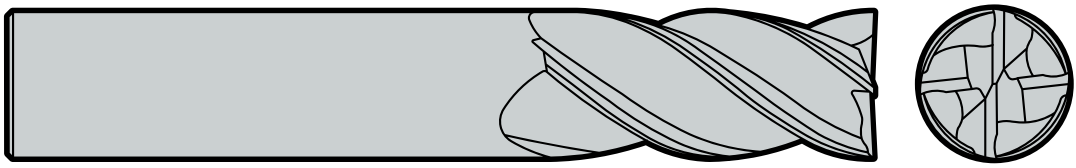
3000 INTIMIDATOR™



The 3000 Intimidator is a 4-flute, highl performance end mill designed for difficult to machine ferrous materials. The 3000 Intimidator can be used in full slotting, roughing, and finishing applications and its specially designed flute relief and unequally spaced index provides chatter-free machining. The 3000 Intimidator is stocked with FC-18 coating.

NUMBER OF FLUTES	4 FLUTES
FINISH	FC-18
CUTTING TYPE	CENTER
CUTTING DIRECTION	RIGHT HAND
SPIRAL DIRECTION	RIGHT HAND
HELIX ANGLE	38 DEGREES
SHANK TOLERANCE	h6
CUTTER TOLERANCE	=+.0000"/-.002" I+0.00MM/-0.05MM

STANDARD OFFERING	**SIZE RANGE**
IMPERIAL	.125" - 1.00"
METRIC	3.00MM - 20.00MM

FAQs

What applications are these tools recommended for?
The Intimidator is designed for difficult to machine ferrous materials. Used in full slotting applications.

What are the Key characteristics of the 3000?
Eccentric Relief, Variable index, Engineered Edge Prep, FC18

What Radial engagement is best for the 3000?
The Intimidator is designed for heavier cutting applications. 30% RDOC to a full slot.

When do you apply the Intimidator?
The Intimidator is used in tougher applications with a larger RDOC.

Contact Engineering at 800.248.8315 or engineering@fullertontool.com

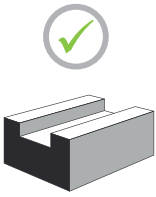
FULLERTON SPEEDS / FEEDS

		Graphite					Cast Iron					Hardened Steels > 48 RC				
		Slotting	Plunge Ramp	Rough Profile	HEM	Finish	Slotting	Plunge Ramp	Rough Profile	HEM	Finish	Slotting	Plunge Ramp	Rough Profile	HEM	Finish
SFM (ft/min)		500	500	800	800	800	400	400	400	600	600	130	130	130	170	170
Axial Depth		< (1xD)	full	< (2xD)	< (2xD)	< (2xD)	< (1xD)	full	< (2xD)	< (2xD)	< (2xD)	< (1xD)	full	< (2xD)	< (2xD)	< (2xD)
Radial Width		full	full	(.25-.3)xD	(.1-.25)xD	(.05-.08)xD	full	full	(.25-.3)xD	(.1-.25)xD	(.05-.08)xD	full	full	(.25-.3)xD	(.1-.25)xD	(.05-.08)xD
1/8"	3mm	.0030	.0030	.0040	.0040	.0040	.0008	.0010	.0007	.0007	.0010	.0006	.0007	.0006	.0006	.0007
1/4"	6mm	.0050	.0050	.0060	.0060	.0060	.0015	.0020	.0015	.0015	.0020	.0012	.0014	.0012	.0012	.0014
3/8"	10mm	.0070	.0070	.0080	.0080	.0080	.0025	.0030	.0025	.0025	.0030	.0018	.0020	.0018	.0018	.0020
1/2"	12mm	.0090	.0090	.0100	.0100	.0100	.0028	.0032	.0028	.0028	.0032	.0020	.0022	.0020	.0020	.0022
3/4"	20mm	.0120	.0120	.0150	.0150	.0150	.0030	.0035	.0030	.0030	.0035	.0024	.0026	.0024	.0024	.0026
1"	25mm	.0180	.0180	.0200	.0200	.0200	.0040	.0045	.0040	.0040	.0045	.0025	.0027	.0025	.0025	.0027

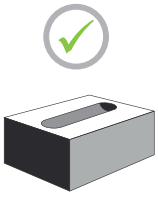
		Steels					Stainless Steels					Super Alloys (Nickel Based, Inconel)				
		Slotting	Plunge Ramp	Rough Profile	HEM	Finish	Slotting	Plunge Ramp	Rough Profile	HEM	Finish	Slotting	Plunge Ramp	Rough Profile	HEM	Finish
SFM (ft/min)		300	300	300	600	600	250	250	250	300	300	90	90	90	120	120
Axial Depth		< (1xD)	full	< (2xD)	< (2xD)	< (2xD)	< (1xD)	full	< (2xD)	< (2xD)	< (2xD)	< (1xD)	full	< (2xD)	< (2xD)	< (2xD)
Radial Width		full	full	(.25-.3)xD	(.1-.25)xD	(.05-.08)xD	full	full	(.25-.3)xD	(.1-.25)xD	(.05-.08)xD	full	full	(.25-.3)xD	(.1-.25)xD	(.05-.08)xD
1/8"	3mm	.0007	.0009	.0007	.0007	.0009	.0007	.0009	.0007	.0007	.0009	.0004	.0005	.0004	.0004	.0005
1/4"	6mm	.0015	.0018	.0015	.0015	.0018	.0015	.0018	.0015	.0015	.0018	.0008	.0010	.0008	.0008	.0010
3/8"	10mm	.0020	.0022	.0020	.0020	.0022	.0024	.0026	.0024	.0024	.0026	.0013	.0015	.0013	.0013	.0015
1/2"	12mm	.0022	.0024	.0022	.0022	.0024	.0026	.0028	.0026	.0026	.0028	.0019	.0020	.0019	.0019	.0020
3/4"	20mm	.0026	.0028	.0026	.0026	.0028	.0028	.0032	.0028	.0028	.0032	.0025	.0028	.0025	.0025	.0028
1"	25mm	.0028	.0030	.0028	.0028	.0030	.0030	.0035	.0030	.0030	.0035	.0027	.0030	.0027	.0027	.0030

Multiply by 25.4 for metric.

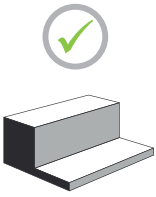
		Titanium				
		Slotting	Plunge Ramp	Rough Profile	HEM	Finish
SFM (ft/min)		90	90	120	150	150
Axial Depth		< (1xD)	full	< (2xD)	< (2xD)	< (2xD)
Radial Width		full	full	(.25-.3)xD	(.1-.25)xD	(.05-.08)xD
1/8"	3mm	.0004	.0005	.0004	.0004	.0005
1/4"	6mm	.0008	.0010	.0008	.0008	.0010
3/8"	10mm	.0012	.0015	.0012	.0012	.0015
1/2"	12mm	.0016	.0018	.0016	.0016	.0018
3/4"	20mm	.0020	.0022	.0020	.0020	.0022
1"	25mm	.0028	.0030	.0028	.0028	.0030



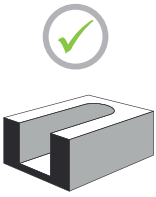
Slotting



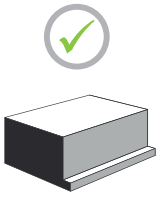
Plunge / Ramp



Rough Profile



HEM

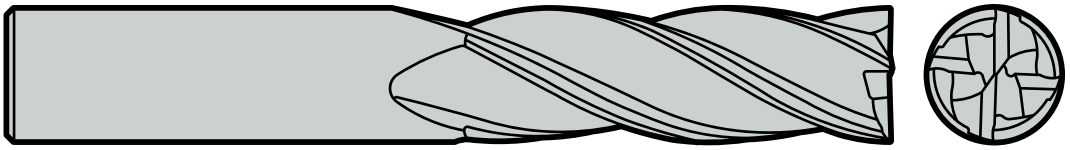


Finish

HEM: High Efficiency Machining

Not Recommended for Composites, Plastics, or Graphite. High Si Aluminum and Low Si Aluminum Recommended in Unique Situations. The parameters listed for tool series that are stocked uncoated are based on running an uncoated tool. If a coating is applied to the tools, the SFM can be increased by approximately 25%. All speed and feed recommendations should be considered only as a starting point. Start with conservative speeds and feeds while analyzing the rigidity of the process. Then cautiously progress incrementally to achieve optimum performance.

3400 HARMONICUT



The 3400 Harmon-i-Cut is a 4-flute, high performance end mill designed for difficult to machine ferrous materials. It features a variable helix, variable index, and variable rake which maximizes tool life and removal rates by minimizing the effects of harmonics. The 3400 Harmon-i-Cut allows the capability to rough and finish with one tool and is stocked with FC-18 coating.

NUMBER OF FLUTES	4 FLUTES
FINISH	FC-18
CUTTING TYPE	CENTER
CUTTING DIRECTION	RIGHT HAND
SPIRAL DIRECTION	RIGHT HAND
HELIX ANGLE	VARIABLE
SHANK TOLERANCE	h6
CUTTER TOLERANCE	=+.0000"/-.002" I+0.00MM/-0.05MM

STANDARD OFFERING	**SIZE RANGE**
IMPERIAL	.125" - 1.00"
METRIC	3.00MM - 25.00MM

FAQs

What applications are these tools recommended for?
The Harmonicut is recommended for Cast Iron and difficult to machine ferrous materials.

What are the Key characteristics of the 3400?
Variable Index, Variable Relief, Engineered Edge Prep, FC18.

What Radial engagement is best for the 3400?
The Harmonicut runs best less than 20% radial engagement using HEM techniques.

Why is the Harmonicut best in Cast Iron?
The Harmonicut has FC18 coating and engineered rake that is best in Cast Iron Applications.

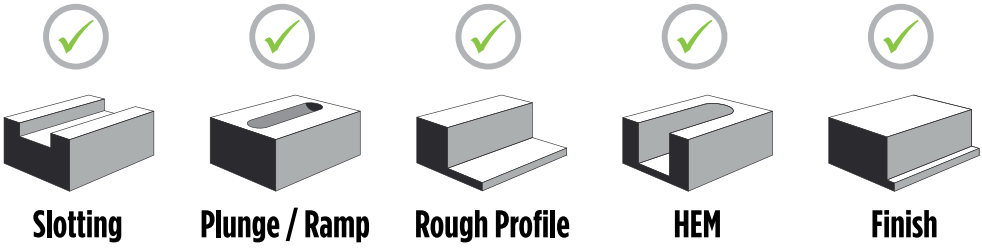
Contact Engineering at 800.248.8315 or engineering@fullertontool.com

FULLERTON SPEEDS / FEEDS

		Cast Iron					Hardened Steels > 48 RC					Steels				
		Slotting	Plunge Ramp	Rough Profile	HEM	Finish	Slotting	Plunge Ramp	Rough Profile	HEM	Finish	Slotting	Plunge Ramp	Rough Profile	HEM	Finish
SFM (ft/min)		250	250	250	525	525	100	100	150	300	300	200	200	300	600	600
Axial Depth		< (1xD)	< (1xD)	1.5xD	1xD	< (1xD)	< (1xD)	< (1xD)	1.5xD	1xD	< (1xD)	< (1xD)	< (1xD)	1.5xD	1xD	< (1xD)
Radial Width		full	full	(.3-.5)xD	(.010-.015)	(.3-.5)xD	full	full	(.3-.5)xD	(.010-.015)	(.3-.5)xD	full	full	(.3-.5)xD	(.010-.015)	(.3-.5)xD
1/8"	3mm	.0005	.0007	.0005	.0005	.0007	.0002	.0006	.0002	.0002	.0006	.0002	.0007	.0002	.0002	.0007
1/4"	6mm	.0010	.0012	.0010	.0010	.0012	.0008	.0012	.0008	.0008	.0012	.0010	.0014	.0010	.0010	.0014
3/8"	10mm	.0020	.0020	.0020	.0020	.0020	.0012	.0018	.0012	.0012	.0018	.0020	.0021	.0020	.0020	.0021
1/2"	12mm	.0025	.0028	.0025	.0025	.0028	.0020	.0025	.0020	.0020	.0025	.0025	.0028	.0025	.0025	.0028
3/4"	20mm	.0030	.0035	.0030	.0030	.0035	.0025	.0035	.0025	.0025	.0035	.0030	.0035	.0030	.0030	.0035
1"	25mm	.0035	.0045	.0035	.0035	.0045	.0035	.0040	.0035	.0035	.0040	.0035	.0040	.0035	.0035	.0040

		Stainless Steels					Super Alloys (Nickel Based, Inconel)					Titanium				
		Slotting	Plunge Ramp	Rough Profile	HEM	Finish	Slotting	Plunge Ramp	Rough Profile	HEM	Finish	Slotting	Plunge Ramp	Rough Profile	HEM	Finish
SFM (ft/min)		200	200	250	300	300	75	75	75	125	125	100	100	125	200	200
Axial Depth		< (1xD)	< (1xD)	1.5xD	1xD	< (1xD)	< (1xD)	< (1xD)	1.5xD	1xD	< (1xD)	< (1xD)	< (1xD)	1.5xD	1xD	< (1xD)
Radial Width		full	full	(.3-.5)xD	(.010-.015)	(.3-.5)xD	full	full	(.3-.5)xD	(.010-.015)	(.3-.5)xD	full	full	(.3-.5)xD	(.010-.015)	(.3-.5)xD
1/8"	3mm	.0002	.0007	.0002	.0002	.0007	.0002	.0003	.0002	.0002	.0003	.0002	.0004	.0002	.0002	.0004
1/4"	6mm	.0008	.0014	.0008	.0008	.0014	.0010	.0010	.0010	.0010	.0010	.0012	.0015	.0012	.0012	.0015
3/8"	10mm	.0019	.0021	.0019	.0019	.0021	.0013	.0015	.0013	.0013	.0015	.0020	.0025	.0020	.0020	.0025
1/2"	12mm	.0025	.0028	.0025	.0025	.0028	.0016	.0020	.0016	.0016	.0020	.0025	.0035	.0025	.0025	.0035
3/4"	20mm	.0029	.0035	.0029	.0029	.0035	.0022	.0025	.0022	.0022	.0025	.0032	.0045	.0032	.0032	.0045
1"	25mm	.0033	.0040	.0033	.0033	.0040	.0024	.0030	.0024	.0024	.0030	.0040	.0050	.0040	.0040	.0050

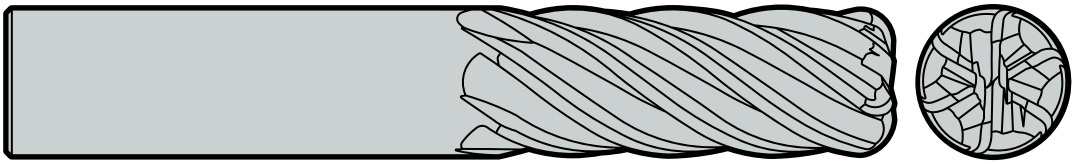
Multiply by 25.4 for metric.



HEM: High Efficiency Machining

Not Recommended for High Si Aluminum (>10%), Low Si Aluminum (<10%), Composites, Plastics, Brass & Copper, or Graphite. The parameters listed for tool series that are stocked uncoated are based on running an uncoated tool. If a coating is applied to the tools, the SFM can be increased by approximately 25%. All speed and feed recommendations should be considered only as a starting point. Start with conservative speeds and feeds while analyizing the rigidity of the process. Then cautiously progress incrementally to achieve optimum performance.

3116 TiMILL



The 3116 Ti-Mill High Performance End Mill is designed for unsurpassed performance in milling Titanium.
The Ti-Mill's 6-flute, maximum edge strength design produces improved surface finishes, higher quality parts, and aggressive feeds and speeds. While its increased core allows strength and stability in-cut and its consistent cutting edges resist fatigue and micro-chipping.
This 3116 Ti-Mill is a must-have for any high efficiency milling applications in Titanium.

NUMBER OF FLUTES	6 FLUTES
FINISH	FC-13
CUTTING TYPE	CENTER
CUTTING DIRECTION	RIGHT HAND
SPIRAL DIRECTION	RIGHT HAND
HELIX ANGLE	VARIABLE
SHANK TOLERANCE	h6
CUTTER TOLERANCE	+.0000"/-.002" |+0.00MM/-0.05MM

STANDARD OFFERING	**SIZE RANGE**
IMPERIAL	.250" - 1.00"
METRIC	6.00MM - 25.00MM

FAQs

What applications are these tools recommended for?
The 3116 series TiMill is the Industry Exclusive solution for high efficiency machining of Titanium.

What are the key characteristics of the TiMill?
6 Flutes, Premium Carbide Grades, Optimal Edge Prep, FC13

What Radial engagement is best for the TiMill?
The TiMill runs best at under 15% radial engagement

What can you expect out of the TiMill?
Maximum efficiency and unsurpassed surface finishes

Contact Engineering at 800.248.8315 or engineering@fullertontool.com

		Titanium				
		Slotting	Plunge Ramp	Rough Profile	HEM	Finish
SFM (ft/min)				400	400	400
Axial Depth		< (1xD)	full	< (2xD)	< (2xD)	< (2xD)
Radial Width		full	full	(.25-.3)xD	(.1-.25)xD	(.05-.08)xD
1/8"	3mm			.0003	.0003	.0004
1/4"	6mm			.0008	.0008	.0010
3/8"	10mm			.0010	.0010	.0015
1/2"	12mm			.0015	.0015	.0020
3/4"	20mm			.0020	.0020	.0025
1"	25mm			.0032	.0032	.0035

Examples:

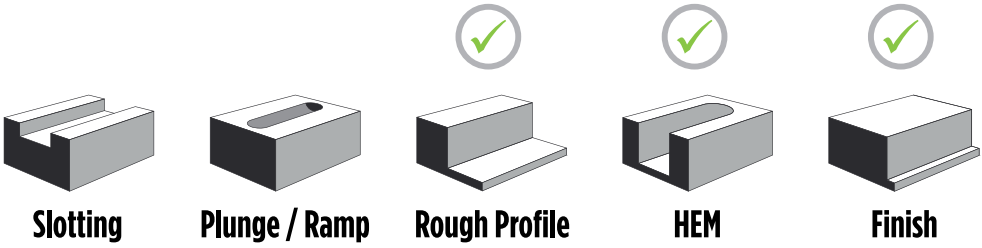
Ti Grade 1
Ti Grade 2
Ti Grade 3
Ti Grade 4
Ti Grade 7
Ti Grade 12

		Titanium				
		Slotting	Plunge Ramp	Rough Profile	HEM	Finish
SFM (ft/min)				300	325	325
Axial Depth		< (1xD)	full	< (2xD)	< (2xD)	< (2xD)
Radial Width		full	full	(.25-.3)xD	(.1-.25)xD	(.05-.08)xD
1/8"	3mm			.0003	.0003	.0004
1/4"	6mm			.0008	.0008	.0010
3/8"	10mm			.0010	.0010	.0015
1/2"	12mm			.0015	.0015	.0020
3/4"	20mm			.0020	.0020	.0025
1"	25mm			.0032	.0032	.0035

Multiply by 25.4 for metric.

Examples:

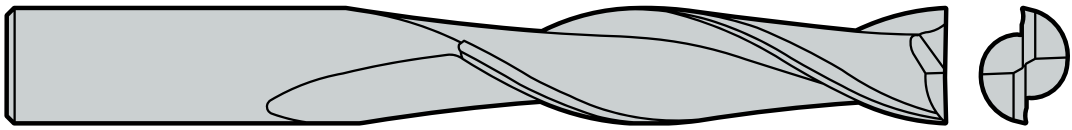
Ti 3Al-2.5V
Ti 6Al-4V
Ti 10V-2Fe-3Al
(with the exception of β Ti)



HEM: High Efficiency Machining

Not Recommended for Graphite, Cast Iron, Hardened Steels > 48RC, Steels, Stainless Steels, Super Alloys (Nickel based, Inconel), or Titanium. Plastics Recommended in Unique Situations. The parameters listed for tool series that are stocked uncoated are based on running an uncoated tool. If a coating is applied to the tools, the SFM can be increased by approximately 25%. All speed and feed recommendations should be considered only as a starting point. Start with conservative speeds and feeds while analyzing the rigidity of the process. Then cautiously progress incrementally to achieve optimum performance.

3215 GENERAL PURPOSE



The 3215 General Purpose end mill has 2-flutes and was designed for use in titanium, super alloys, stainless steels, steels, cast iron, brass & copper, and low si aluminum. It is offered in a variety of configurations and is available with single-end and double-end designs. The 3215 General Purpose end mill is stocked uncoated and with TiAlN, TiCN, and TiN coatings.

NUMBER OF FLUTES	2 FLUTES
FINISH	UNCOATED, TIN, TIALN, TICN
SINGLE/DOUBLE END	SINGLE END, DOUBLE END
CUTTING TYPE	CENTER
CUTTING DIRECTION	RIGHT HAND
SPIRAL DIRECTION	RIGHT HAND
HELIX ANGLE	30 DEGREES
SHANK TOLERANCE	h6
CUTTER TOLERANCE	+.0000"/-.002" | +0.00MM/-0.05MM

STANDARD OFFERING	**SIZE RANGE**
IMPERIAL	.0156" - 1.0"
METRIC	1.00MM - 25.00MM

FAQs

What coatings are offered on the 3215?
The 3215 is offered uncoated, TIALN, TICN, and TIN coated. Other coatings can be added as an altered standard with our FAST Quote system.

What end geometries are offered on the 3215?
The 3215 is offered in Square, Ball, and multiple Corner Radius. If something is not offered it can be added with our JIT services.

What is a benefit for choosing Fullerton?
Fullerton's attention to detail and consistency, are essential in achieving unsurpassed quality.

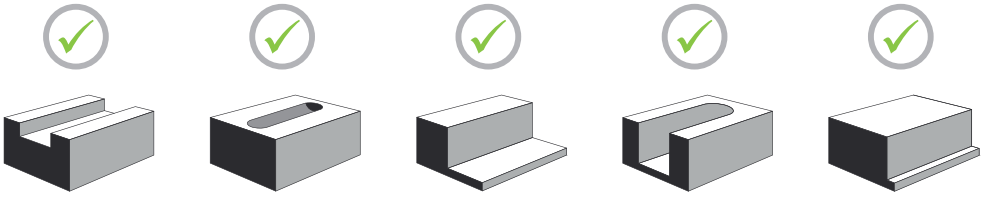
FULLERTON SPEEDS / FEEDS

		Low Si Aluminum (<10%) (1100-1500) SFM (ft/min)					Brass & Copper (400-600) SFM (ft/min)					Cast Iron (250-400) SFM (ft/min)				
		Slotting	Plunge Ramp	Rough Profile	HEM	Finish	Slotting	Plunge Ramp	Rough Profile	HEM	Finish	Slotting	Plunge Ramp	Rough Profile	HEM	Finish
Axial Depth		< (1xD)	< (1xD)	1.5xD	1xD	< (1xD)	< (1xD)	< (1xD)	1.5xD	1xD	< (1xD)	< (1xD)	< (1xD)	1.5xD	1xD	< (1xD)
Radial Width		full	full	(.3-.5)xD	(.010-.015)	(.3-.5)xD	full	full	(.3-.5)xD	(.010-.015)	(.3-.5)xD	full	full	(.3-.5)xD	(.010-.015)	(.3-.5)xD
1/8"	3mm	.0039	.0051	.0039	.0039	.0051	.0004	.0006	.0004	.0004	.0006	.0004	.0008	.0004	.0004	.0008
1/4"	6mm	.0042	.0059	.0042	.0042	.0059	.0008	.0012	.0008	.0008	.0012	.0008	.0020	.0008	.0008	.0020
3/8"	10mm	.0046	.0068	.0046	.0046	.0068	.0020	.0025	.0020	.0020	.0025	.0018	.0036	.0018	.0018	.0036
1/2"	12mm	.0050	.0077	.0050	.0050	.0077	.0033	.0036	.0033	.0033	.0036	.0025	.0049	.0025	.0025	.0049
3/4"	20mm	.0055	.0088	.0055	.0055	.0088	.0045	.0049	.0045	.0045	.0049	.0033	.0060	.0033	.0033	.0060
1"	25mm	.0059	.0098	.0059	.0059	.0098	.0059	.0062	.0059	.0059	.0062	.0039	.0071	.0039	.0039	.0071

		Steels (230-350) SFM (ft/min)					Stainless Steels (130-260) SFM (ft/min)					Super Alloys (Nickel Based, Inconel) (80-120) SMM (ft/min)				
		Slotting	Plunge Ramp	Rough Profile	HEM	Finish	Slotting	Plunge Ramp	Rough Profile	HEM	Finish	Slotting	Plunge Ramp	Rough Profile	HEM	Finish
Axial Depth		< (1xD)	< (1xD)	1.5xD	1xD	< (1xD)	< (1xD)	< (1xD)	1.5xD	1xD	< (1xD)	< (1xD)	< (1xD)	1.5xD	1xD	< (1xD)
Radial Width		full	full	(.3-.5)xD	(.010-.015)	(.3-.5)xD	full	full	(.3-.5)xD	(.010-.015)	(.3-.5)xD	full	full	(.3-.5)xD	(.010-.015)	(.3-.5)xD
1/8"	3mm	.0004	.0006	.0004	.0004	.0006	.0002	.0004	.0002	.0002	.0004	.0002	.0004	.0002	.0002	.0004
1/4"	6mm	.0012	.0017	.0012	.0012	.0018	.0006	.0008	.0006	.0006	.0008	.0004	.0008	.0004	.0004	.0008
3/8"	10mm	.0022	.0030	.0022	.0022	.0030	.0010	.0012	.0010	.0010	.0012	.0006	.0011	.0006	.0006	.0011
1/2"	12mm	.0030	.0045	.0030	.0030	.0045	.0014	.0018	.0014	.0014	.0018	.0008	.0015	.0008	.0008	.0015
3/4"	20mm	.0039	.0060	.0039	.0039	.0060	.0017	.0024	.0017	.0017	.0024	.0010	.0018	.0010	.0010	.0018
1"	25mm	.0047	.0071	.0047	.0047	.0071	.0020	.0031	.0020	.0020	.0031	.0012	.0020	.0012	.0012	.0020

		Titanium (120-200) SMM (ft/min)				
		Slotting	Plunge Ramp	Rough Profile	HEM	Finish
Axial Depth		< (1xD)	< (1xD)	1.5xD	1xD	< (1xD)
Radial Width		full	full	(.3-.5)xD	(.010-.015)	(.3-.5)xD
1/8"	3mm	.0002	.0004	.0002	.0002	.0004
1/4"	6mm	.0006	.0010	.0006	.0006	.0010
3/8"	10mm	.0010	.0016	.0010	.0010	.0016
1/2"	12mm	.0014	.0022	.0014	.0014	.0022
3/4"	20mm	.0017	.0026	.0017	.0017	.0026
1"	25mm	.0020	.0031	.0020	.0020	.0031

Multiply by 25.4 for metric.



Slotting **Plunge / Ramp** **Rough Profile** **HEM** **Finish**

Not Recommended for High Si Aluminum (>10%), Composites, Plastics, Graphite, or Hardened Steels > 48RC. The parameters listed for tool series that are stocked uncoated are based on running an uncoated tool. If a coating is applied to the tools, the SFM can be increased by approximately 25%. All speed and feed recommendations should be considered only as a starting point.
Start with conservative speeds and feeds while analyzing the rigidity of the process. Then cautiously progress incrementally to achieve optimum performance.

Complex machining often requires custom tooling.

We provide custom tooling solutions that increase efficiency and reduce costs, specific to your complex machining applications. Fullerton can assess your machining needs through a collaboration with your machinists and product development teams and our engineering and technical support teams. This allows us to better understand your struggles and overall goals, which helps us design and manufacture the right tooling for you.

6-FLUTE STEP FORM END MILL

FULL RADIUS KEYSEAT CUTTER

DRILL / BACK CHAMFER TOOL

MULTI-STEP COOLANT REAMER

CUS
TOOLING

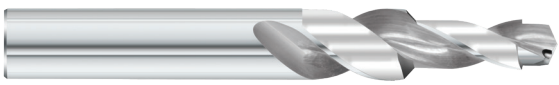
Sometimes that means making a slight alteration to one of our standard tools, while at other times we create innovative, custom tooling specific for your application.

Regardless of how simple or complex your machining needs are, we manufacture every tool with precision and concise parameters that produces tooling with exceptional performance.

TOM SOLUTIONS

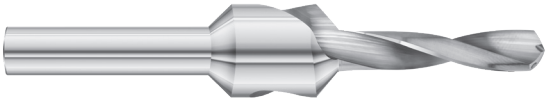
COMPOSITE ROUTER

MULTI-STEP COOLANT DRILL

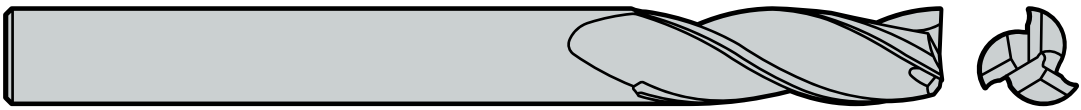


MULTI-STEP POLY DRILL

AEROSPACE DRILL



3300 GENERAL PURPOSE



The 3300 General Purpose end mill has 3-flutes and was designed for use in titanium, super alloys, stainless steels, steels, cast iron, brass & copper, high si aluminum, and low si aluminum. It is offered in a variety of configurations. The 3300 General Purpose end mill is stocked uncoated and with TiAlN, TiCN, and TiN coatings.

NUMBER OF FLUTES	3 FLUTES
FINISH	UNCOATED, TIN, TIALN, TICN
CUTTING TYPE	CENTER
CUTTING DIRECTION	RIGHT HAND
SPIRAL DIRECTION	RIGHT HAND
HELIX ANGLE	30
SHANK TOLERANCE	h6
CUTTER TOLERANCE	+.0000"/-.002" I+0.00MM/-0.05MM

STANDARD OFFERING	**SIZE RANGE**
IMPERIAL	.0312" - 1.0"
METRIC	1.00MM - 25.00MM

FAQs

What coatings are offered on the 3300?
The 3300 is offered uncoated, TiAlN, TiCN, and TiN coated. Other coatings can be added as an altered standard with our FAST Quote system.

What end geometries are offered on the 3300?
e 3300 is offered Square and Ball Nose. If something is not offered it can be added with our JIT services.

What is the benefit for choosing Fullerton?
Fullerton's attention to detail and consistency, are essential in achieving unsurpassed quality.

Contact Engineering at 800.248.8315 or engineering@fullertontool.com

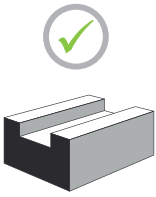
FULLERTON SPEEDS / FEEDS

		Low Si Aluminum (<10%) (1100-1500) SFM (ft/min)					Brass & Copper (400-600) SFM (ft/min)					Cast Iron (250-400) SFM (ft/min)				
		Slotting	Plunge Ramp	Rough Profile	HEM	Finish	Slotting	Plunge Ramp	Rough Profile	HEM	Finish	Slotting	Plunge Ramp	Rough Profile	HEM	Finish
Axial Depth		< (1xD)	< (1xD)	1.5xD	1xD	< (1xD)	< (1xD)	< (1xD)	1.5xD	1xD	< (1xD)	< (1xD)	< (1xD)	1.5xD	1xD	< (1xD)
Radial Width		full	full	(.3-.5)xD	(.010-.015)	(.3-.5)xD	full	full	(.3-.5)xD	(.010-.015)	(.3-.5)xD	full	full	(.3-.5)xD	(.010-.015)	(.3-.5)xD
1/8"	3mm	.0010	.0015	.0010	.0010	.0015	.0008	.0010	.0008	.0008	.0010	.0007	.0009	.0007	.0007	.0009
1/4"	6mm	.0030	.0035	.0030	.0030	.0035	.0015	.0020	.0015	.0015	.0020	.0014	.0020	.0014	.0014	.0020
3/8"	10mm	.0045	.0050	.0045	.0045	.0050	.0025	.0030	.0025	.0025	.0030	.0022	.0026	.0022	.0022	.0026
1/2"	12mm	.0065	.0070	.0065	.0065	.0070	.0030	.0035	.0030	.0030	.0035	.0025	.0034	.0025	.0025	.0034
3/4"	20mm	.0085	.0090	.0085	.0085	.0090	.0035	.0040	.0035	.0035	.0040	.0028	.0045	.0028	.0028	.0045
1"	25mm	.0100	.0110	.0100	.0100	.0110	.0040	.0045	.0040	.0040	.0045	.0035	.0050	.0035	.0035	.0050

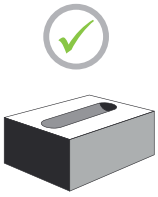
		Steels (230-350) SFM (ft/min)					Stainless Steels (130-260) SFM (ft/min)					Super Alloys (Nickel Based, Inconel) (80-120) SMM (ft/min)				
		Slotting	Plunge Ramp	Rough Profile	HEM	Finish	Slotting	Plunge Ramp	Rough Profile	HEM	Finish	Slotting	Plunge Ramp	Rough Profile	HEM	Finish
Axial Depth		< (1xD)	< (1xD)	1.5xD	1xD	< (1xD)	< (1xD)	< (1xD)	1.5xD	1xD	< (1xD)	< (1xD)	< (1xD)	1.5xD	1xD	< (1xD)
Radial Width		full	full	(.3-.5)xD	(.010-.015)	(.3-.5)xD	full	full	(.3-.5)xD	(.010-.015)	(.3-.5)xD	full	full	(.3-.5)xD	(.010-.015)	(.3-.5)xD
1/8"	3mm	.0007	.0009	.0007	.0007	.0009	.0006	.0008	.0006	.0006	.0008	.0004	.0005	.0004	.0004	.0005
1/4"	6mm	.0015	.0020	.0015	.0015	.0020	.0014	.0017	.0014	.0014	.0017	.0008	.0009	.0008	.0008	.0009
3/8"	10mm	.0023	.0026	.0023	.0023	.0026	.0022	.0022	.0022	.0022	.0022	.0011	.0011	.0011	.0011	.0011
1/2"	12mm	.0026	.0034	.0026	.0026	.0034	.0023	.0029	.0023	.0023	.0029	.0014	.0015	.0014	.0014	.0015
3/4"	20mm	.0030	.0045	.0030	.0030	.0045	.0025	.0040	.0025	.0025	.0040	.0020	.0021	.0020	.0020	.0021
1"	25mm	.0040	.0050	.0040	.0040	.0050	.0030	.0045	.0030	.0030	.0045	.0023	.0025	.0023	.0023	.0025

		Titanium (120-200) SMM (ft/min)				
		Slotting	Plunge Ramp	Rough Profile	HEM	Finish
Axial Depth		< (1xD)	< (1xD)	1.5xD	1xD	< (1xD)
Radial Width		full	full	(.3-.5)xD	(.010-.015)	(.3-.5)xD
1/8"	3mm	.0004	.0006	.0004	.0004	.0006
1/4"	6mm	.0008	.0012	.0008	.0008	.0012
3/8"	10mm	.0012	.0016	.0012	.0012	.0016
1/2"	12mm	.0016	.0022	.0016	.0016	.0022
3/4"	20mm	.0020	.0029	.0020	.0020	.0029
1"	25mm	.0028	.0035	.0028	.0028	.0035

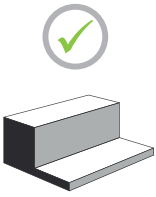
Multiply by 25.4 for metric.



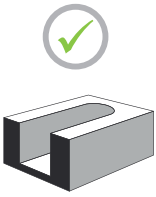
Slotting



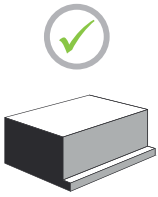
Plunge / Ramp



Rough Profile



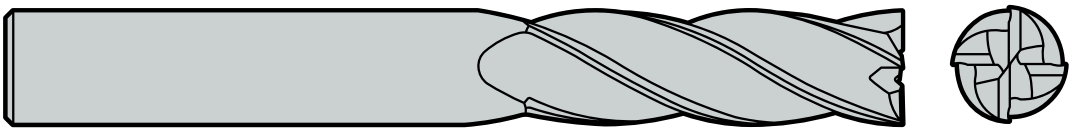
HEM



Finish

Not Recommended for Composites, Plastics, Graphite, or Hardened Steels > 48 RC. High Si Aluminum Recommended in Unique Situations. The parameters listed for tool series that are stocked uncoated are based on running an uncoated tool. If a coating is applied to the tools, the SFM can be increased by approximately 25%. All speed and feed recommendations should be considered only as a starting point. Start with conservative speeds and feeds while analyzing the rigidity of the process. Then cautiously progress incrementally to achieve optimum performance.

3200 GENERAL PURPOSE



The 3200 General Purpose end mill has 4-flutes and was designed for use in titanium, super alloys, hardened steels, stainless steels, steels, cast iron, brass & copper, and low si aluminum. It is offered in a variety of configurations and is available with single-end and double-end designs. The 3200 General Purpose end mill is stocked uncoated and with TiN, TiAlN, TiCN and FC20 coatings.

NUMBER OF FLUTES	4 FLUTES
FINISH	UNCOATED, TIN, TIALN, TICN ,FC20
CUTTING TYPE	CENTER
CUTTING DIRECTION	RIGHT HAND
SPIRAL DIRECTION	RIGHT HAND
HELIX ANGLE	30 DEGREES
SHANK TOLERANCE	h6
CUTTER TOLERANCE	+.0000"/-.002" | +0.00MM/-0.05MM

STANDARD OFFERING	**SIZE RANGE**
IMPERIAL	.0156" - 1.5"
METRIC	0.40MM - 38.00MM

FAQs

What coatings are offered on the 3200?
The 3200 is offered uncoated, FC20, TIALN, TICN, and TIN coated. Other coatings can be added as an altered standard with our FAST Quote system.

Why choose a 3200 with FC20 coating?
The 3200-FC20 is a general purpose tool with a high performance coating at the general purpose price point.

Can you high efficiency machine with the 3200?
Yes, but at slower speeds than a high-performance tool.

What is a benefit for choosing Fullerton?
Fullerton's attention to detail and consistency, are essential in achieving unsurpassed quality.

Contact Engineering at 800.248.8315 or engineering@fullertontool.com

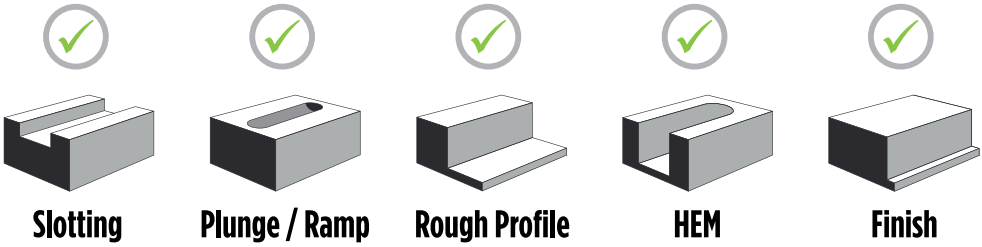
FULLERTON SPEEDS / FEEDS

		Low Si Aluminum (<10%) (1100-1500) SFM (ft/min)					Brass & Copper (400-600) SFM (ft/min)					Cast Iron (250-400) SFM (ft/min)				
		Slotting	Plunge Ramp	Rough Profile	HEM	Finish	Slotting	Plunge Ramp	Rough Profile	HEM	Finish	Slotting	Plunge Ramp	Rough Profile	HEM	Finish
Axial Depth		< (1xD)	< (1xD)	1.5xD	1xD	< (1xD)	< (1xD)	< (1xD)	1.5xD	1xD	< (1xD)	< (1xD)	< (1xD)	1.5xD	1xD	< (1xD)
Radial Width		full	full	(.3-.5)xD	(.010-.015)	(.3-.5)xD	full	full	(.3-.5)xD	(.010-.015)	(.3-.5)xD	full	full	(.3-.5)xD	(.010-.015)	(.3-.5)xD
1/8"	3mm	.0010	.0012	.0010	.0010	.0012	.0009	.0011	.0007	.0007	.0011	.0010	.0012	.0008	.0008	.0012
1/4"	6mm	.0030	.0034	.0030	.0030	.0034	.0013	.0014	.0009	.0009	.0015	.0014	.0015	.0010	.0010	.0015
3/8"	10mm	.0045	.0048	.0045	.0045	.0048	.0021	.0020	.0012	.0012	.0021	.0022	.0022	.0013	.0013	.0022
1/2"	12mm	.0060	.0063	.0060	.0060	.0063	.0025	.0028	.0025	.0025	.0028	.0025	.0030	.0025	.0025	.0030
3/4"	20mm	.0080	.0085	.0080	.0080	.0085	.0030	.0035	.0028	.0028	.0035	.0028	.0035	.0030	.0030	.0035
1"	25mm	.0100	.0114	.0100	.0100	.0114	.0040	.0045	.0035	.0035	.0040	.0035	.0045	.0040	.0040	.0045

		Hardened Steels > 48 RC (80-130) SFM (ft/min)					Steels (230-350) SFM (ft/min)					Stainless Steels (130-260) SFM (ft/min)				
		Slotting	Plunge Ramp	Rough Profile	HEM	Finish	Slotting	Plunge Ramp	Rough Profile	HEM	Finish	Slotting	Plunge Ramp	Rough Profile	HEM	Finish
Axial Depth		< (1xD)	< (1xD)	1.5xD	1xD	< (1xD)	< (1xD)	< (1xD)	1.5xD	1xD	< (1xD)	< (1xD)	< (1xD)	1.5xD	1xD	< (1xD)
Radial Width		full	full	(.3-.5)xD	(.010-.015)	(.3-.5)xD	full	full	(.3-.5)xD	(.010-.015)	(.3-.5)xD	full	full	(.3-.5)xD	(.010-.015)	(.3-.5)xD
1/8"	3mm	.0008	.0009	.0008	.0008	.0009	.0006	.0008	.0006	.0006	.0008	.0006	.0008	.0006	.0006	.0008
1/4"	6mm	.0015	.0016	.0015	.0015	.0016	.0014	.0014	.0014	.0014	.0014	.0014	.0014	.0014	.0014	.0014
3/8"	10mm	.0020	.0022	.0020	.0020	.0022	.0022	.0022	.0022	.0022	.0022	.0022	.0022	.0022	.0022	.0022
1/2"	12mm	.0025	.0025	.0025	.0025	.0025	.0025	.0025	.0025	.0025	.0025	.0023	.0023	.0023	.0023	.0023
3/4"	20mm	.0028	.0030	.0028	.0028	.0030	.0028	.0028	.0028	.0028	.0028	.0025	.0025	.0025	.0025	.0025
1"	25mm	.0030	.0035	.0030	.0030	.0035	.0035	.0035	.0035	.0035	.0035	.0027	.0027	.0027	.0027	.0027

		Super Alloys (Nickel Based, Inconel) (80-120) SMM (ft/min)					Titanium (120-200) SMM (ft/min)				
		Slotting	Plunge Ramp	Rough Profile	HEM	Finish	Slotting	Plunge Ramp	Rough Profile	HEM	Finish
Axial Depth		< (1xD)	< (1xD)	1.5xD	1xD	< (1xD)	< (1xD)	< (1xD)	1.5xD	1xD	< (1xD)
Radial Width		full	full	(.3-.5)xD	(.010-.015)	(.3-.5)xD	full	full	(.3-.5)xD	(.010-.015)	(.3-.5)xD
1/8"	3mm	.0003	.0004	.0003	.0003	.0004	.0003	.0004	.0003	.0003	.0004
1/4"	6mm	.0007	.0010	.0008	.0008	.0010	.0007	.0007	.0007	.0007	.0007
3/8"	10mm	.0012	.0015	.0015	.0015	.0015	.0011	.0011	.0011	.0011	.0011
1/2"	12mm	.0018	.0020	.0020	.0020	.0020	.0014	.0014	.0014	.0014	.0014
3/4"	20mm	.0025	.0028	.0025	.0025	.0025	.0018	.0018	.0018	.0018	.0018
1"	25mm	.0030	.0035	.0030	.0030	.0030	.0025	.0025	.0025	.0025	.0025

Multiply by 25.4 for metric.



Slotting **Plunge / Ramp** **Rough Profile** **HEM** **Finish**

Not Recommended for High Si Aluminum (>10%), Composites, Plastics, or Graphite. The parameters listed for tool series that are stocked uncoated are based on running an uncoated tool. If a coating is applied to the tools, the SFM can be increased by approximately 25%. All speed and feed recommendations should be considered only as a starting point. Start with conservative speeds and feeds while analyzing the rigidity of the process. Then cautiously progress incrementally to achieve optimum performance.

TROUBLESHOOTING | END MILLS

ISSUE	CAUSE	SOLUTION
Tool Break	Feed Rate Excessive	Increase SFM
	Depth Of Cut Excessive	Reduce Depth Of Cut
	Excessive Tool Overhang	Reduce Tool Stick Out
	Excessive Tool Wear	Regrind Sooner
Excessive Wear	Speed Is Too Fast	Decrease Speed
	Hard Work Material	Change Coating
	Wrong Speed / Feed	Increase Speed / Feed
	Primary Relief Angle Too Low	Change To Larger Relief Angle
	Recutting Chips	Change Feed / Speed / Increase Coolant
Poor Surface Finish	Feed Rate Too Fast	Correct Feed / Speed Rates
	Cutting Speed Too Slow	Increase RPM
	Recutting Chips	Change Feed / Speed / Increase Coolant
	Excessive Wear	Regrind Sooner
	Tool Runout	Check Tool Runout in holder/spindle, <.0003 TIR desired
	Excessive Tool Overhang	Reduce Tool Stick Out
	-	Reduce SFM / Increase IPT
Chip Packing	Cut Too Heavy	Decrease Depth and With Of Cut
	Minimal Chip Clearance	End Mill With Fewer Flutes
	Lack of Coolant	Higher Coolant Pressure / Reposition Nozzle

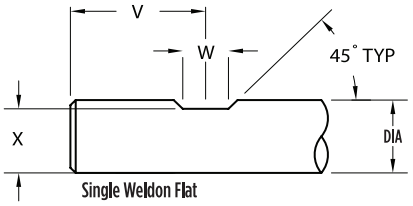
WELDON FLATS

Weldon Flats

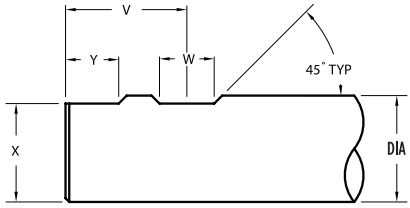
The Advanced Performance Weldon Flat (AF) and the Standard Weldon Flat (WF) are essentially the same, but the length of the Weldon Flat to the cutting end of the tool is different. The AF is measured from the flute washout to the flat. This guarantees that the flute or flute washout will not be inside of the holder. If the flute or flute washout is inside the tool holder, the chips can pack into the holder and can cause the tool to break.

Standard Weldon Flat (WF)

Shank Diameter	V 3.015	W 3.001	X 3.004	Y 3.031
1/8	.5000	.1560	.1050	-
3/16	.6875	.1560	.1500	-
1/4	.7812	.1870	.2150	-
5/16	.7812	.2500	.2750	-
3/8	.7812	.2810	.3200	-
7/16	.7812	.3310	.3780	-
1/2	.8906	.3310	.4350	-
9/16	.9200	.3310	.5000	-
5/8	.9531	.4010	.5550	-
3/4	1.0156	.4560	.6700	-
7/8	1.0156	.4560	.8050	.5000
1	1.1406	.5160	.9200	.5000
1 1/4	1.1406	.5160	1.1510	.5000



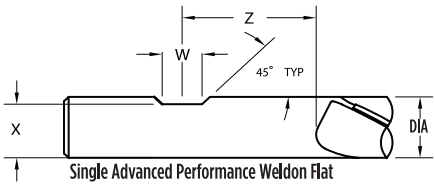
Single Weldon Flat



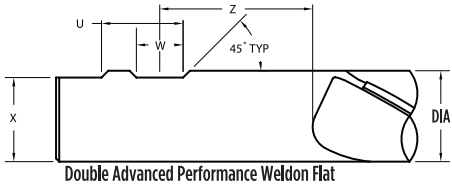
Double Weldon Flat

Advanced Performance Weldon Flat (AF)

Shank Diameter	Z 3.015	W 3.001	X 3.004	U 3.031
3/8	.8310	.2810	.3200	-
7/16	.8310	.3310	.3780	-
1/2	.9400	.3310	.4350	-
5/8	1.1580	.4010	.5550	-
3/4	1.0500	.4560	.6700	-
7/8	1.0500	.4560	.8050	-
1	1.1700	.5160	.9200	.9000
1 1/4	1.1700	.5160	1.1510	.9000
1 1/2	1.1700	.5160	1.4010	.9000



Single Advanced Performance Weldon Flat

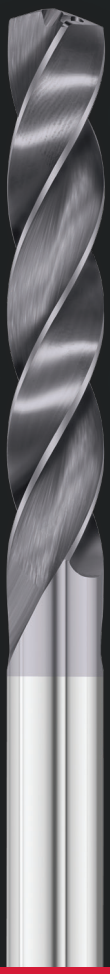


Double Advanced Performance Weldon Flat

For new applications, we recommend the AF. For existing applications using our WF, we recommend staying with our WF unless issues have occurred.

*We cannot guarantee or accept the return of any End Mill with a Flat put on by the customer.

TECHNICAL GUIDE
DRILLS

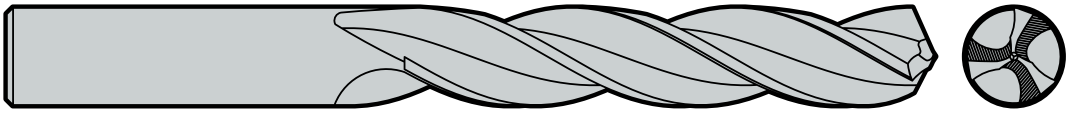


COATING SELECTION GUIDE

Applicable for Continuous Cutting - Drilling

1565

AlumaDrill™



The 1565 AlumaDrill is a 3-flute, high performance drill designed for high-speed drilling in titanium, graphite, brass & copper, high si aluminum, low si aluminum, composites, plastics, and wood. It features enhanced chip evacuation in high speed drilling applications and its unique radial grinds allow self-centering and increases aggressiveness in softer materials. The 1565 AlumaDrill is stocked uncoated.

END STYLE	130 DEGREE HIGH PERFORMANCE POINT
NUMBER OF FLUTES	3 FLUTES
FINISH	UNCOATED
SINGLE/DOUBLE END	SINGLE END
CUTTING DIRECTION	RIGHT HAND
SPIRAL DIRECTION	RIGHT HAND
HELIX ANGLE	30 DEGREE
SHANK TOLERANCE	+.0000"/-.0005" | +0.000MM/-0.013MM
CUTTER TOLERANCE	+.0000"/-.0005" | +0.000MM/-0.013MM

STANDARD OFFERING	**SIZE RANGE**
IMPERIAL	.0625" - 1.0"
METRIC	1.59MM - 25.00MM

FAQs

What applications are this tool recommended for?
The 1565 Series Alumadrill is recommended for high-speed drilling in aluminum, graphite, brass and copper, and titanium.

What are the key characteristics of the Alumadrill?
130 Degree Point, 3 Flutes, +.0000"-.0005" diameter tolerance.

Do you need to use a spotting drill?
No, the Alumadrills point is designed to self center.

Is the Alumadrill available in coolant thru?
Yes, Coolant thru versions can be made as specials.

Contact Engineering at 800.248.8315 or engineering@fullertontool.com

FULLERTON SPEEDS / FEEDS

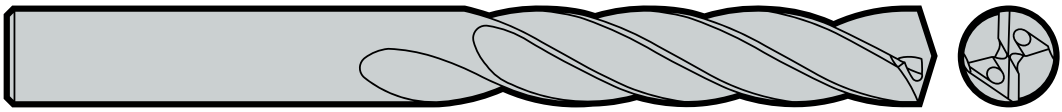
		1/8 - 3mm	1/4 - 6mm	3/8 - 10mm	1/2 - 12mm	3/4 - 19mm	1 - 25mm
High Si Aluminum >10%	RPM	12,224	6,112	4,075	3,056	2,037	1,528
	IPM	49	40	41	31	33	31
	SFM	400	400	400	400	400	400
	IPR	.004	.007	.010	.010	.016	.020
Low Si Aluminum <10%	RPM	15,280	7,640	5,093	3,820	2,547	1,910
	IPM	76	61	64	48	51	48
	SFM	500	500	500	500	500	500
	IPR	.005	.008	.013	.013	.020	.025
Plastics	RPM	12,224	6,112	4,075	3,056	2,037	1,528
	IPM	49	40	41	31	33	31
	SFM	400	400	400	400	400	400
	IPR	.004	.007	.010	.010	.016	.020
Brass & Copper	RPM	16,808	8,404	5,603	4,202	2,801	2,101
	IPM	67	55	56	53	45	42
	SFM	550	550	550	550	550	550
	IPR	.004	.007	.010	.013	.016	.020
Graphite	RPM	7,640	3,820	2,547	1,910	1,273	955
	IPM	31	25	25	19	20	19
	SFM	250	250	250	250	250	250
	IPR	.004	.007	.010	.010	.016	.020
Titanium	RPM	3,056	1,528	1,019	764	509	382
	IPM	8	6	5	5	3	3
	SFM	100	100	100	100	100	100
	IPR	.003	.004	.005	.007	.007	.007

Multiply by 25.4 for metric.

Not Recommended for Cast Iron, Hardened Steels >48 RC, Steels, Stainless Steels, or Super Alloys (Nickel based, Inconel). Composites are only recommended in unique situations. The parameters listed for tool series that are stocked uncoated are based on running an uncoated tool. If a coating is applied to the tools, the SFM can be increased by approximately 25%. All speed and feed recommendations should be considered only as a starting point. Start with conservative speeds and feeds while analyzing the rigidity of the process. Then cautiously progress incrementally to achieve optimum performance.

1505

DOMINATOR™



The 1505 Dominator is a 2-flute, high performance drill designed for holding tight tolerance holes and eliminating the need for reaming in steels, stainless steels, super alloys, and titanium. Its unique geometrical features improve surface finishes, enhance chip removal, and increase coolant flow. The Dominator is available with or without coolant-through and is stocked with FC-7 coating.

END STYLE	144 DEGREE DOMINATOR POINT
NUMBER OF FLUTES	2 FLUTES
FINISH	FC-7
SINGLE/DOUBLE END	SINGLE END
CUTTING DIRECTION	RIGHT HAND
SPIRAL DIRECTION	RIGHT HAND
HELIX ANGLE	30 DEGREE
SHANK TOLERANCE	h6
CUTTER TOLERANCE	+.0000"/-.0005" | +0.000MM/-0.013MM

STANDARD OFFERING	**SIZE RANGE**
IMPERIAL	.1065" - .8750"
METRIC	2.71MM - 22.00MM

FAQs

What applications is this tool recommended for?
The 1505 Series Dominator is recommended for drilling precise holes in Steels/ Hardened steels, Stainless Steel and High Temp Alloys.

What are the key characteristics of the Dominator?
144 Degree Point, Double Margin, FC7, +.0000"-.0005" diameter tolerance.

Do you need to use a spotting drill?
The Dominator drills 144 degree point is designed to self center. When drilling more than 5XD, a spot drill is recommended.

Can you regrind this drill?
Yes, hole tolerance needs to be reviewed to determine min drill size.

Contact Engineering at 800.248.8315 or engineering@fullertontool.com

FULLERTON SPEEDS / FEEDS

		1/8 - 3mm	1/4 - 6mm	3/8 - 10mm	1/2 - 12mm	3/4 - 19mm	1 - 25mm
High Si Aluminum >10%	RPM	12,224	6,112	4,075	3,056	2,037	1,528
	IPM	49	43	37	31	29	24
	SFM	400	400	400	400	400	400
	IPR	.004	.007	.009	.010	.014	.016
Low Si Aluminum <10%	RPM	18,336	9,168	6,112	4,584	3,056	2,292
	IPM	73	64	55	46	43	37
	SFM	600	600	600	600	600	600
	IPR	.004	.007	.009	.010	.014	.016
Brass & Copper	RPM	10,696	5,348	3,565	2,674	1,783	1,337
	IPM	43	32	29	27	21	19
	SFM	350	350	350	350	350	350
	IPR	.004	.006	.008	.010	.012	.014
Graphite	RPM	15,280	7,640	5,093	3,820	2,547	1,910
	IPM	76	50	38	34	31	31
	SFM	500	500	500	500	500	500
	IPR	.005	.007	.008	.009	.012	.016
Cast Iron	RPM	10,696	5,348	3,565	2,674	1,783	1,337
	IPM	86	67	57	53	39	33
	SFM	350	350	350	350	350	350
	IPR	.008	.013	.016	.020	.022	.025
Hardened Steels >48RC	RPM	1,834	917	611	458	306	229
	IPM	4	3	2	2	2	1
	SFM	60	60	60	60	60	60
	IPR	.002	.003	.004	.005	.005	.005
Steels	RPM	3,667	1,834	1,222	917	611	458
	IPM	9	7	10	9	8	6
	SFM	120	120	120	120	120	120
	IPR	.003	.004	.008	.010	.013	.013
Stainless Steels	RPM	3,056	1,528	1,019	764	509	382
	IPM	8	5	5	5	4	3
	SFM	100	100	100	100	100	100
	IPR	.003	.004	.005	.007	.008	.008
Super Alloy (Nickel based Inconel)	RPM	1,834	917	611	458	306	229
	IPM	6	5	4	4	2	2
	SFM	60	60	60	60	60	60
	IPR	.003	.005	.007	.008	.008	.008
Titanium	RPM	3,056	1,528	1,019	764	509	382
	IPM	8	6	5	5	3	3
	SFM	100	100	100	100	100	100
	IPR	.003	.004	.005	.007	.007	.007

Multiply by 25.4 for metric.

Not Recommended for Plastics. Composites are only recommended in unique situations. The parameters listed for tool series that are stocked uncoated are based on running an uncoated tool. If a coating is applied to the tools, the SFM can be increased by approximately 25%. All speed and feed recommendations should be considered only as a starting point. Start with conservative speeds and feeds while analyizing the rigidity of the process. Then cautiously progress incrementally to achieve optimum performance.

1566 poly drill

The 1566 Poly Drill is a high performance drill with 3-flutes designed for burr-free drilling of graphite, composites, and plastics. It produces clean, burr-free holes without breakout, eliminating the need for sanding or deburring. Its 3-flute design allows for ultimate material removal rates and burr teeth provide a clean shearing of fibers. The 1566 Poly Drill is stocked with TiAlN coating.

END STYLE	90 DEGREE POINT
NUMBER OF FLUTES	3 FLUTES
FINISH	TIALN
SINGLE/DOUBLE END	SINGLE END
CUTTING DIRECTION	RIGHT HAND
SPIRAL DIRECTION	RIGHT HAND
HELIX ANGLE	30 DEGREE
SHANK TOLERANCE	+.0000"/-.0005" | +0.000MM/-0.013MM
CUTTER TOLERANCE	+.000"/-.001" | +0.000MM/-0.025MM

STANDARD OFFERING	**SIZE RANGE**
IMPERIAL	.250" - .500"
METRIC	5.00MM - 12.00MM

FAQs

What applications are this tool recommended for?
The 1566 Series Polydrill is recommended for burr free-drilling without breakout in graphite, composites and plastics.

What are the key characteristics of the Polydrill?
90 Degree Point, 3 Flutes, +.0000"-.001" diameter tolerance.

Do you need to use a spotting drill?
No, the poly drill has a self centering point.

What is the availablitliy above .500" dia?
Geometries above .500" dia become too aggressive. Above .500" we go to a polyburr design.

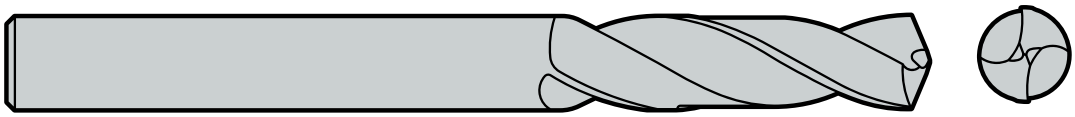
Contact Engineering at 800.248.8315 or engineering@fullertontool.com

		1/8 - 3mm	1/4 - 6mm	3/8 - 10mm	1/2 - 12mm	3/4 - 19mm	1 - 25mm
Composites	RPM	1,681	840	560	420	280	210
	IPM	1	1	1	1	1	1
	SFM	55	55	55	55	55	55
	IPR	.001	.001	.001	.002	.003	.004
Plastics	RPM	1,681	840	560	420	280	210
	IPM	1	1	1	1	1	1
	SFM	55	55	55	55	55	55
	IPR	.001	.001	.001	.002	.003	.004
Graphite	RPM	2,139	1,070	713	535	357	267
	IPM	1	1	1	1	1	1
	SFM	70	70	70	70	70	70
	IPR	.001	.001	.001	.002	.003	.004

Multiply by 25.4 for metric.

Not Recommended for Cast Iron, Hardened Steels >48 RC, Steels, Stainless Steels, or Super Alloys (Nickel based, Inconel). Composites are only recommended in unique situations. The parameters listed for tool series that are stocked uncoated are based on running an uncoated tool. If a coating is applied to the tools, the SFM can be increased by approximately 25%. All speed and feed recommendations should be considered only as a starting point. Start with conservative speeds and feeds while analyzing the rigidity of the process. Then cautiously progress incrementally to achieve optimum performance.

1500 GENERAL PURPOSE



The 1500 Notched Cam Point is a 2-flute, general purpose drill designed to withstand a variety of materials, including titanium, hardened steels, stainless steels, cast iron, and brass & copper. The notched cam point and 30° spiral allows for higher feed rates and increased tool life. The 1500 Notched Cam Point is stocked uncoated, FC-7 and TiAlN coating.

END STYLE	135 DEGREE NOTCHED CAM POINT
NUMBER OF FLUTES	2 FLUTES
FINISH	UNCOATED, FC-7, TIALN
SINGLE/DOUBLE END	SINGLE END
CUTTING DIRECTION	RIGHT HAND
SPIRAL DIRECTION	RIGHT HAND
HELIX ANGLE	30 DEGREES
SHANK TOLERANCE	+.000"/-.001"
CUTTER TOLERANCE	+.0000"/-.0005" | +0.000MM/-0.013MM

STANDARD OFFERING	**SIZE RANGE**
IMPERIAL	.028" - .875"
METRIC	0.71MM - 25.00MM

FAQs

What is the point angle on the 1500?
The 1500 is a 135-degree point.

Do you need to spot drill the 1500 series?
Anything over 5XD length should be spot drilled for best results.

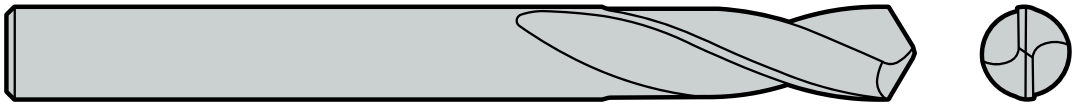
FULLERTON SPEEDS / FEEDS

		1/8 - 3mm	1/4 - 6mm	3/8 - 10mm	1/2 - 12mm	3/4 - 19mm	1 - 25mm
High Si Aluminum >10%	RPM	9,932	4,966	3,311	2,483	1,655	1,242
	IPM	12	15	13	15	13	12
	SFM	325	325	325	325	325	325
	IPR	.001	.003	.004	.006	.008	.010
Low Si Aluminum <10%	RPM	13,752	6,876	4,584	3,438	2,292	1,719
	IPM	23	17	14	17	18	17
	SFM	450	450	450	450	450	450
	IPR	.002	.003	.003	.005	.008	.010
Plastics	RPM	4,278	2,139	1,426	1,070	713	535
	IPM	5	6	7	7	6	5
	SFM	140	140	140	140	140	140
	IPR	.001	.003	.005	.007	.008	.010
Brass & Copper	RPM	7,640	3,820	2,547	1,910	1,273	955
	IPM	5	8	8	8	4	6
	SFM	250	250	250	250	250	250
	IPR	.001	.002	.003	.004	.003	.006
Graphite	RPM	12,224	6,112	4,075	3,056	2,037	1,528
	IPM	18	18	20	21	16	15
	SFM	400	400	400	400	400	400
	IPR	.002	.003	.005	.007	.008	.010
Cast Iron	RPM	6,876	3,438	2,292	1,719	1,146	860
	IPM	8	10	11	10	9	9
	SFM	225	225	225	225	225	225
	IPR	.001	.003	.005	.006	.008	.010
Hardened Steels >48RC	RPM	1,986	993	662	497	331	248
	IPM	2	2	3	2	2	1
	SFM	65	65	65	65	65	65
	IPR	.001	.002	.004	.005	.006	.006
Steels	RPM	4,584	2,292	1,528	1,146	764	573
	IPM	5	5	5	5	4	4
	SFM	150	150	150	150	150	150
	IPR	.001	.002	.004	.005	.006	.007
Stainless Steels	RPM	2,750	1,375	917	688	458	344
	IPM	3	3	3	3	2	2
	SFM	90	90	90	90	90	90
	IPR	.001	.002	.004	.004	.005	.007
Super Alloy (Nickel Based Inconel)	RPM	1,222	611	407	306	204	153
	IPM	1	2	1	1	1	1
	SFM	40	40	40	40	40	40
	IPR	.001	.003	.003	.004	.005	.007
Titanium	RPM	1,528	764	509	382	255	191
	IPM	2	2	2	2	1	1
	SFM	50	50	50	50	50	50
	IPR	.001	.002	.004	.005	.005	.006

Multiply by 25.4 for metric.

Composites are only recommended in unique situations. The parameters listed for tool series that are stocked uncoated are based on running an uncoated tool. If a coating is applied to the tools, the SFM can be increased by approximately 25%. All speed and feed recommendations should be considered only as a starting point. Start with conservative speeds and feeds while analyzing the rigidity of the process. Then cautiously progress incrementally to achieve optimum performance.

1510 GENERAL PURPOSE



The 1510 4-Facet Point is a 2-flute drill designed for use in titanium, hardened steels, stainless steels, steels, cast iron, graphite, brass & copper, high si aluminum, low si aluminum, composites, and wood. The 1510 4-Facet Point is stocked uncoated.

END STYLE	118 DEGREE FOUR FACET POINT
NUMBER OF FLUTES	2 FLUTES
FINISH	UNCOATED
SINGLE/DOUBLE END	SINGLE END
CUTTING DIRECTION	RIGHT HAND
SPIRAL DIRECTION	RIGHT HAND
HELIX ANGLE	25 DEGREES
SHANK TOLERANCE	+.000"/-.001"
CUTTER TOLERANCE	+.0000"/-.0005" | +0.000MM/-0.013MM

STANDARD OFFERING	**SIZE RANGE**
IMPERIAL	.250" - .500"
METRIC	0.71MM - 25.00MM

FAQs

In what applications are the 1510 used?
Typically for screw machine and lathe applications.

Can the 1510 be used in super alloys?
Yes, it can be used in super alloys (Nickel based, Inconel) as a general purpose option.

FULLERTON SPEEDS / FEEDS

		1/8 - 3mm	1/4 - 6mm	3/8 - 10mm	1/2 - 12mm	3/4 - 19mm	1 - 25mm
High Si Aluminum >10%	RPM	10,696	5,348	3,565	2,674	1,783	1,337
	IPM	32	27	23	21	16	13
	SFM	350	350	350	350	350	350
	IPR	.003	.005	.007	.008	.009	.010
Low Si Aluminum <10%	RPM	12,988	6,494	4,329	3,247	2,165	1,624
	IPM	39	36	30	29	22	19
	SFM	425	425	425	425	425	425
	IPR	.003	.006	.007	.009	.010	.012
Brass & Copper	RPM	8,251	4,126	2,750	2,063	1,375	1,031
	IPM	25	21	19	19	14	12
	SFM	270	270	270	270	270	270
	IPR	.003	.005	.007	.009	.010	.012
Graphite	RPM	10,696	5,348	3,565	2,674	1,783	1,337
	IPM	32	27	23	21	16	13
	SFM	350	350	350	350	350	350
	IPR	.003	.005	.007	.008	.009	.010
Cast Iron	RPM	3,667	1,834	1,222	917	611	458
	IPM	11	9	8	7	6	5
	SFM	120	120	120	120	120	120
	IPR	.003	.005	.007	.008	.009	.010
Hardened Steels >48RC	RPM	1,834	917	611	458	306	229
	IPM	4	3	2	3	2	2
	SFM	60	60	60	60	60	60
	IPR	.002	.004	.004	.006	.007	.008
Steels	RPM	3,362	1,681	1,121	840	560	420
	IPM	8	7	6	5	4	4
	SFM	110	110	110	110	110	110
	IPR	.003	.004	.006	.007	.008	.009
Stainless Steels	RPM	2,445	1,222	815	611	407	306
	IPM	5	4	4	3	3	2
	SFM	80	80	80	80	80	80
	IPR	.002	.004	.005	.006	.007	.008
Titanium	RPM	1,375	688	458	344	229	172
	IPM	3	2	2	2	1	1
	SFM	45	45	45	45	45	45
	IPR	.002	.004	.004	.006	.007	.008

Multiply by 25.4 for metric.

Not Recommended for Plastics or Super Alloy (Nickel based, Inconel). Composites are only recommended in unique situations. The parameters listed for tool series that are stocked uncoated are based on running an uncoated tool. If a coating is applied to the tools, the SFM can be increased by approximately 25%. All speed and feed recommendations should be considered only as a starting point. Start with conservative speeds and feeds while analyizing the rigidity of the process. Then cautiously progress incrementally to achieve optimum performance.

TROUBLESHOOTING | DRILLS

ISSUE	CAUSE	SOLUTION
Cutting Edge Build Up	Cutting speed too low	Increase Cutting Speed
	Excessive Hone of Cutting Edge	Reduce Hone
	Bright Cutting Edge Finish	Apply Coating To Tool
Heavy Wear At Flank	Workpiece Not Rigid	Increase Workpiece Rigidity
	Clearance Angle Too Small	Increase Angle
Crumbling Outer Corners	Insufficient Workpiece Clamping	Increase Workpiece Rigidity
	Concentricity Deviation Too Large	Correct Concentricity
	Interrupted Cut	Reduce Feed Rate
Land Wear	Insufficient Workpiece Clamping	Increase Workpiece Rigidity
	Back Taper Too Small	Reduce Tool Change Intervals
	Incorrect Coolant / Oil	Change Coolant
Heavy Chisel Edge Wear	Cutting Speed Too Low	Increase Cutting Speed
	Feed Rate Too High	Reduce Feed Rate
	Excessive Cutting Lip Hone	Excessive Cutting Lip Hone

ISSUE	CAUSE	SOLUTION
Tool Body Scoring	Insufficient Workpiece Clamping	Increase Workpiece Rigidity
	Concentricity Deviation Too Large	Correct Concentricity
	Interrupted Cut	Reduce Feed Rate
	Abrasive Material	Increase Coolant Pressure
Heavy Breakthrough Burring	Feed Rate Too High	Reduce Feed Rate
	Max Wear Exceeded	Increase Tool Change Frequency
	Excessive Cutting Lip Hone	Excessive Cutting Lip Hone
Poor Surface Quality	Insufficient Workpiece Clamping	Increase Workpiece Rigidity
	Concentricity Deviation Too Large	Correct Concentricity
	Insufficient Coolant Volume	Increase Volume and/or Pressure

WHAT IS F.A.S.T.?

Our Fullerton Advanced Solutions Team (F.A.S.T.) is the foundation of our commitment to continuously improve, innovate, and provide product diversity. This includes helping our customers reduce cycle times, minimize cost per piece, combine multiple operations in a single tool, and provide a complete turnkey tooling process.

Our fully equipped Research & Development Lab along with our advanced engineers and application specialists enable our F.A.S.T. team to support our customers in maximizing benefits of using Fullerton tooling solutions, in obtaining manufacturer's goals of optimal process parameters, as well as becoming lean, efficient, and profitable manufacturers.

F.A.S.T. defines what we do for our customers and ensures we deliver on that promise every time.

Our R&D Lab Allows Fullerton To:

- Develop New Tooling Solutions
- Improve Manufacturing Processes for Customers
- Solve Customer Manufacturing Problems
- Test Parts for Customers
- Define Tooling Geometries
- Create Video Content for Application Training

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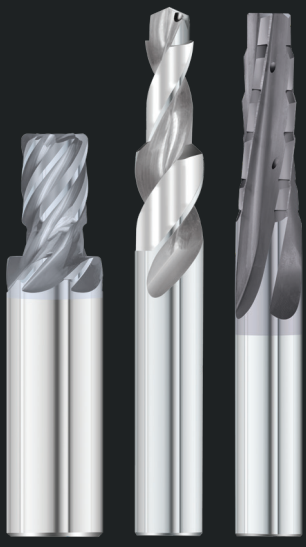
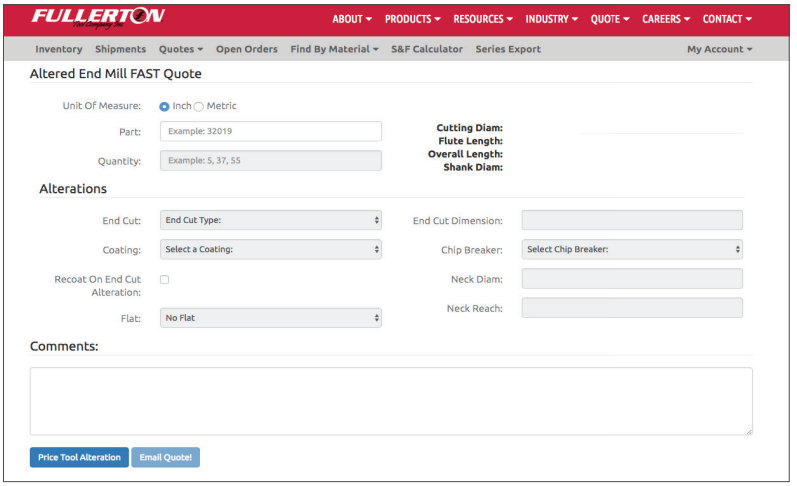
- Reduce Cycle Times
- Minimize Cost Per Piece
- Improve Manufacturing Processes



CLICK QUOTE DONE.

DESIGN YOUR TOOLS ONLINE WITH FAST QUOTES



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COATINGS
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