

MC-CE18

LEADER IN CUTTING TOOL TECHNOLOGY



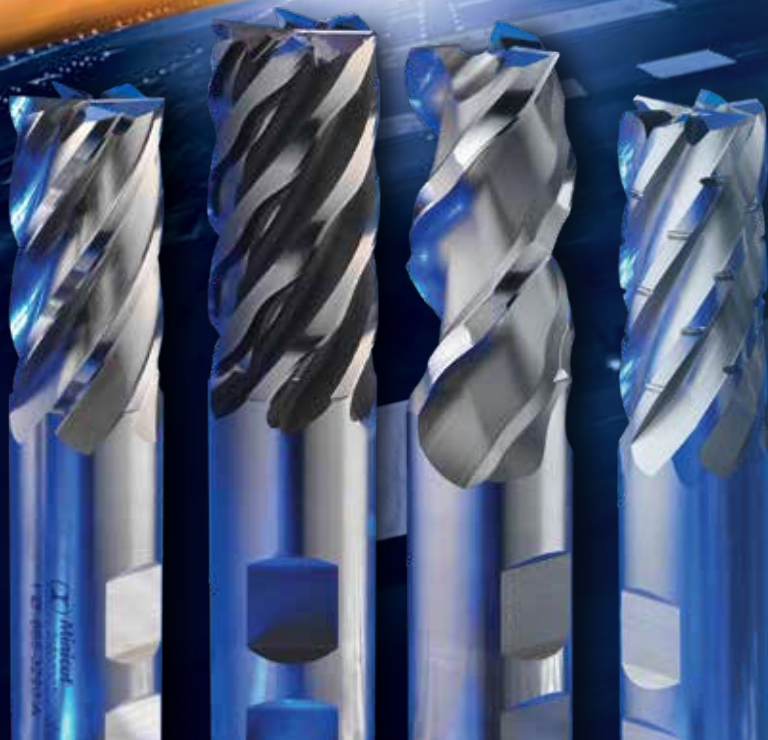
FOR TITANIUM, ALUMINUM AND STAINLESS STEEL ALLOYS:

**MINICUT COBALT GETS
AEROSPACE OFF THE GROUND**

Minicut Cobalt

HIGH-PERFORMANCE COBALT END MILLS

- /// Excellent Chip Evacuation
- /// Vibration-Free Performance
- /// Excellent Roughing Ability in High and Low Speeds
- /// Optimum Performance in Titanium and Aluminum Alloy Materials



Riding the Wave of Technology

From its precise machine-polished flute design, to its milled shiny rake face, the Minicut Wave Cut is built to stay sharp in the most demanding aerospace materials.



Variable helix in both 6- and 3-flute designs takes on high feed rates without producing damaging chatter.

With a cobalt content of 8%, Minicut retains hardness while resisting heat in tough conditions.

Why Minicut Wave Cut Works.

Call it a patented geometric advantage or a stroke of genius in design. But whatever you call it, put it to the test and see the difference Minicut's wave action can make in your aerospace milling applications. A combination of cobalt, precisely polished flutes and its organic design puts more force to the cutting edge for higher removal rates at lower operating speeds. Compare that to carbide and the choice is simple—for aerospace, Minicut Cobalt rules.

The Minicut High-Performance Cobalt end mills line was designed to produce outstanding performance in the lower-speed machines used in the aerospace industry. No other cobalt end mill comes close to its

low-vibration roughing ability where high feed rates are required. On the other hand, the 6-flute 865 model provides outstanding performance finishing titanium and other high-tensile materials. So if you're looking for a line that gives you the best of both worlds, Minicut delivers optimum chip load per tooth and improved surface finishing rigidity.

- ▶ Rigid cobalt design holds its own at lower speeds and high feed rates.
- ▶ From center cutting to fine finishing to efficient roughing, the Minicut line offers many productive choices for aerospace operations.
- ▶ Variable flute design coupled with wave cutting action provide low vibration and reduced chatter.



Pick the performer that's perfect for your project.

For optimum performance with maximum chip load per tooth, the **993** meets your work head-on. With the **930's** aggressive 3-flute design and its ability to handle high feed rates at lower machine speeds, nothing roughs better. The **865** features excellent finishing for titanium and high-tensile materials. And for reduced spindle load with high removal rates, chose the **836** for improved chip control.

SELECTION GUIDE

⊙ Excellent ○ Good

ITEM	MODEL	DESCRIPTION	DIA.		S	N	M	PAGE
			Min.	Max.	Titanium	Aluminum	Stainless Steel	
993 MINICUT WAVE CUT		4-FLUTE & 6-FLUTE WAVE CUT ROUGHING END MILLS	CHAMFER	3/4	2	⊙	○	4
930 MINICUT WAVE CUT		3-FLUTE WAVE CUT ROUGHING END MILLS	SQUARE END	3/8	1-1/4	○	⊙	6
865		4-FLUTE & 6-FLUTE FINISHING END MILLS	SQUARE END	1	2	⊙	○	8
836		4-FLUTE & 6-FLUTE ROUGHERS WITH CHIPBREAKERS	CHAMFER	1	2	⊙	○	10

METRIC

993M MINICUT WAVE CUT		4-FLUTE & 6-FLUTE WAVE CUT ROUGHING END MILLS	CHAMFER	20.0	50.0	⊙	○	4
930M MINICUT WAVE CUT		3-FLUTE WAVE CUT ROUGHING END MILLS	SQUARE END	10.0	32.0	○	⊙	6
865M		4-FLUTE & 6-FLUTE FINISHING END MILLS	SQUARE END	20.0	50.0	⊙	○	8
836M		4-FLUTE & 6-FLUTE ROUGHERS WITH CHIPBREAKERS	CHAMFER	20.0	50.0	⊙	○	10

RECOMMENDED CUTTING CONDITIONS

13-15

GUIDE TO ICONS

Tool is Made of Cobalt.

CO

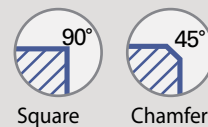
Helix Angle



National
Aerospace
Standards

NAS

Tool Ends



No. of Flutes



Type of Shank



Weldon flat

Cutting Conditions



Center Cutting Geometry



993/993M

Load It Up and Let It Go to Work.

In 4-flute or 6-flute design, nothing provides a higher chip load per tooth in a cobalt end mill than the 993. With its higher removal rates and vibration-free performance, it won't take a backseat with titanium. In fact, this cobalt roughing tool could be mistaken for carbide except for the lower price.

- ▶ Optimum performance with maximum chip loads per tooth
- ▶ Higher metal removal rates
- ▶ Vibration free
- ▶ Improved surface finish
- ▶ Outstanding performance in titanium



4 FLUTE

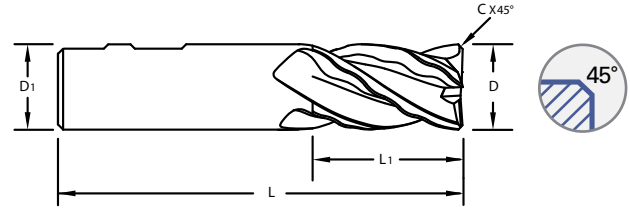


6 FLUTE

Mill Dia. Tolerance (inch)
0~+.003

M	S
Stainless Steel	Titanium
○	◎

993/993M 4-FLUTE AND 6-FLUTE WAVE CUT ROUGHING END MILLS



993

INCH

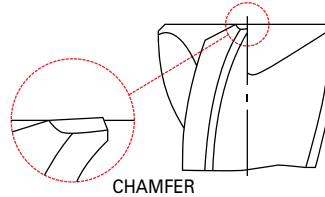
Mill Diameter (D)	Shank Diameter (D1)	Length of Cut (Li)	Overall Length (L)	Number of Flutes	Chamfer (CH)	EDP No.
3/4	3/4	1-5/8	3-7/8	4	.030	993-2416
		2-1/4	4-1/2	4	.030	993-2422
		3	5-1/4	4	.030	993-2430
1	1	2	4-1/2	6	.040	993-3220A
		2	4-1/2	4	.040	993-3220*
		3	5-1/2	6	.040	993-3230A
		3	5-1/2	4	.040	993-3230*
		4	6-1/2	6	.040	993-3240A
		4	6-1/2	4	.040	993-3240*
1-1/4	1-1/4	2	4-1/2	6	.060	993-4020A
		2	4-1/2	4	.060	993-4020*
		3	5-1/2	6	.060	993-4030A
		3	5-1/2	4	.060	993-4030*
		4	6-1/2	6	.060	993-4040A
		4	6-1/2	4	.060	993-4040*
		6	8-1/2	6	.060	993-4060A
1-1/2	1-1/4	2	4-1/2	6	.060	993-4820-40A
		3	5-1/2	6	.060	993-4830-40A
		4	6-1/2	6	.060	993-4840-40A
2	2	2	5-3/4	6	.060	993-6420A
		3	6-3/4	6	.060	993-6430A
		4	7-3/4	6	.060	993-6440A
		6	9-3/4	6	.060	993-6460A
		8	11-3/4	6	.060	993-6480A

993M

METRIC

Mill Diameter (D)	Shank Diameter (D1)	Length of Cut (Li)	Overall Length (L)	Number of Flutes	Chamfer (CH)	EDP No.
20	20	38	104	4	0.8	993M-2038
		75	141	4	0.8	993M-2075
25	25	45	121	6	1.0	993M-2545A
		45	121	4	1.0	993M-2545*
		90	166	6	1.0	993M-2590A
		90	166	4	1.0	993M-2590*
32	32	53	132	6	1.5	993M-3253A
		53	132	4	1.5	993M-3253*
		106	186	6	1.5	993M-32106A
		106	186	4	1.5	993M-32106*
40	32	63	143	6	1.5	993M-4063-32A
		125	205	6	1.5	993M-40125-32A
50	50	75	177	6	1.5	993M-5075A
		106	208	6	1.5	993M-50106A
		150	252	6	1.5	993M-50150A

Reinforced cutting edge



*1" and 1-1/4" end mills with 4 flutes available upon request

Price and delivery available upon request for:

- ▶ Other dimensions
- ▶ Left hand
- ▶ Corner radius or chamfer
- ▶ Extended neck
- ▶ Ball nose
- ▶ Coating

930/930M



The New Wave in End Mills for Aluminum.

Some call it the ultimate roughing tool for aluminum.

And to machinists who have used it, it's a reputation well deserved. That's because its unique 3-flute wave design digs into aluminum to provide vibration-free roughing at high speed rates.

What do we call it? Very efficient.



3 FLUTE

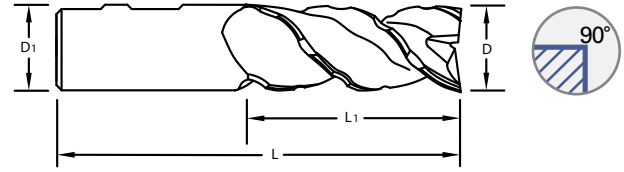
- ▶ Perfect choice for lower speed machining
- ▶ Unique 3-flute design geometry for vibration-free performance
- ▶ High feed rates recommended

Mill Dia. Tolerance (inch)	0~+.003
N	
Aluminum	
	⊙

930/930M 3-FLUTE ROUGHING END MILLS



Page 15



930 INCH

Mill Diameter (D)	Shank Diameter (D ₁)	Length of Cut (L ₁)	Overall Length (L)	EDP No.
3/8	3/8	3/4	2-1/2	930-1208
		1-3/8	3-1/8	930-1213
1/2	1/2	1-1/4	3-1/4	930-1612
		2	4	930-1620
		3	5	930-1630
5/8	5/8	1-5/8	3-3/4	930-2016
3/4	3/4	1-5/8	3-7/8	930-2416
		2-1/4	4-1/2	930-2422
		3	5-1/4	930-2430
1	1	2	4-1/2	930-3220
		3	5-1/2	930-3230
		4	6-1/2	930-3240
1-1/4	1-1/4	2	4-1/2	930-4020
		3	5-1/2	930-4030

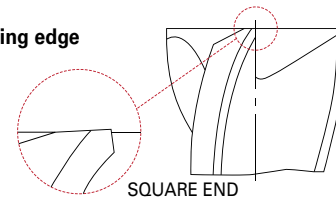
930M METRIC

Mill Diameter (D)	Shank Diameter (D ₁)	Length of Cut (L ₁)	Overall Length (L)	EDP No.
10	10	16	66	930M-1016
		22	72	930M-1022
12	12	26	83	930M-1226
		53	110	930M-1253
16	16	32	92	930M-1632
		63	123	930M-1663
20	20	38	104	930M-2038
		75	141	930M-2075
25	25	45	121	930M-2545
		90	166	930M-2590
30	25	45	121	930M-3045
		90	166	930M-3090
32	32	53	133	930M-3253
		106	186	930M-32106

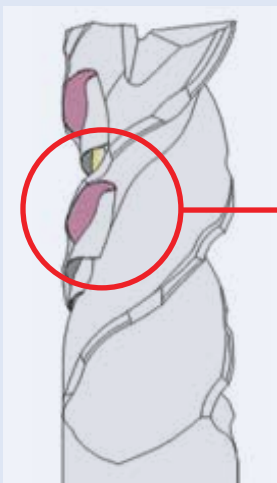
Price and delivery available upon request for:

- ▶ Other dimensions
- ▶ Corner radius or chamfer
- ▶ Ball nose
- ▶ Left hand
- ▶ Extended neck
- ▶ Coating

Reinforced cutting edge



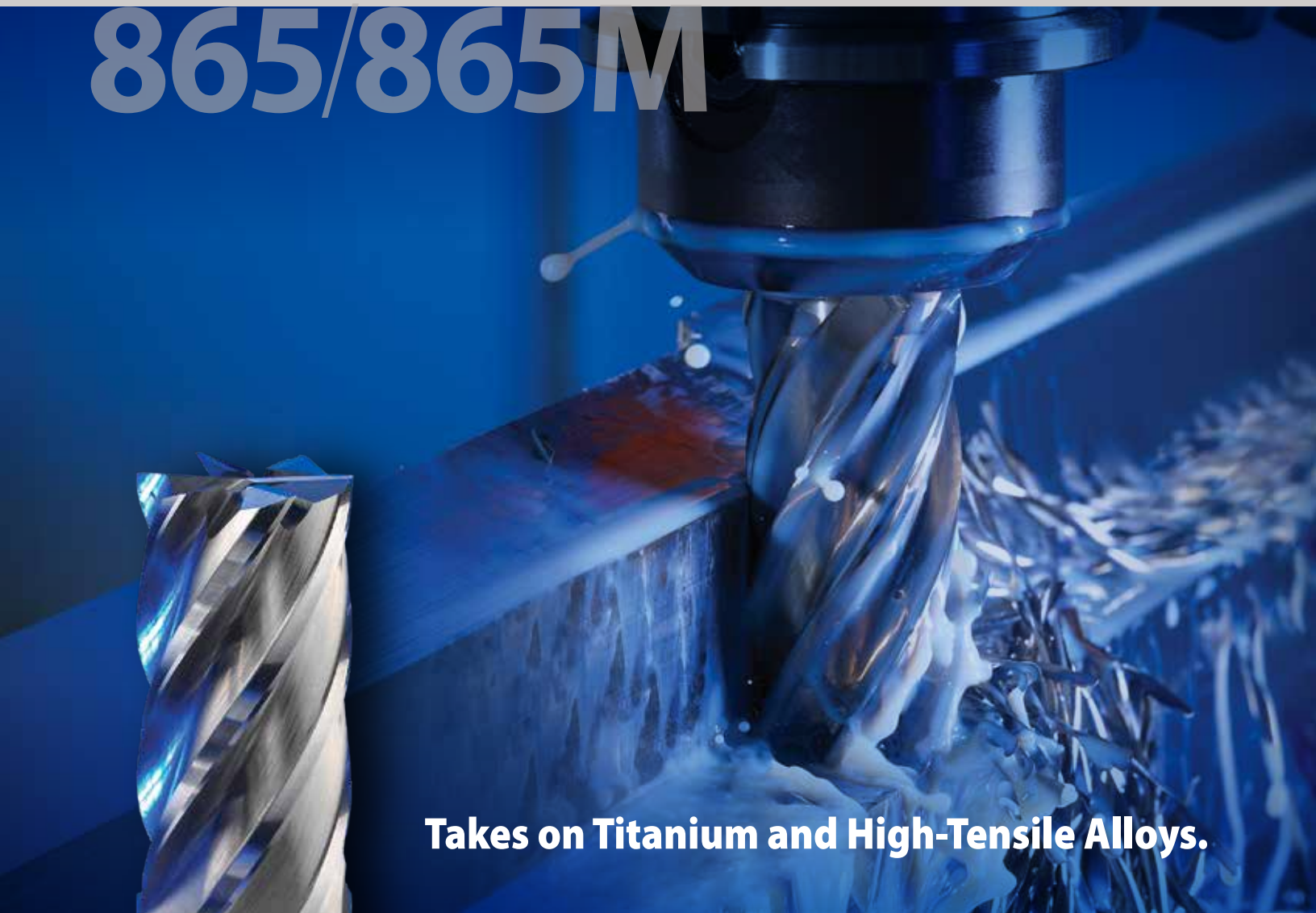
The Minicut Wave Cut Advantage



The Minicut Wave Cut opened a new chapter in cobalt end mills. With its unique geometry that puts more cutting force to the cutting edge, Minicut Wave Cut took the lead over other cutters used to machine exotic materials.

During chip formation, as the chip begins to curl within the gullet space, this unique geometry provides less space in which to curl at the two extremities of the interrupted cutting edge, compared to the central portion. The sinusoidal gullet, in fact, reaches its maximum amplitude at the middle of the interrupted cutting edge. This uneven curling space creates a springing effect on the chips and, combined with the shearing force, produces the phenomenon of chip ejection from the work area.

865/865M



Takes on Titanium and High-Tensile Alloys.



There's no substitute for side cuts in titanium other than using the time-proven Minicut 865. With excellent center cutting ability, the 865 not only can produce high performance in milling, it can provide a fine surface finish, too. Just one more way these end mills make aerospace manufacturers more productive.

- ▶ Multi-flute finishing for titanium and high-tensile materials
- ▶ Excellent center cutting ability
- ▶ NAS type 46 and 66
- ▶ Outstanding performance in titanium



4 FLUTE



6 FLUTE

Mill Dia. Tolerance (inch)
0~+.003

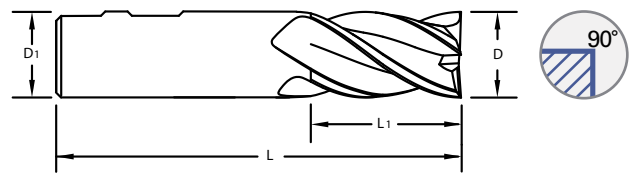
M	S
Stainless Steel	Titanium
○	◎

◎ : Excellent ○ : Good

865/865M 4-FLUTE AND 6-FLUTE FINISHING END MILLS



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865 NAS type 46 & 66

INCH

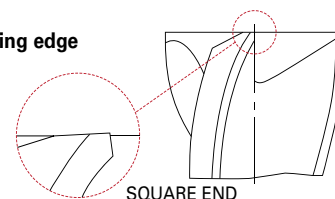
Mill Diameter (D)	Shank Diameter (D1)	Length of Cut (L1)	Overall Length (L)	Number of Flutes	EDP No.
1	1	2	4-1/2	6	865-3220A
		3	5-1/2	6	865-3230A
		4	6-1/2	6	865-3240A
1-1/4	1-1/4	2	4-1/2	6	865-4020A
		3	5-1/2	6	865-4030A
		4	6-1/2	6	865-4040A
		6	8-1/2	6	865-4060A
1-1/2	1-1/4	2	4-1/2	6	865-4820A
		3	5-1/2	6	865-4830A
		4	6-1/2	6	865-4840A
2	2	3	6-3/4	6	865-6430A
		4	7-3/4	6	865-6440A
		6	9-3/4	6	865-6460A
		8	11-3/4	6	865-6480A

865M

METRIC

Mill Diameter (D)	Shank Diameter (D1)	Length of Cut (L1)	Overall Length (L)	Number of Flutes	EDP No.
20	20	38	104	4	865M-2038
		75	141	4	865M-2075
25	25	45	121	6	865M-2545A
		90	166	6	865M-2590A
32	32	53	132	6	865M-3253A
		106	186	6	865M-32106A
40	32	63	143	6	865M-4063A
		125	205	6	865M-40125A
50	50	75	177	6	865M-5075A
		106	208	6	865M-50106A
		150	252	6	865M-50150A

Reinforced cutting edge



Price and delivery available upon request for:

- ▶ Other dimensions
- ▶ Left hand
- ▶ Corner radius or chamfer
- ▶ Extended neck
- ▶ Ball nose
- ▶ Coating

Need Assistance?

Minicut has sales representatives and distributor facilities all over the world to serve you better.

Call toll free: 800-800-2011

Email: sales@minicut.com

You can also visit our website – it's your 24/7 resource!

minicut.com



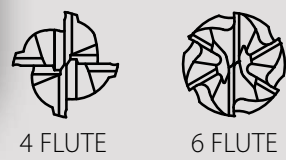
836/836M

Rough and Ready to Take on Titanium.



Not all cobalt chipbreakers are created equal. The Minicut 836 features very high removal rates with reduced spindle load, making it the perfect choice for high-performance roughing in titanium. With shank sizes from 1 to 2 inches and lengths up 9-3/4 inches, this end mill can take whatever titanium or stainless dishes out.

- ▶ High removal rates for fast performance
- ▶ Improved chip control for less build up
- ▶ Reduced spindle load for long machine life



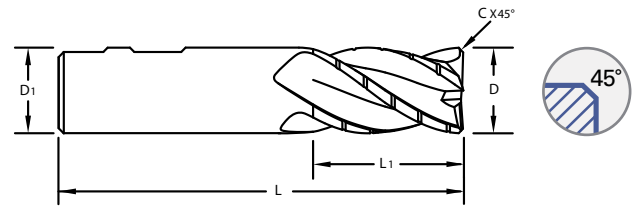
Mill Dia. Tolerance (inch)
0~+.003

M	S
Stainless Steel	Titanium
○	◎

◎ : Excellent ○ : Good

836/836M 4-FLUTE AND 6-FLUTE ROUGHER WITH CHIPBREAKER

CO
4
6
35°
FLAT



836

INCH

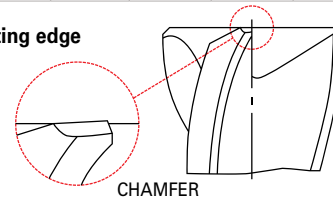
Mill Diameter (D)	Shank Diameter (D ₁)	Length of Cut (L ₁)	Overall Length (L)	Number of Flutes	Chamfer (CH)	EDP No.
1	1	2	4-1/2	6	.040	836-3220A
		3	5-1/2	6	.040	836-3230A
		4	6-1/2	6	.040	836-3240A
1-1/4	1-1/4	2	4-1/2	6	.060	836-4020A
		3	5-1/2	6	.060	836-4030A
		4	6-1/2	6	.060	836-4040A
		6	8-1/2	6	.060	836-4060A
1-1/2	1-1/4	2	4-1/2	6	.060	836-4820A
		3	5-1/2	6	.060	836-4830A
		4	6-1/2	6	.060	836-4840A
2	1-1/4	2	4-1/2	6	.060	836-6420-40A
2	2	2	5-3/4	6	.060	836-6420A
		3	6-3/4	6	.060	836-6430A
		4	7-3/4	6	.060	836-6440A
		6	9-3/4	6	.060	836-6460A

836M

METRIC

Mill Diameter (D)	Shank Diameter (D ₁)	Length of Cut (L ₁)	Overall Length (L)	Number of Flutes	Chamfer (CH)	EDP No.
20	20	38	104	4	0.8	836M-2038
		75	141	4	0.8	836M-2075
25	25	45	121	6	1.0	836M-2545A
		90	166	6	1.0	836M-2590A
32	32	53	132	6	1.5	836M-3253A
		106	186	6	1.5	836M-32106A
40	32	63	143	6	1.5	836M-4063A
		125	205	6	1.5	836M-40125A
50	50	75	177	6	1.5	836M-5075A
		106	208	6	1.5	836M-50106A
		150	252	6	1.5	836M-50150A

Reinforced cutting edge



CHAMFER

Price and delivery available upon request for:

- ▶ Other dimensions
- ▶ Left hand
- ▶ Corner radius or chamfer
- ▶ Extended neck
- ▶ Ball nose
- ▶ Coating

Need Something Special?

If you need special cutting tools or modifications to existing tools, we offer a complete range of engineering services. We have the capability to design and manufacture to your exact specifications.



CASE STUDY | Field Test Report

The Goal: Test 993-6440A 6-Flute Against Competitor

The Test:

Rough cutting titanium 6Al4V aircraft structures using Cincinnati 3-spindle, 5-axis gantry machine at a feed rate of 4.4 inch/min.

Cutting Conditions	
Milling Method	Profiling
Material	Titanium 6Al4V
Machine	Cincinnati 3-spindle, 5-axis gantry machine
Coolant	External
Tool Holder	Milling, side lock
Speed (SFM)	60
RPM	115
Feed (inch/min.)	4.4
Axial Engagement (inch) A_p	3.2
Radial Engagement (inch) A_e	0.85

The Results:

Saved customer \$62,000 in operational costs

The combination of Minicut geometry and exceptional quality beat competitors and allowed a savings of \$62,000 in operational costs. Tool life also was improved by 35%.

- ▶ End mills show clean, predictable flank wear
- ▶ No evidence of chipping

The test exhibited exceptional quality while profiling titanium at 115 rev/min.



▲ Aircraft-grade titanium 6Al4V is easily cut using the Minicut Wave Cut's ability to operate efficiently at lower RPMs.



▲ Extensive rough cutting is possible with the aggressive wave action of the 6-flute 993 Minicut Wave Cut.

RECOMMENDED CUTTING CONDITIONS

993*
(INCH)

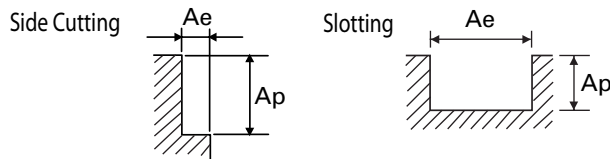
ISO Hardness (Brinell)	Work Materials	Speed and Feed Recommendations					Diameter (in.)				
		Type of Cut	Ap x D	Ae x D	Speed	Parameters	3/4	1	1-1/4	1-1/2	2
S	TITANIUM ALLOY	Side Cutting 	1.5	0.2-0.5	50-80 (SFM)	RPM (rev/min)	254	191	153	127	96
						Fz (inch/tooth)	.0035	.0040	.0050	.0055	.0060
						Feed (inch/min)	5.3	4.6	4.6	4.2	3.5
		Slotting 	0.5-0.8	1	50-80 (SFM)	RPM (rev/min)	254	191	153	127	96
						Fz (inch/tooth)	.0025	.0030	.0040	.0045	.0050
						Feed (inch/min)	3.8	3.4	3.7	3.4	2.9
M	STAINLESS STEEL	Side Cutting 	1.5	0.2-0.5	40-80 (SFM)	RPM (rev/min)	203	153	122	102	76
						Fz (inch/tooth)	.0035	.0040	.0050	.0055	.0060
						Feed (inch/min)	4.3	3.7	3.7	3.4	2.7
		Slotting 	0.5-0.8	1	40-80 (SFM)	RPM (rev/min)	203	153	122	102	76
						Fz (inch/tooth)	.0025	.0030	.0040	.0045	.0050
						Feed (inch/min)	3.0	2.8	2.9	2.8	2.3

* Feeds are given for 6-flute end mills

993M*
(METRIC)

ISO Hardness (Brinell)	Work Materials	Speed and Feed Recommendations					Diameter (mm)				
		Type of Cut	Ap x D	Ae x D	Speed	Parameters	20	25	32	40	50
S	TITANIUM ALLOY	Side Cutting 	1.5	0.2-0.5	15-25 (m/min)	RPM (rev/min)	239	191	149	119	95
						Fz (mm/tooth)	.089	.102	.127	.140	.152
						Feed (mm/min)	127	116	114	100	87
		Slotting 	0.5-0.8	1	15-25 (m/min)	RPM (rev/min)	239	191	149	119	95
						Fz (mm/tooth)	.064	.076	.102	.114	.127
						Feed (mm/min)	91	87	91	82	73
M	STAINLESS STEEL	Side Cutting 	1.5	0.2-0.5	12-25 (m/min)	RPM (rev/min)	191	153	103	95	76
						Fz (mm/tooth)	.089	.102	.127	.140	.152
						Feed (mm/min)	102	93	78	80	69
		Slotting 	0.5-0.8	1	12-25 (m/min)	RPM (rev/min)	191	153	103	95	76
						Fz (mm/tooth)	.064	.076	.102	.114	.127
						Feed (mm/min)	73	70	63	65	58

* Feeds are given for 6-flute end mills



- NOTES:**
- ▶ Coolant needs to be used when machining (slotting or profiling) with these end mills.
 - ▶ For long-length tools or less rigid conditions, reduce speeds and feeds accordingly.

RECOMMENDED CUTTING CONDITIONS

865*
(INCH)

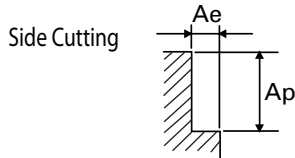
ISO Hardness (Brinell)	Work Materials	Type of Cut	Speed and Feed Recommendations				Diameter (in.)				
			Ap x D	Ae x D	Speed	Parameters	3/4	1	1-1/4	1-1/2	2
S	TITANIUM ALLOY	Side Cutting 	1.5	0.03-0.05	50-80 (SFM)	RPM (rev/min)	254	191	153	127	96
						Fz (inch/tooth)	.0040	.0045	.0050	.0055	.0060
						Feed (inch/min)	6.1	5.2	4.6	4.2	3.5
M	STAINLESS STEEL	Side Cutting 	1.5	0.03-0.05	40-80 (SFM)	RPM (rev/min)	203	153	122	102	76
						Fz (inch/tooth)	.0040	.0045	.0050	.0055	.0060
						Feed (inch/min)	4.9	4.1	3.7	3.4	2.7

* Feeds are given for 6-flute end mills

865M*
(METRIC)

ISO Hardness (Brinell)	Work Materials	Type of Cut	Speed and Feed Recommendations				Diameter (mm)				
			Ap x D	Ae x D	Speed	Parameters	20	25	32	40	50
S	TITANIUM ALLOY	Side Cutting 	1.5	0.03-0.05	15-25 (m/min)	RPM (rev/min)	239	191	149	119	95
						Fz (mm/tooth)	.089	.102	.127	.140	.152
						Feed (mm/min)	127	116	114	100	87
M	STAINLESS STEEL	Side Cutting 	1.5	0.03-0.05	12-25 (m/min)	RPM (rev/min)	191	153	119	95	76
						Fz (mm/tooth)	.089	.102	.127	.140	.152
						Feed (mm/min)	102	93	91	80	69

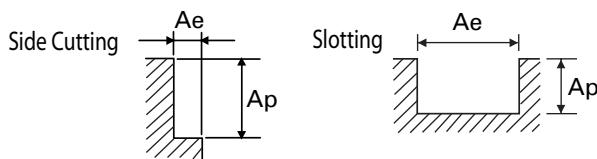
* Feeds are given for 6-flute end mills



836*
(INCH)

ISO Hardness (Brinell)	Work Materials	Type of Cut	Speed and Feed Recommendations				Diameter (in.)				
			Ap x D	Ae x D	Speed	Parameters	3/4	1	1-1/4	1-1/2	2
S	TITANIUM ALLOY	Side Cutting 	1.5	0.2-0.5	50-80 (SFM)	RPM (rev/min)	254	191	153	127	96
						Fz (inch/tooth)	.0035	.0035	.0040	.0040	.0050
						Feed (inch/min)	5.3	4.0	3.7	3.0	2.9
		Slotting 	0.5-0.8	1	50-80 (SFM)	RPM (rev/min)	254	191	153	127	96
						Fz (inch/tooth)	.0025	.0025	.0030	.0030	.0040
						Feed (inch/min)	3.8	2.9	2.8	2.3	2.3
M	STAINLESS STEEL	Side Cutting 	1.5	0.2-0.5	40-80 (SFM)	RPM (rev/min)	203	153	122	102	76
						Fz (inch/tooth)	.0035	.0035	.0040	.0040	.0050
						Feed (inch/min)	4.3	3.2	2.9	2.4	2.3
		Slotting 	0.5-0.8	1	40-80 (SFM)	RPM (rev/min)	203	153	122	102	76
						Fz (inch/tooth)	.0025	.0025	.0030	.0030	.0040
						Feed (inch/min)	3.0	2.3	2.2	1.8	1.8

* Feeds are given for 6-flute end mills



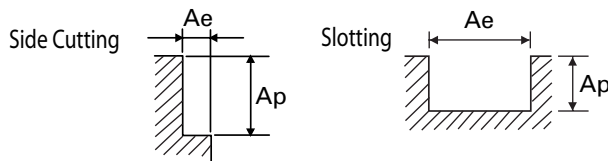
NOTES: ▶ Coolant needs to be used when machining (slotting or profiling) with these end mills.

▶ For long-length tools or less rigid conditions, reduce speeds and feeds accordingly.

RECOMMENDED CUTTING CONDITIONS

836M* (METRIC)

ISO Hardness (Brinell)	Work Materials	Speed and Feed Recommendations*				Diameter (mm)					
		Type of Cut	Ap x D	Ae x D	Speed	Parameters	20	25	32	40	50
S	TITANIUM ALLOY	Side Cutting 	1.5	0.2-0.5	15-25 (m/min)	RPM (rev/min)	239	191	149	119	95
						Fz (mm/tooth)	.089	.089	.102	.102	.127
						Feed (mm/min)	127	102	91	73	73
		Slotting 	0.5-0.8	1	15-25 (m/min)	RPM (rev/min)	239	191	149	119	95
						Fz (mm/tooth)	.064	.076	.102	.114	.102
						Feed (mm/min)	91	87	91	82	58
M	STAINLESS STEEL	Side Cutting 	1.5	0.2-0.5	12-25 (m/min)	RPM (rev/min)	191	153	103	95	76
						Fz (mm/tooth)	.089	.089	.102	.102	.127
						Feed (mm/min)	102	82	63	58	58
		Slotting 	0.5-0.8	1	12-25 (m/min)	RPM (rev/min)	191	153	103	95	76
						Fz (mm/tooth)	.064	.076	.102	.114	.102
						Feed (mm/min)	73	70	63	65	47



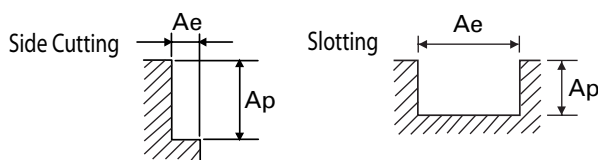
* Feeds are given for 6-flute end mills

930 (INCH)

ISO Hardness (Brinell)	Work Materials	Speed and Feed Recommendations				Diameter (in.)						
		Type of Cut	Ap x D	Ae x D	Speed	Parameters	3/8	1/2	5/8	3/4	1	1-1/4
N	ALUMINUM ALLOY	Side Cutting 	1.5	0.2-0.5	1000-2000 (SFM)	RPM (rev/min)	12730	10600	7950	6360	5100	3970
						Fz (inch/tooth)	.0026	.0039	.0052	.0065	.0092	.0118
						Feed (inch/min)	100	124	124	124	140	140
		Slotting 	0.5-0.8	1	1000-2000 (SFM)	RPM (rev/min)	12730	10600	7950	6360	5100	3970
						Fz (inch/tooth)	.0020	.0030	.0040	.0050	.0070	.0090
						Feed (inch/min)	76	95	95	95	107	107

930M (METRIC)

ISO Hardness (Brinell)	Work Materials	Speed and Feed Recommendations				Diameter (mm)						
		Type of Cut	Ap x D	Ae x D	Speed	Parameters	10	12	16	20	25	32
N	ALUMINUM ALLOY	Side Cutting 	1.5	0.2-0.5	300-600 (m/min)	RPM (rev/min)	1100	9800	7800	6100	5100	3800
						Fz (mm/tooth)	.066	.099	.132	.165	.234	.300
						Feed (mm/min)	2178	2911	3089	3020	3580	3420
		Slotting 	0.5-0.8	1	300-600 (m/min)	RPM (rev/min)	11000	9800	7800	6100	5100	3800
						Fz (mm/tooth)	.051	.076	.102	.127	.178	.229
						Feed (mm/min)	1683	2234	2387	2324	2723	2611



NOTES: ▶ Coolant needs to be used when machining (slotting or profiling) with these end mills.

▶ For long-length tools or less rigid conditions, reduce speeds and feeds accordingly.



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Tool specifications are subject to change without prior notice.



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