



Unequal Index, Variable Helix, Exotic Materials

Vol 1

UVX Series

EXOPRO® UVX-Ni • EXOCARB® AERO UVX • EXOCARB® AERO Silent Rougher
EXOCARB® AERO UVX-Ti • EXOCARB® AERO HFC-Ti



UVX Series

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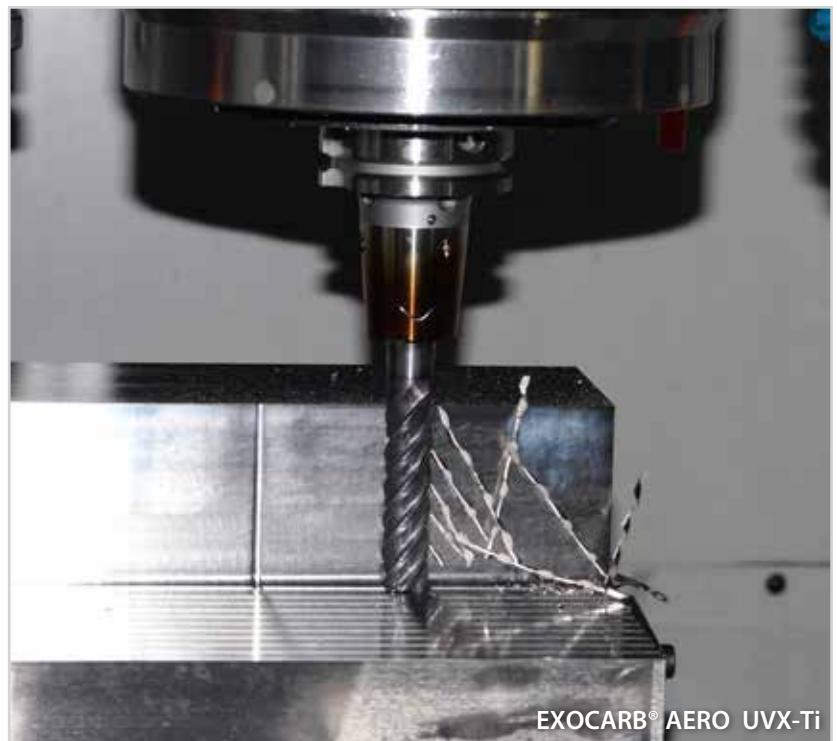
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EXOCARB® AERO HFC-Ti



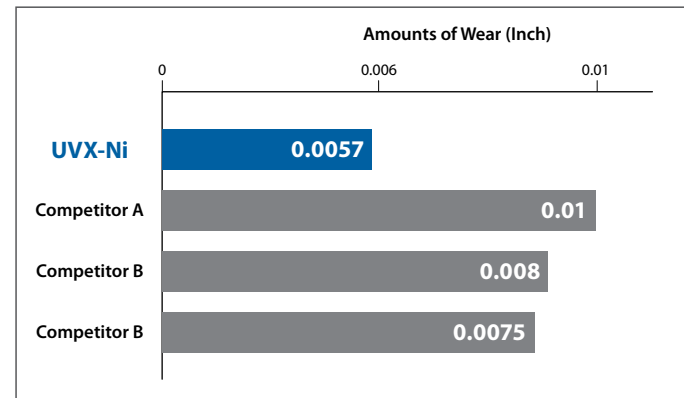
EXOCARB® AERO UVX-Ti

Stable Performance in Nickel Alloys

Inconel 718 (45 HRC)

OSG's EXOPRO® UVX-Ni achieves stable performance in Inconel 718 due to its unique cutting geometry and flute design.

Tool	UVX-Ni	Competitors
Drill Size	Ø1/2" x 1-1/4" x 3-1/2" 0.030 CR	
Work Material	Inconel 718 (45 HRC)	
Speed	100 SFM (764 RPM)	
Feed	6.02 IPM (0.0015 IPT)	
Depth of Cut	Aa: 0.250" / Ar: 0.150"	
Coolant	Water-Soluble (External)	



Corner Protection
Radius with Variable negative rake for strong cutting corners

Variable Helix/ Variable Index
Vibration absorption enables stable machining

Proprietary Cutting Edge Geometry
Reduction of cutting heat and forces

Unique Flute Form
For excellent chip shape and evacuation

Tool Wear After Milling 39"



UVX-Ni
(Mild wear, no chipping)



Comp. A
(Severe wear, chipping)



Comp. B
(Heavy wear)



Comp. C
(Heavy wear)

List 2055

5 Flute, Multiple Lengths, Corner Radius

SPEED FEED P6	CARBIDE	EXO®		Var.°
Milling Diameter Tolerance				
1/4 ≤ D ≤ 1			+0/-0.0015"	



EDP Number	EDP Number w/ Weldon Flat	Mill Diameter	Corner Radius	OAL	Length of Cut	Shank Diameter
		D	R	L	Lc	d
20552501	-	1/4	0.015	2-1/2	5/8	1/4
20552502	-	1/4	0.030	2-1/2	5/8	1/4
20552503	-	1/4	0.060	2-1/2	5/8	1/4
20553121	-	5/16	0.015	2-1/2	3/4	5/16
20553122	-	5/16	0.030	2-1/2	3/4	5/16
20553123	-	5/16	0.060	2-1/2	3/4	5/16
-	20553751	3/8	0.015	2-1/2	7/8	3/8
-	20553752	3/8	0.030	2-1/2	7/8	3/8
-	20553753	3/8	0.060	2-1/2	7/8	3/8
-	20555001	1/2	0.030	2-1/2	5/8	1/2
-	20555002	1/2	0.030	3	1	1/2
-	20555003	1/2	0.060	3	1	1/2
-	20555004	1/2	0.015	3-1/2	1-1/4	1/2
-	20555005	1/2	0.030	3-1/2	1-1/4	1/2
-	20555006	1/2	0.060	3-1/2	1-1/4	1/2
-	20555007	1/2	0.090	3-1/2	1-1/4	1/2
-	20555008	1/2	0.120	3-1/2	1-1/4	1/2
-	20556251	5/8	0.030	3-1/2	1-1/4	5/8
-	20556252	5/8	0.060	3-1/2	1-1/4	5/8
-	20556253	5/8	0.090	3-1/2	1-1/4	5/8
-	20556254	5/8	0.120	3-1/2	1-1/4	5/8
-	20557501	3/4	0.030	4	1-1/2	3/4
-	20557502	3/4	0.060	4	1-1/2	3/4
-	20557503	3/4	0.090	4	1-1/2	3/4
-	20557504	3/4	0.120	4	1-1/2	3/4
-	20551001	1	0.030	4	1-1/2	1
-	20551002	1	0.060	4	1-1/2	1
-	20551003	1	0.090	4	1-1/2	1
-	20551004	1	0.120	4	1-1/2	1

Packed: 1 pc. Available EXO® coating only.
Weldon Flat 3/8" and above.

EP


Work Material																	
List No.	P					M			K	N		S		H			
	Carbon Steels			Alloy Steels	Die Steels	Stainless Steels			Cast Iron	Aluminum		Nickel Alloy	Titanium	Hardened Steels			
	Low	Med.	High			300	400	17-4 PH		6061 7075	Casting			Inconel	6Al4V (30 HRC)	~35 HRC	35-45 HRC
2055						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				<input checked="" type="checkbox"/>				<input type="checkbox"/>	

good best



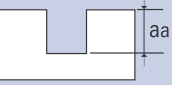
List 2055 - EXOPRO® UVX-Ni : 5 Flute - Corner Radius

Side Milling

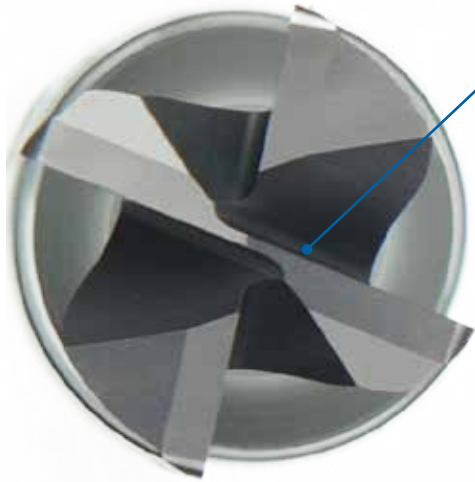
Hardness		
Work Material	High Temp. Alloys Inconel Hastelloy	
Cutting Speed	125-150 SFM	
Depth of Cut	$a_a \leq 0.5D$ $a_r \leq 0.3D$ 	
Mill Dia.	Speed RPM	Feed in/min
1/4	2,100	11.0
5/16	1,600	10.0
3/8	1,400	10.0
1/2	1,100	9.5
5/8	800	9.0
3/4	650	8.0
1	500	7.0

1. Use a rigid and precise machine and holder.
2. When chattering occurs, reduce the speed and feed simultaneously.
3. Use a suitable cutting fluid with high smoke retardant.

Slotting

Hardness		
Work Material	High Temp. Alloys Inconel Hastelloy	
Cutting Speed	75-100 SFM	
Depth of Cut	$a_a \leq 0.5D$ 	
Mill Dia.	Speed RPM	Feed in/min
1/4	1,300	7.0
5/16	1,000	6.5
3/8	900	6.0
1/2	700	5.5
5/8	500	5.0
3/4	400	4.5
1	300	4.0

1. Use a rigid and precise machine and holder.
2. When chattering occurs, reduce the speed and feed simultaneously.
3. Use a suitable cutting fluid with high smoke retardant.



Unequal Spacing of End Teeth

for stable, vibration-free milling

TiAlN Coating

for superior resistance to thermal cracking

Vibration Suppression

Stable, High Efficiency Milling

Unequal spacing of teeth and variable-lead geometry enables stable and high efficiency milling.

Variable Lead

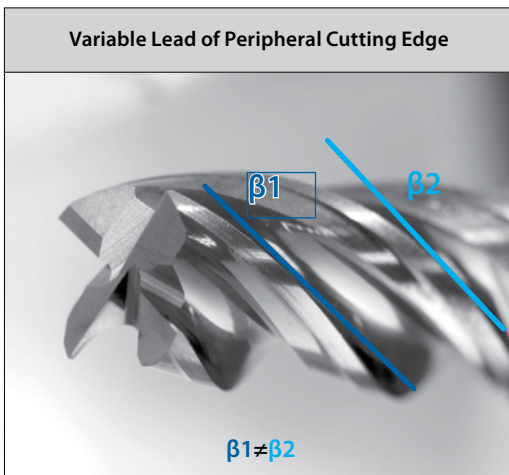
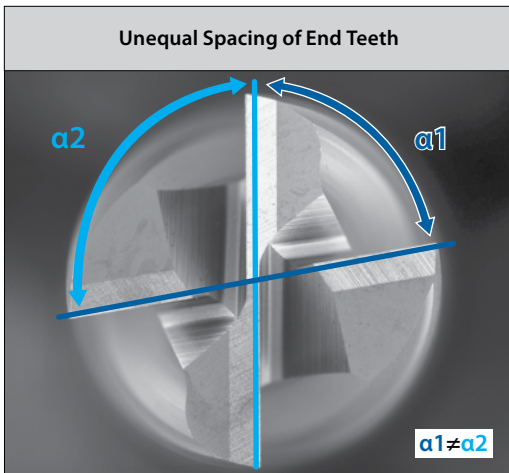
for efficient milling and suppressed vibration

Ideal Flute Shape

for smooth chip evacuation

Ultra-Fine Micrograin Carbide

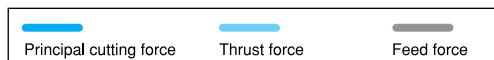
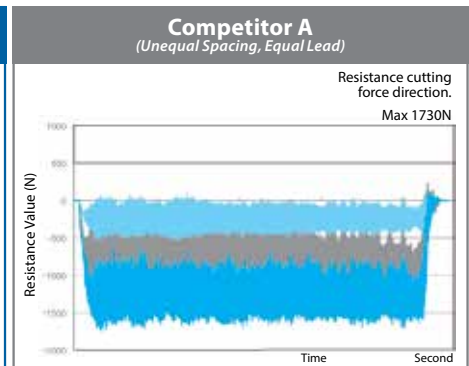
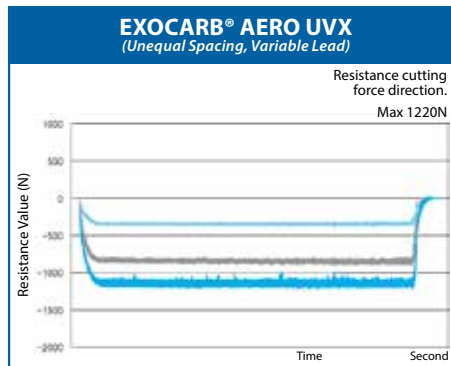
for wear resistance and extended tool life



Chatter Suppression

The UVX Experiences Less Chatter Versus the Competition

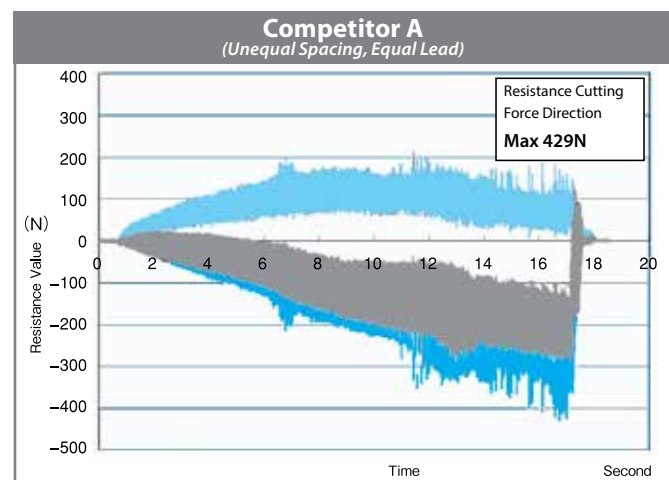
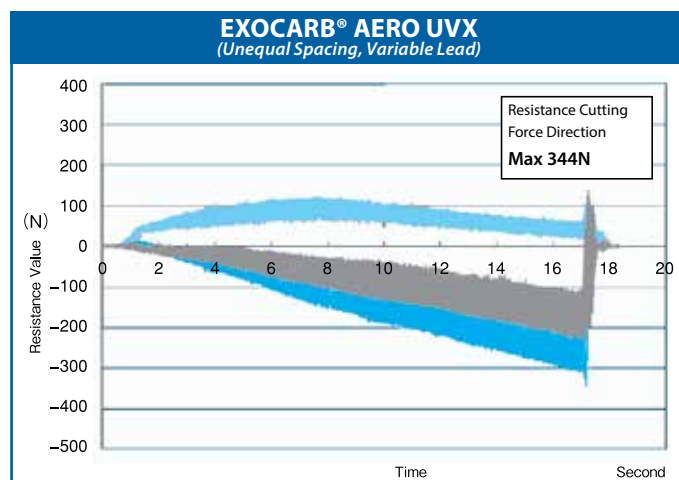
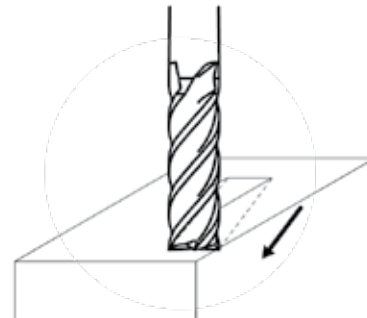
Tool	AERO UVX	Competitor
Drill Size	Ø10	
Work Material	Stainless Steel 304	
Speed	230 SFM (2,230 RPM)	
Feed	10.4 IPM (0.0011 IPT)	
Depth of Cut	Aa: 0.393" (1D)	
Coolant	Water-Soluble (5%)	
Machine	Vertical Machining Center (BT40)	



Stable Performance

Achieves Stable Milling Even When Ramping

Tool	AERO UVX	Competitor
Drill Size	Ø8 x R1	
Work Material	Stainless Steel 304	
Speed	230 SFM (2,785 RPM)	
Feed	19.7 IPM (0.0017 IPT)	
Plunge Angle	0.5°	
Coolant	Water-Soluble (5%)	
Machine	Vertical Machining Center (BT40)	



List 2050

4 Flute, Multiple Lengths, Square End

SPEED FEED P11	CARBIDE	EXO®		Var.°	SHANK h6
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Milling Diameter Tolerance	
1/8 ≤ D ≤ 1	+0 / -0.0015"



EDP Number	EDP Number w/Weldon Flat	Mill Diameter	Overall Length	Length of Cut	Shank Diameter
		D	L	Lc	d
205000111	-	1/8	1-1/2	3/8	1/8
205001111	-	3/16	2	7/16	3/16
205002111	-	1/4	2-1/2	7/16	1/4
205002211	-	1/4	2-1/2	3/4	1/4
205003111	-	5/16	2-1/2	13/16	5/16
205004111	205094111	3/8	2-1/2	1/2	3/8
205004211	205094211	3/8	2-1/2	7/8	3/8
205005111	205095111	7/16	2-3/4	1	7/16
205006111	205096111	1/2	2-1/2	5/8	1/2
205006211	205096211	1/2	3	1	1/2
205006311	205096311	1/2	3	1-1/4	1/2
205007111	205097111	5/8	3-1/2	1-1/4	5/8
205008111	205098111	3/4	4	1-1/2	3/4
205009111	205099111	1	4	1-1/2	1

Packed: 1 pc. Available EXO® coating only.



List No.	Work Material																
	P					M			K	N		S		H			
	Carbon Steels			Alloy Steels	Die Steels	Stainless Steels			Cast Iron	Aluminum		Nickel Alloy	Titanium	Hardened Steels			
	Low	Med.	High			300	400	17-4 PH		6061	Casting			Inconel	6Al4V (30 HRC)	~35 HRC	35-45 HRC
1010	1035	1065	4140	4340			7075										
2050	☐	☐	☐	☐	☐	☐	☐	☐	☐			☐	☐	☐	☐		

☐ good ☐ best



List 2052

4 Flute, Multiple Lengths, Corner Radius

SPEED FEED P11	CARBIDE	EXO®		Var.°	SHANK h6
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Milling Diameter Tolerance	
1/8 ≤ D ≤ 1	+0 / -0.0015"



EDP Number	Edp Number w/ Weldon Flat	Mill Diameter	Corner Radius	Overall Length	Length of Cut	Shank Diameter
		D	R	L	Lc	d
205200111	-	1/8	0.010	1-1/2	3/8	1/8
205200211	-	1/8	0.015	1-1/2	3/8	1/8
205201111	-	3/16	0.015	2	7/16	3/16
205201211	-	3/16	0.030	2	7/16	3/16
205202111	-	1/4	0.015	2-1/2	3/8	1/4
205202211	-	1/4	0.030	2-1/2	3/8	1/4
205202311	-	1/4	0.015	2-1/2	3/4	1/4
205202411	-	1/4	0.030	2-1/2	3/4	1/4
205203111	-	5/16	0.015	2-1/2	5/8	5/16
205203211	-	5/16	0.030	2-1/2	5/8	5/16
205204111	205294111	3/8	0.030	2-1/2	1/2	3/8
205204211	205294211	3/8	0.030	2-1/2	7/8	3/8
205204311	205294311	3/8	0.045	2-1/2	7/8	3/8
205204411	205294411	3/8	0.060	2-1/2	7/8	3/8
205205111	205295111	7/16	0.015	2-3/4	1	7/16
205205211	205295211	7/16	0.030	2-3/4	1	7/16
205206111	205296111	1/2	0.030	2-1/2	5/8	1/2
205206211	205296211	1/2	0.030	3	1	1/2
205206311	205296311	1/2	0.060	3	1	1/2
205206411	205296411	1/2	0.015	3-1/4	1-1/4	1/2
205206511	205296511	1/2	0.030	3-1/4	1-1/4	1/2
205206611	205296611	1/2	0.045	3-1/4	1-1/4	1/2
205206711	205296711	1/2	0.060	3-1/4	1-1/4	1/2
205206811	205296811	1/2	0.090	3-1/4	1-1/4	1/2
205206911	205296911	1/2	0.125	3-1/4	1-1/4	1/2
205207111	205297111	5/8	0.030	3-1/2	1-1/4	5/8
205207211	205297211	5/8	0.060	3-1/2	1-1/4	5/8
205207311	205297311	5/8	0.090	3-1/2	1-1/4	5/8
205207411	205297411	5/8	0.125	3-1/2	1-1/4	5/8
205208111	205298111	3/4	0.030	3-1/2	1-1/2	3/4
205208211	205298211	3/4	0.060	3-1/2	1-1/2	3/4
205208311	205298311	3/4	0.090	4	1-1/2	3/4
205208411	205298411	3/4	0.125	4	1-1/2	3/4
205209111	205299111	1	0.030	4	1-1/2	1
205209211	205299211	1	0.060	4	1-1/2	1
205209311	205299311	1	0.090	4	1-1/2	1
205209411	205299411	1	0.125	4	1-1/2	1

Packed: 1 pc. Available EXO® coating only.



Work Material																		
List No.	P					Die Steels	M			K Cast Iron	N		S		H			
	Carbon Steels			Alloy Steels 4140 4340	Stainless Steels			Aluminum			Nickel Alloy Inconel	Titanium 6Al4V (30 HRC)	Hardened Steels					
	Low 1010 1018	Med. 1035 1045	High 1065		300		400	17-4 PH	6061 7075				Casting	~35 HRC	35-45 HRC	45-50 HRC	50-70 HRC	
2052	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>		

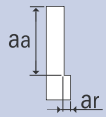
good best



List 2050: Regular Length - 4 Flute

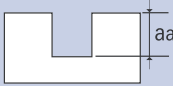
List 2052: Regular Length - 4 Flute - Corner Radius

Side Milling

Hardness	-		Up to 30 HRC		30 to 38 HRC		38 to 45 HRC		45 to 55 HRC		-	
Work Material	Mild Steels Carbon Steels Cast Iron		Alloy Steels Pre-hardened Steels Tool Steels		Hardened Steels Pre-hardened Steels		Stainless Steels Hardened Steels		Stainless Steels Titanium Alloys		High Temp. Alloys Inconel Hastelloy	
Depth of Cut	$a_a=1.5D$ $a_r=0.2D$ 						$a_a=1.5D$ $a_r=0.1D$		$a_a=1.5D$ $a_r=0.05D$			
Mill Dia.	Speed RPM	Feed in/min	Speed RPM	Feed in/min	Speed RPM	Feed in/min	Speed RPM	Feed in/min	Speed RPM	Feed in/min	Speed RPM	Feed in/min
1/8	11,900	41.2	9,075	30.0	7,640	23.2	7,275	23.0	7,030	20.4	3,600	8.2
3/16	8,395	54.0	6,500	43.7	5,540	30.0	5,215	32.1	5,075	27.9	2,590	10.1
1/4	6,420	60.0	4,965	44.6	4,220	33.2	3,970	31.0	3,850	26.0	1,985	9.3
5/16	5,135	62.0	4,000	43.8	3,385	32.3	3,180	32.2	3,080	26.9	1,590	8.8
3/8	4,280	59.5	3,330	43.0	2,820	29.8	2,650	29.2	2,570	26.2	1,325	9.0
7/16	3,670	59.4	2,855	42.4	2,420	29.5	2,270	28.8	2,200	25.5	1,135	9.0
1/2	3,200	51.8	2,500	37.2	2,115	26.6	1,985	25.1	1,925	22.3	995	7.9
5/8	2,565	47.5	2,000	37.0	1,695	24.9	1,590	21.8	1,540	19.8	795	8.6
3/4	2,140	40.5	1,665	30.9	1,410	24.2	1,325	21.5	1,285	18.6	660	8.2
1	1,605	33.7	1,250	26.6	1,060	20.2	995	18.9	965	15.2	495	7.0

1. Use a rigid and precise machine and holder.
2. When chattering occurs, reduce the speed and feed simultaneously.
3. Use a suitable cutting fluid with high smoke retardant.

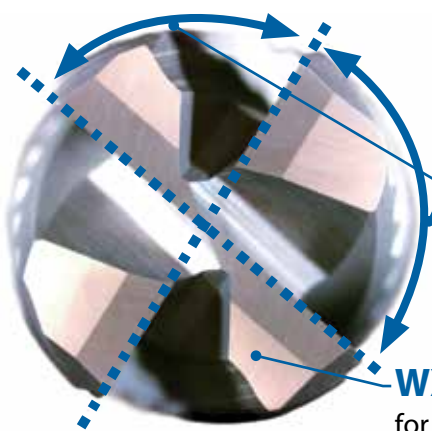
Slotting

Hardness	-		Up to 30 HRC		30 to 38 HRC		38 to 45 HRC		45 to 55 HRC		-	
Work Material	Mild Steels Carbon Steels Cast Iron		Alloy Steels Pre-hardened Steels Tool Steels		Hardened Steels Pre-hardened Steels		Stainless Steels Hardened Steels		Stainless Steels Titanium Alloys		High Temp. Alloys Inconel Hastelloy	
Depth of Cut	$a_a=1D$ 						$a_a=0.5D$		$a_a=0.2D$			
Mill Dia.	Speed RPM	Feed in/min	Speed RPM	Feed in/min	Speed RPM	Feed in/min	Speed RPM	Feed in/min	Speed RPM	Feed in/min	Speed RPM	Feed in/min
1/8	9,932	26.8	8,098	25.1	7,487	20.2	7,029	17.6	6,876	17.2	2,414	5.1
3/16	6,621	31.1	5,399	31.3	4,991	22.5	4,686	22.0	4,584	21.5	1,609	6.0
1/4	4,966	28.3	4,049	23.9	3,744	21.7	3,514	21.8	3,438	21.0	1,207	5.7
5/16	3,973	24.2	3,239	22.0	2,995	21.9	2,812	20.8	2,750	20.4	966	6.3
3/8	3,311	24.5	2,699	22.9	2,496	19.7	2,343	19.2	2,292	18.6	805	5.9
7/16	2,838	22.7	2,314	24.3	2,139	18.2	2,008	17.7	1,965	17.5	690	5.8
1/2	2,483	21.1	2,025	17.8	1,872	17.6	1,757	16.7	1,719	16.5	604	5.6
5/8	1,986	22.2	1,620	17.2	1,497	14.7	1,406	14.6	1,375	14.6	483	4.4
3/4	1,655	19.9	1,350	15.4	1,248	14.4	1,171	13.7	1,146	13.4	402	4.5
1	1,242	17.8	1,012	14.7	936	12.4	879	11.2	860	9.3	302	4.2

1. Use a rigid and precise machine and holder.
2. When chattering occurs, reduce the speed and feed simultaneously.
3. Use a suitable cutting fluid with high smoke retardant.
4. When length of the tool extension from the machine is long, reduce the speed and feed.

EXOCARB® AERO UVX SILENT ROUGHER

Features & Benefits



Unequal Index
for vibration control.

WXL Coating
for exceptional wear resistance.

Unequal Serrations on Cutting Edge
for low cutting resistance.

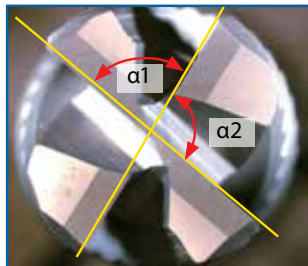
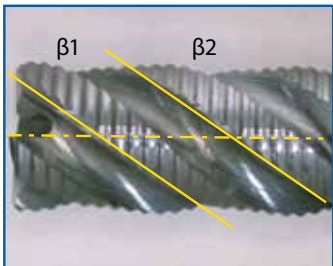
Variable Helix
for reduced vibration.



Significant Vibration Reduction

An Unequal Index and Variable Helix

The Silent Rougher's Unequal Index and Variable Helix combine to provide a significant reduction in vibration while machining.



Low Cutting Resistance

Unequal Serrations on the Cutting Edge

Unequally configured serrations of the cutting edge significantly reduces cutting resistance.

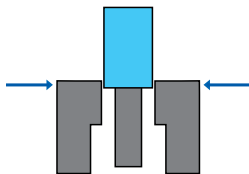


Reducing Vertical Cutting Forces

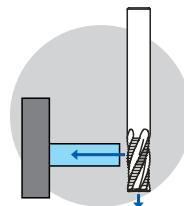
A Low Helix Design for Preventing Vertical Cutting Forces

The Silent Rougher's low helix design helps to reduce the vertical cutting forces when machining.

Side Clamping
Limited Exposed-Core Clamps



Low axial cutting force
Possible deflection of work piece



The Silent Rougher Series

A Variety of Roughers Available for Various Cutting Environments.

Carbide Silent Roughing End Mill

SI-WC-RESF

High Helix Type
(SRH)



Low Helix Type
(SRL)



HSS Silent Roughing End Mill

SI-WH-RESF

HSS
(Japan Stock Only)



OSG PHOENIX®
Exchangeable Head
End Mill Roughing Type



PXNH
High Helix Type



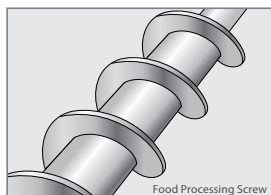
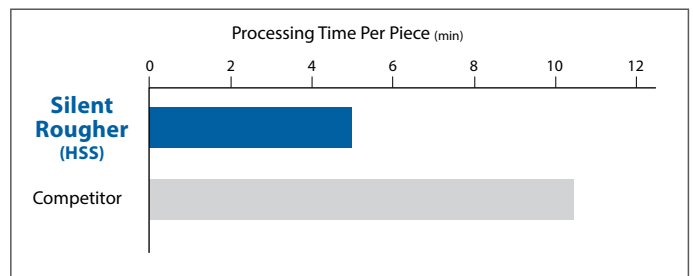
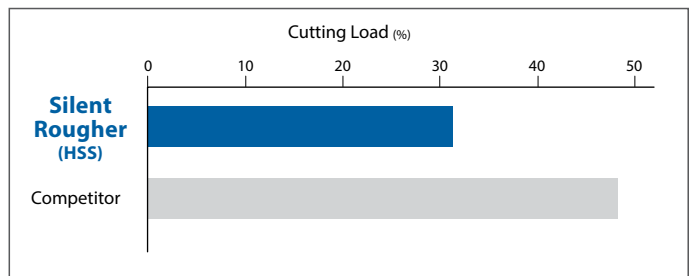
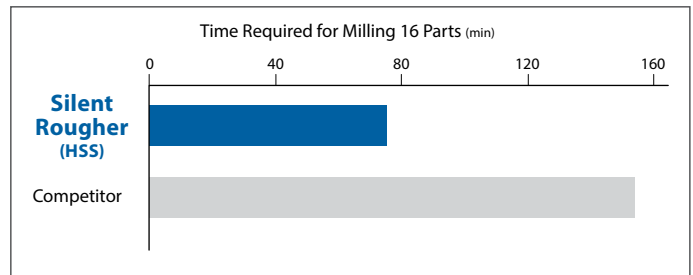
PXNL
Low Helix Type

High Machining Efficiency

Low Cutting Load Enables Longer Tool Life and High Efficiency in Stainless Steel (SUS304)

When machining stainless steel, the high-speed steel Silent Rougher demonstrated high efficiency and reduced the overall time to machine by half.

Tool	Silent Rougher (HSS - Special)	Competitor
Drill Size	Ø16	
Work Material	Stainless Steel (SUS304)	
Cutting Speed	132 SFM (800 RPM)	66 SFM (400 RPM)
Feed Rate	13.6 IPM (0.0042 IPT)	7.5 IPM (0.0047 IPT)
Depth of Cut	Aa = 8.6mm	
Coolant	Water Soluble	
Machine	Vertical Machining Center	
Cutting Load	31%	45%

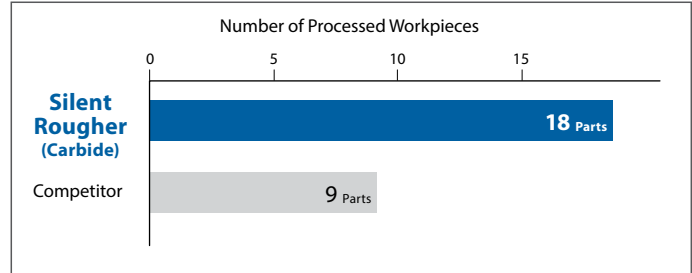


Longer Tool Life

Double the Tool Life Compared to the Competitor in Stainless Steel (SS400)

The EXOCARB® AERO UVX Silent Rougher was able to complete twice as many parts as the competitor.

Tool	Silent Rougher (Carbide - High Helix)	Competitor
Tool Size	Ø10	
Work Material	Structural Steel (SS400)	
Cutting Speed	526 SFM (5,100 RPM)	
Feed Rate	47 IPM (0.0023 IPT)	
Milling Method	Side Milling	
Depth of Cut	aa = 10mm (1D); ar = 5mm (0.5D)	
Coolant	Air Blow	
Machine	Vertical Machining Center	

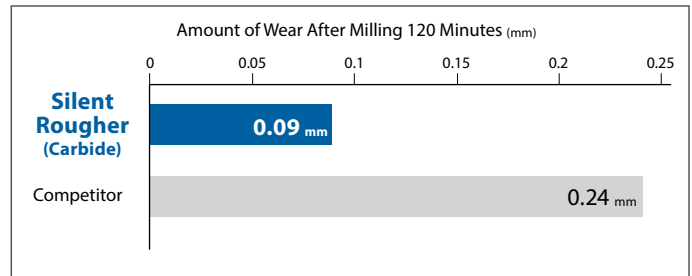


Reduced Tool Wear

Reduced Tool Wear Compared to the Competitor in Stainless Steel (SS400)

Tool wear was reduced to less than half of the competitor's product.

Tool	Silent Rougher (Carbide - Low Helix)	Competitor
Tool Size	Ø10	
Work Material	Structural Steel (SS400)	
Cutting Speed	526 SFM (5,100 RPM)	
Feed Rate	47.2 IPM (0.0023 IPT)	
Milling Method	Side Milling	
Depth of Cut	aa = 10mm (1D); ar = 5mm (0.5D)	
Coolant	Air Blow	
Machine	Vertical Machining Center	



EXOCARB® AERO UVX SILENT ROUGHER

Unequal Index, Variable Helix, eXotic Materials

List 3815

SI-WC-RESF, 4 Flute, Low Helix, Corner Chamfer

NEW SPEED FEED P18 CARBIDE WXL Var. SHANK h6

Milling Diameter Tolerance	
D ≤ 3/8	+0 / -0.002"
D ≥ 1/2	+0 / -0.003"



EDP Number	Mill Diameter	Chamfer Width	Overall Length	Length of Cut	Shank Diameter
	D	C	L	Lc	d
38150111	1/4	0.020	2-1/2	1/2	1/4
38150911	5/16	0.020	3	5/8	5/16
38151711	3/8	0.020	3	3/4	3/8
38152511	1/2	0.020	3-1/2	1	1/2
38153311	5/8	0.030	4	1-1/4	5/8
38154111	3/4	0.030	4-1/4	1-1/2	3/4
38154911	1	0.030	5	2	1

Packed: 1 pc.
Available WXL® coating only.



List 3820

SI-WC-RESF, 4 Flute, High Helix, Corner Chamfer

NEW SPEED FEED P18 CARBIDE WXL Var. SHANK h6

Milling Diameter Tolerance	
D ≤ 3/8	+0 / -0.002"
D ≥ 1/2	+0 / -0.003"



EDP Number	Mill Diameter	Chamfer Width	Overall Length	Length of Cut	Shank Diameter
	D	C	L	Lc	d
38200211	1/4	0.020	2-1/2	1/2	1/4
38201011	5/16	0.020	3	5/8	5/16
38201811	3/8	0.020	3	3/4	3/8
38202611	1/2	0.020	3-1/2	1	1/2
38203411	5/8	0.030	4	1-1/4	5/8
38204211	3/4	0.030	4-1/4	1-1/2	3/4
38205011	1	0.030	5	2	1

Packed: 1 pc.
Available WXL® coating only.



List No.	Work Material																	
	P					M			K	N		S		H				
	Carbon Steels			Alloy Steels	Die Steels	Stainless Steels			Cast Iron	Aluminum		Nickel Alloy	Titanium	Hardened Steels				
	Low	Med.	High			300	400	17-4 PH		6061 7075	Casting			Inconel	6Al4V (30 HRC)	~35 HRC	35-45 HRC	45-50 HRC
3815	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3820	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

good best



EXOCARB® AERO UVX SILENT ROUGHER

Unequal Index, Variable Helix, eXotic Materials

List 3915

SI-WC-RESF, 4 Flute, Low Helix, Corner Chamfer



Milling Diameter Tolerance	
D≤12	+0 / -0.05mm
D>12	+0 / -0.06mm



EDP Number	Mill Diameter	Chamfer Width	Overall Length	Length of Cut	Shank Diameter
	D	C	L	Lc	d
3017406	6	0.5	60	13	6
3017408	8	0.5	80	19	8
3017410	10	0.5	80	22	10
3017412	12	0.5	80	26	12
39150811	14	0.6	85	26	14
39151211	16	0.6	100	32	16
39151611	18	0.6	100	32	18
39152011	20	0.6	105	38	20
39152411	25	0.6	120	45	25

Packed: 1 pc.
Available WXL® coating only.



List 3920

SI-WC-RESF, 4 Flute, High Helix, Corner Chamfer



Milling Diameter Tolerance	
D≤12	+0 / -0.05mm
D>12	+0 / -0.06mm



EDP Number	Mill Diameter	Chamfer Width	Overall Length	Length of Cut	Shank Diameter
	D	C	L	Lc	d
3017456	6	0.5	60	13	6
3017458	8	0.5	80	19	8
3017460	10	0.5	80	22	10
3017462	12	0.5	80	26	12
39200911	14	0.6	85	26	14
39201311	16	0.6	100	32	16
39201711	18	0.6	100	32	18
39202111	20	0.6	105	38	20
39202511	25	0.6	120	45	25

Packed: 1 pc.
Available WXL® coating only.



List No.	Work Material																	
	P						M			K	N		S		H			
	Carbon Steels			Alloy Steels	Die Steels	Stainless Steels			Cast Iron	Aluminum		Nickel Alloy	Titanium	Hardened Steels				
	Low	Med.	High			300	400	17-4 PH		6061	Casting			Inconel	6Al4V (30 HRC)	~35 HRC	35-45 HRC	45-50 HRC
1010	1035	1065	4140	4340			7075											
3915	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐		
3920	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐		

☐ good ☐ best



EXOCARB® AERO UVX SILENT ROUGHER

Unequal Index, Variable Helix, eXotic Materials

List 3825

SI-WC-LN-RESF, Long Neck, 4 Flute, Low Helix, Corner Chamfer

NEW SPEED FEED P18 CARBIDE WXL Var. h6

Milling Diameter Tolerance	
D ≤ 3/8	+0 / -0.002"
D ≥ 1/2	+0 / -0.003"



EDP Number	Mill Diameter	Chamfer Width	Overall Length	Length of Cut	Neck Length	Neck Diameter	Shank Diameter
	D	C	L	Lc	L1	d2	d
38250511	1/4	0.020	2-1/2	1/2	1-1/4	0.2382	1/4
38251311	5/16	0.020	3	5/8	1-3/8	0.3007	5/16
38252111	3/8	0.020	3	3/4	1-1/2	0.3632	3/8
38252911	1/2	0.020	3-1/2	1	1-3/4	0.4882	1/2
38253711	5/8	0.030	4	1-1/4	2	0.6053	5/8
38254511	3/4	0.030	4-1/4	1-1/2	2-1/4	0.7264	3/4
38255311	1	0.030	5	2	2-3/4	0.9685	1

Packed: 1 pc.
Available WXL® coating only.



List 3830

SI-WC-LN-RESF, Long Neck, 4 Flute, High Helix, Corner Chamfer

NEW SPEED FEED P18 CARBIDE WXL Var. h6

Milling Diameter Tolerance	
D ≤ 3/8	+0 / -0.002"
D ≥ 1/2	+0 / -0.003"



EDP Number	Mill Diameter	Chamfer Width	Overall Length	Length of Cut	Neck Length	Neck Diameter	Shank Diameter
	D	C	L	Lc	L1	d2	d
38300611	1/4	0.020	2-1/2	1/2	1-1/4	0.2382	1/4
38301411	5/16	0.020	3	5/8	1-3/8	0.3007	5/16
38302211	3/8	0.020	3	3/4	1-1/2	0.3632	3/8
38303011	1/2	0.020	3-1/2	1	1-3/4	0.4882	1/2
38303811	5/8	0.030	4	1-1/4	2	0.6053	5/8
38304611	3/4	0.030	4-1/4	1-1/2	2-1/4	0.7264	3/4
38305411	1	0.030	5	2	2-3/4	0.9685	1

Packed: 1 pc.
Available WXL® coating only.



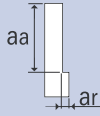
List No.	Work Material																
	P					M			K	N		S		H			
	Carbon Steels			Alloy Steels	Die Steels	Stainless Steels			Cast Iron	Aluminum		Nickel Alloy	Titanium	Hardened Steels			
	Low	Med.	High			300	400	17-4 PH		6061 7075	Casting			Inconel	6Al4V (30 HRC)	~35 HRC	35-45 HRC
3825	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
3830	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

☐ good ☐ best



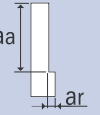
- List 3815 & 3915: 4 Flute, Low Helix, Corner Chamfer**
- List 3820 & 3920: 4 Flute, High Helix, Corner Chamfer**
- List 3825: Long Neck, 4 Flute, Low Helix, Corner Chamfer**
- List 3830: Long Neck, 4 Flute, High Helix, Corner Chamfer**

Side Milling

Hardness				Up to 30 HRC		Up to 45 HRC							
Work Material		Cast Iron		Mild Steels Carbon Steels		Alloy Steels Tool Steels		Hardened Steel Pre-hardened Steel		Stainless Steel 304		Titanium Alloy Ti-6AL-4V	
Depth of Cut		$a_a \leq 1.5D$ $a_r \leq 0.3D$ 											
Mill Dia.		Speed RPM	Feed in/min	Speed RPM	Feed in/min	Speed RPM	Feed in/min	Speed RPM	Feed in/min	Speed RPM	Feed in/min	Speed RPM	Feed in/min
-	6	4,770	24.0	6,370	27.9	4,770	15.7	4,240	12.9	3,710	11.4	2,650	7.0
1/4	-	4,510	26.8	6,020	34.6	4,510	18.1	4,005	15.2	3,500	13.9	2,510	8.2
5/16	-	3,610	36.1	4,825	38.4	3,610	21.4	3,210	18.6	2,810	15.1	2,010	9.3
-	8	3,580	37.0	4,770	42.9	3,580	24.0	3,180	20.1	2,790	17.7	1,990	10.6
3/8	-	3,005	37.3	4,015	43.1	3,005	24.3	2,670	20.1	2,340	17.7	1,670	10.6
-	10	2,860	37.4	3,820	43.3	2,860	24.4	2,550	20.1	2,230	17.7	1,590	10.6
-	12	2,390	33.8	3,180	38.9	2,390	22.0	2,120	18.1	1,860	16.1	1,330	9.8
1/2	-	2,250	33.5	3,010	38.6	2,250	21.8	2,005	18.0	1,750	15.9	1,260	9.7
-	14	2,045	33.2	2,730	38.3	2,045	21.6	1,820	17.9	1,560	15.7	1,140	9.6
5/8	-	1,800	32.8	2,410	38.0	1,800	21.4	1,610	17.8	1,400	15.5	1,010	9.5
-	16	1,790	32.2	2,390	37.7	1,790	21.2	1,590	17.7	1,390	15.3	990	9.4
-	18	1,590	31.4	2,130	36.9	1,590	21.0	1,420	17.3	1,240	14.9	890	9.1
3/4	-	1,500	30.9	2,010	36.1	1,500	19.8	1,340	16.9	1,170	14.5	840	8.8
-	20	1,430	30.3	1,910	35.0	1,430	19.6	1,280	16.5	1,110	14.1	800	8.6
-	25	1,145	25.6	1,530	28.8	1,145	16.8	1,020	15.3	890	13.3	640	7.7
1	-	1,127	25.2	1,505	28.2	1,127	16.3	1,000	15.0	875	12.8	630	7.4

1. Use a rigid and precise machine and holder. 2. Please adjust the speed and feed when cutting depth is large or when machines with low rigidity are used.
 3. Please use a suitable fluid with high smoke retardant properties. 4. During Dry (no fluid) milling, please use air blow to remove disposable chips from the milling area and to eliminate chip packing.

Slotting

Hardness				Up to 30 HRC		Up to 45 HRC							
Work Material		Cast Iron		Mild Steels Carbon Steels		Alloy Steels Tool Steels		Hardened Steel Pre-hardened Steel		Stainless Steel 304		Titanium Alloy Ti-6AL-4V	
Depth of Cut		$a_a \leq 1D$ $a_r \text{ Max} = 0.472$ 											
Mill Dia.		Speed RPM	Feed in/min	Speed RPM	Feed in/min	Speed RPM	Feed in/min	Speed RPM	Feed in/min	Speed RPM	Feed in/min	Speed RPM	Feed in/min
-	6	3,710	16.9	5,840	22.8	4,240	12.5	3,710	10.2	3,180	8.6	2,120	5.1
1/4	-	3,500	17.4	5,520	23.4	4,005	12.8	3,500	10.6	3,010	8.9	2,005	5.2
5/16	-	2,805	17.9	4,420	24.7	3,210	13.4	2,805	10.9	2,415	9.4	1,605	5.4
-	8	2,790	18.5	4,380	25.5	3,180	13.7	2,790	11.4	2,390	9.8	1,590	5.5
3/8	-	2,340	19.4	3,680	26.5	2,670	14.3	2,340	11.8	2,010	10.2	1,335	5.7
-	10	2,230	20.0	3,500	27.5	2,550	14.9	2,230	12.2	1,910	10.6	1,270	5.9
-	12	1,860	18.5	2,920	25.1	2,120	13.7	1,860	11.4	1,590	9.4	1,060	5.5
1/2	-	1,750	18.4	2,760	25.0	2,005	13.6	1,750	11.3	1,505	9.4	1,000	5.5
-	14	1,590	18.3	2,505	24.9	1,820	13.5	1,590	11.2	1,370	9.4	910	5.5
5/8	-	1,400	18.2	2,210	24.8	1,600	13.4	1,400	11.1	1,205	9.4	805	5.5
-	16	1,390	18.1	2,190	24.8	1,590	13.3	1,390	11.0	1,190	9.4	800	5.5
-	18	1,240	17.9	1,950	24.5	1,415	13.2	1,240	10.8	1,065	9.2	710	5.4
3/4	-	1,170	17.6	1,840	24.3	1,335	13.0	1,170	10.7	1,005	9.1	670	5.2
-	20	1,110	17.3	1,750	24.0	1,270	12.9	1,110	10.6	950	9.0	640	5.1
-	25	890	16.8	1,400	23.3	1,020	12.1	890	9.8	765	8.2	510	4.7
1	-	875	16.6	1,380	22.6	1,000	11.7	875	9.6	755	7.9	500	4.6

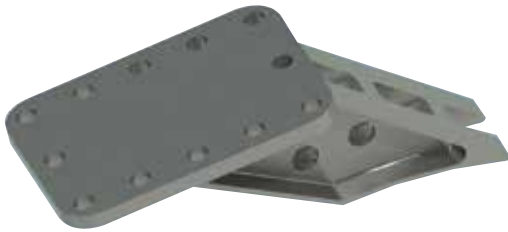
1. Use a rigid and precise machine and holder. 2. Please adjust the speed and feed when cutting depth is large or when machines with low rigidity are used.
 3. Please use a suitable fluid with high smoke retardant properties. 4. During Dry (no fluid) milling, please use air blow to remove disposable chips from the milling area and to eliminate chip packing.



Stable, High Efficiency Milling of Titanium

Stable, High Efficiency Milling

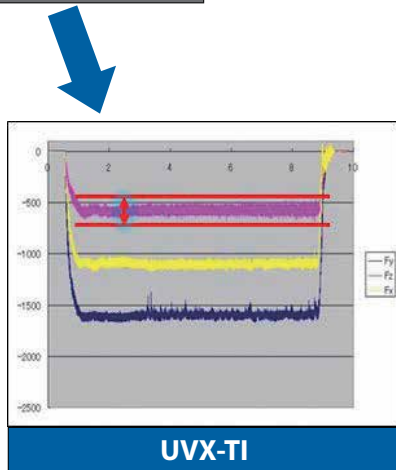
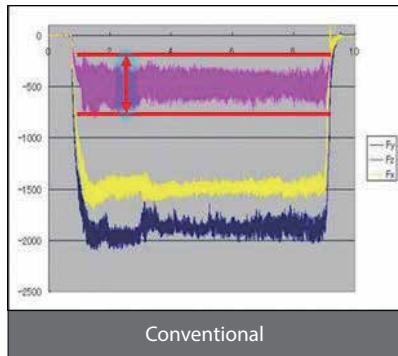
Stable and high efficiency milling of titanium alloy is now possible with UVX-Ti series offering solutions for slot milling and complicated pocket milling.



	Feature	Slot Milling	Side Milling	
			Depth < 3D	Depth > 3D, < 5D
UVX-TI-4FL	Multi-purpose short type, 4FL	⊗	○	X
UVX-TI-5FL	High efficient short type, 5FL	○	⊗	X
UVXL-TI-5FL	High efficient long type, 5FL	△	⊗	⊗

X Not Recommended △ OK ○ Good ⊗ Best

Vibration Suppression Versus the Competition



Unequal Spacing of End Teeth

for stable, vibration-free milling

Variable Lead

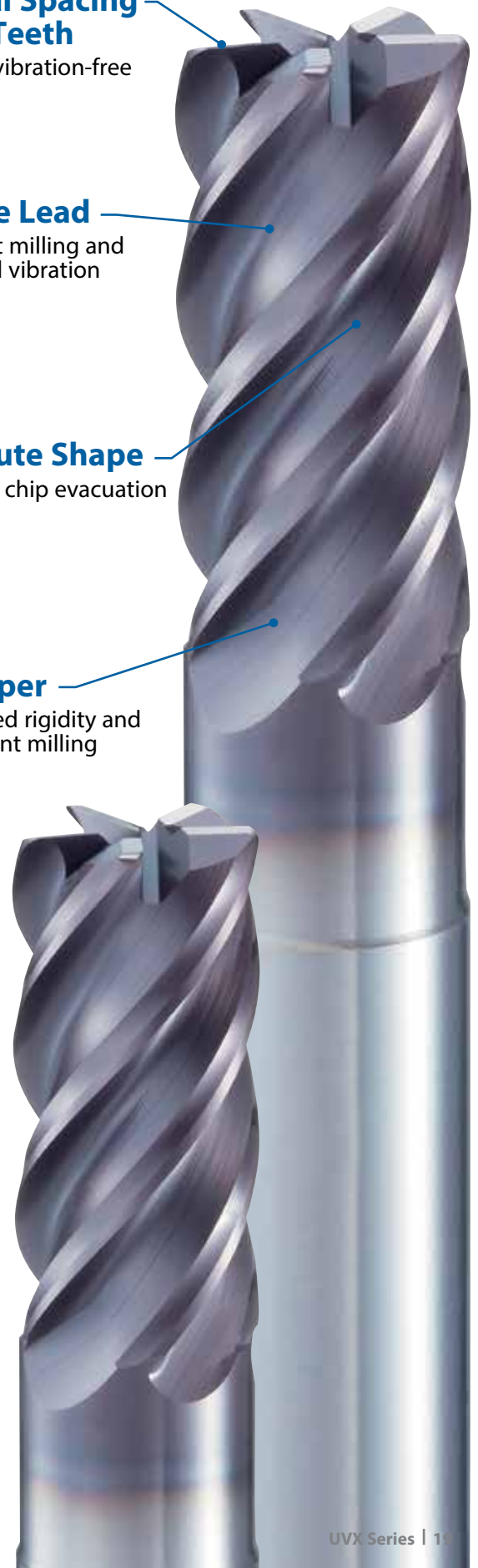
for efficient milling and suppressed vibration

Ideal Flute Shape

for smooth chip evacuation

Web Taper

for increased rigidity and high efficient milling

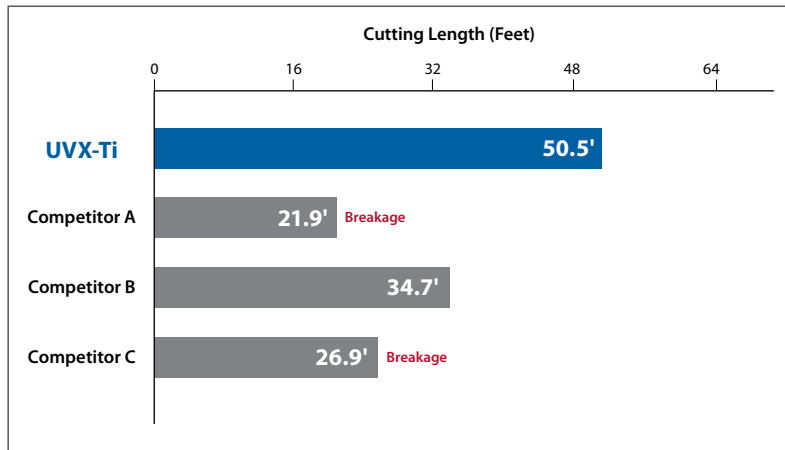


Longer Tool Life

Titanium 6Al-4V (35 HRC)

The UVX-Ti has outstanding resistance against fracture and can cut materials with excellent stability.

Tool	UVX-Ti (5 Flute)	Competitors (4 Flute)
Tool Size	Ø12.7 c R0.762mm	
Work Material	Titanium 6Al-4V (35 HRC)	
Cutting Speed	328 SFM (2,500 RPM)	
Feed	25 IPM (0.002 IPT)	
Milling Method	Side Milling	
Depth of Cut	Aa: 0.25" / Ar: 0.15"	
Coolant	Water-soluble	
Machine	Vertical Machining Center	



After 34.4' of Milling



Superior Surface Finish

Titanium 6Al-4V

The UVX-Ti series can finish wall surfaces with single cutting and offers a seamless, beautiful cutting surface, thanks to vibration-free cutting.

Tool	UVX-Ti (5 Flute)	UVXL-Ti (5 Flute)
Tool Size	Ø16 x R3	Ø12 x R1
Work Material	Titanium 6Al-4V	
Cutting Speed	180 SFM (1,100 RPM)	230 SFM (1,850 RPM)
Feed	22 IPM (0.004 IPT)	26 IPM (0.003 IPT)
Milling Method	Pocket Milling	
Depth of Cut	Aa: 0.629" / Ar: 0.377"	Aa: 1.771" / Ar: 0.007"
M.R.R.	5.2 in ³ /min	0.37 in ³ /min
Coolant	Water-soluble	
Machine	5-Axis Machining Center	



List 2100

UVX-TI-5FL, 5 Flute, Multiple Lengths

NEW
SPEED FEED P27
CARBIDE
EXO®
Var.°
SHANK h6

Milling Diameter Tolerance	
1/2 ≤ D ≤ 1-1/4	+0/-0.002"



EDP Number	Mill Diameter	Overall Length	Length of Cut	Shank Diameter
	D	L	Lc	d
21000711	1/2	2-1/2	5/8	1/2
21000811	1/2	3	1	1/2
21000911	1/2	3-1/2	1-1/4	1/2
21001011	1/2	3-1/2	1-5/8	1/2
21001111	5/8	3-1/2	1-1/4	5/8
21001211	5/8	4	1-7/8	5/8
21001311	3/4	4	1-1/2	3/4
21001411	3/4	5	2-1/4	3/4
21001511	1	4	1-1/2	1
21001611	1	6	3	1
21001711	1-1/4	4	1-1/2	1
21001811	1-1/4	6	3	1
21001911	1-1/4	7	4	1

Packed: 1 pc.
Available EXO® coating only.



Work Material																	
List No.	P					M			K	N		S		H			
	Carbon Steels			Alloy Steels	Die Steels	Stainless Steels			Cast Iron	Aluminum		Nickel Alloy	Titanium	Hardened Steels			
	Low	Med.	High			300	400	17-4 PH		6061	Casting			Inconel	6Al4V (30 HRC)	~35 HRC	35-45 HRC
2100	1010	1035	1065	4140	4340	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				<input checked="" type="checkbox"/>					

good best



EXOCARB® AERO UVX-Ti

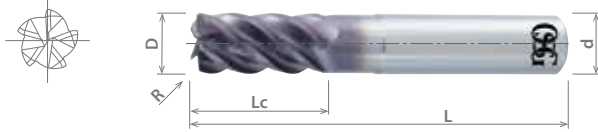
Variable Lead End Mill for Titanium Alloy

List 2106

UVX-TI-CR-5FL, 5 Flute, Multiple Lengths, Corner Radius

NEW SPEED FEED P27 CARBIDE EXO® Var.° SHANK h6

Milling Diameter Tolerance	
1/2 ≤ D ≤ 1-1/4	+0 / -0.002"



EDP Number	Mill Diameter	Corner Radius	Overall Length	Length of Cut	Shank Diameter
	D	R	L	Lc	d
21062111	1/2	0.030	2-1/2	5/8	1/2
21062211	1/2	0.060	2-1/2	5/8	1/2
21062311	1/2	0.090	2-1/2	5/8	1/2
21062411	1/2	0.120	2-1/2	5/8	1/2
21062511	1/2	0.030	3	1	1/2
21062611	1/2	0.060	3	1	1/2
21062711	1/2	0.090	3	1	1/2
21062811	1/2	0.120	3	1	1/2
21062911	1/2	0.015	3-1/2	1-1/4	1/2
21063011	1/2	0.030	3-1/2	1-1/4	1/2
21063111	1/2	0.060	3-1/2	1-1/4	1/2
21063211	1/2	0.090	3-1/2	1-1/4	1/2
21063311	1/2	0.120	3-1/2	1-1/4	1/2
21063411	1/2	0.015	3-1/2	1-5/8	1/2
21063511	1/2	0.030	3-1/2	1-5/8	1/2
21063611	1/2	0.060	3-1/2	1-5/8	1/2
21063711	1/2	0.090	3-1/2	1-5/8	1/2
21063811	1/2	0.120	3-1/2	1-5/8	1/2
21063911	5/8	0.030	3-1/2	1-1/4	5/8
21064011	5/8	0.060	3-1/2	1-1/4	5/8
21064111	5/8	0.090	3-1/2	1-1/4	5/8
21064211	5/8	0.120	3-1/2	1-1/4	5/8
21064311	5/8	0.030	4	1-7/8	5/8
21064411	5/8	0.060	4	1-7/8	5/8
21064511	5/8	0.090	4	1-7/8	5/8
21064611	5/8	0.120	4	1-7/8	5/8
21064711	3/4	0.030	4	1-1/2	3/4
21064811	3/4	0.060	4	1-1/2	3/4
21064911	3/4	0.090	4	1-1/2	3/4
21065011	3/4	0.120	4	1-1/2	3/4
21065111	3/4	0.150	4	1-1/2	3/4
21065211	3/4	0.030	5	2-1/4	3/4
21065311	3/4	0.060	5	2-1/4	3/4
21065411	3/4	0.090	5	2-1/4	3/4
21065511	3/4	0.120	5	2-1/4	3/4
21065611	3/4	0.150	5	2-1/4	3/4
21065711	1	0.030	4	1-1/2	1
21065811	1	0.060	4	1-1/2	1
21065911	1	0.090	4	1-1/2	1
21066011	1	0.120	4	1-1/2	1
21066111	1	0.150	4	1-1/2	1
21066211	1	0.030	6	3	1
21066311	1	0.060	6	3	1
21066411	1	0.090	6	3	1
21066511	1	0.120	6	3	1
21066611	1	0.150	6	3	1
21066711	1 - 1/4	0.030	4	1-1/2	1
21066811	1 - 1/4	0.060	4	1-1/2	1
21066911	1 - 1/4	0.090	4	1-1/2	1
21067011	1 - 1/4	0.120	4	1-1/2	1
21067111	1 - 1/4	0.150	4	1-1/2	1
21067211	1 - 1/4	0.030	6	3	1
21067311	1 - 1/4	0.060	6	3	1
21067411	1 - 1/4	0.090	6	3	1
21067511	1 - 1/4	0.120	6	3	1

Packed: 1 pc.
Available EXO® coating only.



List 2106 (Continued)

UVX-TI-CR-5FL, 5 Flute, Multiple Lengths, Corner Radius



EDP Number	Mill Diameter	Corner Radius	Overall Length	Length of Cut	Shank Diameter
	D	R	L	Lc	d
21067611	1 - 1/4	0.150	6	3	1
21067711	1 - 1/4	0.030	7	4	1
21067811	1 - 1/4	0.060	7	4	1
21067911	1 - 1/4	0.090	7	4	1
21068011	1 - 1/4	0.120	7	4	1
21068111	1 - 1/4	0.150	7	4	1

Packed: 1 pc.
Available EXO® coating only.



Work Material																		
List No.	P					M			K	N		S		H				
	Carbon Steels			Alloy Steels	Die Steels	Stainless Steels			Cast Iron	Aluminum		Nickel Alloy	Titanium	Hardened Steels				
	Low	Med.	High			300	400	17-4 PH		6061	Casting			Inconel	6Al4V (30 HRC)	~35 HRC	35-45 HRC	45-50 HRC
2106	1010	1035	1065	4140	4340	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				<input checked="" type="checkbox"/>						

good best

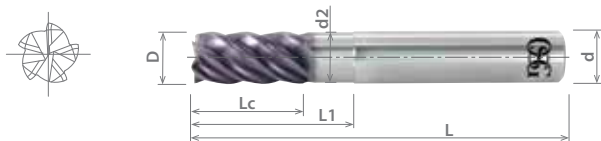


EXOCARB® AERO UVX-Ti

Variable Lead End Mill for Titanium Alloy

List 2104

UVX-TI-LN-5FL, 5 Flute, Regular Length, Reduced Neck, Square End



NEW SPEED FEED P27 CARBIDE EXO® REG Var.° SHANK h6

Milling Diameter Tolerance	
12 ≤ D ≤ 25	+0/-0.05mm

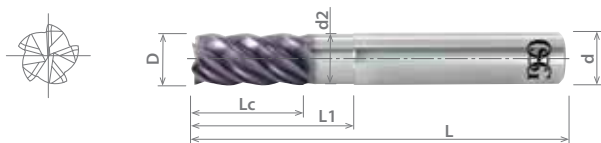
EDP Number	Mill Diameter	Overall Length	Length of Cut	Neck Length	Neck Diameter	Shank Diameter
	D	L	Lc	L1	d2	d
8555320	12	90	24	36	11.5	12
8555360	16	100	32	48	15.5	16
8555400	20	120	40	60	19.5	20
8555450	25	140	50	75	24.5	25

Packed: 1 pc.
Available EXO® coating only.



List 2102

UVX-TI-LN-5FL, 5 Flute, Regular Length, Reduced Neck, Square End



NEW SPEED FEED P27 CARBIDE EXO® REG Var.° SHANK h6

Milling Diameter Tolerance	
1/2 ≤ D ≤ 1-1/4	+0 / -0.002"

EDP Number	Mill Diameter	Overall Length	Length of Cut	Neck Length	Neck Diameter	Shank Diameter
	D	L	Lc	L1	d2	d
21020011	1/2	3-1/2	1	1-1/2	0.480	1/2
21020111	5/8	4	1-1/4	1-7/8	0.605	5/8
21020211	3/4	6-1/2	1-1/2	2-1/4	0.730	3/4
21020311	1	5-1/2	2	3	0.980	1
21020411	1-1/4	6	2-1/2	3-3/4	1.230	1

Packed: 1 pc.
Available EXO® coating only.



Work Material																
List No.	P					M			K	N		S		H		
	Carbon Steels			Alloy Steels	Die Steels	Stainless Steels			Cast Iron	Aluminum		Nickel Alloy	Titanium	Hardened Steels		
	Low	Med.	High			300	400	17-4 PH		6061	Casting			Inconel	6Al4V (30 HRC)	~35 HRC
2104	1010	1035	1065	4140	4340	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				<input checked="" type="checkbox"/>				
2102	1018	1045				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				<input checked="" type="checkbox"/>				

good best



List 2108

UVX-TI-LN-CR-5FL, 5 Flute, Regular Length, Reduced Neck, Corner Radius

NEW	SPEED FEED P27	CARBIDE	EXO®	REG	Var.°	SHANK h6
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Milling Diameter Tolerance	
1/2 ≤ D ≤ 1-1/4	+0/-0.002"



EDP Number	Mill Diameter	Corner Radius	Overall Length	Length of Cut	Neck Length	Neck Diameter	Shank Diameter
	D	R	L	Lc	L1	d2	d
21080011	1/2	0.03	3-1/2	1	1-1/2	0.480	1/2
21080111	1/2	0.06	3-1/2	1	1-1/2	0.480	1/2
21080211	1/2	0.09	3-1/2	1	1-1/2	0.480	1/2
21080311	1/2	0.12	3-1/2	1	1-1/2	0.480	1/2
21080411	5/8	0.03	4	1-1/4	1-7/8	0.605	5/8
21080511	5/8	0.06	4	1-1/4	1-7/8	0.605	5/8
21080611	5/8	0.09	4	1-1/4	1-7/8	0.605	5/8
21080711	5/8	0.12	4	1-1/4	1-7/8	0.605	5/8
21080811	3/4	0.03	6-1/2	1-1/2	2-1/4	0.730	3/4
21080911	3/4	0.06	6-1/2	1-1/2	2-1/4	0.730	3/4
21081011	3/4	0.09	6-1/2	1-1/2	2-1/4	0.730	3/4
21081111	3/4	0.12	6-1/2	1-1/2	2-1/4	0.730	3/4
21081211	3/4	0.15	6-1/2	1-1/2	2-1/4	0.730	3/4
21081311	1	0.03	5-1/2	2	3	0.980	1
21081411	1	0.06	5-1/2	2	3	0.980	1
21081511	1	0.09	5-1/2	2	3	0.980	1
21081611	1	0.12	5-1/2	2	3	0.980	1
21081711	1	0.15	5-1/2	2	3	0.980	1
21081811	1-1/4	0.03	6	2-1/2	3-3/4	1.230	1
21081911	1-1/4	0.06	6	2-1/2	3-3/4	1.230	1
21082011	1-1/4	0.09	6	2-1/2	3-3/4	1.230	1
21082111	1-1/4	0.12	6	2-1/2	3-3/4	1.230	1
21082211	1-1/4	0.15	6	2-1/2	3-3/4	1.230	1

Packed: 1 pc.
Available EXO® coating only.



Work Material																				
List No.	P					M			K	N		S		H						
	Carbon Steels			Alloy Steels	Die Steels	Stainless Steels			Cast Iron	Aluminum		Nickel Alloy	Titanium	Hardened Steels						
	Low	Med.	High	300		400	17-4 PH	6061		Casting	Inconel	6Al4V (30 HRC)	~35 HRC	35-45 HRC	45-50 HRC	50-70 HRC				
2108	1010	1035	1065	4140																
	1018	1045		4340																

good best



EXOCARB® AERO UVX-Ti

Variable Lead End Mill for Titanium Alloy

List 2110

UVX-TI-LN-CR-5FL, 5 Flute, Regular Length, Reduced Neck, Corner Radius

NEW SPEED FEED P27 CARBIDE EXO® REG Var.° SHANK h6

Milling Diameter Tolerance	
12 ≤ D ≤ 25	+0/-0.05mm



EDP Number	Mill Diameter	Corner Radius	Overall Length	Length of Cut	Neck Length	Neck Diameter	Shank Diameter
	D	R	L	Lc	L1	d2	d
8555321	12	1.0	90	24	36	11.5	12
8555322	12	1.5	90	24	36	11.5	12
8555323	12	2.0	90	24	36	11.5	12
8555324	12	2.5	90	24	36	11.5	12
8555325	12	3.0	90	24	36	11.5	12
8555326	12	4.0	90	24	36	11.5	12
8555361	16	1.0	100	32	48	15.5	16
8555362	16	1.5	100	32	48	15.5	16
8555363	16	2.0	100	32	48	15.5	16
8555364	16	2.5	100	32	48	15.5	16
8555365	16	3.0	100	32	48	15.5	16
8555366	16	4.0	100	32	48	15.5	16
8555401	20	1.0	120	40	60	19.5	20
8555402	20	1.5	120	40	60	19.5	20
8555403	20	2.0	120	40	60	19.5	20
8555404	20	2.5	120	40	60	19.5	20
8555405	20	3.0	120	40	60	19.5	20
8555406	20	4.0	120	40	60	19.5	20
8555407	20	5.0	120	40	60	19.5	20

Packed: 1 pc.
Available EXO® coating only.



Work Material																	
List No.	P					M			K	N		S		H			
	Carbon Steels			Alloy Steels	Die Steels	Stainless Steels			Cast Iron	Aluminum		Nickel Alloy	Titanium	Hardened Steels			
	Low	Med.	High			300	400	17-4 PH		6061	Casting			Inconel	6Al4V (30 HRC)	~35 HRC	35-45 HRC
2110	1010	1035	1065	4140	4340	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				<input checked="" type="checkbox"/>					

good best

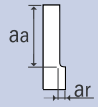
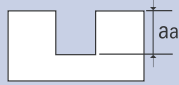


List 2100: 5 Flute, Square End

List 2106: 5 Flute, Corner Radius

List 2102: 5 Flute, Regular Length, Reduced Neck, Square End

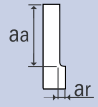
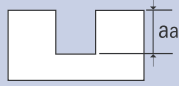
List 2108: 5 Flute, Regular Length, Reduced Neck, Corner Radius

Cutting Speed	Side Milling		Slotting	
	200-265 SFM		100-165 SFM	
Depth of Cut	$a_a \leq 1.8D$ $a_r = 0.2D$ 		$a_a \leq 1D$ 	
Mill Dia.	Speed RPM	Feed in/min	Speed RPM	Feed in/min
1/2	1,800	31.9	1,270	12.6
5/8	1,410	25.0	1,000	9.9
3/4	1,050	22.5	840	9.9
1	890	19.5	630	7.4

1. Use a rigid and precise machine and holder.
2. The above cutting conditions are to be used as general guidelines. Please adjust the speed, feed and cutting depth according to actual cutting conditions.
3. Water soluble coolant is highly recommended.

List 2104: 5 Flute, Regular Length, Reduced Neck, Square End

List 2110: 5 Flute, Regular Length, Reduced Neck, Corner Radius

Cutting Speed	Side Milling		Slotting	
	200-265 SFM		100-165 SFM	
Depth of Cut	$a_a \leq 1.8D$ $a_r = 0.2D$ 		$a_a \leq 1D$ 	
Mill Dia.	Speed RPM	Feed in/min	Speed RPM	Feed in/min
12	1,900	33.7	1,350	13.4
16	1,400	24.8	990	9.8
20	1,100	23.6	800	9.4
25	900	19.7	640	7.6

1. Use a rigid and precise machine and holder.
2. The above cutting conditions are to be used as general guidelines. Please adjust the speed, feed and cutting depth according to actual cutting conditions.
3. Water soluble coolant is highly recommended.

Special Cutting Edge
for high-feed finishing of floors
in titanium

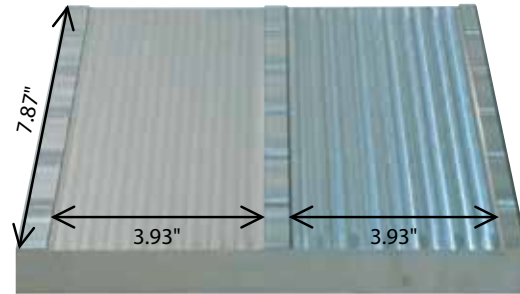
Large Bottom Radius
produces excellent
surface finishes

Short Flute Design
enhances stability
& stable machining,
even with long
reach

High Efficiency Bottom Finishing

Achieve Superior Surface Finish in Less Time

The HFC-Ti, a highly efficient bottom finishing end mill, achieves superior surface accuracy with reduced machining time.



HFC-Ti

59 sec
Ra=0.419µm
Rz=1.940µm

Radius End Mill (5FL)

390 sec
Ra=0.844µm
Rz=3.385µm

Average Milling Condition

Surface Roughness (Ra)	3.2µm
Depth of Cut (Aa)	0.0196"
Feed Rate	118 IPM

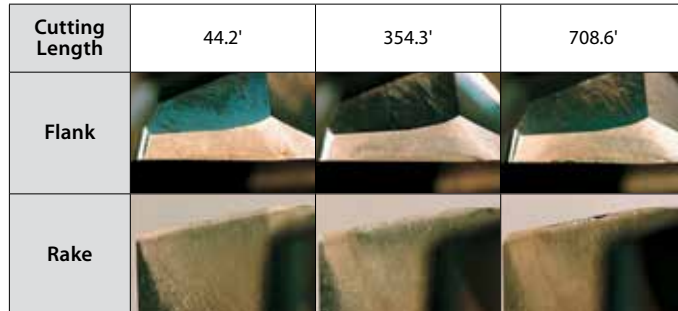
Tool	HFC-Ti	Competitor Radius EM
Tool Size	Ø16mm 6 Flute	Ø16mm 5 Flute
Cutting Speed	230 SFM	
Feed	177 IPM (0.021 IPT)	20 IPM (0.002 IPT)
Milling Method	Contour Milling	
Depth of Cut	Aa: 0.0196" / Ar: 0.236"	Aa: 0.0196" / Ar: 0.314"
Coolant	Water-soluble	

High Efficiency Milling

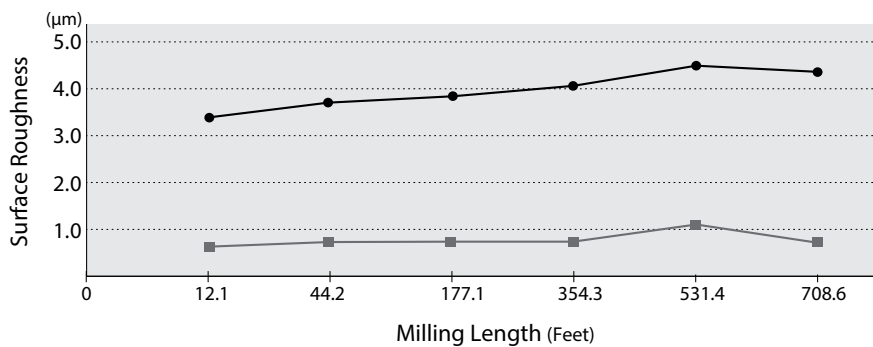
Titanium 6Al-4V

The HFC-Ti was able to achieve consistent surface roughness and normal wear even after milling 656' of material.

Tool	HFC-Ti
Tool Size	Ø16mm
Work Material	Titanium 6Al-4V
Cutting Speed	328 SFM (1,990 RPM)
Feed	236 IPM (0.020 IPT)
Depth of Cut	Aa: 0.0196" / Ar: 0.236"
Coolant	Water-soluble
Overhang Length	2.75"
Machine	Horizontal Machining Center

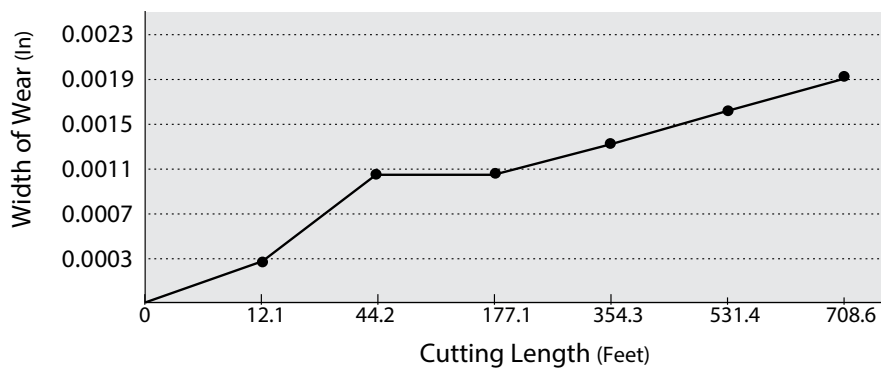


Change in Surface Roughness



● (Rz)	3.557	3.812	3.903	4.151	4.520	4.403
■ (Ra)	0.849	0.944	0.946	0.980	1.016	0.997

Wear Amount



EXOCARB® AERO HFC-Ti

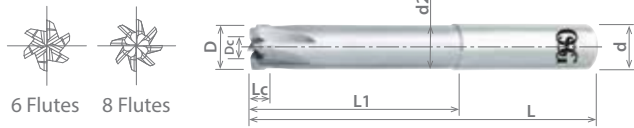
High Feed Radius End Mill for Titanium Alloy

List 2080

HFC-Ti, 6 & 8 Flute

SPEED FEED P31	CARBIDE	BR		SHANK h6
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Milling Diameter Tolerance	
5/8 ≤ D ≤ 1	+0 / -0.002"



EDP Number	Mill Diameter	Effective Diameter	Overall Length	Length of Cut	Neck Length	Neck Diameter	Shank Diameter	No. of Flutes
	D	Dc	L	Lc	L1	d2	d	
20806250	5/8	0.304	4.72	0.197	2.76	0.586	5/8	6
20807500	3/4	0.365	4.72	0.197	2.76	0.711	3/4	8
20801000	1	0.486	4.72	0.197	2.76	0.961	1	8

Packed: 1 pc.
Available Bright only.

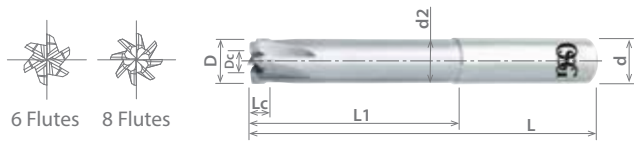


List 2081

HFC-Ti, 6 & 8 Flute

SPEED FEED P31	CARBIDE	BR		SHANK h6
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Milling Diameter Tolerance	
16 ≤ D ≤ 25	+0 / -0.05mm



EDP Number	Mill Diameter	Effective Diameter	Overall Length	Length of Cut	Neck Length	Neck Diameter	Shank Diameter	No. of Flutes
	D	Dc	L	Lc	L1	d2	d	
8555716	16	7.77	120	5	70	15	16	6
8555720	20	9.72	120	5	70	19	20	8
8555725	25	12.15	120	5	70	24	25	8

Packed: 1 pc.
Available Bright only.



Work Material																	
List No.	P					M			K	N		S		H			
	Carbon Steels			Alloy Steels	Die Steels	Stainless Steels			Cast Iron	Aluminum		Nickel Alloy	Titanium	Hardened Steels			
	Low	Med.	High			300	400	17-4 PH		6061	Casting			Inconel	6Al4V (30 HRC)	~35 HRC	35-45 HRC
2080	1010	1035	1065	4140	4340								<input checked="" type="checkbox"/>				
2081	1018	1045											<input checked="" type="checkbox"/>				


good best

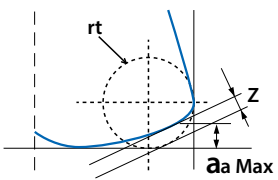


List 2080: 6 & 8 Flute, Inch

List 2081: 6 & 8 Flute, Metric

Contour Milling

Work Material		Titanium Alloy Ti-6AL-4V				
Cutting Speed		165 - 330 SFM				
Depth of Cut		$a_a \leq 0.035D$ $a_r \leq 0.39D$ 				
Mill Dia.		Speed RPM	Feed in/min	Ramping Angle	R (rt)	Z
in	mm					
5/8	-	1,500	164	2°	0.031	0.016
-	16	1,490	175		0.033	0.018
3/4	-	1,250	132		0.037	0.021
-	20	1,190	140		0.039	0.022
-	25	850	189		0.047	0.029
1	-	935	192		0.049	0.030



1. During machining, please program the milling paths according to the recommended simulated R (rt) respective to the individual end mill diameter.
2. Using water soluble coolant is highly recommended.



shaping your dreams

 **Safe use of cutting tools**

- Use safety cover, safety glasses and safety shoes during operation.
- Do not touch cutting edges with bare hands.
- Do not touch cutting chips with bare hands. Chips will be hot after cutting.
- Stop cutting when the tool becomes dull.
- Stop cutting operation immediately if you hear any abnormal cutting sounds.
- Do not modify tools.
- Please use appropriate tools for the operation. Check dimensions to ensure proper selection.

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