

# Nose Section Fuselage

CFRP Window Trimming



MACHINING

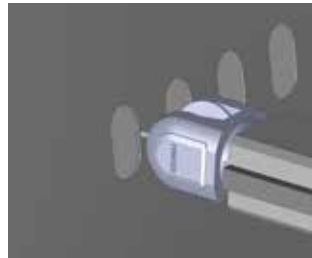


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## CFRP — WINDOW TRIMMING

<b>Tool Dimensions</b>	1/2 x 1/2 x 5/8 x 3.5	
<b>Description</b>	EM PCD Left End CB	
<b>Series</b>	Special PCD Router 4 Flute	
<b>Vc</b>	287 m/min	941 SFM
<b>S (RPM)</b>	7,200	
<b>F<sub>z</sub></b>	0,087mm	0.0034"
<b>F</b>	2,500 mm/min	98.6 IPM
<b>Ap</b>	10,4mm	0.409"
<b>Ae</b>	12,7mm	0.500"



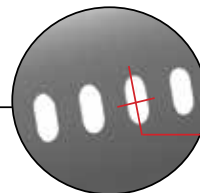
WIDIA™  
SHINING  
MOMENT

## REDUCES TOOL COST

End mill ran 100 meters in material with no delamination to the satisfaction of the customer.

### SPECIAL PCD ROUTER

WIDIA PCD Solution reduced cost per part by 50% vs competitor



467mm x 272mm  
(18.4" x 10.7")

# Aerospace Product Details

## High-Performance Roughers



- Shallow pitch rougher.
- 4–6 flutes with variable spacing.
- Regular length of cut.
- Stainless steel and high-temp alloys.
- Center cutting.



	Series	Grade	(ZU) Flutes	(D1) Diameter Range
Inch	<b>4U80</b>	ALTIN-MT	4	5/16–1"
			6	5/8–1"
Metric			4	6–12mm
			6	16–25mm

## High-Performance Solid Carbide End Mills • Roughing



- Center cutting.
- Flat shallow profile.
- Standard items listed. Additional styles and coatings made-to-order.
- Roughing profile also on radii portion of end mill.



	Series	Grade	(ZU) Flutes	(D1) Diameter Range
Inch	<b>4969</b>	WP15PE	4	.3937–.9843"
Metric				

## High-Performance Solid Carbide End Mills • VariMill™



- Unequal flute spacing.
- Center cutting.
- Ramping angle 3°.
- Optimized for difficult-to-machine workpiece materials.
- Semi-finishing to finishing applications.
- High-speed machining capability.
- Standard items listed. Additional styles and coatings made-to-order.



	Series	Grade	(ZU) Flutes	(D1) Diameter Range
Inch	<b>7VNX</b>	WS15PE	7	3/8–1"
Metric	<b>77NE</b>			

## High-Performance Solid Carbide End Mills • VariMill



- Shallow pitch rougher.
- 4–6 flutes with variable spacing.
- Regular length of cut.
- Stainless steel and high-temp alloys.
- Center cutting.



	Series	Grade	(ZU) Flutes	(D1) Diameter Range
Inch	<b>5V0T</b>	ALTIN-MT	5	1/4–3/4"
Metric	<b>57N8</b>			

These pages overview the details for the products presented in the operations throughout this catalog



### ■ X-Feed™

- Designed for high-feed rates.
- 6 flutes and 3 x D diameter neck reach.
- Designed for circular plunging and ramping, 3D machining, face milling, and pocketing applications.
- Stainless steel and high-temp alloys.
- Improved tool life due to reduced radial forces.



	Series	Grade	(ZU) Flutes	(D1) Diameter Range
Inch	<b>7FNS</b>	ALTiN-MT	6	1/4–1"
Metric	<b>7ONS</b>			6–25mm

*New Advances products launching January 1, 2019*



### ■ Solid Carbide Drills

- Low thrust.
- Excellent centering capabilities.
- Easy to regrind.
- Reduces risk of chip jamming and catastrophic failure.
- Improves hole straightness.
- Improves hole alignment when drilling through cross holes and inclined exits.



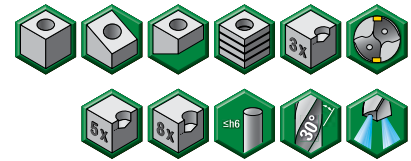
Series	Grade	L:D	(D1) Inch Diameter	(D1) Metric Diameter
<b>TDD105Z</b>	WU20PD	15xD	.1181–.5118"	3–13mm
<b>TDD106Z</b>		20xD		
<b>TDD107Z</b>		25xD		
<b>TDD108Z</b>		30xD		

*All-Star items (not all diameters are included in the program.)*



### ■ Solid Carbide Drills

- Excellent chip flow due to flute design and finish.
- New coating enables higher cutting speeds.
- Higher feed rates on stainless steels and duplex.
- Available for custom solutions, as well as step-drilling.
- Real 8 x D drill lengths.
- Cylindrical shank h6 for perfect runout.
- Double-margin design for critical operations.



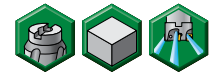
Series	Grade	L:D	(D1) Inch Diameter	(D1) Metric Diameter
<b>TDS</b>	WK15PD	3xD	.1181–.7874"	3–20mm
		5xD		
		8xD		

*All-Star items (not all diameters are included in the program.)*



### ■ Face Mills • Victory™ M1200 Series

- Twelve cutting edges.
- High feed rates for rough face milling.
- Use standard M1200 inserts.
- Do not load wiper inserts.




Series	Cutting Edges	(ZU) Flutes	(D1) Inch Diameter	(D1) Metric Diameter	All-Star
<b>M1200™ Shell Mill</b>	12	4	2"	50,8mm	NO
		5	2.5"	63,5mm	NO
		6	3"	76,2mm	YES
		8	4"	101,6mm	YES
		9	5"	127mm	NO

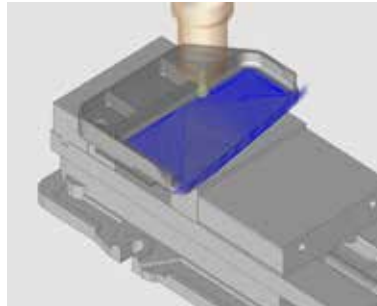
# BENEFITS OF THIS BROCHURE

Advanced milling methods (i.e., high-speed, trochoidal, etc.) were used, which enabled the use of higher feeds and speeds beyond traditional methods published by WIDIA™. Use of tooling in advanced-application parameters is highly dependent on proper application of machining programming methods. Users may want to also want to consult their CAM system supplier on programming techniques for advanced milling.

## ILLUSTRATED PROCESS STEPS

For each component, see actual strategies and tooling technologies specifically designed for aerospace.

1		<b>ROUGHING HIGH MACHINING (ROUGH BIG POCKET)</b>	
	<b>Tool Dimensions</b>	12 x 12 x 26 x 83 x R-3.0	
	<b>Description</b>	Special VariMill III™ End Mill	
	<b>Series</b>	77NE 7 Flute	7VNX 7 Flute
	<b>Vc</b>	115 m/min	378 SFM
	<b>S (RPM)</b>	3,052	3,052
	<b>Fz</b>	0,1mm	0.0039"
	<b>F</b>	2,136 mm/min	84 IPM
	<b>Ap</b>	24mm	0.094"
	<b>Ae</b>	0,6mm	0.0236"



## WIDIA SHINING MOMENTS


Each component includes a real-life customer case where WIDIA tooling technology and machining strategy came together to increase productivity and reduce cost!

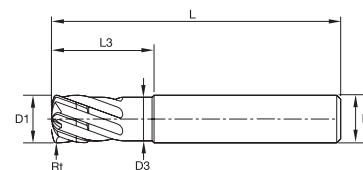


	COMPETITOR	WIDIA
	<b>Roughing AIRFOIL</b>	
<b>Specifications</b>	16x16x15x83xR-1 6 Flutes	Based on 77NE 7 Flute
<b>Workpiece Material</b>	Titanium	
<b>Width</b>	230mm	
<b>Length of Blade</b>	420mm	
<b>Total Milling Cycle Time</b>	93 Minutes	62 Minutes

## APPLICATION PARAMETERS

This cutting data shows real-life application parameters.

	<b>ROUGHING HIGH MACHINING (ROUGH BIG POCKET)</b>		
<b>Tool Dimensions</b>	12 x 12 x 26 x 83 x R-3.0		<b>D1</b> = 12
<b>Description</b>	Special VariMill III™ End Mill		<b>D</b> = 12
<b>Series</b>	77NE 7 Flute	7VNX 7 Flute	<b>Ap1 max</b> = 26
<b>Vc</b>	115 m/min	378 SFM	<b>L</b> = 83
<b>S (RPM)</b>	3,052	3,052	<b>Rt</b> = 3.0
<b>Fz</b>	0,1mm	0.0039"	
<b>F</b>	2,136 mm/min	84 IPM	
<b>Ap</b>	24mm	0.094"	
<b>Ae</b>	0,6mm	0.0236"	



S (RPM)	=	Spindle Speed
Fz [IPT]	=	Feed per Tooth
F	=	Feed
Ap	=	Axial Depth of Cut
Ae	=	Radial Width of Cut
D1	=	Outer Diameter Tool
Rt	=	Radius
L	=	Length