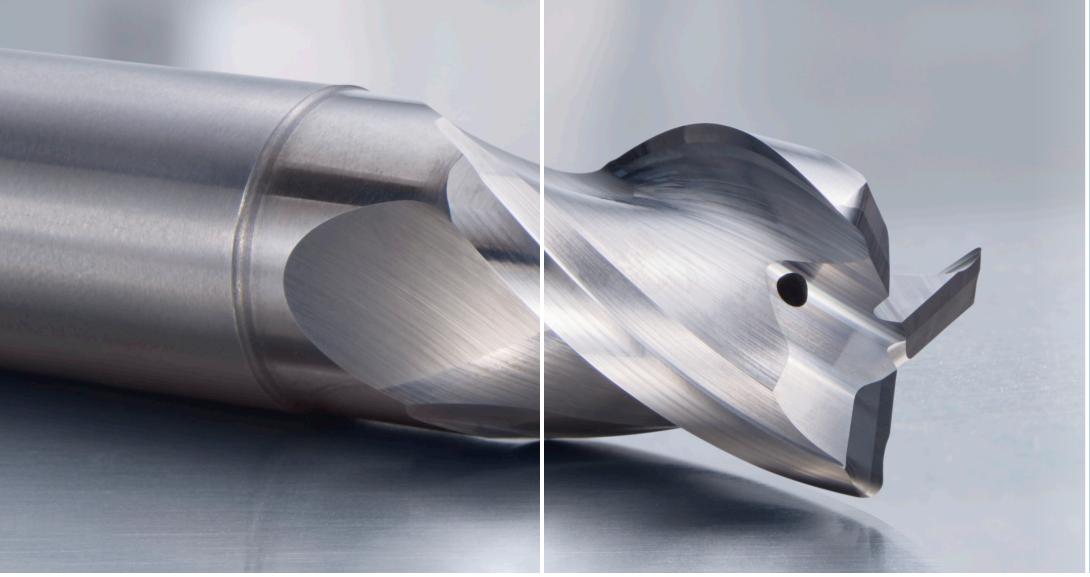


NIAGRA CUTTER™ AN230 & AN335

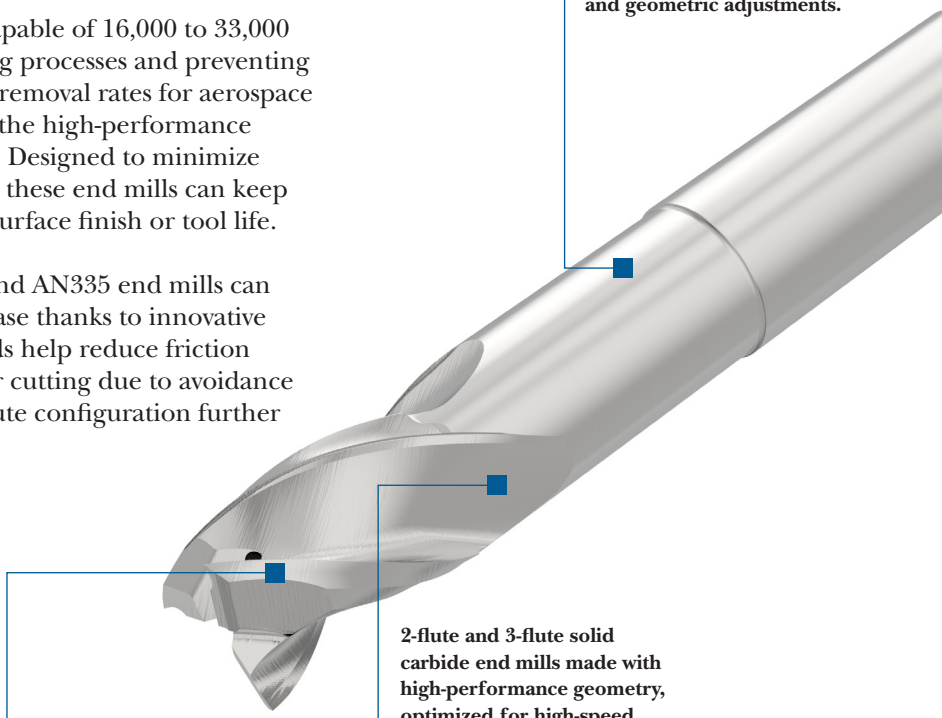
PRODUCT SUMMARY & RANGE

REACH PEAK METAL REMOVAL RATES IN HIGH-VELOCITY ALUMINUM MILLING

AN230 & AN335

For modern machine tools equipped with spindles capable of 16,000 to 33,000 rpm or more, avoiding vibrations is critical to securing processes and preventing damage to the spindle. Achieve exceptional material removal rates for aerospace slotting and profiling applciations in aluminum with the high-performance AN230 and AN335 milling tools from Niagara Cutter. Designed to minimize deflection and vibrations with its advanced geometry, these end mills can keep up with any high-velocity spindle without sacrificing surface finish or tool life.

For the highest level of process security, the AN230 and AN335 end mills can spend an elongated amount of time in the cut with ease thanks to innovative engineering. Specifically engineered, polished K-lands help reduce friction and contact with the chip as well as provide smoother cutting due to avoidance of material adhesion. Radial coolant holes in the 3-flute configuration further improve performance and chip control.



KEY BENEFITS

- High MRR
- Process reliability
- Superior chip control
- Long tool life

RANGE OVERVIEW

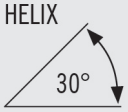
- 94 uncoated inch end mills
  (AN230/AN230R)
  (AN335/AN335R)
- 0.5", 0.75", 1.00" diameter sizes
- Standard square corner and aerospace radii options

Niagara Cutter
A SECO TOOLS COMPANY

AN230 & AN230R

SOLID CARBIDE

HELIX



RADIUS

SQUARE END

CENTER CUTTING

PRODUCT NUMBER	DESCRIPTION	FLUTE DIA	SHANK DIA	LENGTH OF CUT	OVERALL LENGTH	NECK DIA	REACH	FLUTES	RADIUS	SHANK TYPE
03302585	AN230-0.500-E2-S.0-Z2	1/2	1/2	3/4	3	0.470	1-1/4	2	-	CYLINDRICAL
03302588	AN230-0.500-E3-S.0-Z2	1/2	1/2	3/4	3-1/2	0.470	1-3/4	2	-	CYLINDRICAL
03302591	AN230-0.500-E4-S.0-Z2	1/2	1/2	3/4	4	0.470	2-1/4	2	-	CYLINDRICAL
03302594	AN230-0.500-E5-S.0-Z2	1/2	1/2	3/4	4-1/2	0.470	2-3/4	2	-	CYLINDRICAL
03302597	AN230-0.750-E2-S.0-Z2	3/4	3/4	1	4	0.720	2-1/8	2	-	CYLINDRICAL
03302602	AN230-0.750-E3-S.0-Z2	3/4	3/4	1	4-1/2	0.720	2-5/8	2	-	CYLINDRICAL
03302607	AN230-0.750-E4-S.0-Z2	3/4	3/4	1	5	0.720	3-1/8	2	-	CYLINDRICAL
03302612	AN230-0.750-E5-S.0-Z2	3/4	3/4	1	5-1/2	0.720	3-5/8	2	-	CYLINDRICAL
03302617	AN230-1.000-E2-S.0-Z2	1	1	1-1/4	4	0.960	2-1/8	2	-	CYLINDRICAL
03302622	AN230-1.000-E3-S.0-Z2	1	1	1-1/4	4-1/2	0.960	2-5/8	2	-	CYLINDRICAL
03302627	AN230-1.000-E4-S.0-Z2	1	1	1-1/4	5	0.960	3-1/8	2	-	CYLINDRICAL
03302586	AN230R-0.500-E2-R030.0-Z2	1/2	1/2	3/4	3	0.470	1-1/4	2	0.030	CYLINDRICAL
03302587	AN230R-0.500-E2-R060.0-Z2	1/2	1/2	3/4	3	0.470	1-1/4	2	0.060	CYLINDRICAL
03302589	AN230R-0.500-E3-R030.0-Z2	1/2	1/2	3/4	3-1/2	0.470	1-3/4	2	0.030	CYLINDRICAL
03302590	AN230R-0.500-E3-R060.0-Z2	1/2	1/2	3/4	3-1/2	0.470	1-3/4	2	0.060	CYLINDRICAL
03302592	AN230R-0.500-E4-R030.0-Z2	1/2	1/2	3/4	4	0.470	2-1/4	2	0.030	CYLINDRICAL
03302593	AN230R-0.500-E4-R060.0-Z2	1/2	1/2	3/4	4	0.470	2-1/4	2	0.060	CYLINDRICAL
03302595	AN230R-0.500-E5-R030.0-Z2	1/2	1/2	3/4	4-1/2	0.470	2-3/4	2	0.030	CYLINDRICAL
03302596	AN230R-0.500-E5-R060.0-Z2	1/2	1/2	3/4	4-1/2	0.470	2-3/4	2	0.060	CYLINDRICAL
03302598	AN230R-0.750-E2-R030.0-Z2	3/4	3/4	1	4	0.720	2-1/8	2	0.030	CYLINDRICAL
03302599	AN230R-0.750-E2-R060.0-Z2	3/4	3/4	1	4	0.720	2-1/8	2	0.060	CYLINDRICAL
03302600	AN230R-0.750-E2-R090.0-Z2	3/4	3/4	1	4	0.720	2-1/8	2	0.090	CYLINDRICAL
03302601	AN230R-0.750-E2-R120.0-Z2	3/4	3/4	1	4	0.720	2-1/8	2	0.120	CYLINDRICAL
03302603	AN230R-0.750-E3-R030.0-Z2	3/4	3/4	1	4-1/2	0.720	2-5/8	2	0.030	CYLINDRICAL
03302604	AN230R-0.750-E3-R060.0-Z2	3/4	3/4	1	4-1/2	0.720	2-5/8	2	0.060	CYLINDRICAL
03302605	AN230R-0.750-E3-R090.0-Z2	3/4	3/4	1	4-1/2	0.720	2-5/8	2	0.090	CYLINDRICAL
03302606	AN230R-0.750-E3-R120.0-Z2	3/4	3/4	1	4-1/2	0.720	2-5/8	2	0.120	CYLINDRICAL
03302608	AN230R-0.750-E4-R030.0-Z2	3/4	3/4	1	5	0.720	3-1/8	2	0.030	CYLINDRICAL
03302609	AN230R-0.750-E4-R060.0-Z2	3/4	3/4	1	5	0.720	3-1/8	2	0.060	CYLINDRICAL
03302610	AN230R-0.750-E4-R090.0-Z2	3/4	3/4	1	5	0.720	3-1/8	2	0.090	CYLINDRICAL
03302611	AN230R-0.750-E4-R120.0-Z2	3/4	3/4	1	5	0.720	3-1/8	2	0.120	CYLINDRICAL
03302613	AN230R-0.750-E5-R030.0-Z2	3/4	3/4	1	5-1/2	0.720	3-5/8	2	0.030	CYLINDRICAL
03302614	AN230R-0.750-E5-R060.0-Z2	3/4	3/4	1	5-1/2	0.720	3-5/8	2	0.060	CYLINDRICAL
03302615	AN230R-0.750-E5-R090.0-Z2	3/4	3/4	1	5-1/2	0.720	3-5/8	2	0.090	CYLINDRICAL
03302616	AN230R-0.750-E5-R120.0-Z2	3/4	3/4	1	5-1/2	0.720	3-5/8	2	0.120	CYLINDRICAL
03302618	AN230R-1.000-E2-R030.0-Z2	1	1	1-1/4	4	0.960	2-1/8	2	0.030	CYLINDRICAL
03302619	AN230R-1.000-E2-R060.0-Z2	1	1	1-1/4	4	0.960	2-1/8	2	0.060	CYLINDRICAL
03302620	AN230R-1.000-E2-R090.0-Z2	1	1	1-1/4	4	0.960	2-1/8	2	0.090	CYLINDRICAL
03302621	AN230R-1.000-E2-R120.0-Z2	1	1	1-1/4	4	0.960	2-1/8	2	0.120	CYLINDRICAL
03302623	AN230R-1.000-E3-R030.0-Z2	1	1	1-1/4	4-1/2	0.960	2-5/8	2	0.030	CYLINDRICAL
03302624	AN230R-1.000-E3-R060.0-Z2	1	1	1-1/4	4-1/2	0.960	2-5/8	2	0.060	CYLINDRICAL
03302625	AN230R-1.000-E3-R090.0-Z2	1	1	1-1/4	4-1/2	0.960	2-5/8	2	0.090	CYLINDRICAL
03302626	AN230R-1.000-E3-R120.0-Z2	1	1	1-1/4	4-1/2	0.960	2-5/8	2	0.120	CYLINDRICAL
03302628	AN230R-1.000-E4-R030.0-Z2	1	1	1-1/4	5	0.960	3-1/8	2	0.030	CYLINDRICAL
03302629	AN230R-1.000-E4-R060.0-Z2	1	1	1-1/4	5	0.960	3-1/8	2	0.060	CYLINDRICAL
03302630	AN230R-1.000-E4-R090.0-Z2	1	1	1-1/4	5	0.960	3-1/8	2	0.090	CYLINDRICAL
03302631	AN230R-1.000-E4-R120.0-Z2	1	1	1-1/4	5	0.960	3-1/8	2	0.120	CYLINDRICAL

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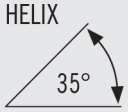
AN335 & AN335R

SOLID CARBIDE

HELIX



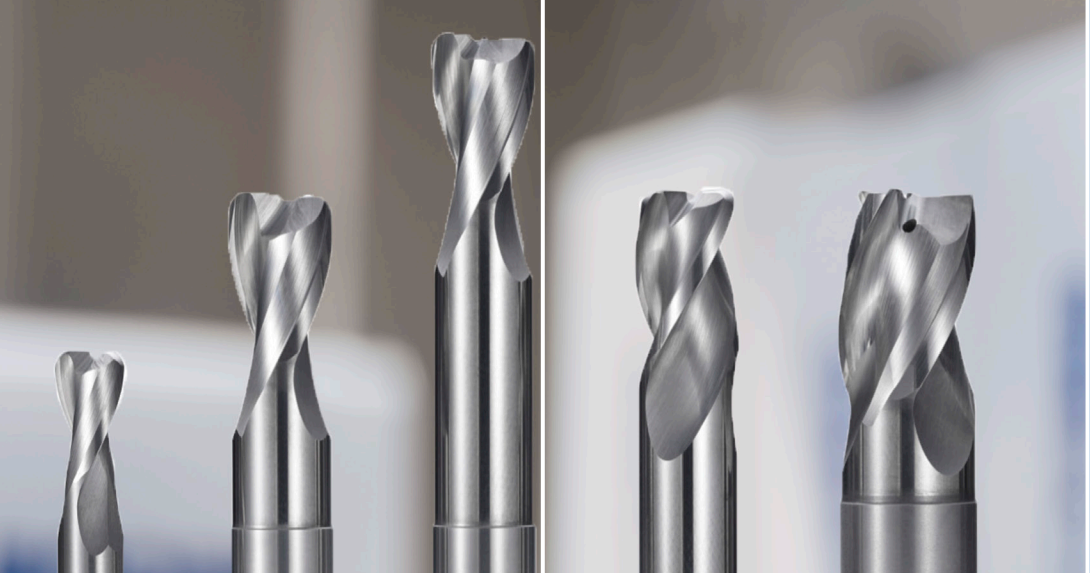
RADIUS

SQUARE END

CENTER CUTTING

COOLANT THROUGH

PRODUCT NUMBER	DESCRIPTION	FLUTE DIA	SHANK DIA	LENGTH OF CUT	OVERALL LENGTH	NECK DIA	REACH	FLUTES	RADIUS	SHANK TYPE
03302634	AN335-0.500-E2-S.0-Z3A	1/2	1/2	3/4	3	0.470	1-1/4	3	-	CYLINDRICAL
03302637	AN335-0.500-E3-S.0-Z3A	1/2	1/2	3/4	3-1/2	0.470	1-3/4	3	-	CYLINDRICAL
03302640	AN335-0.500-E4-S.0-Z3A	1/2	1/2	3/4	4	0.470	2-1/4	3	-	CYLINDRICAL
03302643	AN335-0.500-E5-S.0-Z3A	1/2	1/2	3/4	4-1/2	0.470	2-3/4	3	-	CYLINDRICAL
03302646	AN335-0.750-E2-S.0-Z3A	3/4	3/4	1	4	0.720	2-1/8	3	-	CYLINDRICAL
03302651	AN335-0.750-E3-S.0-Z3A	3/4	3/4	1	4-1/2	0.720	2-5/8	3	-	CYLINDRICAL
03302656	AN335-0.750-E4-S.0-Z3A	3/4	3/4	1	5	0.720	3-1/8	3	-	CYLINDRICAL
03302662	AN335-0.750-E5-S.0-Z3A	3/4	3/4	1	5-1/2	0.720	3-5/8	3	-	CYLINDRICAL
03302667	AN335-1.000-E2-S.0-Z3A	1	1	1-1/4	4	0.960	2-1/8	3	-	CYLINDRICAL
03302672	AN335-1.000-E3-S.0-Z3A	1	1	1-1/4	4-1/2	0.960	2-5/8	3	-	CYLINDRICAL
03302677	AN335-1.000-E4-S.0-Z3A	1	1	1-1/4	5	0.960	3-1/8	3	-	CYLINDRICAL
03302635	AN335R-0.500-E2-R030.0-Z3A	1/2	1/2	3/4	3	0.470	1-1/4	3	0.030	CYLINDRICAL
03302636	AN335R-0.500-E2-R060.0-Z3A	1/2	1/2	3/4	3	0.470	1-1/4	3	0.060	CYLINDRICAL
03302638	AN335R-0.500-E3-R030.0-Z3A	1/2	1/2	3/4	3-1/2	0.470	1-3/4	3	0.030	CYLINDRICAL
03302639	AN335R-0.500-E3-R060.0-Z3A	1/2	1/2	3/4	3-1/2	0.470	1-3/4	3	0.060	CYLINDRICAL
03302641	AN335R-0.500-E4-R030.0-Z3A	1/2	1/2	3/4	4	0.470	2-1/4	3	0.030	CYLINDRICAL
03302642	AN335R-0.500-E4-R060.0-Z3A	1/2	1/2	3/4	4	0.470	2-1/4	3	0.060	CYLINDRICAL
03302644	AN335R-0.500-E5-R030.0-Z3A	1/2	1/2	3/4	4-1/2	0.470	2-3/4	3	0.030	CYLINDRICAL
03302645	AN335R-0.500-E5-R060.0-Z3A	1/2	1/2	3/4	4-1/2	0.470	2-3/4	3	0.060	CYLINDRICAL
03302647	AN335R-0.750-E2-R030.0-Z3A	3/4	3/4	1	4	0.720	2-1/8	3	0.030	CYLINDRICAL
03302648	AN335R-0.750-E2-R060.0-Z3A	3/4	3/4	1	4	0.720	2-1/8	3	0.060	CYLINDRICAL
03302649	AN335R-0.750-E2-R090.0-Z3A	3/4	3/4	1	4	0.720	2-1/8	3	0.090	CYLINDRICAL
03302650	AN335R-0.750-E2-R120.0-Z3A	3/4	3/4	1	4	0.720	2-1/8	3	0.120	CYLINDRICAL
03302652	AN335R-0.750-E3-R030.0-Z3A	3/4	3/4	1	4-1/2	0.720	2-5/8	3	0.030	CYLINDRICAL
03302653	AN335R-0.750-E3-R060.0-Z3A	3/4	3/4	1	4-1/2	0.720	2-5/8	3	0.060	CYLINDRICAL
03302654	AN335R-0.750-E3-R090.0-Z3A	3/4	3/4	1	4-1/2	0.720	2-5/8	3	0.090	CYLINDRICAL
03302655	AN335R-0.750-E3-R120.0-Z3A	3/4	3/4	1	4-1/2	0.720	2-5/8	3	0.120	CYLINDRICAL
03302657	AN335R-0.750-E4-R030.0-Z3A	3/4	3/4	1	5	0.720	3-1/8	3	0.030	CYLINDRICAL
03302658	AN335R-0.750-E4-R060.0-Z3A	3/4	3/4	1	5	0.720	3-1/8	3	0.060	CYLINDRICAL
03302659	AN335R-0.750-E4-R090.0-Z3A	3/4	3/4	1	5	0.720	3-1/8	3	0.090	CYLINDRICAL
03302660	AN335R-0.750-E4-R120.0-Z3A	3/4	3/4	1	5	0.720	3-1/8	3	0.120	CYLINDRICAL
03302663	AN335R-0.750-E5-R030.0-Z3A	3/4	3/4	1	5-1/2	0.720	3-5/8	3	0.030	CYLINDRICAL
03302664	AN335R-0.750-E5-R060.0-Z3A	3/4	3/4	1	5-1/2	0.720	3-5/8	3	0.060	CYLINDRICAL
03302665	AN335R-0.750-E5-R090.0-Z3A	3/4	3/4	1	5-1/2	0.720	3-5/8	3	0.090	CYLINDRICAL
03302666	AN335R-0.750-E5-R120.0-Z3A	3/4	3/4	1	5-1/2	0.720	3-5/8	3	0.120	CYLINDRICAL
03302668	AN335R-1.000-E2-R030.0-Z3A	1	1	1-1/4	4	0.960	2-1/8	3	0.030	CYLINDRICAL
03302669	AN335R-1.000-E2-R060.0-Z3A	1	1	1-1/4	4	0.960	2-1/8	3	0.060	CYLINDRICAL
03302670	AN335R-1.000-E2-R090.0-Z3A	1	1	1-1/4	4	0.960	2-1/8	3	0.090	CYLINDRICAL
03302671	AN335R-1.000-E2-R120.0-Z3A	1	1	1-1/4	4	0.960	2-1/8	3	0.120	CYLINDRICAL
03302673	AN335R-1.000-E3-R030.0-Z3A	1	1	1-1/4	4-1/2	0.960	2-5/8	3	0.030	CYLINDRICAL
03302674	AN335R-1.000-E3-R060.0-Z3A	1	1	1-1/4	4-1/2	0.960	2-5/8	3	0.060	CYLINDRICAL
03302675	AN335R-1.000-E3-R090.0-Z3A	1	1	1-1/4	4-1/2	0.960	2-5/8	3	0.090	CYLINDRICAL
03302676	AN335R-1.000-E3-R120.0-Z3A	1	1	1-1/4	4-1/2	0.960	2-5/8	3	0.120	CYLINDRICAL
03302678	AN335R-1.000-E4-R030.0-Z3A	1	1	1-1/4	5	0.960	3-1/8	3	0.030	CYLINDRICAL
03302679	AN335R-1.000-E4-R060.0-Z3A	1	1	1-1/4	5	0.960	3-1/8	3	0.060	CYLINDRICAL
03302680	AN335R-1.000-E4-R090.0-Z3A	1	1	1-1/4	5	0.960	3-1/8	3	0.090	CYLINDRICAL
03302681	AN335R-1.000-E4-R120.0-Z3A	1	1	1-1/4	5	0.960	3-1/8	3	0.120	CYLINDRICAL



NIAGRA CUTTER™ AN230 & AN335

PRODUCT SUMMARY & RANGE

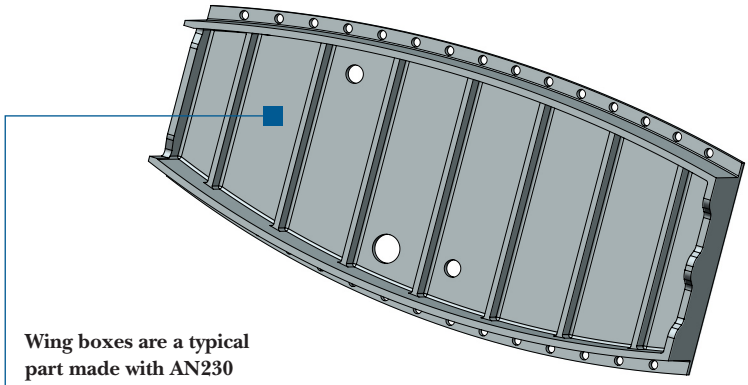
CUSTOMIZED SOLUTIONS FOR UNIQUE AEROSPACE CHALLENGES

MATERIAL GROUPS
Non-ferrous 16-17

Designed for high-velocity milling in the most advanced Aerospace aluminum slotting and profile milling applications, the standard range of AN230 and AN335 tools may also be modified to suit manufacturers' unique aerospace and heavy machinery applications. Our team experts can optimize radii and length for your end milling needs as well as provide coatings such as diamond-like carbon (DLC) and various non-ferrous solutions.

INDUSTRY TARGETS

- **Aerospace:** Large aerospace structural components such as wing box's fuselage panels and floor structures.
- **General Machining:** Support components such as brackets, flanges, jigs, and fixtures.



Wing boxes are a typical part made with AN230 and AN335 tools.

IMPACT	BENEFITS	ADVANTAGES	FEATURES
Minimize downtime with improved process reliability	Consistent tool life	Reduced friction and contact with chips	Polished K-lands
Increase chip evacuation at high MMR	Improves performance	Superior chip control	Radial coolant holes
Reduce cycle times with less required secondary polishing	Eliminates harmonics	Improves surface finish	Variable flute spacing

P-2001-3500 GT20-201

Niagara Cutter
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