SGS®
Solid Carbide Tools

AHB
TOOLING & MACHINERY

COMPLETE METALWORKING SOLUTIONS

(800) 991-4225
www.ahbinc.com
ISO Certified
customerservice@ahbinc.com

VALUE AT THE SPINDLE®

Aerospace Solutions

KYOCERA

www.kyocera-sgstool.com
ISO 9001:2015 Certified

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KYOCERA
KYOCERA SGS Tech Hub

SGS CUSTOM SOLUTIONS

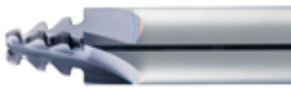
The KYOCERA SGS Tech Hub (KSTH) is a division of KYOCERA SGS Precision Tools Inc. created to focus on custom high-performance cutting tool solutions, while exploring emerging technologies. The state-of-the-art custom facility is designed with the purpose and resources to provide MORE than a cutting tool. KSTH provides a complete scope of services and works with customers to tailor solutions from conception to application and beyond.

KSTH works closely with the aerospace manufacturers through developing many new and innovative milling and drilling solutions, carbide grades, edge preparations, and coatings specifically to overcome the challenges faced by the aerospace market.

Our technicians develop specific special solutions on customer supplied components and testing requirements using the latest technology in testing applications.

KSTH provides quotation requests within a 24-hour period with aggressive deliveries.

Root Form Cutter (Bulb Tool) | Used to create the root form on a disc



Root Form Cutter (Christmas Tree Cutter) | A form cutter similar to the Root Form Cutter with a different form style

Step Drill | Used to create a hole as well as a chamfer or counterbore in a component

Back Chamfer Tool | Used to create a chamfer on the backside of a component

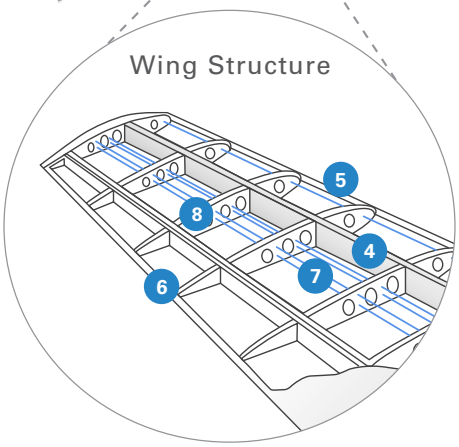
Combination Drill / Mill / Chamfer Tool | Used to create a hole and bring it to size while chamfering the top and bottom surfaces in a variety of hole making operations

Tight Tolerance Step Reamer | Used to finish and size holes in various operations

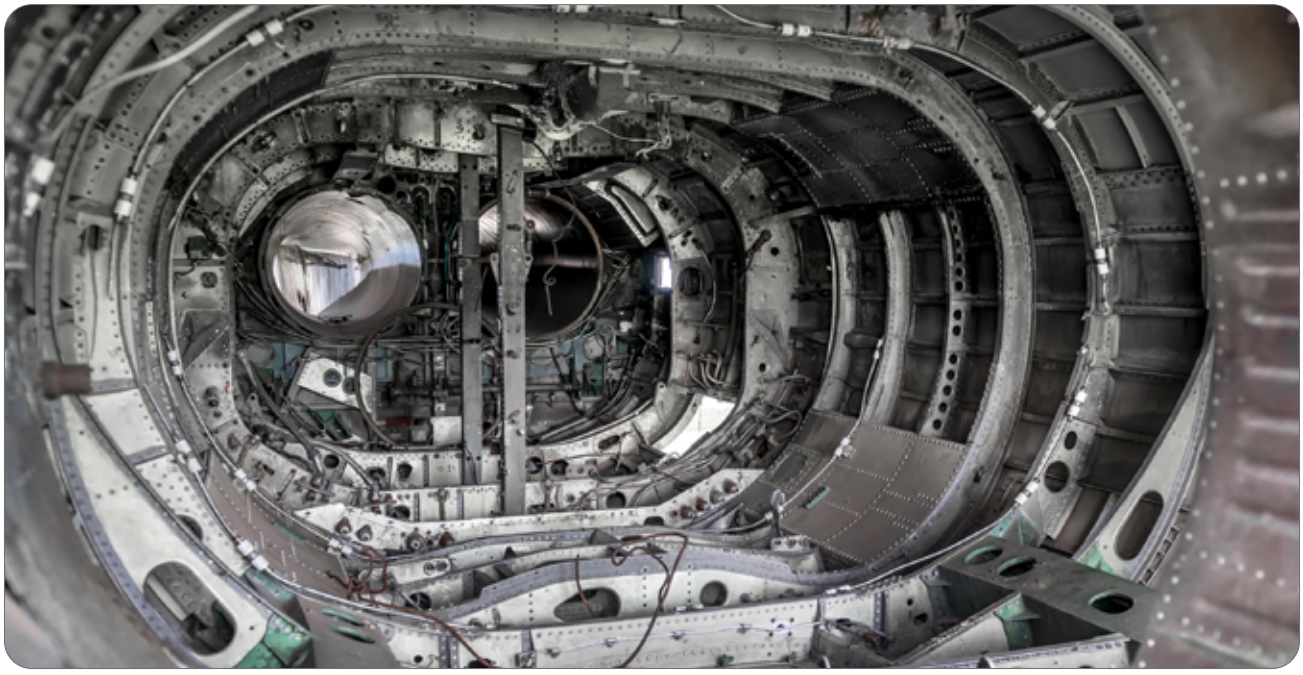
Tapered Neck Ball Mill | Used for reaching into contour mill components

T-Slot Cutter / Keyway Cutter | Used to create a track and/or groove in a part

AIRFRAME



1. Fuselage
2. Flap Track
3. Engine Pylon
4. Wing Spar
5. Leading Edge
6. Trailing Edge
7. Stringers
8. Ribs



FUSELAGE

MACHINING CHALLENGE

Small diameter drilling and milling can be a challenge in composite materials, where tools can become dull quickly. This can lead to burring and other poor quality finishes.

SGS TOOLING SOLUTIONS

Our up cut and down cut diamond pattern routers and micro drills provide excellent repeatability when machining CFRP, fiberglass, and composite materials without burrs, splintering, or fraying.

CVD and DLC diamond coatings are available as well as the up cut chipbreaker pattern routers for finer part edge finishes.

SGS TOOLING SOLUTIONS

NON-FERROUS

Series 31 Coarse Composite Router

Series 20 Carbon Composite Router

HiPerCarb® 131N Aluminum Drill

Series 120 CFRP Drill

M814 Micro Drill

Series 25 Compression Router

FLAP / SLAT TRACK

MACHINING CHALLENGE

Pocket milling in difficult-to-cut materials, such as 15-5 PH or similar stainless steels. Chip evacuation is critical in order to prevent the potential re-cutting or pinching of the high-strength chips that have become trapped in the pockets.

SGS TOOLING SOLUTIONS

STAINLESS STEELS

T-Carb® Series 51B Endmill

Z-Carb High Performance Rougher

H-Carb High Efficiency Endmill

ENGINE PYLON

MACHINING CHALLENGE

Rough milling of titanium, including heavy axial depths-of-cut in some slotting applications. Solid round cutting tools with low cutting force designs can be employed in these applications to maximize metal removal.

SGS TOOLING SOLUTIONS

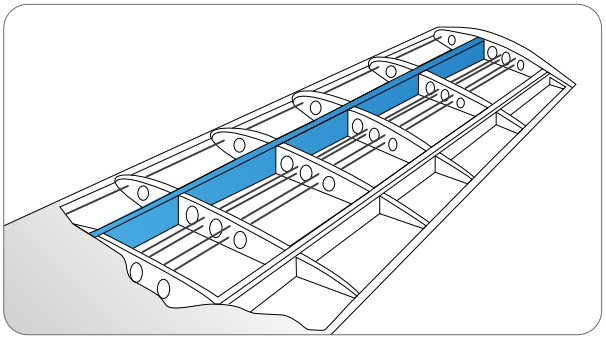
HIGH TEMP ALLOYS

T-Carb® Series 51B Endmill

Z-Carb High Performance Rougher

H-Carb High Efficiency Endmill

WING SPAR

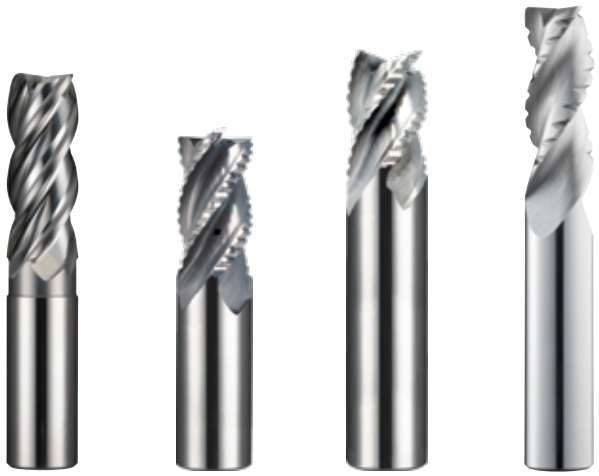


MACHINING CHALLENGE

Large Aluminum parts require heavy stock removal. Cutters capable of high metal removal rates are required. Cutting tools with serrated edges can be utilized effectively in wing spar applications.

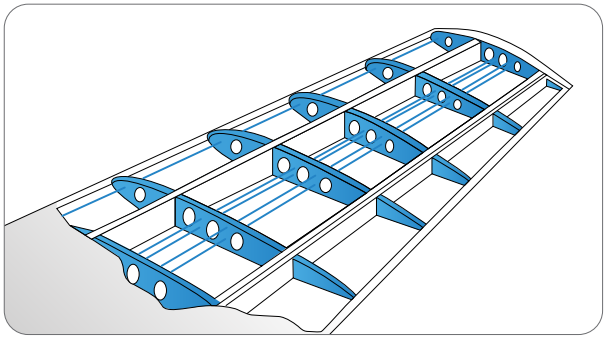
SGS TOOLING SOLUTIONS

NON-FERROUS



S-Carb® APF Endmill | S-Carb® APR-3 Endmill | S-Carb® APR-4 Endmill | S-Carb® Series 43CB Endmill

STRINGERS & RIBS

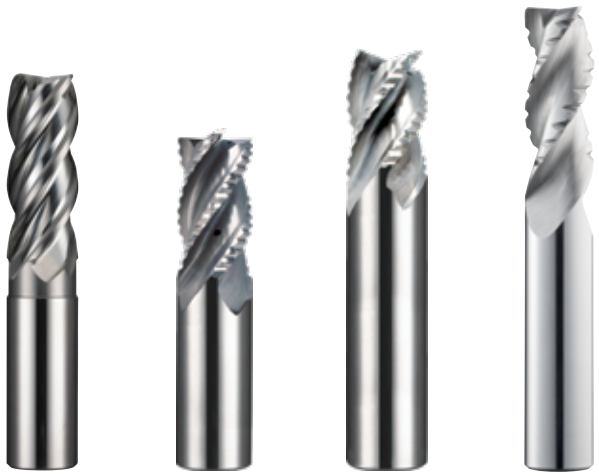


MACHINING CHALLENGE

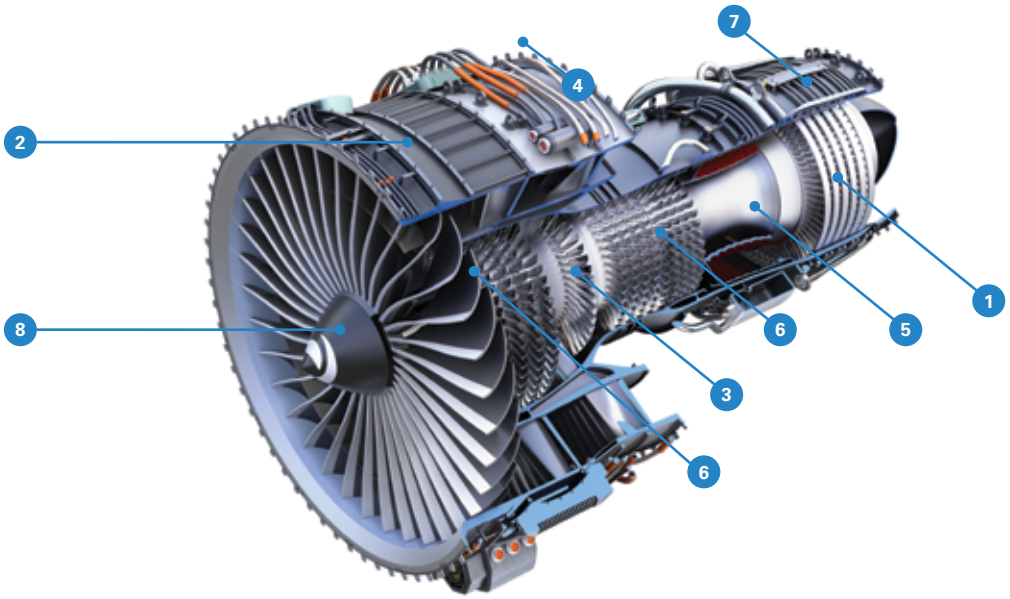
Heavy stock removal on workpieces that are difficult to fixture. Milling tools capable of high metal removal rates while generating low cutting forces are preferred.

SGS TOOLING SOLUTIONS

NON-FERROUS



S-Carb® APF Endmill | S-Carb® APR-3 Endmill | S-Carb® APR-4 Endmill | S-Carb® Series 43CB Endmill



1. Blades & Vanes
2. Stators
3. Blisks
4. Fan Casing
5. Spools
6. Turbine Disc
7. Combustion Casing
8. Hub

BLADES & VANES

MACHINING CHALLENGE

Thin cross sections create the challenge of chatter, especially when combined with limited work holding configurations. Cutters generating low cutting forces are required.

SGS TOOLING SOLUTIONS

STAINLESS STEELS

HIGH TEMP ALLOYS

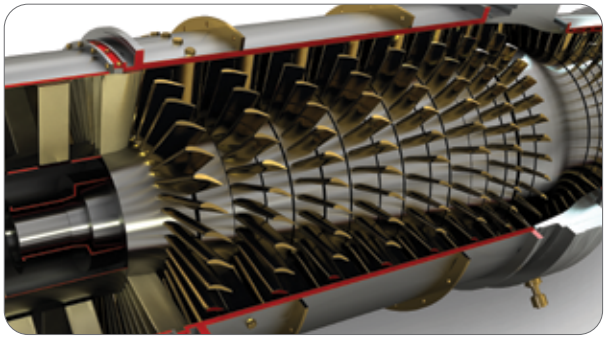
T-Carb® Series 51B Endmill

Tapered Circle Segment Barrel Endmill Series 67B

Z-Carb High Performance Rougher

H-Carb High Efficiency Endmill

BLISKS & STATORS



MACHINING CHALLENGE

Proper tooling is required to maximize the efficiency offered by advanced programming techniques. Variable helix end mills can be used effectively in these applications.

SGS TOOLING SOLUTIONS

STAINLESS STEELS

HIGH TEMP ALLOYS

T-Carb® Series 51B Endmill

Tapered Circle Segment Barrel Endmill Series 67B

Multi-Carb Series 66 Endmill

H-Carb High Efficiency Endmill

FAN CASINGS

MACHINING CHALLENGE

The combination of component shape and material make the casing a challenging component to machine. Thin walls create work-holding obstacles that can lead to chatter when excessive tool pressure is present. The casing is traditionally manufactured from Titanium alloys, which present an inherent challenge for increased heat at the cutting edge and potential for edge build-up.

SGS TOOLING SOLUTIONS

STAINLESS STEELS

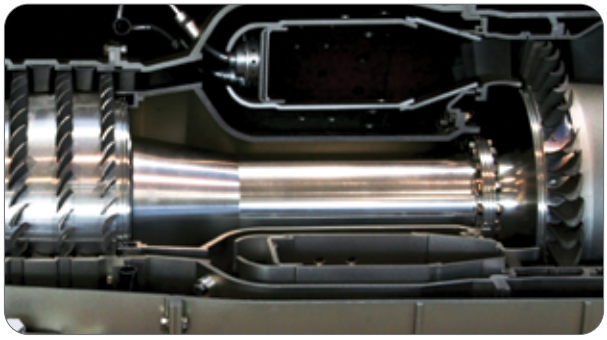
HIGH TEMP ALLOYS

T-Carb® Series 51B Endmill

Z-Carb High Performance Rougher

H-Carb High Efficiency Endmill

SPOOLS



MACHINING CHALLENGE

The jet engine spool is comprised of complex contours that require a high surface finish quality across the entire length of the OD and ID of this titanium part in order to pass ultrasonic inspections.

SGS TOOLING SOLUTIONS

STAINLESS STEELS

HIGH TEMP ALLOYS

Z-Carb Advanced Productivity Endmill

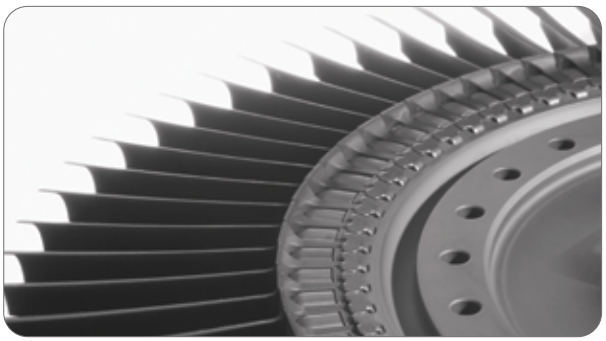
T-Carb® Series 51 Endmill

Z-Carb High Performance Rougher

HiPerCarb® 135 Drill

HiPerCarb® 143M-S HTA/ Stainless Steel Drill

TURBINE DISCS



MACHINING CHALLENGE

Plunging/facing applications become more challenging in heat-resistant alloys such as René, INCONEL®, WASPALOY®, and others. Cutting tools with good chipping and notch resistance are required.

SGS TOOLING SOLUTIONS

STAINLESS STEELS

HIGH TEMP ALLOYS

Z-Carb HTA Endmill

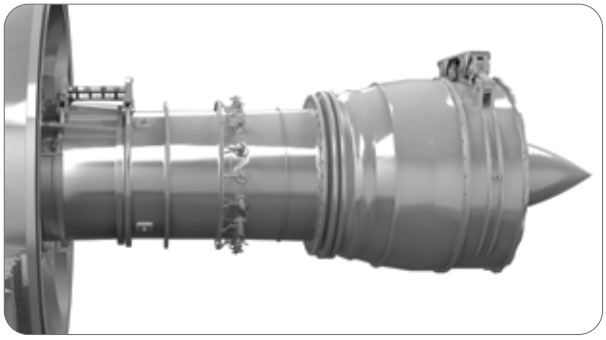
T-Carb® Series 51B Endmill

Tapered Circle Segment Barrel Endmill Series 67B

Z-Carb High Performance Rougher

H-Carb High Efficiency Endmill

COMBUSTION CASINGS



MACHINING CHALLENGE

Difficult materials, including René alloys, INCONEL® 718, WASPALOY®, Titanium, and the nickel-based Alloys. Similar to challenges presented by fan casings, with the addition of nickel-based alloys; workholding rigidity and tool pressure continue to be major machining factors.

SGS TOOLING SOLUTIONS

STAINLESS STEELS

HIGH TEMP ALLOYS

Z-Carb HTA Endmill

Multi-Carb Series 66 Endmill

Series M032 Micro End Mills

LANDING GEAR

MACHINING CHALLENGE

In the hardened state, 300M high-strength alloy steel presents the challenge of size control (holding diameter sizes over length of the part). Cutting tools with high wear resistance are necessary to prevent size variations or taper over the full length of cut.

SGS TOOLING SOLUTIONS

- STAINLESS STEELS
- HIGH TEMP ALLOYS
- STEELS

Z-Carb High Performance Rougher | T-Carb® Series 51B Endmill | Z-Carb Advanced Productivity Endmill | H-Carb High Efficiency Endmill | HiPerCarb® 143M-S HTA/ Stainless Steel Drill | HiPerCarb® 142P Steel Drill

FLOOR PANELS

MACHINING CHALLENGE

Honeycomb materials are utilized for their high strength to weight ratios. Thin walled cross sections of aluminum must be carefully machined to prevent tearing or compressing the material.

SGS TOOLING SOLUTIONS

- NON-FERROUS

S-Carb® 43 Endmill with Reach (Series 43L) | Series 25 Compression Router | Series 31 Coarse Composite Router | Series 20 Carbon Composite Router | S-Carb® APR-3 Endmill | HiPerCarb® 131N Aluminum Drill

WHEELS & BRAKES

MACHINING CHALLENGE

The wheels and braking systems are under a massive amount of strain during the braking process. These applications require a high surface finish quality involving complicated profiles inside the bore and thin walled sections. Size control is a challenge and cutting tools with high wear resistance are necessary to prevent size variations or taper over the full length of cut.

SGS TOOLING SOLUTIONS

STAINLESS STEELS | STEELS | HIGH TEMP ALLOYS | NON-FERROUS

Z-Carb High Performance Rougher

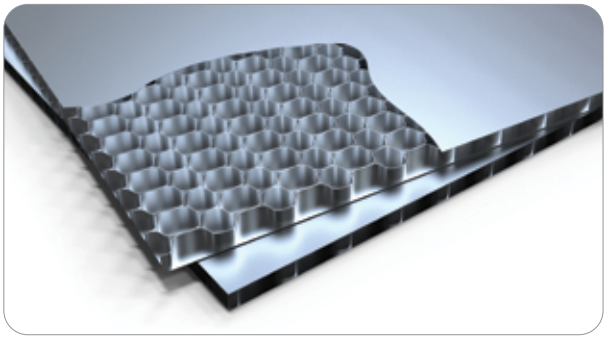
S-Carb® Series 43 Endmill

HiPerCarb® 143M-S HTA/Stainless Steel Drill

HiPerCarb® 142P Steel Drill

HiPerCarb® 131N Aluminum Drill

COMPOSITE MACHINING



MACHINING CHALLENGE

Laminate materials can tear easily and machinability can vary based on the composition of the individual layers as well as the full laminate itself. Tooling with sharp cutting edges and abrasive wear resistance are critical for the effective machining of this special class of materials.

SGS TOOLING SOLUTIONS

NON-FERROUS

Series 25 Compression Router

Series 20 Carbon Composite Router

Series 31 Coarse Composite Router

Series 120 CFRP Drill

Industry
Aerospace

Material
15-5 PH Stainless Steel
(275-325 Bhn Hardness)

Product
HI-PERCARB® 143M-S

Application
Drilling

Competitor
Comparable HP Drill

Coolant
Flood

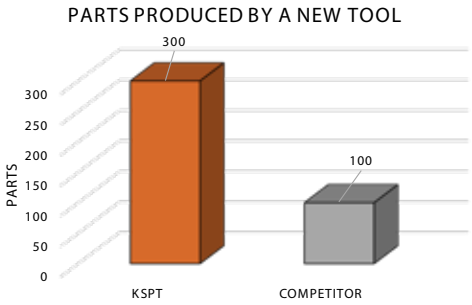
Tool Information
5.6mm DIA
28mm LOC
66mm OAL

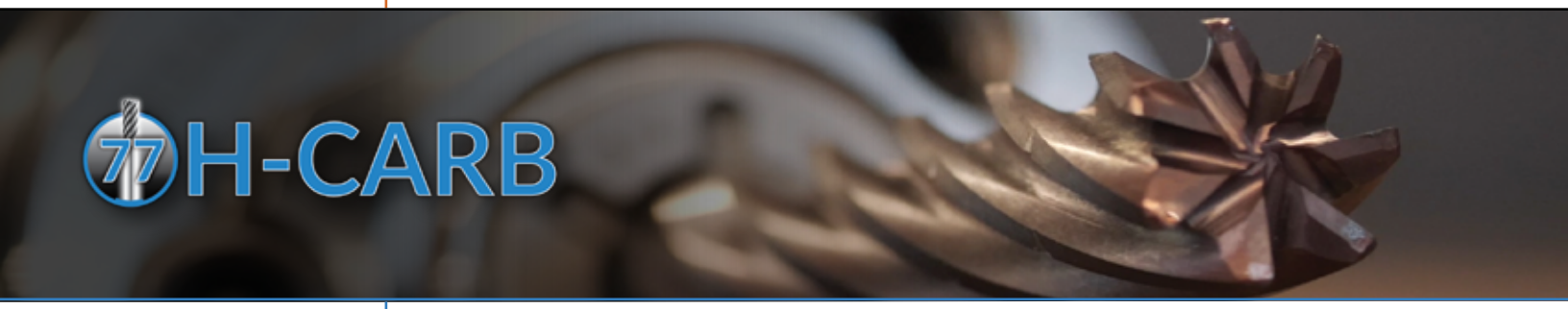
	KSPT	Competitor
TOOL DIAMETER	*.2200*	*.2200*
SPEED	*2365 RPM*	*1500 RPM*
FEED	*7.3 IPM*	*2.3 IPM*
AXIAL DEPTH (AP)	*.7500*	*.3000*
CYCLE TIME	*0:11 MINUTES*	*1:34 MINUTES*

Scan Code to See the HI-PERCARB® 143M-S IN ACTION!

Series 143M-S Drill Case Study

Adding the Hi-PerCarb® 143M-S internal coolant drill to the customer's tooling arsenal resulted in an 88% improvement in cycle time. The 143M-S was able to produce over 8 holes for every hole produced by the competitor's drill and the customer saw a 66% improvement in tool life. After the job was complete, the customer experienced a total cost savings of over $17,000 and a total cost reduction of 84%.





Industry
Aerospace

Material
13-8PH Stainless Steel
(42 HRc Hardness)

Product
Series 77 H-Carb

Application
High Efficiency Milling

Competitor
2″ Indexable Cutter

Coolant
Flood

Tool Information
5/8″ DIA
1-7/8″ LOC
4″ OAL

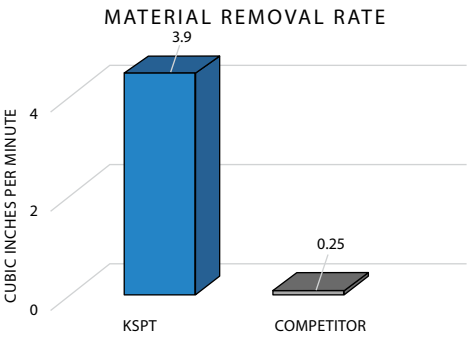
	KSPT	Competitor
TOOL DIAMETER	*5/8″*	*Indexable Cutter*
SPEED	*1700 RPM*	*500 RPM*
FEED	*35.7 IPM*	*5.0 IPM*
AXIAL DEPTH (AP)	*1-3/4″*	*.025″*
CYCLE TIME	*0:20 MINUTES*	*0:60 MINUTES*

Scan Code to See the Series 77 H-Carb IN ACTION!

Series 77 End Mill Case Study

Cycle time using the H-Carb was more than 3 times faster and the feed rate was increased nearly 5.5 times over the competitor's indexable cutter in this application.

The H-Carb produced almost 4 times as many parts per tool, with a 1,460% improvement in material removal rate resulting in an overall annual cost savings of $114,663.



COATINGS

Ti-NAMITE® Tool Coatings are specifically engineered for SGS solid carbide rotary tools. The Di-NAMITE® coating lineup includes proprietary processes that result in optimized tool life and increased speed and feed rates in a variety of applications.

	Coating	Identifying Color	Layer Structure	Thickness	Hardness (HV)	Coefficient of Friction (Fretting)	Thermal Stability	General Information
Ti-NAMITE®	Titanium Nitride (TiN)	gold	Multilayer	1–5 microns	2200	0.40–0.65	600°C / 1112°F	A general purpose coating with good adhesion and abrasion resistant properties. Suitable for a wide vacopper
Ti-NAMITE-A®	Aluminum Titanium Nitride (AlTiN)	dark grey	Nano structure	1–5 microns	3700	0.30	1100°C / 2010°F	Excellent thermal and chemical resistance allows for dry cutting and improvements in performance of carbide. The coating has a high hardness giving great protection against abrasive wear and erosion.
Ti-NAMITE-B®	Titanium DiBoride (TiB2)	light grey-silver	Monolayer	1–2 microns	4000	0.10–0.20	850°C / 1562°F	This ceramic based coating ensures a smooth surface and a low affinity to cold welding or edge build up, which makes it optimal for aluminum and copper applications. It has high toughness and high hardness.
Ti-NAMITE-C®	Titanium Carbonitride (TiCN)	pink-red	Multilayer	1–5 microns	3000	0.30–0.45	400°C / 752°F	A very wear resistant coating with high toughness and shock resistance. Good in interrupted cuts found in applications like milling.
Ti-NAMITE-X®	Proprietary (TX)	black	Nano Composite	1–5 microns	3600	0.45	1150°C / 2100°F	The structural design of Ti-Namite-X is adapted to meet a diverse range of applications; everything from high- and low-alloy steels to hardened materials (up to 65 HRC core hardness). Ti-Namite-X is suitable for operations which require high cutting speeds, high temperatures at the cutting edge, and high metal removal rates.
Di-NAMITE®	Crystalline Diamond (Diamond)	black	Monolayer	6–20 microns	>8000	0.15–0.20	800°C / 1470°F	This is the hardest coating available with the best abrasion resistance. It is carbon based so it is limited in application capabilities. This coating is suitable for machining highly abrasive, non-ferrous materials such as CFRP and graphite.
Ti-NAMITE-M®	Proprietary (TM)	copper	Nano Composite	1–5 microns	3600	0.45	1150°C / 2100°F	Features include high wear resistance, reduced friction, and excellent prevention of edge build up. This coating provides superior material removal rates and tool life when used in high performance operations with difficult to machine materials like titanium.
Ti-NAMITE-H®	Proprietary (TH)	copper	Nano Composite	1–5 microns	3800	0.30	1100°C / 2010°F	This coating demonstrates a superior combination of hardness and adhesion in hard machining of molds and dies and machining high-alloy stainless steels for high temperature applications such as turbines. The smooth surface ensures optimum surface quality and decreases the temperature in the cutting zone by reducing friction.

SOLUTIONS AROUND THE GLOBE

KYOCERA SGS Precision Tools is an ISO 9001:2015 Certified leader of round solid carbide cutting tool technology for the aerospace, metalworking, and automotive industries with manufacturing sites in the United States and United Kingdom. Our global network of Sales Representatives, Industrial Distributors, and Agents blanket the world selling into more than 60 countries.

LEADERS IN SOLID CARBIDE TOOL TECHNOLOGY

Brand names such as Z-Carb, S-Carb®, V-Carb, Hi-PerCarb®, Multi-Carb have become synonymous with high performance tooling in the machining and metalworking industry.

We're proud to have pioneered some of the world's most advanced cutting technology right here on our Northeast Ohio manufacturing campus. KSPT high performance end mills, drills and routers are increasing productivity and reducing cost around the world.

EXCEEDING CUSTOMER EXPECTATIONS

As the world's manufacturing needs change, so does KSPT. It's all about the science, starting with our lab inspected substrate materials to our tool designs and coatings. Our exceptional team of researchers, engineers, and machinists are dedicated to developing the absolute best and delivering the ultimate Value at the Spindle®.

- Incredible batch-to-batch consistency
- Metallurgical lab dedicated to testing and rigorous quality control
- ISO 9001:2015 Certified quality procedures
- Patented geometries that extend tool life, reduce chatter, cut cycle times, and improve part quality—even at extreme parameters
- Specialists in extreme and demanding product applications
- Comprehensive tooling services
- Experienced Field Sales Engineers who work to optimize a tool for your particular application
- Dedicated multi-lingual customer service representatives

SGS PRODUCTS ARE DISTRIBUTED BY:

www.kyocera-sgstool.com

SGS® Solid Carbide Tools

VALUE AT THE SPINDLE®

KYOCERA SGS Precision Tools
150 Marc Drive
Cuyahoga Falls, Ohio 44223
U.S.A.

KYOCERA SGS Tech Hub
149 Slayton Avenue
Danville, Virginia 24540 U.S.A.

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