YG-1 AND THE AEROSPACE INDUSTRY – AN INNOVATION STORY

Each industry in manufacturing presents multiple challenges, and today Aerospace manufacturing industry is no stranger to challenges. Working with materials (Carbon, glass, Kevlar, … fibers reinforced plastics) in multiple applications, including primary structures such as airframes and many engine and non-structural parts, Titanium in structural frame and working components, Inconel in engine parts located in “hot” zones of the engine, and aluminum in airframe and other critical and non-critical components. YG-1, working with Aerospace OEM’S, machine tool builders, tier one, two and three for composite (CFRP) parts have developed “best in class” products, processes and relationships that drive success. These relationships built over time, are designed to bring you the most cost effective and secure solutions available today.

YG-1, as a global leader in the manufacture and application of cutting tools, brings you these innovations in the form of superior tooling, expert support and world class delivery, worldwide.
AIRFRAME

Aluminum

For generations, aircraft manufacturers have produced airplanes using the lightest possible materials available. Many of these airframe, structural and non-structural components are made from Aluminum Alloys. YG-1 addresses the challenges facing the machining of aluminum head on with ALU-POWER HPC, SPADE DRILL and DREAM DRILL ALU.

This product addresses milling / drilling challenges such as smearing, heat build-up and poor finishes with an all new geometry, specifically made to reduce tool pressure, provide an escape path for chips, creating excellent chip evacuation, and coatings like DLC and micro grain substrates for extended tool life. Providing the needed geometries with polished flutes, extended length tools for better reach, corner radii selections, neck tools, and coolant through options, YG-1 covers your needs for aluminum, and also needs for larger diameter tools with even HSS and HSSCo tooling too. Drilling requires the same attentions, where SPADE DRILL and DREAM DRILL ALU, will give you the performance needed while drilling.

ALU-POWER HPC – Your Choice in Milling Aluminum.

DREAM DRILLS ALU

Drilling and hole making require special attention to detail. Whether you are drilling blind or fine finishing you will want the features that DREAM DRILL ALU offer. Built to fit the needs of the Aerospace market, DREAM DRILL ALU utilizes special point geometry, margin relief and polishing to make chips flow, making hole accuracy and penetration rates well above standard.

YG-1 AEROSPACE SOLUTIONS
Composites

**DRILLING CFRP AND CFRP / METAL STACKS**
Unique challenges are faced when drilling CFRP and CFRP / METAL STACKS. Delamination, fiber pull out, and tool life issues plague these processes. In new generation aircrafts, CFRP / CFRP / ALUMINUM, CFRP / TITANIUM, are most common and YG-1 has developed a series of drills including straight drills, combo drill-countersink and countersinks. YG-1 covers the drilling processes, most used including, gantries with 3, 4, or 5 axis, robot end effectors, power feed machines and hand held. YG-1 drilling products are performing with high production rate and providing the lowest cost per hole – while maintaining the highest standard in quality. **D-POWER** – Your choice in drilling CFRP.

**MILLING, TRIMMING AND CUTTING CFRP PARTS**
Most CFRP parts need trimming and cutout prior to assembly in the aircraft. These processes are prone to leave you with more delamination and fiber pullout. Dust evacuation and tool life are key components to successful CFRP manufacturing. Understanding this, YG-1 developed a wide range of CFRP End Mills starting from the chip breaker, to the compression, to the helical flute to the one shot rough and finish End Mills series. With this investment in tooling for trimming and cutout, YG-1 is serving customers in all platforms, with all types of machines, with high degree of technical support. **D-POWER** – Your choice in milling / trimming CFRP.

**CFRP CUTTING TOOLS INNOVATION**
CFRP materials are known by their inhomogeneous nature, anisotropic and abrasive properties, therefore YG-1 has developed a process to study tool material type and geometry to prevent any part defects due to the drilling or trimming process, and optimize the tool life. By developing the best carbide, matched with innovative processes in CVD coating done in-house, YG-1 can maintain its leading position in CFRP machining. **D-POWER** – Your choice in cutting CFRP.
Inconel • Titanium • Stainless Steel • Steel • Nickel Superalloys

High Temperature Alloys, Structural and Stainless Steel are the backbone of aircraft engines. Where heat has nowhere to go, these materials pose specific challenges in thermal transfer of heat in the cutting process. While most materials carry heat away in the chip, heat resistant alloys do not. Sharp cutting edges, superior coatings and finishes help deflect the heat. Processes developed to minimize the arc of engagement and added flutes also help in heat dissipation. Slotting, roughing and finishing are faced by YG-1’s double core technology - TITANOX and provides the strongest tool available with the latest coatings and superior carbide grade. V7Plus is the choice in variable helix, variable pitch corner radius options and length options when double core is not needed. DREAM DRILL INOX – Specifically made to tackle those difficult to machine materials available in 3, 5 and 8xD.

THREADED MILL
Solid Carbide Thread Mill with and without Coolant Hole
A Thread mill can produce various thread diameters with the same pitch and it is multi usable for blind holes and through holes and for left hand threads. The biggest benefit is decrease costs and eliminate the possibility of threading rework due to broken taps.

DREAM DRILL INOX
YG-1 Tailored TiAIN-Coated Solid Carbide Drills (with Coolant Holes) for Tough Materials like Stainless Steels, Nickel Alloys and Titanium
The staple of YG-1. Drilling made simple and cost effective. Drill point geometry, advanced flute design, coolant through and coating will give you both security and simplicity in hole making.

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Titanium Alloy • Stainless Steel • Pre-Hardened Steel

Titanium, stainless steel and pre-hard steel wrap up the aircraft experience. Smearing and sticking, part distortion while roughing, poor surface finishes and chip evacuation along with tool life are very mentionable challenges in these materials. Components of pre-hard material can reach up to 60Rc and require a process and tool all alone. X5070 was developed with this material in mind, capable of machining materials up to 70Rc. Uniquely qualified this product was designed to hold up to your hard component needs. 4, 5 and 6 flute versions of both V7Plus and TitanNox will cover your solid carbide End Mill needs. TitanNox – Double core technology allows for slotting and finishing with a strong, reliable performance in Ti and stainless steel. V7Plus can handle the stainless steel, steel up to 45Rc. Hole making, suffering the same challenges can be met with DREAM DRILL INOX and 2 variations of insert drills, SPADE DRILLS and i-One DRILLS, developed with these application in mind.

V7 Plus
Y-Coated Solid Carbide End Mills for Steels, Cast Irons, Stainless Steels
The work horse of the End Mill line with the most options, in variable flute, variable helix, corner radius, neck tools, flute options and geometries of all kinds for your steel, stainless, iron needs.

TitanNox Power
Y-Coated Solid Carbide End Mills for Titanium, Stainless Steels, Inconel
True Double Core technology plows through your roughing and semi-finish to finish needs in difficult to machine Ti and stainless applications. Multiple flute options and radii.

X5070
Blue Coated Solid Carbide End Mills for High Hardened Steels
It’s in the name – designed to cut materials between 50Rc and 70Rc; the newly designed workhorse cuts through these heat-treated materials where others tool fail. X5070 is superbly engineered to cut finer finishes, rough hardened steels and stainless steels, and finish processes previously left to grind.

i-One DRILLS
YG-1’s newest addition to the Dream Drill line. Simple indexable insert, with all of the geometry of a solid carbide and the economy of throw-away inserts. i-One Drill will cover your 3, 5, and 8D needs.

DREAM DRILL INOX
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Synchro Tap
Combo, Synchro, Hand, STL, Prime – Tapping in today’s materials and applications take an enormous amount of engineering. Today, at YG-1 engineering is in the forefront of tap manufacturing. With world class design and support – combined with expedited specials production YG-1 understands that tapping is one of the most important features supported today. YG-1 can produce the tapped hole you require, promptly, accurately, and cost effectively.

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LANDING GEAR

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TOOL HOLDERS

High Performance Tool Holders
Produced to today’s highest standards, HSK, CAT, BT, Straight, etc.
Tool holders and related accessories support the YG-1 product line-up. Dynamic Hydraulic, superior balancing,
End Mill holders and Milling Chucks all produced with accuracy, rigidity and simplicity in design.

YG-1 Tool holders complete the machining package

SPECIALS

Custom Solutions to Your Needs
With up to 40% of all tooling used to manufacture aircraft today requiring specials, YG-1 is committed to an engineering, technical and production staff that can design and apply this unique tooling.
Through experience and know-how, situated in the heart of densely populated manufacturing areas, YG-1 has built specials facilities that are staffed with these professionals. With decades of experience and the most talented workforce, YG-1 produces the specials that meet your demands.