

# CINCINNATI TECHNOLOGIES

## WHERE INNOVATION TAKES FLIGHT

Since 1884, Cincinnati has been building quality machine tools and helping the world's leading aerospace manufacturers produce superior parts at lower cost. Today, with the combined strengths of **Cincinnati Machine, Giddings & Lewis** and **Cincinnati Automation & Test**, we continue to expand our horizons and partner with the aerospace industry to help the next generation of ideas take flight.

**Regional agent for Singapore, Malaysia and Indonesia**



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**CINCINNATI TECHNOLOGIES**  
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### High-Speed Aluminum Processing

Cincinnati Machine offers the broadest range of products for high-speed processing of aluminum. Whether you're machining aircraft engine components or structural parts, our machines deliver the speed, precision and agility needed for maximum throughput. Cincinnati aluminum processing machines are specially designed to produce highly accurate parts with superior surface finish eliminating scrap and unnecessary operations providing the most cost-effective processing method.

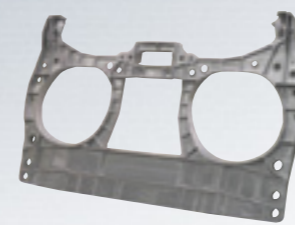
Today, Cincinnati equipment can be found across the globe processing thin wall aluminum components of all shape and sizes. The HyperMach™ linear motor profiler is achieving the highest metal removal rates in production anywhere – 460 in<sup>3</sup>/min (.30 m<sup>3</sup>/min).

Our modular machine designs are flexible and easily customizable, so you can choose the machine best suited for your aluminum processing requirements.



### Titanium and Hard Metal Processing

Titanium brings tremendous advantages to aircraft construction — compatibility with composite materials, lightweight, great stiffness, strength, heat- and fatigue-resistance. Cincinnati Machine has long provided superior machine tools for efficient processing of this tough metal and together with our extensive experience, we consistently deliver long-term, reliable operation. Our newest machines are designed for rigidity and stiffness while utilizing special features that enable optimized cutting performance.



We specialize in helping manufacturers choose not only the right machine but also work with you in selecting tools, fixtures

and machining techniques – all critical elements in machining Titanium.

Our experience doesn't stop with Titanium. Cincinnati machines are well-suited for other hard metals including steel and nickel alloys such as Inconel. You can rely on our quality machine tools and processing expertise to help you muscle your way through the toughest metals.

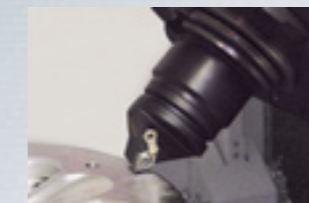
### Vertical Turning and Mill Turning

Jet engine manufacturers have relied on Giddings & Lewis vertical turning centers for decades. The VTC's precision and flexibility make them a productive choice for a wide range of aerospace parts. The high dynamic stiffness of the hydrostatic ram and the true positioning capabilities of the cross slide elevation and clamping system are just two features which add to the accuracy of G & L vertical turning centers. The live spindle, a multi-tasking option, is capable of milling, drilling and tapping operations.

A right angle head can perform live spindle operations on the sides of parts without a second setup.

Choosing the C-axis option provides full contouring with the 360,000 position table. Full X-axis travel optimizes cutting time by allowing manufacturers to cut from both sides of center.

Cincinnati Machine's GEMINEX Series of multi-tasking machining centers offers a flexible solution for processing medium and large parts requiring milling and turning in a single set-up. These machines maximize productivity by combining 4- and 5-axis machining and high-speed turning capabilities using our proven and highly reliable H5 horizontal machining center platform.



Both Giddings & Lewis VTCs and

Cincinnati Machine GEMINEX eliminate the need for additional setups, reducing manufacturing costs while improving accuracy.

### Automated Composites Processing

Automated Composites processing equipment is enabling sweeping changes to take place in the way new aircraft are designed and built. Cincinnati Machine is the undisputed leader in this technology. With nearly 100 installations around the world, we have more installed machines than the combined total of all other suppliers for this equipment. Our experience and advanced R&D in this field has produced a steady stream of innovative machine designs. Today, Cincinnati Machine customers can choose from the most comprehensive line of Automated Composites products, technologies and support services.

Cincinnati Machine offers several options for fast, precise lay-up including new techniques for automating the entire manufacturing process resulting in significant cost savings over conventional methods. Additionally, our composites-specific CNC and software solutions simplify the programming and processing of high quality parts.

We are the pioneer in Tape Laying, offering high and low rail models in flat and contour configurations accommodating tape widths up to 12 in (300 mm).

Our VIPER® Fiber Placement Systems feature seven axes of motion to provide a one-step fabrication process for the manufacture of solid or core contour and concave parts. Cincinnati Flat Charge Laminators deliver superior lay-up rates in production of long, thin structural parts such as stringers, spars and beams.



### Automated Assembly, Systems Integration and Testing

World-class producers of aircraft and aircraft components are now seeing the cost savings and accuracy improvements that can be achieved utilizing manufacturing practices that were once only used in automotive manufacturing. Our Cincinnati Automation & Test business is leveraging its automotive expertise to tailor solutions for the aerospace industry. We have successfully designed, built and installed systems for some of the most respected aerospace manufacturers.



Cincinnati Automation & Test offerings include composite forming, material handling and fixturing solutions employing standard, flexible or customized solutions to satisfy specific manufacturing challenges and ergonomic needs.

### Horizontal Boring

Giddings & Lewis boring mills are known for their robust design and large capacity. From X-braced columns to high-performance way systems, G & L boring mills are rigid cutting platforms that allow heavy metal removal at a high level of precision. The traveling-column configuration easily handles long parts such as landing gears or flap tracks. Modular in design, the machines offer the flexibility to fit the



machine to the application. One of the headstock choices, a four-speed headstock with high-torque is effective for titanium or Inconel applications.

Use of contouring heads or programmable boring bars enhance machining versatility by adding turning operations and the ability to machine complex geometries deep inside a part.

