



The addition of a Prima Power Laserdyne 795XL fiber laser system has expanded Hi-Tek's fabricating capabilities and accuracy.

Hi-Tek Adds Fiber Laser Processes

Product features wide application, size range for precision drilling

▶ Hi-Tek Manufacturing Co., a Mason, Ohio, U.S.A.-based company specializing in products for the hot gas paths of turbines, recently expanded its fabricating capabilities with the addition of a Prima Power Laserdyne 795XL fiber laser system.

The 795XL integrates a 12 kW fiber laser, which improves drilling and cutting for selected applications, and requires lower input power for a given level of average output power and less cooling.

The Laserdyne system's Beam-Director 3 uses a contouring head design with C-axis (rotary) motion of 900°, and D-axis (tilt) motion of 300°. Hi-Tek said it features an encoder design with improved accuracy and repeatability, higher assist gas airflow, adjustable mirrors for easy and accurate beam alignment and cassette-mounted lens

and cover slides for quick, accurate changeover.

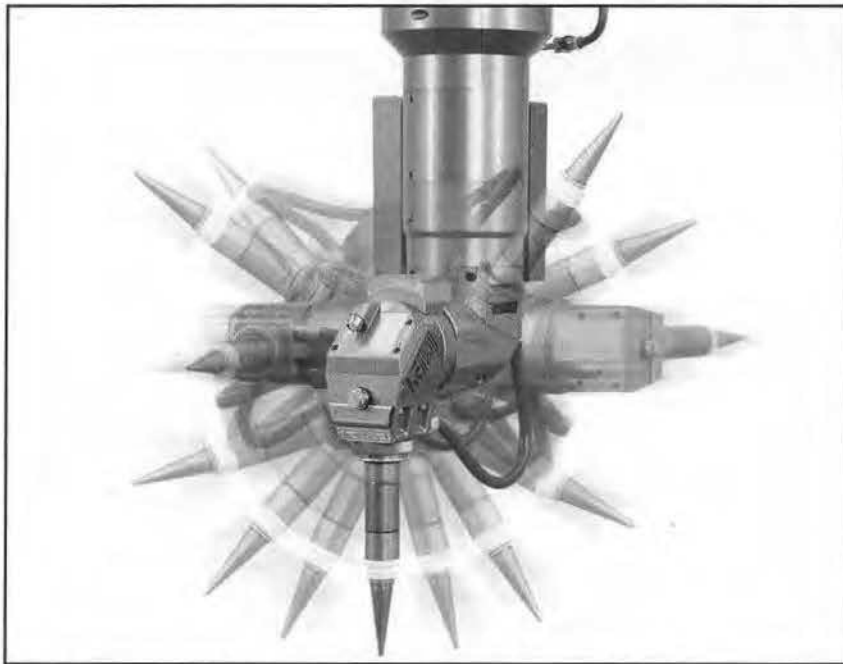
According to Scott Stang, manufacturing technology manager for Hi-Tek, the Laserdyne fiber equipped laser system presents manufacturing opportunities.

"We're using the Laserdyne fiber laser to percussion drill, trepan, cut and weld," Stang said. "Products range in size from small military aircraft engine applications to large distributed energy turbines and all applications in between. Many of the components require a combination of cooling hole drilling and complete assembly including fitting and laser welding of sheet metal components. Increasingly, these parts may have a thermal barrier coating applied before cooling holes are drilled with the fiber laser. Many components require assembly, including vacuum brazing along

with heat treatment, before they are shipped to customers."

Hi-Tek processes high-temperature materials including Haynes 625 alloy 188, 230 and 718. Material thickness ranges from 0.0127 to 1.27 cm. In addition to drilling these materials, Hi-Tek's six-axis laser system cuts and welds medium to large 3-D parts with combined high velocity and acceleration.

"We deal with many different material specifications, and almost all are high-temperature nickel- or cobalt-based alloys," Stang said. "Many parts are precision castings, some forgings and some sheet metal parts ranging from .005 cm thick up to 1.27 cm thick. Many parts are TBC coated. Part runs are all across the map — from a one-piece lot size up to production runs that last as long as six months without shutting down. What is typical of most of our customers



The full multiaxis laser beam motion of the Laserdyne 795XL allows processing at complex angles.

is that their needs change rapidly and we have to change with them."

Hi-Tek also utilizes Laserdyne YAG and CO₂ lasers as part of its manufacturing systems. The company said that

Laserdyne's software and hardware for part mapping and focus control enhance both the quality and cycle times compared to traditional methods of production. An example is the SP94P

control, which includes as a standard feature a full complement of dedicated hardware and software features including automatic focus control for capacitive part sensing; patented optical focus control (OFC) for sensing of thermal barrier coated surfaces; ShapeSoft software for programming shaped holes; breakthrough detection for drilling clean, consistent holes with the minimum number of pulses; and multibuffer capable mapping.

The OFC/AFC precisely guides the motion system, maintaining critical focus position and following the contour of the part regardless of slight surface irregularities, the company said.

Stang said the fiber laser system operates at up to 20 m/min in all axes with bidirectional accuracy of 12.7 micrometers, adding that this is accurate throughout the system's 2 m x 1 m x 1 m work envelope. Accuracy of the system is certified to ISO 230-1:1996 and 230-2:2006 in accordance with Prima Power Laserdyne's standard accuracy and repeatability test procedures, Hi-Tek said. ♡

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