

For Immediate Release

News About: Mitsui Seiki USA, Inc.

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Cut From 1.5" to 35" Spiral Bevel Gears on Mitsui Seiki Machining Centers

[FRANKLIN LAKES, NJ – JULY 2009] According to Mitsui Seiki USA, Inc., several of its customers are successfully cutting 10- 14 class ring gears in low to mid-volume applications, such as for aerospace and power generation, on its CNC vertical and horizontal machining centers. Traditionally, manual gear hobbers or CNC gear cutting machines are employed, however compelling benefits are surfacing in certain applications using highly precise machining centers. In particular, Mitsui Seiki's Vertex machine is suitable for ring gears up to 16" and a special gear making model incorporates a rotary trunnion table for the finish turning operations.

"This machine can turn the gear faces, the final profile of the internal bore, and generate the gear teeth," says Mark Speier, Sales Engineer at Mitsui Seiki.

On one of its largest precision 5-axis machining centers, the HU80A-5X, users are producing spiral bevel gears up to 35". "One of the benefits of producing gears on that machine is that the relative gearboxes or gear cases, and even reduction gear boxes, can also be processed on this one machine," adds Speier. "The gear housing is a critically precise piece. The accuracy of both parts has a direct correlation to the transmission performance over the life of the motor. The end product reliability is a positive factor, too. Further, the gear is mounted flat and then turned up 90° (or another angle) so that the end mills can cut at the optimum attitude to the gear profile. This results in excellent roughing efficiencies. For finishing, ball nose end mills generate the final profile before heat treating."

Mitsui Seiki's initial foray into gear cutting involved cutting the gear teeth, roughing, and semi-finishing operations prior to heat treating. Now, by adding turning operations to the Vertex machine, accuracies have improved through the single setup for all operations. The company anticipates turning functionality will be available on the HU80A-5X in about 6 months.

“The traditional gear cutting machines may run faster,” concedes Speier, “however the tooling economics, improved accuracy through one setup machining, and improved process control, the overall cost may be advantageous, especially in low volume runs. Plus, this application may enable our current gear making customers to get more use out of their Mitsui Seiki 5-axis machining centers. Our knowledge base is growing exponentially in this area.”

One of the key aspects to successful gear cutting on a Mitsui Seiki machining center is software. CNC Software, Inc., developers of Mastercam® has generated the optimum toolpaths for spiral bevel gear cutting and has been an integral partner in this area with Mitsui Seiki.

For more information, contact Mitsui Seiki USA, Inc.’s regional office in Michigan at (734) 922-2706, or email Mark Speier at mspeier@mitsuiseiki.com.

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Photo captions:

Vertex Bevel Gear Cutting: Spiral bevel gears up to 16” can be cut on Mitsui Seiki’s Vertex 5-axis machining center equipped with a trunnion rotary table. With this configuration up to three turning operations can be accomplished, along with milling the flat surfaces and teeth prior to heat treating.

HU80 Bevel Gear Cutting: Spiral bevel gears up to 35” can be cut on Mitsui Seiki’s HU80A-5X Horizontal Machining Center. The plus with this machine is the gear is mounted flat and then turned up 90° (or other angle) so that the end mills can cut at the optimum attitude to the gear profile. This results in excellent roughing efficiencies. Further, the gear housings, reduction gear boxes and other relative parts to the actual gear can be produced on a single machine.