

# Job Shop Combines Waterjet Cutting with EDM



Jack McGrail is so confident of his job shop's abilities and those of his OMAX® abrasive waterjet cutting systems that he will, every once in a while, cut a potential customer's part for free just to prove the point. And in those rare occasions when he does, the scenario typically involves parts that the customer is convinced should be done on the shop's wire EDM equipment.

Abrasive waterjet cutting and wire EDM work are the specialties of Jack's Machine. McGrail noted that what motivated him to venture into abrasive waterjet cutting was the fact that a large portion of the shop's wire EDM work could be processed much faster using abrasive waterjet cutting. As a result, the shop continues to process

additional parts on its OMAX abrasive waterjet cutting systems and takes on more high-production jobs.

With its OMAX abrasive waterjet equipment, Jack's Machine easily and consistently holds overall part sizes to  $\pm 0.003$ " and cuts extremely square edges with surface finishes as smooth as 64 Ra. Plus, the shop does a lot of medical instrument parts, and abrasive waterjet cutting them eliminates the occurrence of heat-affected zones and edge stress typically associated with conventional machining methods, both of which can compromise part integrity.

Jack's Machine has an OMAX 2652 JetMachining® Center and an OMAX 55100 JetMachining Center. Both machines are equipped with OMAX Tilt-A-Jet® taper-reduction accessory, Intelli-MAX® Software-based control and 30 hp high-energy direct drive pumps for 55,000 psi cutting capability.

The shop's OMAX 2652 is a mid-sized cantilever-style machine. It has, as standard, a MAXJET® 5i Nozzle and programmable Z-axis movement. With a completely sealed and protected Ball Screw Drive System, the machine provides an X-Y cutting travel of 52" x 26" paired with a table size of 69" x 30".

As a large cantilever-style machine, the OMAX 55100 sports a table size of 126" x 65" and work envelope offering an X-Y cutting travel of 100" x 55". The machine's cantilever Y-axis on a bridge X-axis, with a Motorized Z-Axis, gives Jack's Machine the option to load material from the three open sides of the machine.





"We can cut parts right to size with our OMAX machines," said McGrail. "The machines' Tilt-A-Jet accessory, precision table motion and easy-to-use controls are what make that possible. Plus, part edges are smooth, square and taper-free."

He said that the software-based Intelli-MAX controls, which include free upgrades for the life of the machines, make it simple to load a customer's DFX part file, initiate a tool path and have the machines running in minutes, and if needed, the controls allow him to quickly draw part files from scratch.

Additionally, the control's built-in nesting software automatically optimizes material usage at Jack's Machine. According to McGrail, the function reduces a task that would have taken hours down to just minutes, and all that is needed to initiate the function is to enter material sheet sizes.

McGrail indicated that the Tilt-A-Jet, working in unison with precision machine axis motion, is key to the high accuracy of the OMAX waterjet systems. While the Tilt-A-Jet tilts +/- 9° to eliminate taper, machine X-axis and Y-axis movements provide linear positioning repeatability of +/- 0.002". The Tilt-A-Jet positions a machine's cutting nozzle at an angle calculated by the software control to exactly offset for the taper created from the abrasivejet stream, transferring that taper instead to the scrap portions of raw materials.

The majority of the shop's parts are cut from 2' x 4' and 4' x 8' sheets of 410 stainless steel, 300 series stainless steel, 17-4, Titanium and aluminum. Work pieces can be the

size of a paper clip or so big that moving them requires a forklift, said McGrail. Parts range in thickness from 0.030" to 3", although the OMAX machines are capable of cutting up to 6" thick.

Jack's Machine does a great deal of medical work, the majority of which is done on the OMAX abrasive waterjet cutting systems. McGrail said that in addition to new jobs, many of those previously cut on the shop's wire EDMs are now processed on the abrasive waterjet machines.

Generally, Jack's Machine ships between 150 and 200 jobs per month, with volumes ranging from 1 to 20 to as many as 1,000 pieces per job. The shop also has been doing much more high-production work, so the OMAX abrasive waterjet machines are typically running non-stop.

In order to provide its customers with quality parts delivered on time, McGrail said that the shop will continue to specialize in EDM and abrasive waterjet cutting. And if there's the possibility of securing a high-volume job, he's still willing to consider cutting a test part for free to prove the shop can do it faster and better.



**JACK'S MACHINE CO. INC.**

**LOCATION:** Hanson, Massachusetts

**OWNER:** Jack McGrail

**FOUNDED:** 1985

**WEBSITE:** www.jacksmachine.com

**SPECIALIZES IN:** High precision abrasive waterjet cutting and EDMing of quality jobs delivered on time.

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