

# MAKING THE MOST OF (AND WITH) A WIRE EDM

"If they need it quick, they call on us," notes Dave Brown, Vice President of Lyons Tool and Die Company. "Difficult parts with short lead times are our specialty." His manufacturing facility in Meriden, Connecticut, is often called upon to participate in the development of components or assemblies that others choose to steer clear of.

"Our participation often begins with the review of a design concept proposed by the customer," adds Brown. "Our engineering group reviews the application and makes recommendations that may reduce cost, improve manufacturability, or improve the performance of the device or assembly."

Founded in 1951, Lyons quickly made a name for itself in the production of complex custom metal stampings and progressive dies. Since then the company has branched out. Today, Lyons serves manufacturers in diverse industries from medical to aerospace. The manufacturer's capabilities include precision metal stamping, rapid prototyping, CNC machining of complex parts, production wire EDM, component assembly, and overall project management. The FDA-registered company also has Class 10,000 cleanrooms for packaging and assembling medical devices and implants.

Lyons produces a wide range of tooling for its internal stamping operations, including progressive dies (steel and carbide), coining dies, compound dies, progressive eyelet dies, progressive compound dies, and secondary dies as well as a variety of tooling for its rapid-prototyping department. Stampings are done not only in metals such as stainless steel, titanium, aluminum, beryllium, brass, copper, bronze, and carbon steels, but also in engineered plastics and composites including Kapton®, Mylar®, Teflon®, and other insulating materials.

In 2005 Lyons purchased a new FANUC 12" wire EDM machine — its third FANUC EDM — from Methods EDM. The exclusive North American source for FANUC EDMs, Methods EDM is a division of Methods Machine Tools, Inc. Lyons uses its three machines (often around the clock) to make precision tooling components for its stamping operations, to produce prototype components for its growing customer base, and to perform secondary operations on production parts such as stainless steel tubing.

For one customer, an OEM medical-device provider, Lyons may turn out up to 50,000 parts every year, utilizing the FANUCs in a precision secondary operation to create a specialized cutting edge.

"The part is a blade for a disposable surgical device," Brown explains. "The customer informed us that the cutting edge was meeting or exceeding the requirements for the device, from both a functional and cost standpoint."

With exceptionally fast cutting speeds, a lightning-fast, extremely reliable auto wire feed system, and a powerful CNC, FANUC wire EDMs are available in five models with Z-axis heights to 16". They provide exceptional accuracy and surface finishes and come standard with anti-electrolysis power supplies, digital servo systems, nano interpolation, linear glass scales, high-pressure flushing, chiller units, quick-change cartridge filtration systems, and remote monitoring capabilities.

With five microprocessors to control artificial intelligence cutting functions, graphics, keyboard, and power supply, the FANUC CNC is fiber-optically interfaced to perform 8 times faster than other EDM controls. FANUC wire EDM machines offer fast cutting speeds using economical brass wire. Revolutionary Adaptive Control cutting technology monitors the number of effective pulses per second and adjusts the machine's feed rate to maximize cutting speed and minimize wire breaks. A unique function monitors thickness variations in the workpiece and automatically adjusts cutting current, reducing overall machining time by 30%. High Response Vector Control helps provide true circular accuracy and excellent vertical straightness.

Noncutting time is minimized and productivity increased by FANUC's Auto Wire Feed (AWF) System, which anneals, cuts, moves to a new location, threads, and begins discharging (spark-to-spark) in just 10 seconds. It can thread .010" diameter wire through a start hole as small as .015" while the workpiece is submerged. A 35-pound wire spool allows the completion of complicated jobs with longer run times.

"The new machine is everything we wanted," says Brown. "These FANUC wire machines help make Lyons one of the fastest prototyping houses in the country. We're very impressed with their quality and ability to hold very tight tolerances. We pride ourselves on being able to make very difficult parts, and the FANUC wire EDM is one of the precision tools we use to produce these parts. Often a customer comes to us with a part that, in production, will require tooling costing anywhere from \$10,000 to \$500,000. Prior to making this investment, customers often call upon us to produce prototype parts utilizing our FANUC wire EDMs and other rapid-prototyping equipment. We can make a dozen parts in days as opposed to weeks,

At right: In addition to medical devices, Lyons provides contract manufacturing of precision components for the aerospace, automotive, marine, defense, communications, firearms, electronics, mechanical power transmission, and many other industries.



At Left: Located in Meriden, Connecticut, Lyons often runs its three FANUC wire EDM machines around the clock. Lyons uses them not only to make tooling components for its internal manufacturing operations, such as those displayed in the foreground, but also to make prototype and production parts for customers.

depending on the complexity of the job. These parts allow the customer to test the component or device without a huge initial investment. And then when they finally do decide to invest in production tooling, they know that the component meets the functional requirements of the assembly!"

For one medical-device customer, Lyons produced a short run of just 5,000 parts on the EDMs. Each machine was loaded with specially configured stacks of material, then set to run unattended through the night. Upon completion of the EDM operation, Lyons' prototype technicians put a complex series of bends into each part prior to providing the customer with the finished components.

Lyons has significantly expanded its capabilities through alliances with trusted subcontractors. The company can now manage a project from conception all the way to finished parts. Subcontracted services include plating, coating, casting, laser/electron beam welding, laser cutting, plastic injection molding, and metal injection molding, just to name a few.

According to Brown, the medical components Lyons produces are used in laparoscopic devices, surgical instruments, and other devices, approximately 80% of which are disposable. Often Lyons makes many of the metal components found in an otherwise plastic instrument, but the metal components are typically the most difficult ones to produce.

Although performance was the main reason Lyons chose to buy its first FANUC EDM about seven years ago, it was not the only reason. "Frankly, we felt it was the best value for the price," Brown recalls. "Also, the service we get from Methods has been consistently good, and that was definitely a factor in our decision to stick with FANUC for our next two EDMs. Training from Methods has been very effective. FANUC continues to improve the various features of the machines. And, the installation of the new machine went extremely well. Upon completion, we were making parts the next day. Plus, we get fast, knowledgeable, free troubleshooting over the phone. The warranty is great, but the FANUCs just don't break down very often. In the long run, that saves our customers time and money too."

Lyons customers can be found all over the world. In addition to medical devices, Lyons provides contract manufacturing of precision components to many industries including aerospace, automotive, marine, defense, communications, firearms, electronics, mechanical power transmission, and many others.



At left: Lyons often makes many of the metal components found in an otherwise plastic instrument, but those metal parts are typically the most difficult ones to produce. For this vascular-instrument component, Lyons created the blank with a FANUC wire EDM machine and then formed the final part with a series of secondary bends.



Above: The medical components Lyons produces are used in laparoscopic devices, surgical instruments, etc., approximately 80% of which are disposable. Produced in quantity from metal sheets, components such as the one shown here are first profiled on a FANUC wire EDM machine. The "fingers" are then bent and twisted.

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