

## **New Catheter Tipping Process Aids Tubing's Accuracy and Throughput**

**The Project: To resolve inconsistency and waste issues associated with manual tipping method.**

**The Solution: Use automated system that processes a wide range of tubing durometers, shapes, and sizes.**

The company has been able to increase production capacity by approximately 120 percent.

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### **By Brian Beahm and Jim Ward**

How does an industry leader of custom multi-lumen plastic extrusions for medical devices develop a foolproof method to cost-effectively create smooth, repeatable tip geometries for catheter tubing applications? This was the challenge faced by the management team of FBK Medical Tubing Inc. in Birmingham, AL.

Catheters are typically manufactured using a multi-step process, and the number of stages in product development varies depending on the degree of product complexity. Tipping is often the final step in the process as the catheter is refined to pass more easily through the vasculature.

Tube tipping is accomplished by carefully heat-treating the end of the tube to the point that it begins to soften. This softened plastic is then conformed into detailed dimensions. Some applications require the forming of a slight radius on the outside edge of the tube; others demand a more severe radius. As a result, the end of the tube is closed off or its inner diameter is decreased. Other applications require the thermoforming of the tube end into a shape similar to the end of a sharpened pencil.

Hubert Thomas, FBK's production manager, says a manual tipping process was used at the company to form smooth radiuses, both closed and open-ended at the tips of the tubes. "This manual operation was artsy and dependent upon the operator's talents and fatigue level," he recalls. "It required patience and a measure of

forearm and hand strength in order to repetitively apply a constant pressure while the tip is being formed.”

Problems with product consistency, coupled with the high cost of training employees, motivated the company to seek a new solution. “We began to shop around for an automated tipping system,” says Thomas, “but the systems we reviewed were not cost-effective and lacked the ability to easily accommodate our consistency needs, production demand, and existing tipping die types and sizes.”

The company turned to Beahm Designs in Campbell, CA, for a custom solution. Beahm Designs, a supplier of catheter manufacturing equipment, has expertise in creating tipping equipment that precisely and quickly forms thermoplastic catheter tips. The custom solution developed for FBK, called the Dual Tipper (512-A), processes two catheters at the same time and is capable of closed or open, as well as round or tapered, tubing ends. A key feature of the Dual Tipper is that it's not limited to catheter size, which gave FBK a new level of flexibility in terms of production capability.

In addition, FBK's R&D staff found the equipment easy to operate. Once equipment parameters are set, the thermal nozzle is traversed to the tipping die, where the tubing to be tipped is simultaneously inserted. Upon completion of tip forming, the thermal nozzle is retracted, and air cools the mold and tubing. The digital timers and pressure controls of the forming process decrease the likelihood of user error, and tubing is pneumatically withdrawn from tipping die.

FBK has proprietary forming tools that are used in conjunction with the Dual Tipper to provide customized solutions to meet specific requirements, enabling the company to tip a wide variety of disposable thermoplastics. The automated system has helped FBK increase profits by reducing production costs and increasing sales volume. In fact, the company has been able to increase production capacity by approximately 120 percent—more than double per hour from the previous manual method. The Dual Tipper also effectively eliminates the inconsistency and waste associated with manual labor dependency, and the digital heat-control feature allows the company to document job specifications for instant repeatability with immediate results.

FBK currently uses five Dual Tipper machines. Their operating specifications are highlighted below.

### **Operating Specifications**

• Temperature range: ambient to 600°F

• Heating and cooling timing range: 1-999 seconds

• Insertion force: 3-100 psi

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&#149 Grip force: 3-100 psi

&#149 Dimensions: 21 x 8 x 25 in.

&#149 Facilities requirements: 120 Vac, 500 W, 100-psi compressed air

&#149 Die types: stainless steel, glass, Teflon, silicon

### **ONLINE**

For additional information on the products and technologies discussed in this article, see *Medical Design Technology* online at [www.mdtmag.com](http://www.mdtmag.com) and the following websites:

&#149 [www.beahmdesigns.com](http://www.beahmdesigns.com)

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