

# Nordson MEDICAL's Innovative Multilayer Extrusion Technology Solves Product Redesign Challenges



## CUSTOMER SITUATION

A large multinational medical device company needed to redesign a critical component of a device used in cardiovascular surgery. The component was stainless steel, which was costly to manufacture and presented difficulties such as corrosion, risk of electrical current passing through the blood, and microscopic pinholes that could cause platelet damage and blood coagulation. The redesign was necessary to keep pace with competitors, and ultimately to reduce manufacturing costs in an increasingly cost-sensitive healthcare environment.

In addition to meeting cost targets, redesign challenges included:

- Identifying a biocompatible material that would perform well during the customer's manufacturing process, would have a smooth surface finish that would not cause platelet damage and blood coagulation, and would not require an electrical bridge in the device to draw electrical current away from the blood
- Delivering high-volume components with exceptional control of wall thickness (tolerance of  $\pm 5$  microns)

The customer initially engaged with several prospective suppliers until it awarded Nordson MEDICAL the contract to develop the component using a high-speed, 2-layer polyurethane extrusion process. Key factors in the customer's decision were:

- *Nordson MEDICAL's proposal of an innovative, coextruded multilayer tubing solution*
- *Proven track record in extruding polyurethane*
- *Access to a range of potential materials in stock or with short lead times*
- *Transparency to allow the customer full access during development/concept trials at Nordson MEDICAL*
- *Ability to meet high-volume needs within budget*



## NORDSON SOLUTION

At the outset, Nordson MEDICAL undertook a series of rapid turn-around trials to identify materials with suitable mechanical performance and electrical resistance. The trials identified a polyester-based polyurethane material that yielded excellent electrical resistance; however, the surface finish at a microscopic level was rough, presenting a potential risk of platelet damage.

The Nordson MEDICAL team proposed a multilayer tube using a thin layer of smooth, polyether-based polyurethane extruded over the preferred polyester-based polyurethane, which significantly improved surface finish.

During the next phase of the project, Nordson MEDICAL used its existing equipment to provide the customer with product for design and process validations. Concurrently, the team collaborated with the customer and suppliers to develop new equipment that allowed Nordson MEDICAL to manufacture tubing that met precise specifications at speeds of up to 240 mpm (787 fpm), increasing output and reducing cost. Nordson MEDICAL has installed multiple high-speed extrusions lines and will be installing more to further boost production.



## OUTCOME

Nordson MEDICAL's advanced extrusion technology allowed Nordson MEDICAL to meet cost targets and allowed the customer to develop a functionally improved next-generation device. The customer has ramped up production and is running 4 assembly lines using the 2-layer extruded tubing Nordson MEDICAL produces. Seventy percent of its customers have converted from the old device with the stainless-steel component to the new, improved device with the polyurethane component.