

Case Study: Catheter-Wound Cauterizing Element

A custom circuit with an additional challenge: it's tiny

Challenge

A medical device company approached Minco with a flex circuit need. They were looking to connect a heated portion of their device to their power supply. They also had to be able to sense temperature and were looking to use the flex to carry the signals delivered by the sensor. They had planned on using another supplier for the heater, but when they learned that Minco manufactured sensors and heaters as well as flex circuits, they became interested in an integrated solution that encompassed all three technologies.

The application was to cauterize the exit wound in the femoral artery caused by removing a catheter during a heart procedure. Ordinarily, such a wound can take hours to heal. The company's device promised to cauterize the wound in only six minutes.

Solution

Minco Engineers were able to integrate our flex circuit with a heater, which could rapidly reach the target temperature. Given the fact that a human life was on the balance, the component had to heat to precisely 100°C to ensure the wound was cauterized properly. The circuit also had to be quite tiny; the finished component had to be only slightly larger than a catheter, a donut shape with a 4mm (0.16") outer diameter and 1.5mm (0.06") inner diameter. The Flex circuit integrated an All-Polyimide heater, created using a special no-adhesive process that allows the heater to reach higher temperatures than adhesive-based heaters. The circuit itself was not only complex in its size; with limited real estate the elements had to be stacked on top of each other. There were twenty-two 0.08mm micro blind vias for power as well as two 0.15mm blind vias to carry the signal of the surface-mount NTC thermistor that sensed the temperature of the heat sink.

Benefit

The medical device company can now cauterize catheter wounds in a fraction of the time it would normally take. Their idea, combined with Minco's ability to combine Flex Circuits, heaters, and sensors into a tiny integrated solution for a critical application, led to the improved care of the customer's patients.



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