

## **FIREROD® Cartridge Heaters Provide Comfort and Warmth for Premature Infants**

### **Summary:**

- Watlow's engineering expertise and manufacturing capabilities solve the toughest thermal problems
- Understanding all aspects of the customer's work environment ensures the correct heating solution is designed
- Watlow's FIREROD® cartridge heaters continue to provide safe and reliable solutions for medical equipment providers

It is critical for premature infants to maintain a constant temperature. Premature babies often have less body fat compared to full term infants which can make it difficult for them to regulate their own body temperature. Infants can also lose body heat as much as four times faster than adults. If a baby's skin temperature drops just one degree, oxygen use can increase by up to 10 percent.

In neonatal intensive care units, keeping an infant's temperature stable is a challenge when doctors and nurses are treating these small patients. A company based in Germany has been working closely with Watlow for about four years to develop a new line of infant incubators that provides the constant temperature these small babies require.

The medical devices provider manufactures equipment for hospitals as well as other safety products for emergency services, law enforcement, mining and other industries. The company's incubator offering brings new technology to improve care for premature infants.

"An earlier version of the incubator utilized a ceramic heater in the reflector," said Torsten Roth, key account manager for Watlow in Germany. "Infant beds that are equipped with infant warming units must be mobile, so they susceptible to damage as they are moved from one area of the neonatal ward to another. When care providers bump into walls and doorways the ceramic heaters were getting damaged resulting in unit failures and costly repairs."

The new incubator required a more durable heating technology. The customer approached Watlow Germany with their problem and working together identified the FIREROD® cartridge heater as the best solution to deliver safe and reliable heat in their demanding environment.

The FIREROD used in the incubator utilizes a radiant heat design providing a comfortable and constant 37 degrees Celsius for the infant. In the warmup stage of the device, the heaters ramp up to 600°C. The external sheath of each heater is oxidized by lasers to create a darker surface area. In radiant applications, heaters with a dark oxide surface improve the efficiency by which the FIREROD emits thermal energy and heat transfer. Using this type of laser process to oxidize the heaters also reduces the risk of coatings or other materials flaking off and falling on the infant later.

Since the initial design additional testing and development have continued resulting in improved performance and reliability. As an example. engineering changes to the pin wire inside the cartridge heaters has prolong the life of the product.

The new incubator requirements also called for the heaters to have low leakage current to ensure safe operation to the infant. The FIREROD designed utilizes an 8 mm core inside of a 10 mm outside diameter sheath. By reducing the diameter of the FIREROD's ceramic core, the dielectric insulation layer (the distance between the element wire and the inside diameter of the metal sheath) is increased. This important design element allows more magnesium oxide fill material to be used to insulate the heater significantly reducing the potential for leakage current.

"Safety is crucial in this application since the equipment is intended to provide comfort and safety to small infants," Roth said. "Our client has other suppliers for cartridge heaters, but none of them could meet this the tough demands of this high-performance application." Watlow's engineering expertise and commitment to continuous testing and improvement continue to provide break through solutions that enable our customers to thrive.