

Silicone Rubber Heaters: Benefits and Installation Concerns

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Widely used on semiconductor production equipment, Watlow® silicone rubber heaters (<https://www.watlow.com/products/heaters/flexible-heaters/flexible-silicone-rubber-heaters>) are versatile enough for foodservice equipment, medical technology and more. While these flexible workhorses can be customized to meet the exact needs of an industry and application, silicone rubber heaters also require care during installation to prevent damage and avoid premature failure.

A Pliable Solution: Silicone Rubber Heater Advantages

Silicone rubber heaters derive their adaptability from their thin profile, light weight and capacity to fit in small spaces. Yet they are also durable, stable and capable of outlasting many of the component parts that surround them in microchip processors and other machinery.

In addition, silicone rubber heaters boast a rapid warmup and efficient heat transfer. These heaters are also capable of operating at temperatures up to 500°F. They provide consistent temperature uniformity while decreasing wattage requirements.

Ease of installation is another advantage silicone rubber heaters have over other options. Thanks to their pliant nature, silicone rubber heaters are conducive to fitting in tiny notches or isolated nooks, though as will be discussed in this article their placement necessitates caution.

Silicone rubber heaters also happen to be less expensive than comparable alternatives.

Silicone Rubber Heater Installation Considerations

When installing silicone rubber heaters, it is imperative to follow the instructions carefully to preserve the heaters' structure and longevity. Though silicone heaters are pliant, they are prone to harm from overflexing, pulling and cutting, which are the leading causes of damage-related, pre-installation returns.

There are also safety measures to consider during the installation process. Furthermore, attentiveness is necessary when servicing equipment around these heaters.

Safety Concerns

Before installing a silicone rubber heater, it is essential to do some prework. After verifying the circuit integrity, installers should ensure the corresponding metal part for the heater is clean and smooth; note that metallic "burrs" could penetrate the heater surface and contribute to malfunction.

A critical step before the actual heater placement is to remove any labels from the part. Failure to remove labels can create heat-related problems that impair heater function and even cause a fire hazard.

If a label is not rated for a heater's operating temperature, the label becomes a fuel source. Certain types of labels can cause a chemical reaction that releases chlorides and breaks down the silicone rubber. Over time, this can further lead to arcing or combustion.

Prior to installation, the heater should also be inspected for any damage, particularly on the ends and the interior surface that will contact the part. Never install a damaged heater.

Damage Prevention

Silicone rubber heaters most often sustain damage during the installation process or when they are removed for maintenance on surrounding modules. Damage typically occurs when the heater is bent, pulled, twisted or trimmed.

These heaters are designed to fit snugly for optimal heat transfer, but they should also fit without cutting and with minimal insulation compression and limited strain on the fasteners. No other devices aside from the jacket fasteners should be used to hold the heaters in place.

Watlow recommends a second fitting after the initial installation to ensure uniform contact to the part. It may be necessary to adjust the heater fasteners, but a proper fit is important to prevent hot or cold spots, maintain steady heat transfer and prevent premature heater failure.

Cleanliness and Moisture

As an integral part of the machines that make semiconductors, silicone rubber heaters often operate in cleanroom environments where operating temperatures are generally stable and dust is negligible. Medical, communications and aerospace applications often have similar requirements, but to a lesser degree, making silicone rubber heaters ideal for multiple industries and applications.

Cleanliness is less a concern for the lifespan of silicone rubber heaters than moisture. Although silicone rubber is water resistant, the heaters should not be sprayed with or immersed in liquid. The heaters should remain dry to protect their long-term functionality.

Silicone Rubber Heater Maintenance

Even with a life expectancy that can exceed 10 years, silicone rubber heaters do not have a periodic maintenance schedule. However, there may be occasional maintenance issues that arise with the equipment in which the heaters are installed and which may require the removal and reinstallation of the heaters.

The heaters may be removed by following the installation instructions in reverse order, but remember to handle the heaters gently when removing. Before removing the heaters from parts, allow them to cool completely; silicone rubber heaters are especially vulnerable to damage from rough handling when hot.

Removing a silicone rubber heater should not require tugging or extreme bending. Do not use the heater lead wires to pull the heater from the pipe, and make sure to completely disengage the jacket fasteners before removing the heaters. Be attentive of the bracket points and edges when removing the heaters as there may be additional fasteners or other protrusions that could harm the heaters.

Prior to reinstallation, a heater should be assessed for discoloration or brittleness, which are indicators of over-temperature exposure, as well as tiny punctures or other signs of damage that may have been caused by handling or contact with interference points within the equipment where the heater resides. Do not reinstall a heater that appears to be damaged. If the heater is unharmed, it should fit easily back into place without use of force.

Find the Right Watlow® Heater for Your Needs

Silicone rubber heaters are flexible in more ways than one, and Watlow has dozens of sizes and configurations available to serve a variety of applications.

If silicone rubber heaters are not ideal for your needs, Watlow is here to help you find a heater or thermal system that suits your unique requirements and budget. Connect with Watlow (<https://www.watlow.com/contact-us>) today for immediate assistance or to locate a sales representative or distributor near you.