DUREX INDUSTRIES

closing the loop on thermal solutions

ISO 9001 REGISTERED COMPANY

www.durexindustries.com

Durex 1/8 Inch Cartridge Heater

Durex Industries 1/8 Inch (3.175 mm) Cartridge Heater was developed for Original Equipment Manufacturers (OEMs) that require a small high power thermal solution. Typical applications include injectors used in a gas chromatograph, ion sources used in mass spectrometers, lead attachment in die bonders and other applications requiring a high watt density in a small area.

This miniature cartridge heater, is designed with a thin 304 stainless steel wall for fast temperature response, and is swaged for low internal temperatures and longer life. Additionally, Durex' proprietary magnesium oxide (MgO) compaction process assures the highest possible dielectric strength. 1/8th Inch Cartridge Heaters can be used in applications up to 1000°F (538°C). Custom heaters can be designed in lengths up to 12 inches (305 mm), and 750 watts.

ADVANTAGES

Proprietary Swaging Process

- Higher operating temperature
- Higher heat transfer
- Robust heater design
- Longer heater life

Proprietary MgO Compaction

- Higher dielectric strength
- Faster thermal response

Miniature Size / Low Mass

- Better heat transfer
- Quicker response time
- Longer life due to lower internal temperature

APPLICATIONS

- **Analytical Instrumentation**
  - Gas Chromatograph
  - Mass Spectrometers
- **Medical Devices**
  - Fluid Heating
  - Patient Comfort
- **Semiconductor Equipment**
  - Die Bonding
  - Integrated Circuit Testing
- **Aerospace**
  - Freeze Protection

SPECIFICATIONS

Electrical:

- Minimum Volts: 5V
- Maximum Wattage @ 240V: 744W **Depends on wire watt density*
- Maximum Amperage @ 240V: 3.1A
- Wattage Tolerance: +10%, –15%
- Maximum Volts: 240V

Mechanical Sheath Material:

- Standard: 304 Stainless Steel
- Optional: Inconel®

Mechanical Dimensions:

- Diameter: 0.122 inch (3.10 mm) +/- 0.002 (0.05 mm)
- Length Minimum: 0.75 inch (19.05 mm)
- Length Maximum: 12 inch (304.8 mm)
- Length Tolerance to 4.5 inch (114.3 mm): +/- 0.94 inch (2.4 mm)
- Length Tolerance > 4.5 inch (114.3 mm): 3.0%

Heater Sheath Temperature: • 1400°F (760°C)

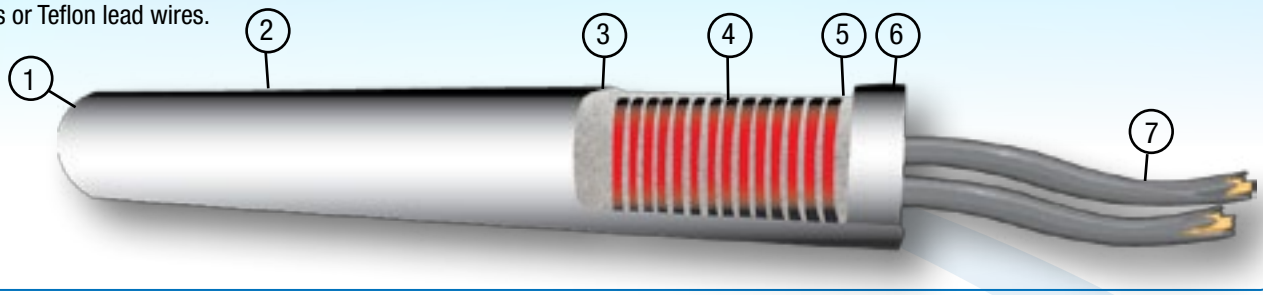
Construction:

- **Sheath:** Swaged
- **Lead Wires**
  - Standard: Solid Lead Wires
  - Option: Stranded Lead Wires
- **Wire Insulation**
  - Fiberglass Rated 250°C (482°F)
  - Teflon® Rated 200°C (392°F)
  - Mica Glass Tape Rated 450°C (842°F)
- **Welded End-Disc**

Durex 1/8 Inch Cartridge Heater

PRODUCT CONSTRUCTION

1. End Disc TIG welded to prevent moisture absorption.
2. 304 Stainless Steel for harsh environments. Also, available in Inconel®.
3. Magnesium Oxide (MgO) insulation compacted for maximum dielectric strength and thermal conductivity.
4. Nickel-Chromium Resistance Wire evenly wound for uniform heat distribution to the sheath.
5. Ceramic Core is a robust base for the heater element.
6. Ceramic Cap reduces potential for contamination.
7. Fiberglass or Teflon lead wires.



1/8 Inch CARTRIDGE HEATER • CASE HISTORY

An analytical instrumentation system supplier had a new application for rebuilding column heads used by leading gas chromatograph (GC) manufacturers. The product specifications called for a small heat source that would provide quick thermal responses. Voltage and wattage varied with GC manufacturers, so the engineers needed a thermal solution supplier with flexibility to provide quick delivery and competitive pricing for several custom heater designs.

Durex Industries' product specialists worked closely with the customer's engineers to define common requirements for each GC manufacturer and, where possible, merge the requirements. An 1/8 inch cartridge heater was selected as the heater platform because the heater's small physical size and high watt density were compatible with the original instrumentation manufacturer's specifications. By understanding the scope of the requirements, Durex Industries engineers were able to reduce the number of heater designs and product cost.

Guideline: Cartridge Heater Watt Density for Heating Metals W/in² (cm²)

Tight hole clearance is essential for maximizing the watt density and extending the life of a cartridge heater. Contact factory for applications beyond the Cartridge Heater Watt Densisty Guideline.

$$\text{Watt Density} = \frac{\text{Wattage}}{\text{Heated Length} \times \text{Diameter} \times 3.14}$$

Hole Clearance	1000°F (538°C)	800°F (427°C)	600°F (316°C)	400°F (204°C)	200°F (93°C)
0.0025 in (0.630mm)	205 (31.77)	295 (45.72)	300 (46.5)	300 (46.5)	300 (46.5)
0.0005 in (0.127mm)	175 (42.62)	240 (37.20)	300 (46.5)	300 (46.5)	300 (46.5)
0.0075 in (0.190mm)	145 (22.47)	200 (31.00)	285 (44.17)	300 (46.5)	300 (46.5)
0.0100 in (0.254mm)	100 (15.50)	150 (23.25)	200 (31.00)	250 (38.75)	300 (46.5)

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Visit us online at: www.durexindustries.com or e-mail: sales@durexindustries.com