



closing the loop on thermal solutions

Magnum™ Cartridge Heaters

INTRODUCTION

Magnum™ cartridge heaters are swaged designs, made for use in applications where high density, high temperatures and long service life are critical to minimize mold service downtime and expensive press open time. The swaged construction produces a highly compacted unit that resists shock and vibration, while providing for maximum element life through efficient transfer heating. They last up to 20 times longer than uncompacted cartridge heaters.



Design Features

- Temperatures up to 1400°F (760°C)
- Many standard diameters offered
- Alloy sheaths
- Highly compacted unit
- Shock and vibration resistant
- Custom manufactured to specifications
- UL/cUL component recognition available
- Metric sizes also available

Typical Applications

- Liquid immersion
- Plastic molds
- Dies
- Labeling
- Medical equipment
- Platens
- Packaging equipment
- Hot stamping
- Sealing
- Injection molding



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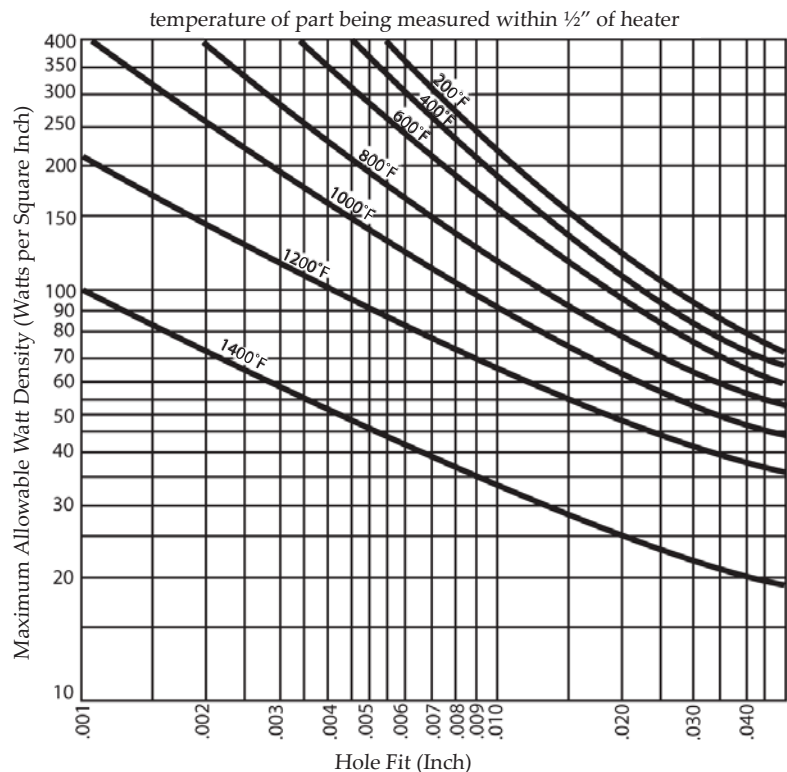
SPECIFICATIONS

Nominal Diameter	1/8"	1/4"	5/16"	3/8"	1/2"	5/8"	11/16"	3/4"	1"	6.5mm	8mm	10mm	12.5mm	16mm	20mm
Actual Diameter ± 0.002" (± 0.05mm)	0.122"	0.246"	0.309"	0.371"	0.496"	0.621"	0.683"	0.746"	0.996"	0.252"	0.312"	0.391"	0.489"	0.627"	0.784"
Maximum Volts	240	240	240	240	480	480	480	480	480	240	240	240	480	480	480
Maximum Amps	3.1	4.2	6	6.5	10.5	22	22	22	25	4	6	6	10.5	22	22
Minimum Wattage	Consult Durex Industries for minimum wattage														
Wattage Tolerance	+ 5, -10% of rated wattage														
Length Tolerance	± 2% of length, ± 3/32" minimum														
Camber Tolerance	Up to 12" long: .010" per foot Over 12" long: .015" per foot														
Watt Density	$\frac{\text{Total Wattage}}{\text{Diameter} \times 3.14 \times \text{heated length}}$														

Cartridge Heaters

FACTORS for LONGER HEATER LIFE

- Do not exceed recommended maximum watt density specified for the heater size.
- The heater sheath must fit properly into the machined hole. A tight fit is critical.
- Protect the heater from contaminants such as oil, grease, and vapors.
- Install adequate power to accomplish work load and make up for heat losses.
- The graph represents cartridge heaters used in steel parts. For stainless steel refer to a fit 0.0015" (0.04mm) larger than actual fit. For aluminum and brass, refer to a temperature 100°F (38°C) above actual temperature.





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ORDERING INFORMATION

When ordering cartridge heaters, specify the following:

A. Nominal Diameter - see specifications for assistance.

B. Overall Sheath Length - measured in inches or millimeters from end to end of heater sheath.

C. Lead Length - specify in inches.

D. Termination Type - see following pages for assistance.

E. Voltage - specify.

F. Wattage - specify.

G. Special Modifications - specify as required.



SPECIAL MODIFICATIONS

In addition to the standard design, Durex Industries offers a variety of special modifications which are available to customize the heater for your application.

Distributed Wattage: Resistance windings can be concentrated in specific areas of the heater for localized heat distribution.

Centerless Grinding: Precision grinding of the heater sheath provides tighter diameter tolerances when required.

DURASLIK Coating: DURASLIK coating can be provided on heater sheath for applications requiring chemical resistance or easy removal.

Ground Leadwire: Separate color coded ground wire can be provided when required.

Special Connectors: Various connectors for power leads can be provided upon request.

Terminal Boxes: NEMA 1 as well as moisture resistant or explosive resistant boxes can be provided when required.

CARTRIDGE CARE and MAINTENANCE

1. Store heaters in a dry area, especially during periods of high humidity.
2. Protect leads from abrasion, abuse, and exposure to contaminants such as grease and plastic drool.
3. Maintain temperature control and keep accessories in good working condition to obtain correct operating conditions.
4. All cartridge heaters have hygroscopic tendencies and can accumulate moisture in shipping and storage. Heaters with low di-electric insulation values (less than 1 meg ohm) can be baked in an oven for several hours or started at low voltage to eliminate moisture.



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TERMINATION TYPES

S1 - Standard Leads

Fiberglass insulated leadwires are externally connected to nickel pins. The connection area is electrically insulated with heavy-wall fiberglass sleeving.

12" leads are standard.

Specify longer leads if required.

Standard cold length at lead exit: 0.375".

Standard cold length at disc end: 0.25".



F1 - Swaged-in Flexible Leads

Fiberglass insulated leadwires are internally connected to nickel pins. This design allows for greater flexibility at the lead exit point of the heater.

12" leads are standard.

Specify longer leads if required.

Standard cold length at lead exit: 0.375".

Standard cold length at disc end: 0.25".



T5 - Teflon® Leads & Seal

Teflon® insulated leadwires with a Teflon® end seal swaged into the heater sheath provide a moisture resistant design. This design requires a minimum of 1" cold section at lead exit end of heater.

12" leads are standard.

Specify longer leads if required.

Specify "E" for epoxy potted end seal with 12" Teflon® insulated leads.



R1 - Right Angle Leads

Fiberglass insulated leads exit at a right angle from the heater sheath. Includes stainless steel end cap and high temperature potting.

Specify overall length of heater.

Other diameters available upon request.

Sheath Diameter	"L" Length
1/4"	7/16"
3/8"	1/4"
1/2"	1/4"
5/8"	1/4"
3/4"	1/2"
1"	1/2"



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TERMINATION TYPES

B1 - Straight Braid Lead Protection

Stainless steel braid over fiberglass insulated leadwires exits straight from heater sheath for abrasion resistance, yet is flexible enough for sharp bends.

3" additional leads beyond braid is standard.

Specify longer leads if required.

Standard cold length at lead exit: 0.375".

Standard cold length at disc end: 0.25".

B2 - Right Angle Braid Protection

Stainless steel braid over fiberglass insulated leadwires exits at right angle from heater sheath.

Includes stainless steel end cap.

3" leads beyond braid is standard.

Specify longer leads if required.

Specify overall heater length.

C1 - Straight Armor Cable

Armor cable over fiberglass insulated leadwire exits straight from heater sheath for heavy duty lead protection.

3" leads beyond armor is standard.

Specify longer leads if required.

Specify galvanized or stainless steel armor when ordering.

C2 - Right Angle Armor Cable

Armor cable over fiberglass insulated leadwire exits at a right angle from heater sheath.

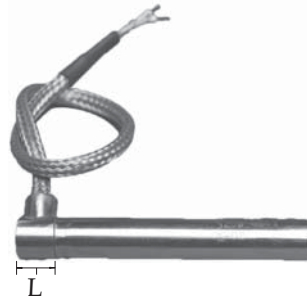
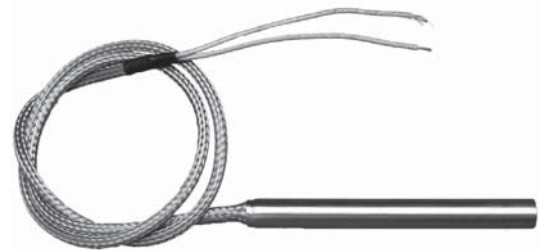
Includes stainless steel end cap.

3" leads beyond armor is standard.

Specify longer leads if required.

Specify galvanized or stainless steel armor and overall heater length.

Other diameters available for armor.



Sheath Diameter	"L" Length
1/4"	7/16"
3/8"	1/4"
1/2"	1/4"
5/8"	1/4"
3/4"	1/2"
1"	1/2"



Sheath Diameter	Flex Diameter	"L" Length
1/4"	11/32"	1/4"
3/8"	11/32"	3/8"
1/2"	3/8"	1/2"
5/8"	1/2"	9/16"
3/4"	1/2"	9/16"
1"	1/2"	3/4"

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TERMINATION TYPES

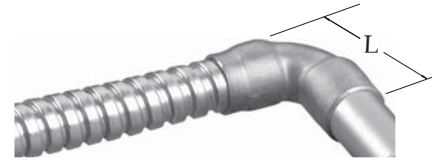
C4 - Right Angle Armor Cable with Copper Elbow

Armor cable leads extend at right angle from heater with right angle copper elbow.

3" leads beyond armor is standard.

Specify longer leads if required.

Specify galvanized or stainless steel armor and length of heater sheath.



Sheath Diameter	Flex Diameter	"L" Length
1/4"	9/32"	7/8"
3/8"	11/32"	7/8"
1/2"	1/2"	1 1/8"
5/8"	1/2"	1 1/4"
3/4"	5/8"	1 3/4"
1"	5/8"	1 1/8"

TC - Internal Thermocouple

Thermocouple provides an integral method for temperature control. Thermocouple junction (grounded or ungrounded) can be located at the end disc, center, or lead end. Please specify thermocouple type, location, and whether grounded or ungrounded.

Type J or Type K is standard.

Other thermocouple types are available.



M - Immersion Pipe Fitting

Threaded NPT pipe fitting is silver soldered or welded directly to heater sheath for immersion applications. Fiberglass insulated leadwires exit high temperature cement potting.

3/4" cold section required before fitting.

Specify "MS" for stainless fitting / "MB" for brass fitting.

Other lead options are available.

Epoxy & Epoxylite® available for moisture applications.

Other NPT sizes may be available.



Diameter Inches	Minimum Unheated	Pipe Thread Size NPT	Fitting Length
1/4"	1/4"	1/8"	1/2"
3/8"	1"	1/4"	5/8"
1/2"	1"	3/8"	3/4"
5/8"	1"	1/2"	7/8"
3/4"	1 1/4"	3/4"	1"
1"	1 1/4"	1"	1 1/8"

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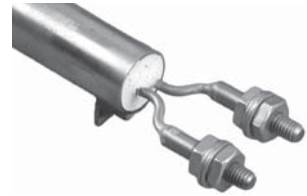
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TERMINATION TYPES

N1 - Post Terminals

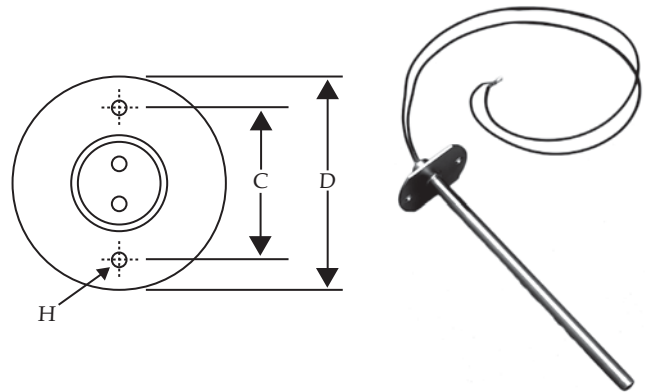
Threaded stainless steel terminals are welded directly to nickel pin for rigid mount applications. Includes two (2) nuts and washers for each terminal.



MF - Mounting Flange

Stainless steel flange welded directly to heater sheath. Fiberglass insulated leadwires are standard. Other flange sizes and hole patterns are available upon request.

Diameter Inches	Flange Size	Dimensions		
		D	C	H
1/4", 3/8", 1/2"	FS	1"	3/4"	0.144"
1/4", 3/8", 1/2", 5/8", 3/4"	FM	1 1/2"	1 1/8"	0.156"
5/8", 3/4", 1"	FL	2"	1 1/2"	0.201"



Cartridge Heaters

DURASLIK

The DURASLIK coating for cartridge heaters, developed by Durex Industries, allows any cartridge heater to be removed with relative ease after long term use. The patented non-stick coating acts as a corrosion inhibitor and solid lubricant when the heater is inserted into a drilled hole and energized.

Benefits

- Reduced downtime caused by "sticky" heater removal.
- Coating is bonded directly to the heater sheath for easy handling.
- No need for secondary release agents prior to insertion.
- Superior heater transfer characteristics for increased life.

Technical Data

- The ultra-thin Duraslik coating only adds 0.0010" to 0.0015" (0.025 – 0.037mm) to the cartridge heater diameter.
- Coating is applied up to 1/4" of lead exit.
- Coating is rated up to 1400°F (760°C).
- Heater diameter is manufactured to within standard tolerances before the coating is applied.

