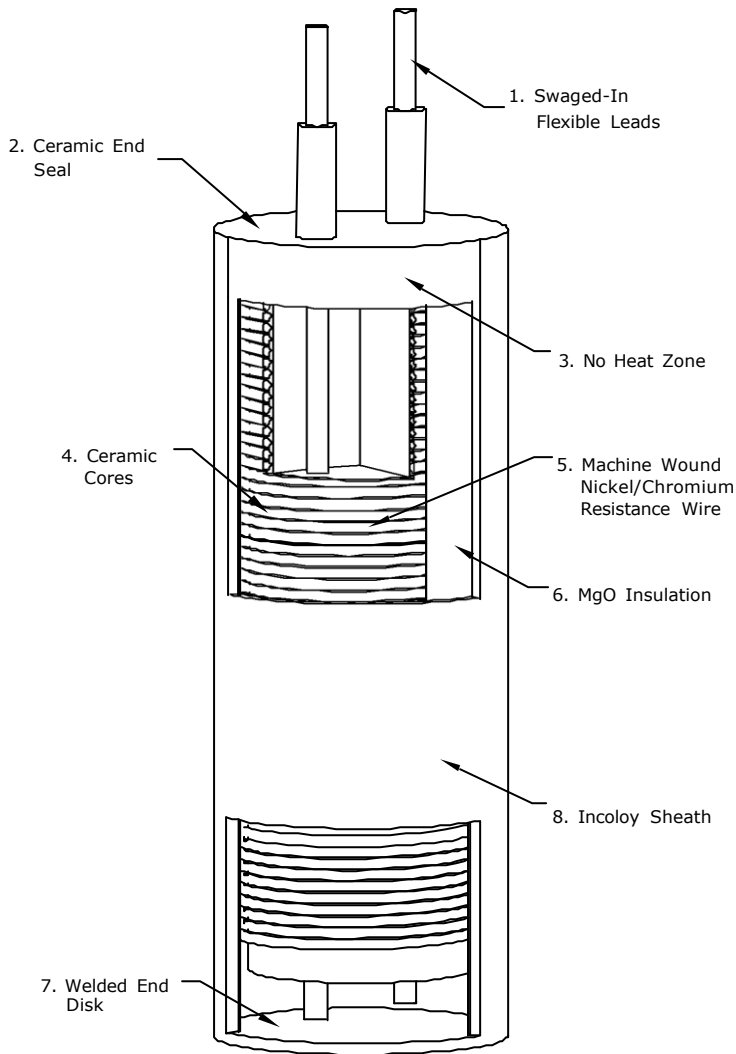


# CARTRIDGE HEATERS



Cartridge heaters are round tubular heaters with electrical terminations on one side. These dependable heaters are made to withstand tough industrial usage. With a tolerance of  $\pm 0.002$ " on their outside diameter to secure a tight fit inside receptacle holes, and rock hard compaction of MgO insulation through swaging, these heaters can attain up to 1500°F sheath temperature.

They are available with various termination styles and mounting attachments.

In cartridge heaters the resistance wire loops are positioned as close as possible to the outside shell. Because the MgO powder insulation around these loops is compacted by swaging and transformed into a very hard medium, heat transmission is very efficient. Cartridge heaters can have up to 200 W/in<sup>2</sup> watt density.

Cartridges are usually supplied with lead wires.

The attachment of the leads to the central pins is done internally, in a 3/8" cold section. In excessively hot applications the length of this cold section could be increased. To facilitate installation and avoid excessive air pockets, cartridges are made 0.004" less than nominal size of the receptacle hole with a tolerance of  $\pm 0.002$ ".

Cartridges can be dual-voltage, three-phase, and/or be supplied with a ground terminal. With numerous different terminal styles, mounting attachments, and various optional features, they are widely used in numerous high temperature applications.

See our technical section of the catalogue for additional information on cartridge heaters.

# CARTRIDGE HEATERS

## **Optional Features**

### **Built-in thermocouples**

One optional feature on Acrolab cartridge heaters is built-in thermocouples. These could be type "J" or "K", grounded or ungrounded, and attached either at the disc end or the middle of the cartridge.

### **Graphite coating**

To facilitate their installation and removal, cartridges could be coated with a graphite-like substance. This solid lubricant doesn't increase the outside diameter, and is suitable for temperatures up to 750° F.

### **Moisture and contamination proofing**

To protect cartridge heaters against moisture and contamination, Teflon lead wires are used and the lead end is sealed using Epoxy, RTV silicone or Teflon. The temperature limitation is 480° F.

### **Distributed wattage**

In applications such as sealing bars or rubber molds, the two ends of a cartridge heater are usually colder than the middle. To overcome this inconsistency and have a uniformly distributed heat source, cartridges could be made to have higher wattages at the ends. 35/30/35 is a common wattage distribution.

### **Center-less grinding**

In applications where superior heat transfer is required, the tolerance on the outside diameter could be improved to +/-0.001" by center-less grinding.

### **Zones and cold sections**

We can also manufacture cartridges with cold sections and separate zones that can be controlled independently.

# CARTRIDGE HEATERS

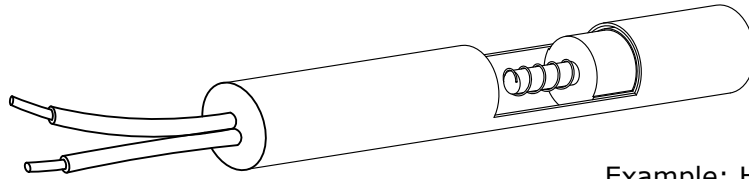
## Cartridge Heater Specifications

DIAMETER (NOM)	1/4	5/16	3/8	1/2	5/8	3/4	1
DIAMETER (ACTUAL)	0.246	0.310	0.371	0.496	0.621	0.746	0.996
MAX LENGTH	36"	36"	72"	96"	96"	96"	96"
MAX VOLTAGE (CSA)	240 V	240 V	480 V	480 V	480 V	480 V	480 V
MAX VOLTAGE	250 V	250 V	600 V	600 V	600 V	600 V	600 V
MAX WATTAGE AT 240V	1200 W	1300 W	2000 W	3000 W	5300 W	5300 W	5300 W
WATTAGE TOLERANCE	+5%-10%						
DIAMETER TOLERANCE	+/-0.002"						
LENGTH TOLERANCE	+/-2% of length						
CAMBER TOLERANCE	0.010" per ft up to 12in						
	0.018" per ft above 12in						

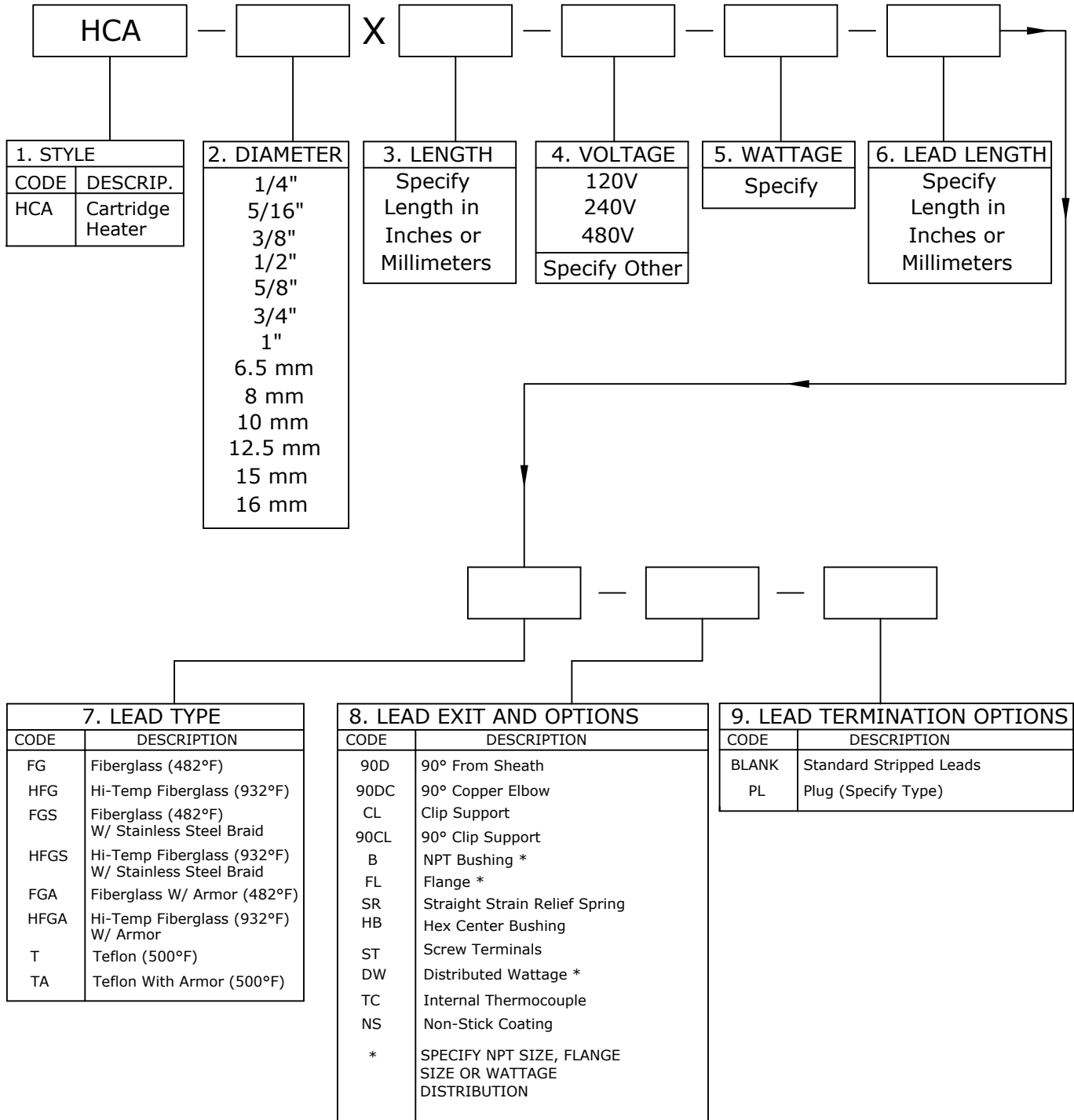
## Selection & Installation Tips

- Cartridges should have a tight fit in the receptacle hole. Drilling and reaming to the next standard size and using a larger cartridge could solve the problem of loose or worn-out holes.
- Lead wires should be kept away from abrasion, and should not be exposed to temperatures above 840°F.
- Stocked cartridge heaters, which have been exposed to air and moisture for a long period of time, should be energized on a low voltage prior to usage, in order to eliminate possible moisture contamination. It is always preferable to stock cartridges in sealed bags.
- Cartridges should be immersed completely inside the receptacle hole. Proper mounting attachments can prevent their edging out by vibration. If it is necessary to have an exposed section, that part should be unheated.
- Receptacle holes should be properly cleaned prior to the installation of a cartridge.
- When designing molds, it is recommended to make the receptacle cavities such that they will accommodate cartridge heaters completely and all-the-way-through. This will later facilitate the removal of the heaters.
- Watt densities should be kept within the safe range. This can be done by using either larger cartridges or as many as it is reasonably possible.
- To prevent short cycling, the wattage of a cartridge should be close to the wattage required by that specific application.

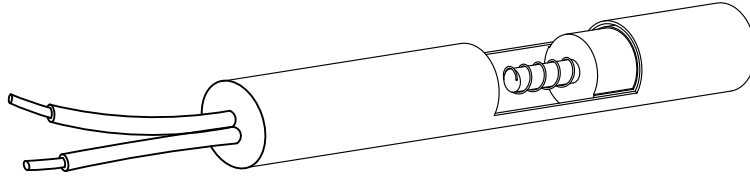
# CARTRIDGE HEATERS



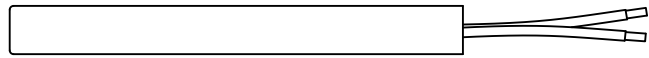
Example: HCA-5/8X24-240-1200-72FG



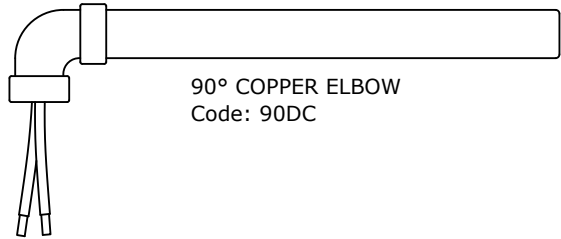
# CARTRIDGE HEATERS



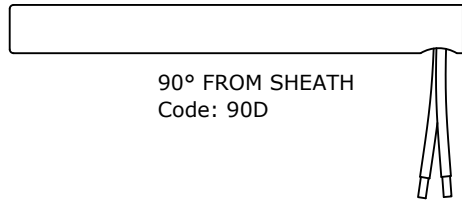
## LEAD EXIT OPTIONS



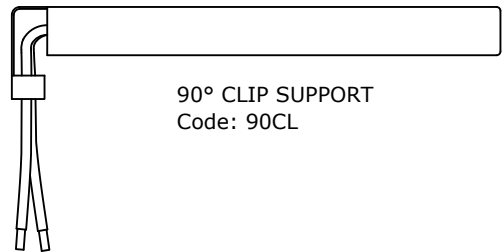
Straight Exit  
Code: Leave Blank



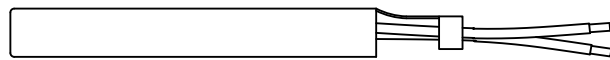
90° COPPER ELBOW  
Code: 90DC



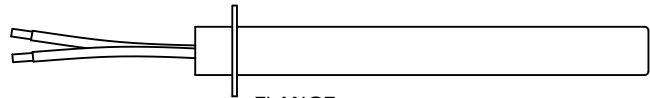
90° FROM SHEATH  
Code: 90D



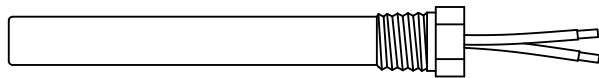
90° CLIP SUPPORT  
Code: 90CL



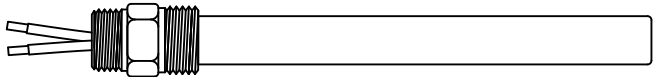
CLIP SUPPORT  
Code: CL



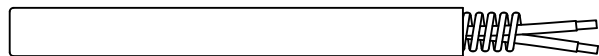
FLANGE  
Code: FL



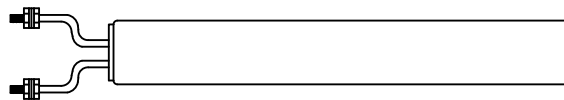
NPT BUSHING  
Code: B



HEX CENTER BUSHING  
Code: HB



STRAIGHT STRAIN RELIEF SPRING  
Code: SR



SCREW TERMINALS  
Code: ST