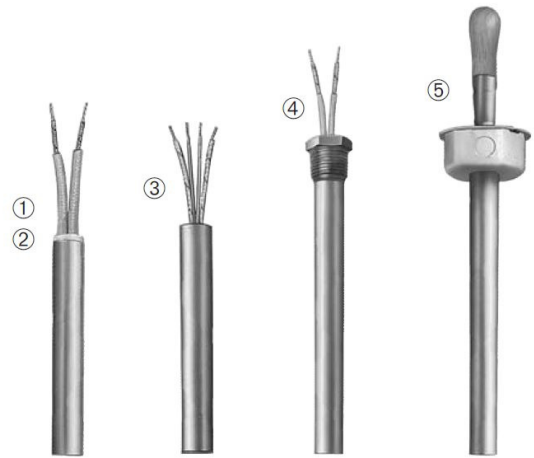


## Hi-Density Cartridge Immersion Heaters

Since Their Introduction in 1972, Hi-Density Cartridge Heaters Have Evolved and Today Offer a Multitude of Diverse Product Options:

1. (HDC) A Hi-Density cartridge heater in US sizes
2. (HDM) A Hi-Density cartridge heater in Metric sizes
3. (HDP) Pennybottom™, A Hi-Density cartridge heater with a Built-in Thermocouple and Flat Copper end disc designed for Plastic Runnerless Molding Bushings
4. (HDL) A Hi-Density cartridge heater designed with NPT Fittings for Immersion heating
5. (HDB) Bolt Heaters A Hi-Density cartridge heater designed for assisting in the assembly of large machinery



## Performance Capabilities

- Higher watt densities permit smaller heaters to be used without sacrificing life expectancy. This results in up-front as well as long-term cost savings.
- Swaged construction provides maximum support for the resistance wire and excellent heat transfer characteristics, improving the overall life expectancy of the cartridge heater.
- Termination styles and special features allow customization to any application.
- Applications up to 1400°F (760°C)

## Typical Applications

- Plastic Extruders
- Plastic Molding
- Hot Runner Molds
- Shoe Machinery
- Hot Stamping
- Food Processing
- Medical Equipment
- Heating Gases and Liquids
- Packaging
- Glue Guns
- Molds
- Laminating Presses
- Aerospace
- Platens
- Sealing Bags
- Scientific Equipment
- Semi-Conductor
- Food Service Equipment

## Multi-Purpose Use

Thermal Solutions offers a combination of over 1000 sizes in industry standard diameters and lengths ranging from 1" (25.4 mm) to 36" (914.4 mm) in a complete spectrum of wattages and operating voltages. Multi-Purpose Use Cartridge Heaters are the solution for a multitude of original equipment manufacturers (OEMs) or maintenance (MRO) applications.

## Engineered Specific Purpose Use

As a company we are uniquely qualified and committed to providing value-added expertise in engineering and manufacturing capabilities. Let us provide the optimal solution to your thermal loop system and cartridge heater design challenges.

## Ordering Information for Custom Engineered/Manufactured Heaters

Understanding that an electric heater can be very application specific, for sizes and ratings not listed, Thermal Solutions of Texas will design and manufacture a Hi-Density Cartridge Heater to meet your requirements. **Standard lead time is 3 weeks. Please Specify** the following:

- |                                   |   |
|-----------------------------------|---|
| <input type="checkbox"/> Diameter | <input type="checkbox"/> Termination types  |
| <input type="checkbox"/> Length   | <input type="checkbox"/> Lead Length        |
| <input type="checkbox"/> Wattage  | <input type="checkbox"/> Cable/Braid length |
| <input type="checkbox"/> Voltage  | <input type="checkbox"/> Special Features   |

### Standard Specifications

#### Dimensional Specifications

Nominal Diameter	1/8		1/4		5/16		3/8		1/2		5/8		3/4		1	
	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)
Actual Diameter	0.122	(3.10)	0.246	(6.25)	0.308	(7.82)	0.371	(9.42)	0.496	(12.60)	0.621	(15.77)	0.746	(18.95)	0.996	(25.30)
Diameter Tolerance	± .002	(0.051)	± .002	(0.051)	± .002	(0.051)	± .002	(0.051)	± .002	(0.051)	± .002	(0.051)	± .003	0.076	± .003	0.076
Minimum Length	1.25	(31.8)	1	(25.4)	1	(25.4)	1	(25.4)	1	(25.4)	1	(25.4)	1 1/4	(31.8)	1 1/4	(44.5)
Maximum Length	12	(305)	36	(914)	36	(914)	48	(1219)	60	(1524)	72	(1829)	72	(1829)	72	(1829)
Length Tolerance Heaters up to 5" (127mm) long	± 3/32 (2.4)		± 3/32 (2.4)		± 3/32 (2.4)		± 3/32 (2.4)		± 3/32 (2.4)		± 3/32 (2.4)		± 1/8 (3.2)		± 1/8 (3.2)	
Length Tolerance Heaters up to 5" (127mm) long	± 2% of Sheath Length															
Camber Tolerance Heaters up to 12" (305mm) long	010 * (.254 mm) per foot of Length															
Camber Tolerance Heaters up to 12" (305mm) long	020 * (.508 mm) per foot of Length															

A certain amount of Camber is unavoidable. With a slight force, Hi-Density Cartridge Heaters will flex enough to fit into a straight reamed hole.

#### Electrical Specifications

Nominal Diameter	1/8	1/4	5/16	3/8	1/2	5/8	3/4	1
Maximum Voltage	240	240	240	240	240	480*	480*	480*
Maximum Amperage (see below for exceptions)	3.0	4.4	4.5	6.7	10.5	23	23	23
Maximum Amperage for Types F, F1, W, W3, M3, S1 & S2 Terminations	-	3	3	5.5	7.6	9.7	9.7	9.7
Minimum Wattage at 120V on a 1" long Heater	-	50	45	45	50	50	-	-
Minimum Wattage at 120V on a 2" long Heater	5	20	20	20	20	20	20	20
Max Wattage at 120V	360	525	540	800	1260	2760	2760	2760
Max Wattage at 240V	720	1050	1080	1600	2520	5520	5520	5520
Max Wattage at 480V	-	-	-	-	-	11,000	11,000	11,000
Wattage Tolerance	+10,-15%		Plus 5% - Minus 10%					
Resistance Tolerance	+10,-15%		Plus 10% - Minus 5%					

\*480V when applicable, Consult Thermal Solutions

#### Length Tolerance for Lead Wire Wires

Wire Braid Leads - Armor Cable Leads
Up to 36": -1/2", +1" (-12.7mm, +25.4mm)
36" - 72": -1", +2" (-25.4mm, +50.8mm)
Above 72": +4" (+101.6mm)



**Note:** Specifications detailed on this page are standard. Consult Thermal Solutions if your application requires tighter tolerances or has other special requirements.

### Temperature Coefficient of Resistance

The electrical resistance (ohms) of the heater resistance wire increases with temperature rise. Standard Hi-Density Cartridge Heaters are manufactured with ohms (cold ohms) 3.3% lower than the actual calculated ohms (hot ohms) to compensate for this increase.

### Available Electrical Features

Diameter	Dual Volts	3-Phase	Dual Circuits	Multiple Heat Zones (maximum 3 zones)
1/8"	No	No	No	No
1/4"	No	No	No	No
5/16"	No	No	No	No
3/8"	Yes*	No	No	Yes*
1/2"	Yes*	No	Yes	Yes*
5/8"	Yes	Yes	Yes	Yes
3/4"	Yes	Yes	Yes	Yes
1"	Yes	Yes	Yes	Yes

Consult factory for maximum wattages and voltages  
\* Heaters may require a larger diameter transition area at lead end.