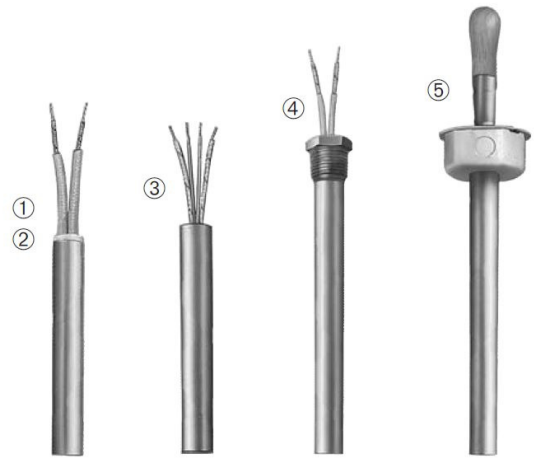


Hi-Density Cartridge Immersion Heaters

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.