

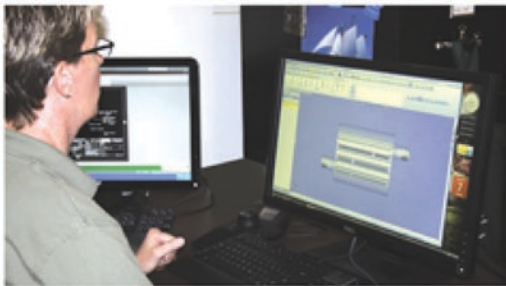
nextthermal[®]
smart heat management

Cartridge Heater Solutions

www.nextthermal.com



who is Nexthermal?



Nexthermal is a new name for a company that has focused passion and energy toward the creation of electric heating elements, systems and engineering services since 1986.

Nexthermal solves heating application challenges and creates dramatic process capability improvements for our customers.

Our customers' requirements, product development plans and competitive position in the marketplace drive our smart heat management innovation. Ingenuity, collaboration and a sense of urgency converts concepts to products and capabilities.

*If heat is vital to your process...
add **Nexthermal** to your team!*

Hotset Corporation established in Battle Creek, Michigan as a separate entity and strategic partner to Hotset GmbH

Initial cartridge heater produced

U.S. coil heater production launched

Pressed in Brass coil heater introduced

Production facility expanded

Heater based assemblies unveiled

1986

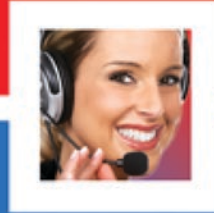
1991

1998

2002

2003

2004



As you engage **Nexthermal** our goal is that you conclude we are:

Approachable — Welcoming discussion, highly interested in the details of your application. Sincerely committed to helping you succeed.

Dynamic — Responding with a sense of urgency, proactively anticipating and planning for challenges, demonstrating agility that incorporates your input and experience to accelerate the best solution.

Knowledgeable — Our application experience, ability to understand your process, generating market driven solutions should lead you to clearly see that Nexthermal is your heat management expert.

International — United States roots with a global reach. With customers and strategic partners worldwide Nexthermal has the resources to generate the right solution to you delivering world class benefits well beyond your investment in our products and services.



Manufacturing in Bangalore, India; Introduced anti-seize coating and highly moisture resistant coil heater head

Selected as the exclusive Elstein marketing agent in the United States; Engineering Services Team created

Hotflow circulation heater invented, targeting electric vehicle, medical and food production markets

Renamed Nexthermal to emphasize commitment to heat management solutions worldwide. Location, ownership, manufacturing facilities and staff remain the same. Introduced eheat energy efficient cartridge heaters

2006

2008

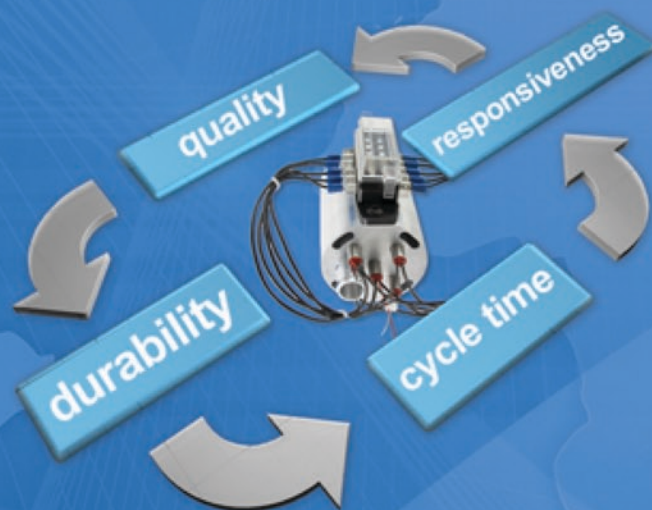
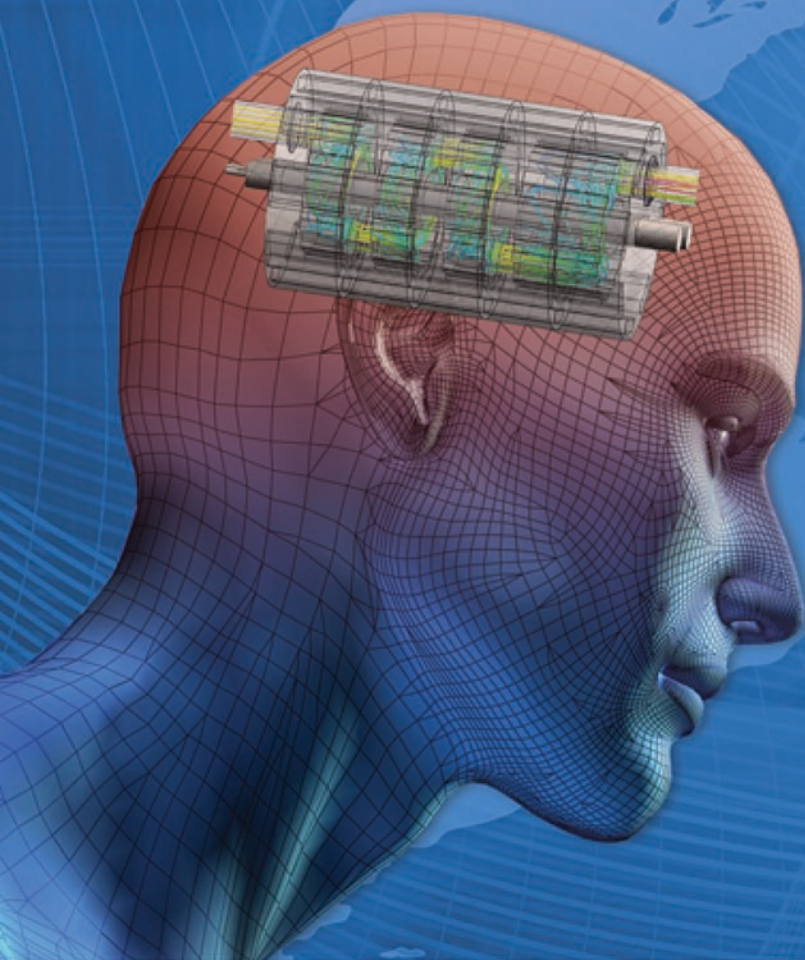
2009

2010

Nextthermal cartridge heaters... your smart heat management choice.

- » While many companies can build a general use cartridge heater, Nextthermal is committed to deliver the best heater specifically for your application. When you see the design elements beyond the obvious similarities to commodity heaters, critical engineering decisions can be made to dramatically improve durability, product quality, responsiveness and cycle time.

Every application carries with it performance requirements that must be carefully considered.



Factors such as movement, moisture, dimensional tolerances, operating temperature, material being heated and environmental conditions will impact the design of the heater.

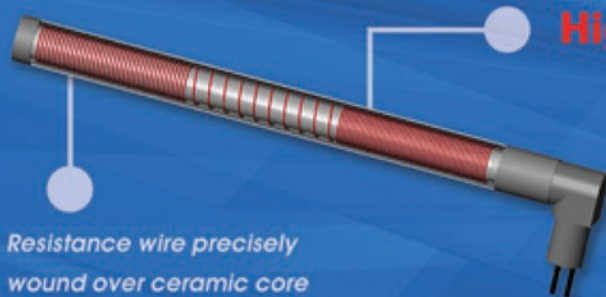


Nexthermal manufactures heaters with better components, materials and precision...

- High watt density heaters are built with 8" long ceramic cores, 33% longer than our competitors—resulting in fewer electrical connections on longer heaters.
- Standard stainless steel sheath is SS321 for improved corrosion resistance (Incoloy is also available).
- New, compact right angle exit with flat sides to aide removal. (when heaters last as long as Nexthermal's do, this is important)
- Antisieze coating applied in house for faster delivery.
- Centerless grinding option to a tolerance of +/- .0008" for a better fit.
- Computer controlled winding ensures the right wattage distribution profile on every heater...every build.
- Technical support to understand your application and design a heater with your specific use in mind.
- Attaining and maintaining ISO 9001 since 2000.

high watt density vs. medium watt density construction

» All cartridge heaters Nexthermal manufactures are swaged (highly compacted) heaters. Customers who require precise, durable heat should accept nothing less. The compaction created during the swaging process enables the cartridge heater to more responsively deliver heat, and provides the resistance wire with dense thermal mass — improving performance and heater life greatly over loose fill cartridge heaters.

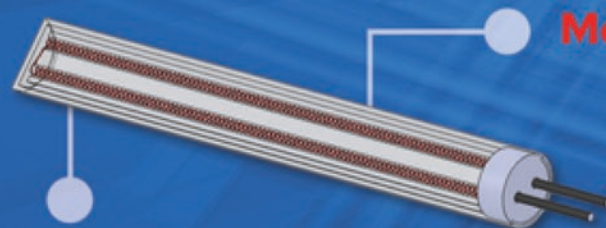


Resistance wire precisely wound over ceramic core

High watt density heaters

The machine winding of the high watt density heater delivers the most precise distributed wattage profile. High watt density heaters can be built to your specifications from 1" long to over 100". Warranted to 160 watts per square inch.

Both high watt and medium watt construction can be built as an energy saving eheat cartridge heater.



Resistance wire spiral inserted inside ceramic core

Medium watt density heaters

The medium watt density heater has a continuous resistance spiral throughout the heater delivering unparalleled reliability. For longer heaters there are fewer internal electrical connections. Medium watt density heaters start at 8" long, and can be built to over 100". Warranted to 65 watts per square inch.

Specify a **high watt** density heater if:

Watt density is greater than 65 watts per square inch.*

And/or the heater is less than 8".

And/or your application requires a precise wattage distribution.

* High watt density heaters are commonly built below 65 watts per square inch and in lengths up to 100" long for specific applications.



Specify a **medium watt** density heater if:

Watt density is less than 65 watts per square inch.

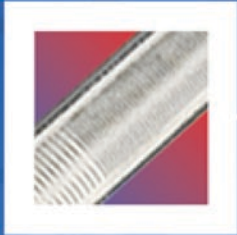
And the heater is 8" or longer.

And you do not need highly precise wattage distribution.

In the past only high watt density heaters could support an internal Type J or K TC. Nextthermal can now manufacture medium watt density heaters with an internal TC.

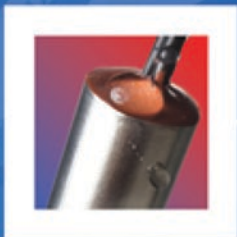


cartridge heater performance options



Distributed Wattage

Nextthermal has developed industry specific winding profiles to improve thermal profiles including packaging, rubber and injection molding. We have also successfully developed OEM specific winding profiles to compensate for challenging heater placement.



Moisture Resistance

If your application requires wash down, has high amounts of humidity in the ambient air, or has machining oil nearby — Nextthermal has a wide range of options to deliver moisture resistance at your operating temperature.



Anti-Seize Coating

Building a heater that lasts longer can make removal more difficult when a heater must be replaced. Removal labor often costs more than the heater itself. Nextthermal in-house anti-seize coating is a cost effective option that can be added without impacting delivery.



Removal Aids

Nextthermal offers knock out tabs and other removal aids that allow you to quickly and confidently remove a heater when it is time to replace it. Knock out tabs are recommended when you are installing the heater in a through bore prone to oxidation.

Unique requirements?

Engage a Nextthermal application engineer at 269.964.0271

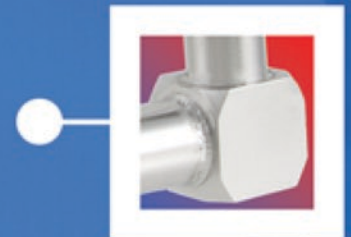
Right Angle Exit

Nexthermal has redesigned the right angle exit with flat sides, making it possible to use a wrench to precisely position lead exit and break oxidation bonds when removing a heater.



Right Angle Block

The Right Angle Block has flat sides and substantial material to provide the strength needed for highly corrosive environments such as die casting — where the heater sheath can be bonded to the bore.



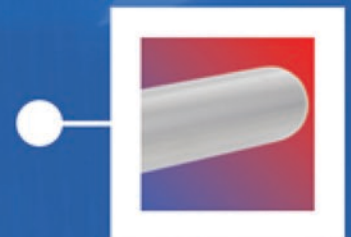
Standard Flanges, Special Flanges and NPT

If your application calls for specific insertion depth, or must be held in place — Nexthermal offers standard flanges for most diameters. We can also design special flanges for your application. NPT fittings can be added to your cartridge heater.



Centerless Grind Tolerance

Nexthermal's standard tolerance of $\pm.002"$ compares favorably to other cartridge heaters. If heat transfer is critical to your application, Nexthermal offers premium centerless grind tolerances that are $\pm.0008"$.



nexthermal®

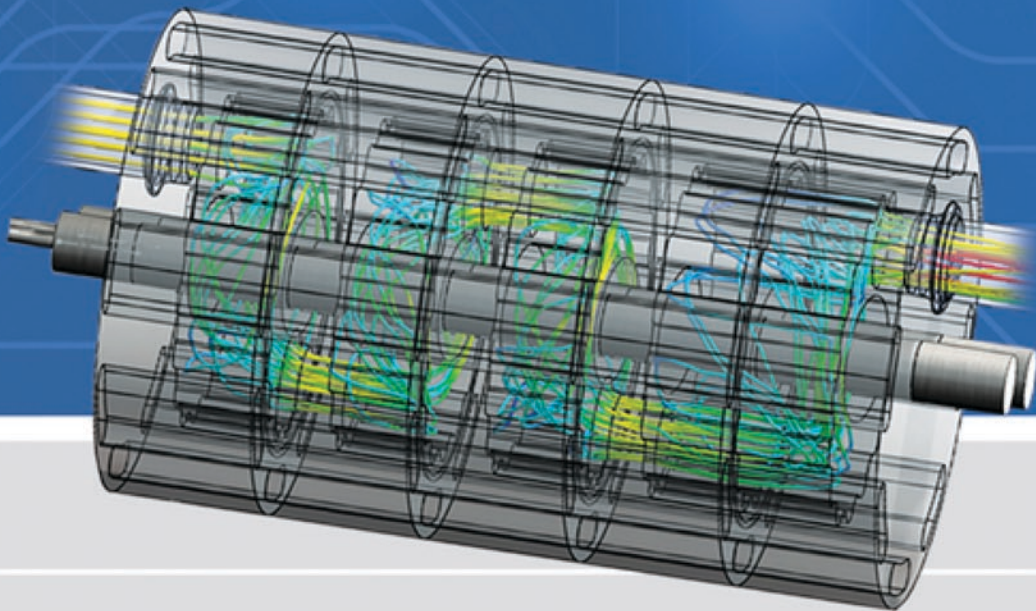
cartridge heater based assemblies



» Nexthermal cartridge heaters are versatile. We work together with our customers, clearly focused on their objectives. Nexthermal has combined our electric heaters with ingenuity to create solutions that have generated new products and capabilities for our customers.

Common **Nexthermal** assembly solutions include:

- Early stage new product design
- “Plug and play” assembly combining heaters and sensors into one plug to deliver a completed assembly that improves your production throughput
- Redesign of an existing component with multiple vendors or need for improved performance



engineering services

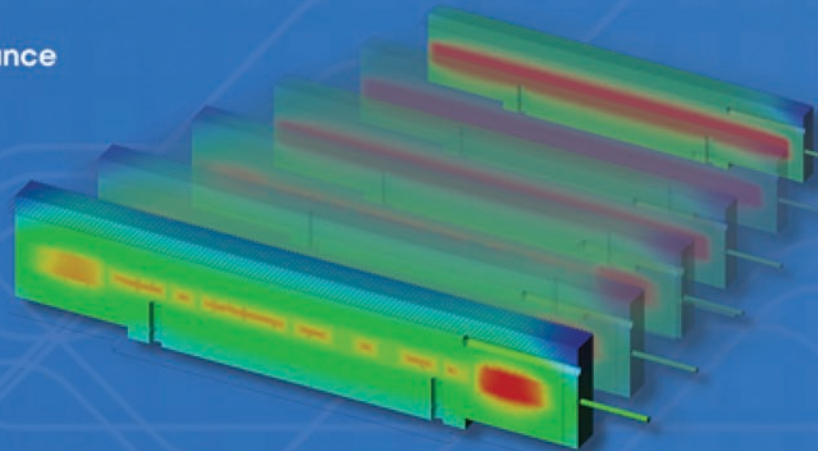
A heater is one component of a smart heat management system.

To optimize performance one must carefully consider:

- Heater location
- Cycle Time
- Fit to mating surfaces
- Sensing method and location
- Material being heated
- Performance goals
- Control method

Engineering services include:

- Production and product development assistance
- Thermal engineering consulting
- Solid modeling
- Design optimization for performance and energy consumption
- FEA and Lab Simulation



The more complex the design, and the more critical heat is to design performance, the greater the impact Nexthermal engineering service will have on your process. Your application, performance goals and future plans create a unique opportunity to explore the power of Nexthermal engineering services.

Nexthermal eheat cartridge heaters

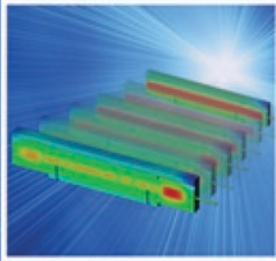
Nexthermal eheat cartridge heaters are constructed with a special high thermal transfer sheath material that creates a fast responding, longer lasting, more energy efficient heater. At the same rated wattage, Nexthermal eheat cartridge heaters have measured up to 25% improved energy efficiency over traditional build cartridge heaters.

Nexthermal eheat Cartridge heaters are the fast responding, energy efficient and direct replacements for your existing cartridge heaters. Extend the capabilities of your existing system with eheat cartridge heaters, or develop around its strengths to bring smart heat management capabilities to your market.

The high thermal transfer sheath results in a heater that can perform the same work with fewer watts - saving energy and reducing total system amperage.

For higher watt density applications such as hot glue systems, the eheat delivers heat to the application faster, resulting in more heat delivered with a lower heater core temperature. This extends heater life.

Nexthermal eheat cartridge heaters reach set point faster, and can reduce cycle times of demanding applications.



eheat Cartridge Heater Reference Chart

maximum recommended continuous operating temperature 650 °F

Diameter	Diameter Tolerance		Maximum Heater Length	Construction		Thermo-couple	
	Standard Swage to Size Tolerance	Premium Centerless Grind Tolerance		High Watt Density	Medium Watt Density	J	K
						●	●
.250"	.248 - .244"	.2488-.2472"	60.0"	●	●	●	●
.3125"	.3105 - .3066"	.2488-.2472"	70.0"	●	●	●	●
.375"	.373 - .369"	.3732-.3717"	80.0"	●	●	●	●
.500"	.498 - .494"	.4972-.4957"	100.0"	●	●	●	●
.625"	.623 - .619"	.6232-.6217"	100.0"	●	●	●	●
6.5mm		6.48-6.44mm	1524 mm	●	●	●	●
8.0mm		7.98-7.94mm	1178 mm	●	●	●	●
9.0mm		8.98-8.94mm	1178 mm	●	●	●	●
9.5mm		9.48-9.44mm	2032 mm	●	●	●	●
10.0mm		9.98-9.94mm	2032 mm	●	●	●	●
12.5mm		12.48-12.44mm	2540 mm	●	●	●	●
16.0mm		15.98-15.94mm	2540 mm	●	●	●	●

Cartridge Heater Technical Data

	High Watt Density	Medium Watt Density	1/8" heater
Dimensional			
Length Tolerance	± 1.5% (min ± 1mm)	± 1.5% (min ± 1mm)	Plus or minus 3%
Premium length tolerance	upon request	upon request	
Minimum heater length	1" (25.5mm)	7" (177.8mm)	1.25" (31.75mm)
Maximum Length	Please see chart opposite page by diameter	Please see chart opposite page by diameter	Please see chart opposite page by diameter

Material			
Standard Sheath Material (rated 1382°F)	SS321 (rated 1382°F)	SS321 (rated 1382°F)	SS 321
Optional Sheath Material	Inconel (rated 1865°F)	Inconel (rated 1865°F)	Not available
Premium Energy Saving Sheath	eheat (rated 650°F)	eheat (rated 650°F)	Not available

Electrical			
Maximum recommended/warranted sheath load	160 Watts per square inch	80 watts per square inch	120 watts per square inch
Standard Wattage tolerance	+5%/-10%	± 10%	± 10%
Premium Wattage Tolerance	± 5%, lower possible with specific designs	± 5 %	± 10%, ± 5 %
Standard High Voltage Stability (cold) ≤24V	500V-AC Nominal voltage	500V-AC Nominal voltage	Not available
Standard High Voltage Stability (cold) >24V	1500V-AC nominal voltage	1500V-AC nominal voltage	800 V
Premium High Voltage Stability (cold) >250V	>1500 V-AC nominal voltage upon request	>1500 V-AC nominal voltage upon request	Not available
Insulation Resistance	Min 5 Meg ohms at 500V-DC	Min 5 Meg ohms at 500V-DC	Min 5 Meg ohms at 500V-DC
Premium Insulation Resistance	> 5M ohms at 500V-DC upon request	Not available	Not available
Discharge Current (cold)/ Leakage current	Max 0.5 mA @253 V-DC	Max 0.5 mA @253 V-DC	Max 0.5 mA @253 V-DC
Maximum Connection Voltage UL rated	575V	250V	250V
Maximum Connection Voltage	600V	600V	250V

Cold Section by Heater Length

Heater OAL (mm)	Cold length at head (mm) (reference)	Cold length at head (mm) (reference)	Total cold length (mm)
≤ 35	4	5	9
≥36 & ≤ 79	5	5	10
≥ 80 & ≤ 99	7	5	12
≥100 & ≤120	10	8	15
≥121 & ≤ 200	12	8	17
≥201 & ≤ 299	12	8	17
≥300 & ≤399	14	8	19
≥400 & ≤ 549	16	8	21
≥ 550	20	8	25

Please use this information as reference. Nexthermal is capable of producing customer specific heaters.

To discuss your application more precisely...call us at:

269-964-0271

or email

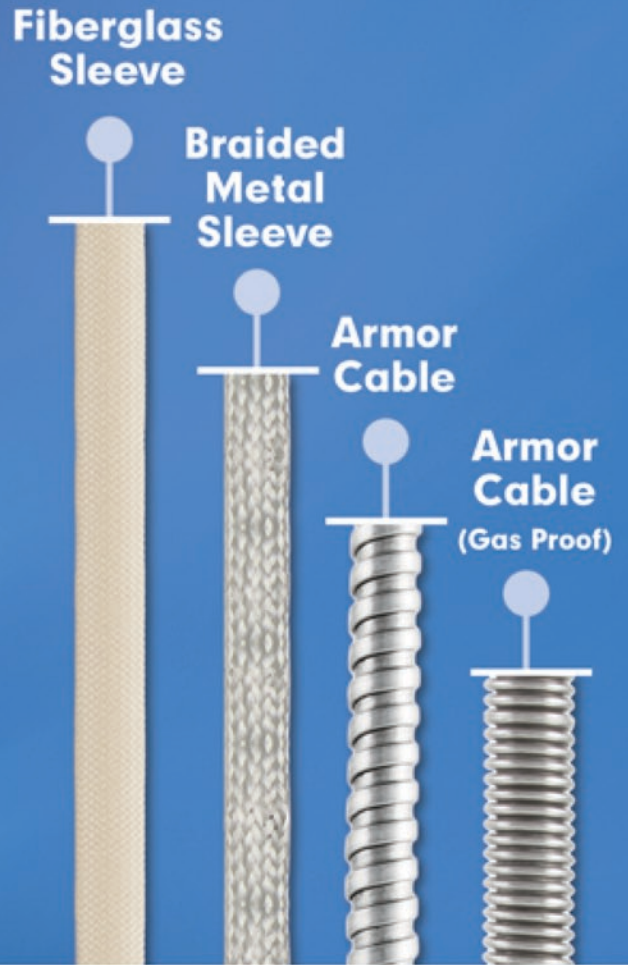
sales@nexthermal.com

lead and lead protection options

leads



lead protection



potting options

Ceramic
Temperature Rating
1000 °F | 538 °C



Epoxy
Temperature Rating
600 °F | 315 °C



Teflon Plug
Temperature Rating
450 °F | 232 °C



Silicone
Temperature Rating
500 °F | 260 °C



Silicone (High Temp.)
Temperature Rating
650 °F | 343 °C



Standard Cartridge Heater Configuration Chart

Diameter	Diameter Tolerances		Maximum Heater Length	Construction				Sheath Material			
	Standard Swage to Size Tolerance	Premium Centerless Grind Tolerance		High Watt Density	Medium Watt Density	Thermo-couple		SS321	Incoloy 800	eheat	Stainless NPT Size
						J	K				
.125"		.1240-.1201"	4.0"	●				●	Teflon Plug & Leads Only		
.250"	.248-.244"	.2488-.2472"	60.0"	●	●	●	●	●	●	●	.125"
.3125"	.3105-.3066"	.3114-.3098"	70.0"	●	●	●	●	●	●	●	.125"
.375"	.373-.369"	.3732-.3717"	80.0"	●	●	●	●	●	●	●	.250"
.500"	.498-.494"	.4972-.4957"	100.0"	●	●	●	●	●	●	●	.375"
.625"	.623-.619"	.6232-.6217"	100.0"	●	●	●	●	●	●	●	.500"
.6875"		.6866-.6850"	100.0"	●	●	●	●	●	●		.500"
.750"	.748-.744"	.7492-.7476"	100.0"	●	●	●	●	●	●		.750"
1.0"		.9984-.9969"	100.0"	●		●	●	●			1.00"
6.2mm		6.18-6.14mm	1524 mm	●	●	●	●	●	●		
6.5mm		6.48-6.44mm	1524 mm	●	●	●	●	●	●	●	.125"
7.0mm*		6.98-6.94mm	1524 mm	●	●	●	●	●	●		
8.0mm		7.98-7.94mm	1178 mm	●	●	●	●	●	●	●	.125"
9.0mm*		8.98-8.94mm	1178 mm	●	●	●	●	●	●	●	
9.5mm*		9.48-9.44mm	2032 mm	●	●	●	●	●	●	●	.250"
10.0mm		9.98-9.94mm	2032 mm	●	●	●	●	●	●	●	.250"
11.0mm*		10.98-10.94mm	2032 mm	●	●	●	●	●	●		
12.0mm*		11.98-11.94mm	2540 mm	●	●	●	●	●	●		
12.5mm		12.48-12.44mm	2540 mm	●	●	●	●	●	●	●	.375"
13.0mm*		12.98-12.94mm	2540 mm	●	●	●	●	●	●		
14.0mm*		13.98-13.94mm	2540 mm	●	●	●	●	●	●		
15.0mm*		14.98-14.94mm	2540 mm	●	●	●	●	●	●		
16.0mm		15.98-15.94mm	2540 mm	●	●	●	●	●	●	●	.500"
17.5mm*		17.48-17.44mm	2540 mm	●	●	●	●	●	●		
18.0mm*		17.98-17.94mm	2540 mm	●	●	●	●	●	●		
19.0mm*		18.98-18.94mm	2540 mm	●	●	●	●	●	●		.750"
20.0mm		19.98-19.94mm	2540 mm	●	●	●	●	●	●		.750"
22.0mm*		21.98-21.94mm	2540 mm	●	●	●	●	●	●		

*Non Standard Metric Diameters with Special Construction

		Temp. Rating		Movement	Moisture
		'F	'C		
Potting Options	Ceramic	1000	538	Good	Not Recommended
	Silicone - Standard	500	260	Excellent	Excellent
	Silicone - High Temp.	650	343	Excellent	Excellent
	Epoxy	600	315	Very Good	Very Good
	Teflon® Plug	450	232	Very Good	Not Recommended
Lead Options	Fiberglass (Standard)	482	250	Good	Not Recommended
	Teflon®	500	260	Excellent	Excellent
	Silicone	356	180	Excellent	Excellent
	Silicone Cable	356	180	Excellent	Excellent
	High Temp. Fiberglass	932	500	Not Recommended	Not Recommended

Lead Protection				Exit and Removal			
Fiberglass Sleeve	Braided Metal Sleeve	Armor Cable	Gas Proof Armor	Right Angle Exit	Right Angle Block	Flange	Knock Out Tab
							

This chart is representative of standard cartridge heater configurations. Please call Nexthermal at 269-964-0271 for additional options, special configurations, and assemblies.

Teflon® is a registered trademark of the E.I. du Pont de Nemours & Company.

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Nexthermal heaters...



Improve effectiveness and life of electric vehicle batteries

Extend the capabilities of existing hot runner injection molding designs and assist new product development

Helped make disease detection of Malaria, Bird Flu and more than 2000 other diseases faster, more affordable and portable

Participated in the 2010 Olympics testing for controlled substances and creating snow

Enable mass spectrometry systems to detect parts per billion

Improve aerospace hydraulic system responsiveness and energy efficiency

Create energy savings opportunity and more hygienic design for food production companies

nexthermal.

Imagine what we can do when we combine experience and innovate together.

