Phoenix Thermal Supply

Expandable Split Sheath Cartridge Heaters

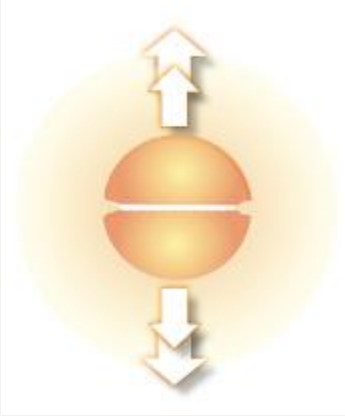
With the expandable cartridge heaters we combine for the first time the best features of the common cartridge heater with an adaptive tuning and a quick and easy removal.

Hot

cold

The system

The Expandable Heaters consist of a compressed, high performance cartridge heater and made with the best materials with the particularity of being able to expand itself thanks to the fork-shaped point in a point that allows the expansion and retraction of the cartridge.



In the expansion process the expandable cartridge fits the walls of its housing, providing the correct thermal transfer, and avoiding the "oven effect" that occurs in other types of poorly dimensioned heaters with respect to diameter and fit. Bores that for any other circumstances are oversized, can benefit from our expandable heaters- the best solution to allow more adjustment tolerance

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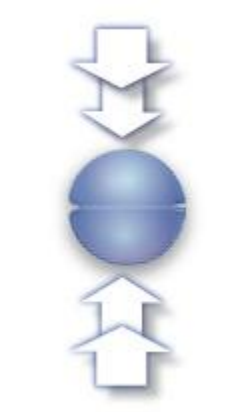
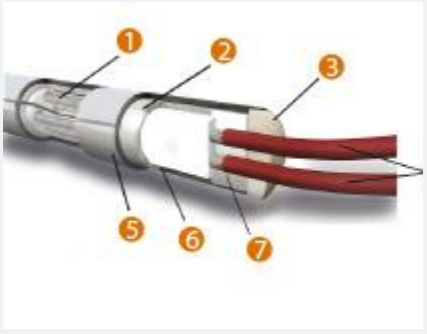


At the contraction process the Expandable Heaters return to their original form, facilitating a smooth removal from the orifice, with the subsequent advantages like not having to drill the mold again, reuse them in other locations, reduce the stock since it will have the same diameter for different drills, etc.

Quality of the materials

The Expandable Heaters are manufactured with an internal compacting system of all its components in order to increase their usable life. The Nickel/Chrome 80/20 conductor wire is introduced into the cavities of a ceramic body which focuses the suitable separation in order to obtain a better insulation. Fully coated with magnesium oxide of high purity grain sized controlled to ensure the complete cartridge Expan fill. Later comes a compacting process and a rectification of the surface until calibrate the desired size. And finally, a rigorous quality control inspection that guarantees the best operation of the cartridge



1. Nickel/Chrome 80/20 conductor wire, melting point 2552ºF
2. Grain sized Magnesium oxide
3. Hard refractory paste
4. Conducting wire
5. Stainless Steel AISI 304/316/321/INCOLOY
6. Ceramic core
7. Hard ceramic head

The facilities and the unique building system ensure the maximum purity inside guaranteeing a longer lifetime.

Hundreds of different terminations

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All possible terminations you may require for all underwater applications, vibration, high temperatures, special food use, corrosive saline environment, graded etc.

Thermocouples, the best accessory

The cartridge heater can be manufactured with a probe built into the cartridge sensor, at any point requested. The advantages of incorporating sensors are countless, for instance considerable longer cartridge life, localized temperature accuracy, energy saving, where you cannot accommodate a conventional sensor due to space problems.

Technical data.

Voltage (V)	120 - 130 - 240 - 380 - 400
Power tolerance(w)*	+ 5 % - 10 %
Power	Depends on the dimensions
Length Tolerance	± 3% maximum 0.787inch
Standard Diameter's Tolerance	-0.0039 to -0.0059 inch
Leakage current*	<=0.5mA a 253 v.
Insulation*	>=5 MΩ a 500 V
High voltage heaters*	1500V to > 24V Operating voltage
	500V to > 24V Operating voltage
Tube material	Stainless Steel
Wire	NiCr 8020
Melting temperature	1382º F

*tests have been done at room temperatures

The uniform heating

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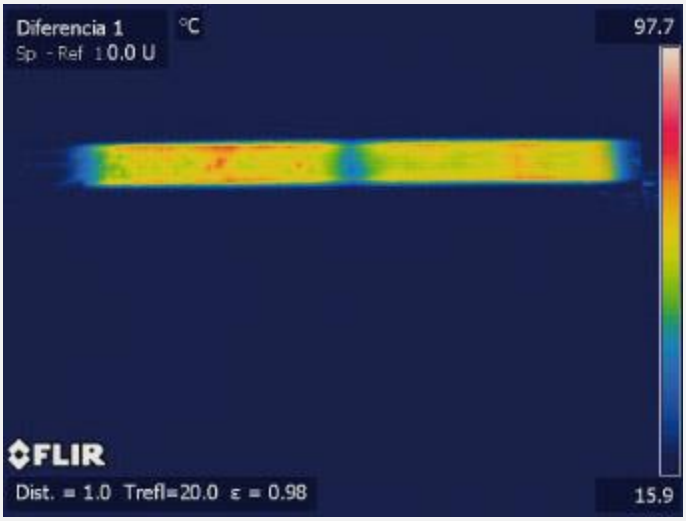
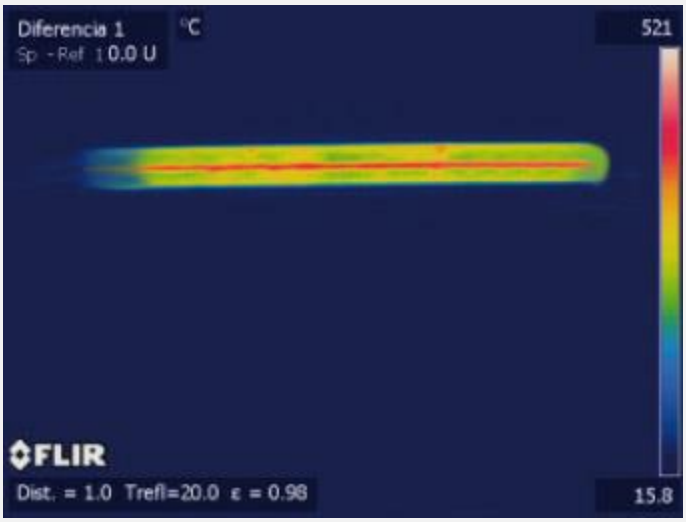
The Expandable Heaters are made with just one spring shaped heating wire that has a greater quantity of wire than any other model of cartridge heater. This way we obtain uniform heating around the whole perimeter, without any kind of cold areas or temperature variations.

Compressed high density cartridge heater thermography.
Several cold zones observed, especially in the center of the heater from 9.843 mm.



Ordinary split sheath cartridge heater thermography
It is observed cold spots at the end of the connections .This does not uniformly heated mold or application.



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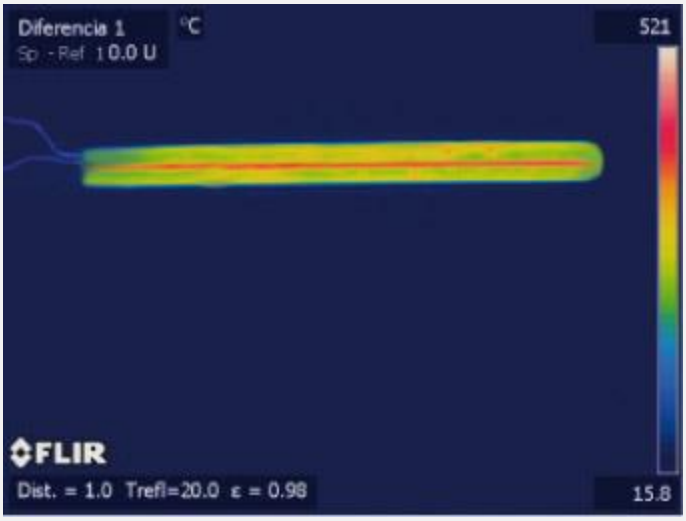
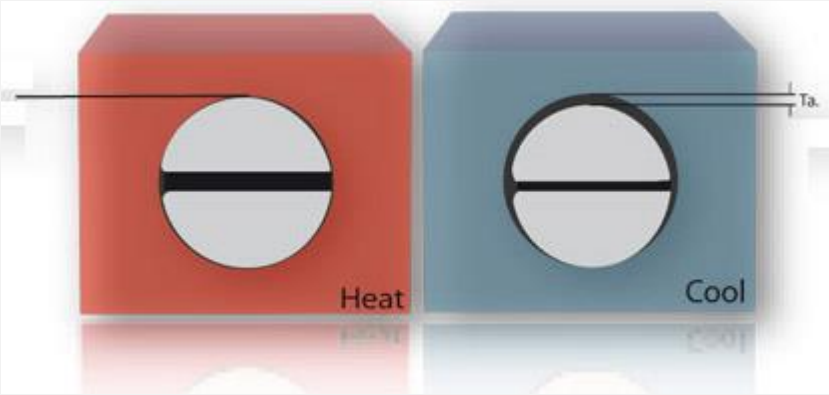
Expandable Heaters thermography
Clearly shows the absence of cold zones thanks to its unique construction, which allows more heating wire in the whole area of the cartridge included in the connection areas.



The heater that conforms to the bore.

The expansion around the perimeter of the cartridge makes of the Expandable Heater the best solution for large diameter bore, caused by attrition, expansion or made with little tight tolerances.

Maximum adjustment. Better heat transfer.



Fitting tolerance

The adjustment tolerance of the heater is obtained from the distance between the surface of the cartridge and the inner wall of the hole, which must be uniform throughout its lineal perimeter.

The extraction, faster and easier even in long lengths.

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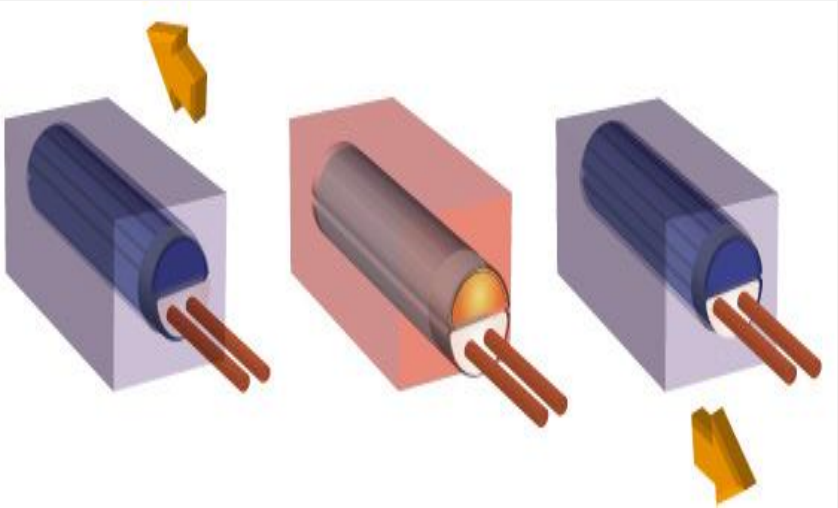
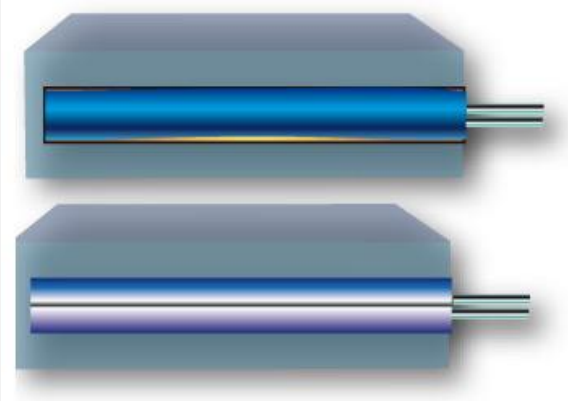
Expandable heaters, for its unique construction, allow the easy removal when the cartridge is cold, saving time and considerable effort, minimizing machine stop time and human resources. Needs no adjustment paste and you will not have to drill, destroy or perform expensive operations to remove the cartridge. You can reuse the Expandable Heaters in other molds need to be heated





Long lengths, will not bend, which is the main problem with conventional cartridges, thanks to the shape of its tubes which perform the function to reinforce the structure of expandable heaters longitudinally, facilitating its removal. By expand evenly around the perimeter, heat transmission will be uniform without creating curvatures which produce cavities producing overheat and breaking of the resistance.

Accuracy in expansion.

The Expandable Heaters are designed to have the widest range of the high quality heater tolerances of all international market.

All of the intermediate sizes can be made in diameter and length, volts, watts distribution, cold areas, special finishes, finishing, etc.

Ø	Drill	Real Ø	Cold zone	Minimum length	Maximum length	Maximum amps according to the length	
3/8"	3/8" ±0.004	0.366	0.787	3.937	39.37	15	15
0.394	0.394 ±0.004	0.386	0.787	3.937	39.37	15	15
0.472	0.472 ±0.004	0.465	0.787	3.937	59.055	25	25

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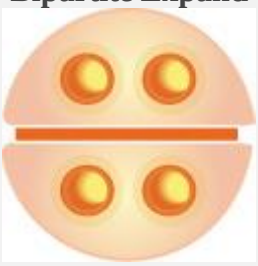
0.492	0.492 ±0.004	0.484	0.787	3.937	59.055	30	25
1/2"	1/2" ±0.004	0.492	0.787	3.937	59.055	30	25
0.59	0.59 ±0.004	0.583	1.181	3.937	59.055	40	25
5/8"	5/8" ±0.004	0.617	1.181	3.937	59.055	40	25
0.63	0.63 ±0.004	0.622	1.181	3.937	59.055	40	25
3/4"	3/4" ±0.004	0.742	1.181	3.937	59.055	40	25
0.787	0.787 ±0.004	0.78	1.181	3.937	59.055	40	25
0.984	0.984 ±0.004	0.969	1.181	3.937	59.055	40	30
1"	1" ±0.004	0.984	1.181	3.937	59.055	40	30

Longer Service Life "The Difference"

More Nickel/Chrome 80/20 heating wire in the Expandable Heaters than in a typical split sheath heater or a swaged cartridge heater with the same compression, The Expandable Heater have more heating wire (nickel/chromium 80/20) than the split heaters or compressed cartridges with the same compression, The principle key is the more heating wire, the larger has to be its diameter for the same amount of watts. The larger diameter reduces fatigue and wear of the heating wire, resulting into a longer service life.

Section of an Expandable heater with more heating wire per cartridge

Bipartite Expand



Basic Bipartite