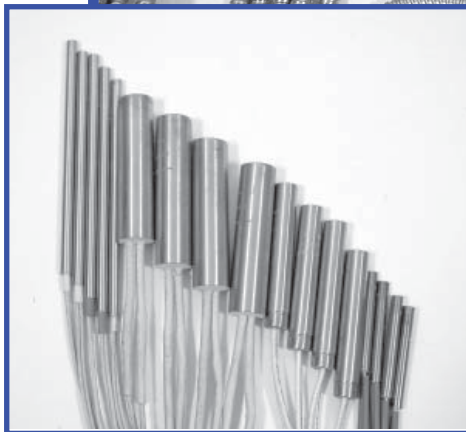
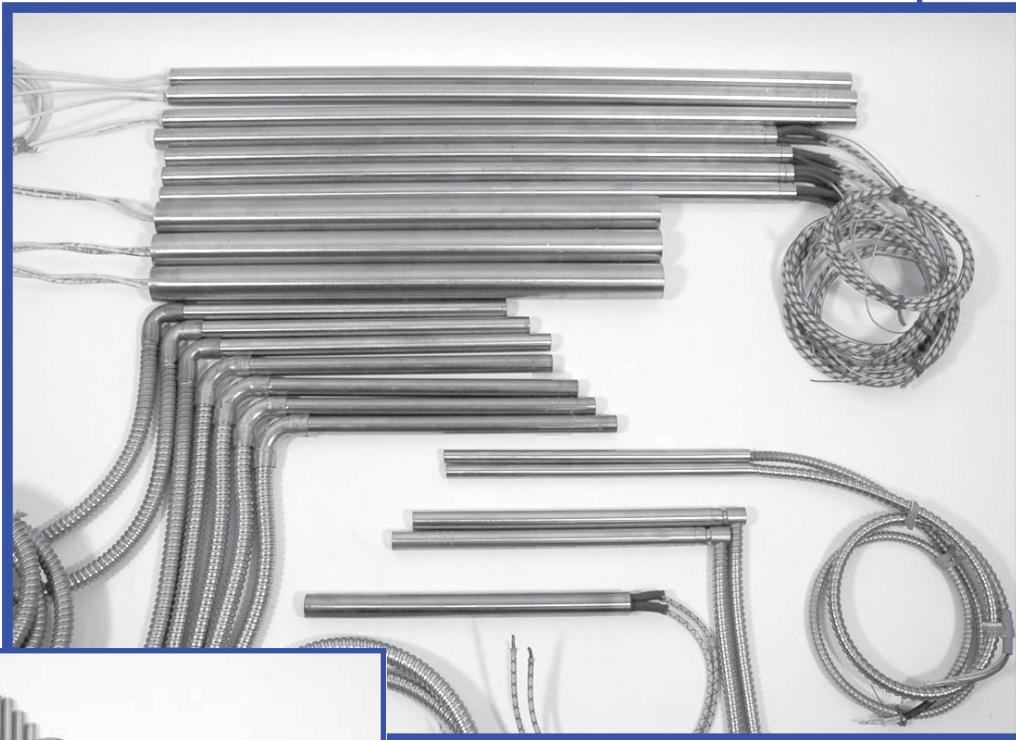


Cartridge Heaters

QUALITY - Our specially designed cores provide both performance and durability for the most difficult applications.

VARIETY - We can provide the an extremely comprehensive selection of both size and configurations available.

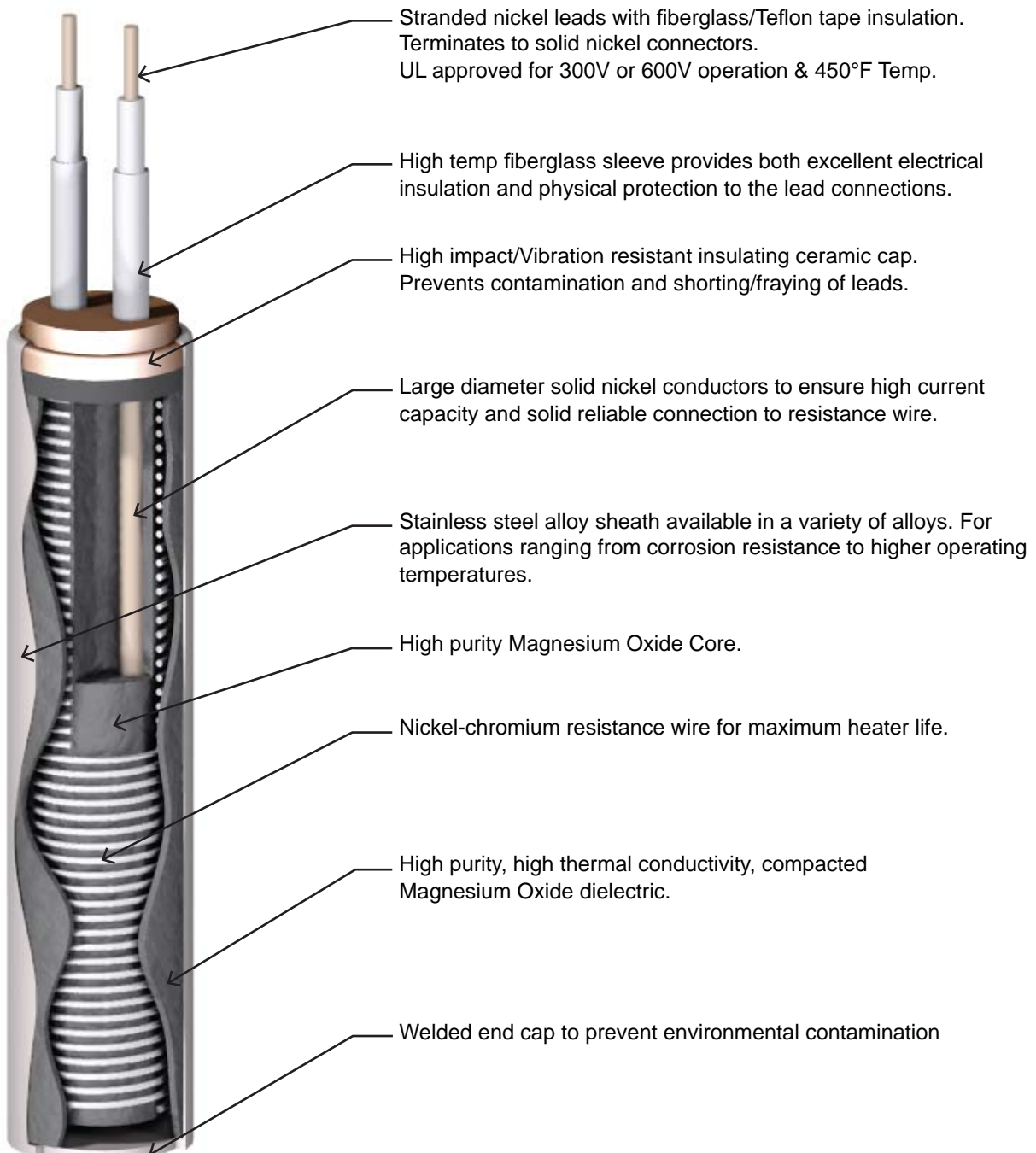


AVAILABILITY - One of the largest inventories in North America, thousands of Cartridge Heaters In-Stock for immediate delivery.

SUPPORT - Our engineers and sales staff have years of knowledge and can help design unique heaters for your applications. Provide problem solving ideas related to process and materials.

Hi-Density Cartridge Heaters

Grade "A" Nickel-Chrome resistance wire is very precisely wound onto solid ultra high purity magnesium oxide cores, placed into the sheath tubing. The remaining space inside the sheath is filled with grains of magnesium oxide (MgO). Today's Hi-Density cartridge heaters are manufactured using a Swagging or Crushing process; this mechanical procedure reduces the final diameter of the heater and compacts the unit. After compaction the MgO grains form a solid mass thereby increasing both the thermal conductivity and dielectric strength of the heater.



Stranded nickel leads with fiberglass/Teflon tape insulation. Terminates to solid nickel connectors. UL approved for 300V or 600V operation & 450°F Temp.

High temp fiberglass sleeve provides both excellent electrical insulation and physical protection to the lead connections.

High impact/Vibration resistant insulating ceramic cap. Prevents contamination and shorting/fraying of leads.

Large diameter solid nickel conductors to ensure high current capacity and solid reliable connection to resistance wire.

Stainless steel alloy sheath available in a variety of alloys. For applications ranging from corrosion resistance to higher operating temperatures.

High purity Magnesium Oxide Core.

Nickel-chromium resistance wire for maximum heater life.

High purity, high thermal conductivity, compacted Magnesium Oxide dielectric.

Welded end cap to prevent environmental contamination

CARTRIDGE HEATERS

Dia	Length	Volts	Watts	Termination	Specials	Part Number
1/4	1 1/4	120	100	10" Swaged F.G.	J T/C	212AH2-TJ1
1/4	1 1/4	240	150	10" Swaged F.G.		212BH2
1/4	1 1/2	120	100	10" Swaged F.G.		214AH2-2
1/4	1 1/2	240	100	10" Swaged F.G.		214BH2-1
1/4	1 1/2	240	200	10" Swaged F.G.		214BH2-2
1/4	1 3/4	240	200	34" Swaged F.G.		216BH2-1
1/4	2	120	150	10" Swaged F.G.		220AH2-1
1/4	2	240	150	10" Swaged F.G.		220BH2
1/4	2 1/2	240	200	10" Swaged F.G.		224BH2
1/4	3	120	200	10" Swaged F.G.		230AH2-3
1/4	3	240	300	10" Swaged F.G.		230BH2
1/4	4	120	100	10" Swaged F.G.		240AH2-2
1/4	4	120	100	36" Swaged F.G.		240AH2-1
1/4	4	240	200	10" Swaged F.G.		240BH2
1/4	4	240	300	34" Swaged F.G.		240BH2
1/4	5	120	225	10" Swaged F.G.		250AH2
1/4	5	240	250	10" Swaged F.G.		250BH2-2
1/4	5	240	350	10" Swaged F.G.		250BH2-2
1/4	6	120	400	10" Swaged F.G.		260AH2
1/4	6	240	400	10" Swaged F.G.		260BH2
1/4	7	120	275	10" Swaged F.G.		270AH2
1/4	7	240	275	10" Swaged F.G.		270BH2
1/4	7	240	300	10" Swaged F.G.		270BH2-36
1/4	7	240	400	10" Swaged F.G.		270BH2-1

CARTRIDGE HEATERS

Dia	Length	Volts	Watts	Termination	Specials	Part Number
3/8	1 1/2	120	200	10" Swaged F.G.		314AH2
3/8	1 1/2	240	150	34" Swaged F.G.		314BH2-2
3/8	1 1/2	240	250	10" Swaged F.G.		314BH2-1
3/8	2	120	250	10" Swaged F.G.		320AH2
3/8	2	240	150	10" Wirebraid	J T/C	320BH3-TJ
3/8	2	240	250	10" Swaged F.G.		320BH2-1
3/8	2	240	300	10" Swaged F.G.		320BH2-2
3/8	2 1/2	240	300	10" Swaged F.G.		324BH2
3/8	3	120	400	22" Swaged F.G.		330AH2-1
3/8	3	120	500	10" Swaged F.G.		330AH1-1
3/8	3	240	150	22" Swaged F.G.		330BH2-1

CARTRIDGE HEATERS

Dia	Length	Volts	Watts	Termination	Specials	Part Number
3/8	3	240	300	22" Swaged F.G.		330BH2-4
3/8	3	240	400	10" Swaged F.G.		330BH2-6
3/8	3	240	500	10" Swaged F.G.		330BH2
3/8	4	120	375	10" Swaged F.G.		340AH2-3
3/8	4	240	400	10" Swaged F.G.		340BH2
3/8	4	240	500	10" Swaged F.G.		340BH2-4
3/8	4 1/2	240	600	10" Swaged F.G.		344BH2-1
3/8	5	240	375	10" Swaged F.G.		350BH2-2
3/8	5	240	500	10" Swaged F.G.		350BH2-1
3/8	5	240	600	10" Swaged F.G.		350BH2
3/8	5 1/2	240	600	10" Swaged F.G.		354BH2-1
3/8	6	120	225	10" Swaged F.G.		360AH2-1
3/8	6	120	400	22" Swaged F.G.		360AH2-2
3/8	6	240	400	10" Swaged F.G.		360BH2-2
3/8	6	240	500	10" Swaged F.G.		360BH2-5
3/8	6	240	600	10" Swaged F.G.		360BH2-1
3/8	6	240	750	10" Swaged F.G.		360BH2-3
3/8	6 1/2	240	600	10" Swaged F.G.		364BH2
3/8	6 1/2	240	1000	10" Swaged F.G.		364BH2-1
3/8	7	120	400	10" Swaged F.G.		370AH2-1
3/8	7	120	600	10" Swaged F.G.		370AH2
3/8	7	240	500	22" Swaged F.G.		370BH2-2
3/8	7	240	600	10" Swaged F.G.		370BH2-5
3/8	7	240	800	10" Swaged F.G.		370BH2
3/8	7	240	1000	10" Swaged F.G.		370BH2-6
3/8	7 1/2	240	1000	10" Swaged F.G.		374BH2-3

CARTRIDGE HEATERS

Dia	Length	Volts	Watts	Termination	Specials	Part Number
3/8	8	240	500	22" Swaged F.G.		380BH2-4
3/8	8	240	700	10" Swaged F.G.		380BH2
3/8	8	240	800	10" Swaged F.G.		380BH2-7
3/8	8	240	1000	10" Swaged F.G.		380BH2-3
3/8	9	240	800	10" Swaged F.G.		390BH2-2
3/8	9	240	1000	10" Swaged F.G.		390BH2
3/8	9 1/2	240	740	10" Swaged F.G.		394BH2
3/8	9 1/2	240	1000	10" Swaged F.G.		394BH2-2
3/8	10	240	500	10" Swaged F.G.		3100BH2
3/8	10	240	1000	10" Swaged F.G.		3100BH2-3
3/8	10 1/2	240	1000	10" Swaged F.G.		3104BH2

CARTRIDGE HEATERS

Dia	Length	Volts	Watts	Termination	Specials	Part Number
3/8	11	240	1000	10" Swaged F.G.		3110BH2-2
3/8	11 1/2	240	1000	10" Swaged F.G.		3114BH2-1
3/8	11 1/2	240	1150	10" Swaged F.G.		3114BH2
3/8	12	240	500	22" Swaged F.G.		3120BH2-3
3/8	12	240	600	22" Swaged F.G.		3120BH2-2
3/8	12	240	1000	10" Swaged F.G.		3120BH2-1
3/8	14	240	1000	10" Swaged F.G.		3140BH2
3/8	16	240	1000	10" Swaged F.G.		3160BH2-2
3/8	18	240	1700	10" Swaged F.G.		3180BH2
1/2	1 1/2	240	200	10" Swaged F.G.		414BH2
1/2	2	120	200	10" Swaged F.G.		420AH2
1/2	2	240	200	10" Swaged F.G.		420BH2
1/2	2 1/2	120	300	10" Swaged F.G.		424AH2
1/2	2 1/2	240	200	10" Swaged F.G.		424BH2-2
1/2	2 1/2	240	500	24" Swaged F.G.		424BH2-1
1/2	3	240	300	10" Swaged F.G.		430BH2-5
1/2	3	240	400	22" Swaged F.G.		430BH2-4
1/2	3	240	500	22" Swaged F.G.		430BH2-2
1/2	3	240	500	36" Swaged F.G.	J T/C	430BH4-TJ1
1/2	3 1/2	240	500	10" Swaged F.G.		??4MBH-1
1/2	4	240	500	10" Swaged F.G.		440BH2-4
1/2	4	240	750	10" Swaged F.G.		440BH2-6

CARTRIDGE HEATERS

Dia	Length	Volts	Watts	Termination	Specials	Part Number
1/2	5	120	500	10" Swaged F.G.		450AH2-1
1/2	5	240	200	10" Swaged F.G.		450BH2-5
1/2	5	240	350	10" Swaged F.G.		450BH2
1/2	5	240	400	24" Wirebraid	Straight	450BH3
1/2	5	240	500	10" Swaged F.G.		450BH2-2
1/2	5	240	550	36" Armor Cable	RT Angle	450BH9-1
1/2	5	240	700	10" Swaged F.G.		450BH2-4
1/2	5	240	800	10" Swaged F.G.		450BH2-3
1/2	5 1/2	240	750	10" Swaged F.G.		454BH2
1/2	6	240	400	10" Swaged F.G.		460BH2-3
1/2	6	240	500	24" Wirebraid	Straight	460BH3-1
1/2	6	240	700	58" Wirebraid	RT Angle	460BH6-1
1/2	6	240	750	10" Swaged F.G.		460BH2-6
1/2	6	240	1000	10" Swaged F.G.		460BH2
1/2	6 1/2	240	1000	10" Swaged F.G.		464BH2-1

CARTRIDGE HEATERS

Dia	Length	Volts	Watts	Termination	Specials	Part Number
1/2	7	240	500	10" Swaged F.G.		470BH2
1/2	7	240	530	72" Armor Cable	RT Angle	470BH9-2
1/2	7	240	600	10" Swaged F.G.		470BH2-2
1/2	7	240	1000	10" Swaged F.G.		470BH2-1
1/2	8	240	400	10" Swaged F.G.		480BH2
1/2	8	240	500	10" Swaged F.G.		480BH2-1
1/2	8	240	600	10" Swaged F.G.		480BH2-5
1/2	8	240	800	10" Swaged F.G.		480BH2-6
1/2	8	240	1000	10" Swaged F.G.		480BH2-2
1/2	8	240	1000	48" Armor Cable	RT Angle	480BH9-1
1/2	8	240	1200	10" Swaged F.G.		480BH2-10
1/2	8	240	1500	10" Swaged F.G.		480BH2-8
1/2	8	240	2000	48" Armor Cable	RT Angle	480BH9
1/2	9	240	600	10" Swaged F.G.		490BH2-2
1/2	9	240	900	10" Swaged F.G.		490BH2-1
1/2	9	240	1000	10" Swaged F.G.		490BH2
1/2	10	240	500	10" Swaged F.G.		4100BH2-2
1/2	10	240	1000	10" Swaged F.G.		4100BH2-3
1/2	10	240	1500	10" Swaged F.G.		4100BH2
1/2	10	240	1500	34" Swaged F.G.		4100BH2-1
1/2	11	240	1500	10" Swaged F.G.		4110BH2-1
1/2	12	240	600	12" Wirebraid	STRAIGHT	4120BH6
1/2	12	240	1000	10" Swaged F.G.		4120BH2
1/2	12	240	1500	10" Swaged F.G.		4120BH2-3
1/2	12	240	2000	10" Swaged F.G.		4120BH2-11

CARTRIDGE HEATERS

Dia	Length	Volts	Watts	Termination	Specials	Part Number
1/2	13	240	1000	72" Wirebraid		4130BH3-2
1/2	13	240	1200	12" Wirebraid	STRAIGHT	4130BH3-1
1/2	14	240	1000	60" Swaged F.G.		4140BH2-3
1/2	14	240	1400	22" Wirebraid	STRAIGHT	4140BH3
1/2	14	240	1500	12" Swaged F.G.		4140BH2-2
1/2	15	240	1000	10" Swaged F.G.		4150BH2-1
1/2	15	240	1200	10" Swaged F.G.		4150BH2
1/2	16	240	1000	10" Swaged F.G.		4160BH2-1
1/2	18	240	1500	22" Swaged F.G.		4180BH2-1
1/2	20	240	1500	10" Swaged F.G.		4200BH2

CARTRIDGE HEATERS

Dia	Length	Volts	Watts	Termination	Specials	Part Number
5/8	4	240	500	10" Swaged F.G.		540BH2-2
5/8	4	240	750	10" Swaged F.G.		540BH2-3
5/8	5	240	500	22" Swaged F.G.		550BH2-1
5/8	5	240	1000	10" Swaged F.G.		550BH2
5/8	5	240	1000	22" Swaged F.G.		550BH2-2
5/8	6	120	500	10" Swaged F.G.		560AH2
5/8	6	240	500	10" Swaged F.G.		560BH2
5/8	6	240	1000	10" Swaged F.G.		560BH2-3
5/8	6	240	1500	10" Swaged F.G.		560BH2-5
5/8	7	240	500	22" Swaged F.G.		570BH2-1
5/8	7	240	850	10" Swaged F.G.		570BH2
5/8	7	240	1000	10" Swaged F.G.		570BH2-2
5/8	8	240	850	10" Swaged F.G.		580BH2-1
5/8	8	240	1000	10" Swaged F.G.		580BH2-4
5/8	8	240	1500	10" Swaged F.G.		580BH2-5
5/8	8	240	2000	10" Swaged F.G.		580BH2-3
5/8	9	240	1000	10" Swaged F.G.		590BH2-1
5/8	10	240	500	10" Swaged F.G.		5100BH2-2
5/8	10	240	750	10" Swaged F.G.		5100BH2-1
5/8	10	240	1000	10" Swaged F.G.		5100BH2
5/8	10	240	1500	10" Swaged F.G.		5100BH2-5
5/8	10	240	2000	10" Swaged F.G.		5100BH2-3
5/8	11	240	1000	10" Swaged F.G.		5110BH2-1
5/8	12	240	500	10" Swaged F.G.		5120BH2
5/8	12	240	1500	10" Swaged F.G.		5120BH2-1
5/8	12	240	2000	10" Swaged F.G.		5120BH2-3

CARTRIDGE HEATERS

Dia	Length	Volts	Watts	Termination	Specials	Part Number
5/8	13	240	1500	10" Swaged F.G.		5130BH2
5/8	14	240	1000	10" Swaged F.G.		5140BH2-1
5/8	16	240	750	22" Swaged F.G.		5160BH2-3
5/8	16	240	1000	10" Swaged F.G.		5160BH2-2
5/8	16	240	1600	22" Swaged F.G.		5160BH2-1
5/8	18	240	2500	10" Swaged F.G.		5160BH2
5/8	18	240	1200	10" Swaged F.G.		5180BH2-2
5/8	18	240	1400	22" Swaged F.G.		5180BH2-1
5/8	20	240	1500	34" Swaged F.G.		5200BH2-1

CARTRIDGE HEATERS

Dia	Length	Volts	Watts	Termination	Specials	Part Number
3/4	3	120	500	10" Swaged F.G.		630AH2
3/4	3	240	800	10" Swaged F.G.		630BH2
3/4	3 1/2	240	500	10" Swaged F.G.		634BH2-1
3/4	3 3/4	240	600	10" Swaged F.G.		634BH2
3/4	4	240	600	10" Swaged F.G.		640BH2-1
3/4	4	240	765	10" Swaged F.G.		640BH2-2
3/4	4	240	1000	10" Swaged F.G.		640BH2-4
3/4	4	240	500	10" Swaged F.G.		640BH2-6
3/4	4 1/2	240	1200	10" Swaged F.G.		644BH2
3/4	5	240	1000	10" Swaged F.G.		650BH2-1
3/4	5	240	500	10" Swaged F.G.		650BH2-5
3/4	6	120	500	10" Swaged F.G.		660AH2
3/4	6	240	500	10" Swaged F.G.		660BH2-1
3/4	6	240	1000	10" Swaged F.G.		660BH2
3/4	6	240	1200	10" Swaged F.G.		660BH2-2
3/4	7	240	1000	10" Swaged F.G.		670BH2
3/4	7	240	1500	10" Swaged F.G.		670BH2-1
3/4	8	240	600	10" Swaged F.G.		680BH2-1
3/4	8	240	800	10" Swaged F.G.		680BH2-10
3/4	8	240	1000	10" Swaged F.G.		680BH2-4
3/4	8	240	1350	10" Swaged F.G.		680BH2-3
3/4	8	240	1500	10" Swaged F.G.		680BH2-6
3/4	8	240	1750	10" Swaged F.G.		680BH2-8
3/4	8	240	1800	10" Swaged F.G.		680BH2-12
3/4	8	240	2000	10" Swaged F.G.		680BH2-11

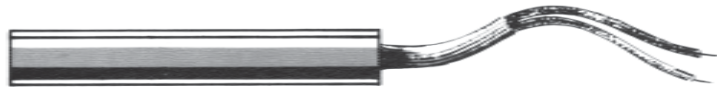
CARTRIDGE HEATERS

Dia	Length	Volts	Watts	Termination	Specials	Part Number
3/4	9	240	350	10" Swaged F.G.		690BH2-3
3/4	9	240	1000	10" Swaged F.G.		690BH2-2
3/4	9	240	1200	10" Swaged F.G.		680BH2-6
3/4	9	240	1550	10" Swaged F.G.		690BH2
3/4	9	240	1800	10" Swaged F.G.		690BH2-7
3/4	9	240	2000	10" Swaged F.G.		690BH2-4
3/4	9	240	2200	10" Swaged F.G.		690BH2-10
3/4	9 1/2	240	2000	10" Swaged F.G.		694BH2
3/4	10	240	1000	10" Swaged F.G.		6100BH2-7
3/4	10	240	1600	10" Swaged F.G.		6100BH2-4
3/4	10	240	2000	10" Swaged F.G.		6100BH2-6
3/4	10	240	2200	10" Swaged F.G.		6100BH2-9
3/4	10	240	2250	10" Swaged F.G.		6100BH2-8
3/4						

CARTRIDGE HEATERS

Dia	Length	Volts	Watts	Termination	Specials	Part Number
3/4	11	240	1000	10" Swaged F.G.		6110BH2-3
3/4	11	240	1650	10" Swaged F.G.		6110BH2-2
3/4	11	240	2200	10" Swaged F.G.		6110BH2-4
3/4	12	240	1000	10" Swaged F.G.		6120BH2-5
3/4	12	240	1000	10" Swaged F.G.	RT ANGLE	6120BH9-3
3/4	12	240	2000	10" Swaged F.G.		6120BH2
3/4	12	240	2200	10" Swaged F.G.		6120BH2-6
3/4	12	240	2500	10" Swaged F.G.		6120BH2-2
3/4	13	240	1000	10" Swaged F.G.		6130BH2
3/4	14	240	1000	10" Swaged F.G.		6140BH2-2
3/4	14	240	1100	10" Swaged F.G.		6140BH2-4
3/4	14	240	1200	10" Swaged F.G.		6140BH2-1
3/4	14	240	1500	34" Swaged F.G.		6140BH2-3
3/4	14	240	2200	10" Swaged F.G.		6140BH2-6
3/4	14	240	2500	10" Swaged F.G.		6140BH2-7
3/4	14	240	2750	10" Swaged F.G.		6140BH2-5
3/4	15	240	1000	10" Swaged F.G.		6150BH2-2
3/4	15	240	1500	34" Swaged F.G.		6150BH2-1
3/4	15	240	2500	10" Swaged F.G.		6150BH2-3
3/4	16	240	1100	10" Swaged F.G.		6160BH3-3

CARTRIDGE HEATERS



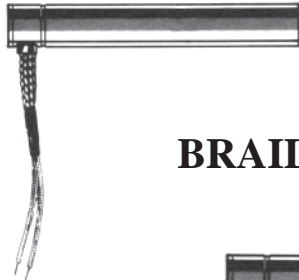
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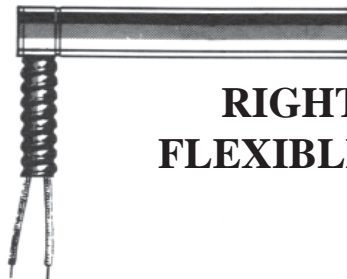
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Design & Use

Watt Density - Defined by the total wattage distributed over the total heated area of the sheath surface, expressed in square inches. A heaters watt density governs the resistance wire temperature, which then determines the sheath temperature. Hi-Density design allows the heater to operate at much higher watt densities, with lower resistance wire temperatures because of the improved heat distribution.

Cartridge heaters watt density can be calculated by using this formula:

$$\text{Watt Density} = \frac{\text{Heater Wattage}}{\text{Heated Length} \times \text{Heater Diameter} \times 3.1416}$$

The actual heated length is less the cold sections (un-heated) at each end of the standard heater. Typically designs require between 3/8” to 1/2” on the cold end depending on the type of termination used and 1/4” to 3/8” at the opposite end.

The lower a heaters watt density the longer the life expectancy, the steps below should be considered when designing cartridge heated applications:

- A) Increasing the number of heaters using lower watt densities.
- B) Increasing the diameter of the heater lowers the watt density.
- C) Increasing the length of the heater lowers the watt density.

Cartridge Heater Design & Use

Heater Fit - Proper fit and clearance is the most important factor in performance and life expectancy of a cartridge heater, drilled holes in molds, platens, dies should be properly sized for efficient heat transfer.

Allowing part of the heater's heated section to operate in open air will allow these areas temperature to rise significantly, these severe over temperature conditions will greatly accelerate the heaters normal aging process.

The chart below provides the common heater sizes. If your size isn't noted it can be provided with your quotation.

Nominal Size	1/4"	5/16"	3/8"	1/2"
Actual Diameter	.248"	.310"	.371"	.496"
Diameter Tolerance	+/- .002"	+/- .002"	+/- .002"	+/- .002"
Nominal Size	5/8"	3/4"	1"	
Actual Diameter	.621"	.746"	.996"	
Diameter Tolerance	+/- .002"	+/- .003"	+/- .003"	

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