



HYBRID CARTRIDGE HEATING ELEMENTS

Improve heat transfer to the air

Hybrid cartridge heaters quickly disperse heat in closed environments.

Speed heat up time by maximizing the heat transfer area with an integrated heat sink. Hybrid cartridge heaters are ideal for applications requiring fast heat dispersion using forced convection. The expanded surface area increases thermal transfer for rapid heat up, lower sheath temperature and longer life.

Agency Approvals

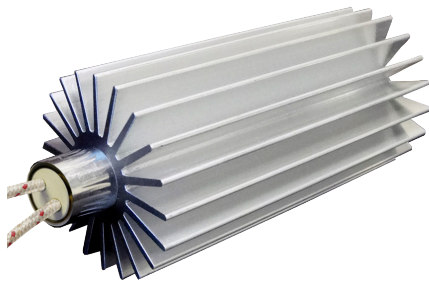
Heatron offers an extensive UL option list and builds to UL 60601/IEC-60601.

UL E91597 (UL 499)

CSA LR66355-1 (CSA-C22.2)

TUV* EN60335-1/A11 and EN61010-1A2

*This approval gives Heatron the option of CE marking.



DESIGN GUIDE

Construction Options:

See Design Guide on back page for common options

Performance Options:

- Low leakage current
- Dual voltage
- Dual wattage
- Ground wires
- Three phase power
- Controlled heat profile
- Internal thermocouple
- Over temperature control
- Special marks

APPLICATIONS

Medical and Life Science

- Molecular diagnostics
- Incubators

Industrial

- Forced air heating
- Land reclamation

Construction Options					
Sheath	Lead Exit	Lead Wire	Outer Jacket	End Seal	Mounting
304 Stainless Steel	Straight	Fiberglass	SS Braid	Mica	Threaded Fitting
316L Stainless Steel	Right Angle	Silicone	SS Cable	Epoxy	Flange
Incoloy	Elbow	Teflon	Strain Relief Spring	Ceramic	
	Bent Radius Sheath	Straight Pins	Silicone	Silicone	
			Fiberglass	Teflon	

Lead Options: Crimped On, Swaged In, No-Heat Extension
 Insulation and heater materials available with UL, CSA or Mil Spec recognition.

Design Guide											
Nominal Diameter	Maximum Amps*	Maximum Volts	Maximum Volts**					Minimum Watts (120V)***			
			120V 1 Phase	240V 1 Phase	480V 1 Phase	240V 3 Phase	480V 3 Phase	Length			
								1"	1 1/2"	2"	
1/4"	4.4	240	525	1,050					100	55	40
3/8"	7.2	480	800	1,600					65	35	25
1/2"	9.7	480	1,160	2,320					40	25	20
5/8"	23.0	480	2,760	5,520	11,000				35	20	15
3/4"	23.0	480	2,760	5,520	11,000	9,550	19,100		30	15	10
Nominal Diameter	Maximum Amps*	Maximum Volts	Maximum Volts**					Minimum Watts (220V)***			
			220V	380V				25.4 mm	38.1 mm	50.8 mm	
8.0mm	4.4	240	965					340	185	135	
10.0mm	7.2	480	1,580					220	120	85	
12.5mm	9.7	480	2,130					135	85	70	
16.0mm	23.0	480	5,060	8,740				120	70	50	
20.0mm	23.0	480	5,060	8,740				100	50	35	

* Data determined by current capability or internal parts and lead wire. Consult Heatron for higher AMPS.

** Higher wattages available with design additions. Consult Heatron for higher wattage requirements.

*** Data based on space limits for resistance windings internal to the heater. For minimums at 240 volts, multiply listed wattage by 4. Consult Heatron for lower wattage requirements.

US Size Dimensions			
Diameter		Length	
Nominal	Actual	Minimum	Maximum*
	Inches	Inches	Inches
1/4"	.245	7/8	36
3/8"	.371	7/8	48
1/2"	.495	7/8	60
5/8"	.621	1.0	72
3/4"	.745	1.0	72

Metric Size Dimensions			
Diameter		Length	
Nominal	Actual	Minimum	Maximum*
	mm	mm	mm
8.0mm	6.2	22.2	915
10.0mm	9.42	22.2	1,220
12.5mm	12.57	22.2	1,520
16.0mm	15.77	25.4	1,830
20.0mm	18.92	25.4	1,830

* Recommended maximum length; longer lengths available.

US Size Tolerances	
Diameter	± 0.003 inches
Length	± 3%
Camber	≤ 6 Inches in length: 0.006 inches > 6 inches in length: 0.02 inches per foot
Wattage	+5%, -10% per NEMA Standard
Resistance	+10%, -5% per NEMA Standard
No Heat	1/4 inches on disc end Minimum 1/4 inches on lead end

Metric Size Tolerances	
Diameter	± 0.07 mm
Length	± 3%
Camber	≤ 150mm length: 0.16mm > 150mm length: 0.25mm per 300mm
Wattage	+5%, -10% per NEMA Standard
Resistance	+10%, -5% per NEMA Standard
No Heat	6 mm on disc end Minimum 6 mm on lead end

* Tighter tolerances available.

With thousands of possible configurations, contact Heatron Engineering for optimal design and construction ratings.