



# Hybrid Cartridge Heaters

## 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
- Centerless grinding
- 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	Fittings
304 Stainless Steel	Straight	Fiberglass	SS Braid	Mica	Silicone Rubber Overmold
316L Stainless Steel	Right Angle	Silicone	SS Cable	Epoxy	Post Terminal (1/2", 5/8", 3/4")
Incoloy	Elbow	Teflon	Strain Relief Spring	Ceramic	UL Listed Plug
	Double Ended	Straight Pins	Silicone	Silicone	Conduit Box
			Fiberglass	Teflon	
			Ceramic Beads		

**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 Watts**					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 Watts**		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

\* Recommended maximum length; longer lengths available.

## 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

## US Size Tolerances

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

## Metric Size Tolerances

<b>Diameter*</b>	± 0.07 mm
<b>Length*</b>	± 3%
<b>Camber</b>	≤ 150mm length: 0.16mm > 150mm length: 0.25mm per 300mm
<b>Wattage</b>	+5%, -10% per NEMA Standard
<b>Resistance</b>	+10%, -5% per NEMA Standard
<b>No Heat</b>	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.