

C A B L E H E A T E R S

Low Mass; High Versatility

The versatile Watlow cable heater can be formed to a variety of shapes as dictated by its many applications. Cable heaters are small diameter, high performance units, fully annealed and readily bent to a multitude of configurations.

The heater can be formed into a compact coiled nozzle heater for use on plastic injection molding equipment supplying a full 360 degrees of heat with optional distributed wattage. A straight cable can snake through a sealing bar in packaging equipment. Flat spiral configurations are used in semiconductor manufacturing while a star wound cable is used for air and gas heating.

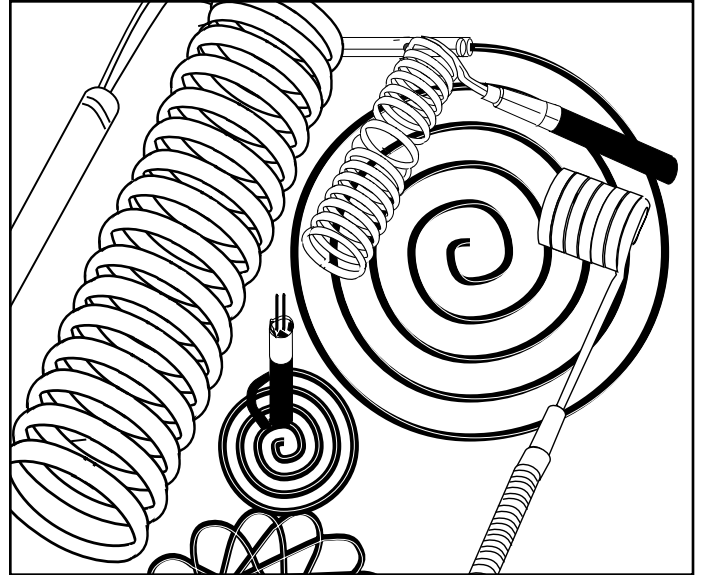
Different applications require different construction methods, including one, two, three or four resistance wires; parallel coil or straight wire; drawn or swaged sheaths; with or without internal thermocouples; leads exiting from one or both ends, and round, rectangular or square cable.

Whatever the application, the Watlow cable heater can be shaped to fit your application needs.

Applications

- Plastic injection molding nozzles
- Semiconductor manufacturing and wafer processing
- Hot metal forming dies and punches
- Sealing and cutting bars
- Medical, analytical and scientific instruments
- Restaurant and food processing equipment
- Cast-in heaters
- Laminating and printing presses
- Air heating
- Textile manufacturing
- Heating in a vacuum environment

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Features and Benefits

High ductility

- Allows heater to be cold formed into almost any shape

Low mass

- Allows for quick response to heating and cooling

Heaters are constructed with no open seams

- Can be isolated or sealed from process environment with optional compression fittings or HTF adaptor seals

Standard 304 stainless steel or optional 316 L stainless steel or Inconel® 600

- Provides high temperature corrosion and oxidation resistance along with ideal thermal expansion properties

Heater sheath can be brazed

- Allows permanent attachment of mounted fittings

Diameters range from 0.040 inch (1 mm) to 0.188 inch (5 mm) diameter. Lengths range from ¾ inch (19 mm) to over 70 feet (2134 cm)

- Packs a lot of heat into a tiny space



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C A B L E H E A T E R S

Features and Benefits *continued*

Internal construction options

- Allow internal thermocouples and no-heat sections. (Not available in all sizes)

Can operate in unusual environments

- Including cryogenic and subfreezing temperatures, high vacuum, and gaseous and liquid immersion conditions.

Performance Capabilities

- Continuous operating temperatures to 1200°F (650°C) with intermittent operating periods achieving up to 1500°F (815°C).
- Dependent on type of element wire used.
- Watt densities on the cable to 30 W/in² (4.65 W/cm²), and as high as 75 W/in² (11.62 W/cm²) within factory approved

Electrical Data and Coiling Limits

Sheath Diameter inches		Maximum Voltage (mm)	Surface Area Per Linear Foot in		Minimum Bend Radius (cm)		Minimum Coiled Inside Diameter inches (mm)	
0.040 ± 0.002	(1.016 ± 0.051)	48	1.51	(9.743)	1/16	(1.588)	1/8	(3.175)
0.062 ± 0.002	(1.575 ± 0.051)	120	2.34	(15.098)	1/8	(3.175)	1/4	(6.350)
0.058 ± 0.002	(1.473 ± 0.051)	240	2.18	(14.065)	1/8	(3.175)	1/4	(6.350)
0.094 + 0.002 - 0.003	(2.388 + 0.051 - 0.076)	240	3.54	(22.840)	3/16	(4.763)	3/8	(9.525)
0.102 square ± 0.003		240	4.90	(31.615)	1/4	(6.350)	1/2	(12.700)
0.103 ± 0.003 x	(2.667 ± 0.076) x							
0.153 ± 0.005 rectangular	(3.886 ± 0.127)	240	16.19	(39.938)	1/4	(6.350)	1/2	(12.700)
0.125 ± 0.003	(3.175 ± 0.076)	240	4.71	(30.389)	1/4	(6.350)	1/2	(12.700)
0.157 ± 0.004	(3.998 ± 0.102)	240	5.92	(38.196)	5/16	(7.938)	5/8	(15.875)
0.188 + 0.003 - 0.006	(4.775 + 0.076 - 0.152)	240	7.09	(45.745)	3/8	(9.525)	3/4	(19.050)
0.128 square ± 0.003	(3.353 ± 0.076)	240	6.31	(40.712)	1/4	(6.350)	1/2	(12.700)

In most cases 30 W/in² (4.65 W/cm²) is the safe allowable limit for cable watt density. Please consult factory before ordering >30 WSI cables.

Standard Resistance/Wattage Tolerance ±10 percent.

Cable heaters can run on both ac and dc, 50 or 60 Hz. Consult factory for amperage limitations.

Coiling Tolerances

Cable Diameters	Standard Coiled Width Tolerances		Standard Coiled I.D. Tolerances			
	Coiled Width inches (mm)	Tolerances inches (mm)	Coil I.D. Range inches (mm)		Tolerances inches (mm)	
All Diameters	Below 6 (152.4)	+ 0 - 1/8 (+0.000 - 3.175)	Below 0.625 (Below 15.875)		+0.000 - 0.015 (+0 - 0.381)	
	6 to 10 (152.4 to 254.0)	+ 1/8 - 3/8 (+3.175 - 9.525)	0.625 to 0.999 (15.875 to 25.375)		+0.000 - 0.030 (+0 - 0.762)	
	Over 10 (Over 254.0)	+ 1/4 - 1/2 (+6.350 - 6.350)	1.000 to 1.999 (25.400 to 50.775)		+0.000 - 0.062 (+0 - 1.575)	
			2.000 to 2.999 (50.800 to 76.175)		+0.000 - 0.125 (+0 - 3.175)	
			3.000 to 3.999 (76.200 to 101.575)		+0.000 - 0.250 (+0 - 6.350)	
			4.000 to 4.999 (101.600 to 126.975)		+0.000 - 0.375 (+0 - 9.525)	
			5.000 and Over (127.000 and Over)		+0.000 - 0.500 (+0 - 12.700)	

When the O.D. of the coil is required to be the critical dimension, this fact must be specified at the time of ordering so that proper coiling procedures can be determined. I.D. and O.D. dimensions cannot be held on the same unit. Please consult with the factory before ordering coiled cable heaters requiring other than standard tolerances.

Cable Straight Length Tolerance Tolerances

Length	≤24"	>24"≤60"	>60"≤100"	>100"
Tolerance	±3/8"	±3/8"	±3/8"	±3/8"

How to Order

To order your stock cable heater, specify:

- Watlow code number (from Watlow Heater's catalog) and/or voltage and wattage specifications
- Watts
- Straight length or coiled (If coiled, please specify inside diameter, coil width and lead orientation.)
- Lead length (Standard lengths will be supplied if not otherwise specified.)
- Lead protection (Standard length and type will be furnished if not otherwise specified.)

If our stock units do not meet your application needs, Watlow can manufacture cable heaters to your special requirements. For made-to-order units, please consult factory.

Availability

Stock: Heaters are stocked straight and formed to shape on request requiring 1 to 2 working days, contingent upon quantity and heater options.

Made-to-Order: Delivery dependent on complexity of order. Consult factory.