

# High-Temperature Heaters

High-Temperature Heaters	Sheath Materials	Max. Operating Temperatures		Typical Max. Watt Densities		Page
		°F	°C	W/in <sup>2</sup>	W/cm <sup>2</sup>	
<b>MULTICELL™</b>	Alloy	2050	1120	30	4.6	<b>461</b>
<b>High-Temperature FIREROD®</b>	Platen	1800	982	100	15.5	<b>467</b>
<b>High-Temperature Tubular</b>	Inconel® 600	1800	983	30	4.6	<b>468</b>
<b>Ceramic Fiber</b>	Ceramic fiber	2200	1204	30	4.6	<b>469</b>



High-Temperature Heaters

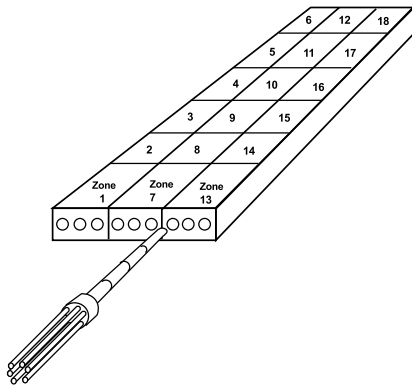
# High-Temperature Heaters

## MULTICELL™ Heaters

The advanced design of the MULTICELL™ insertion heater from Watlow® offers three major advantages: extreme process temperature capability, independent zone control for precise temperature uniformity and loose fit design for easy insertion and removal.

### Performance Capabilities

- Engineered to achieve sheath temperatures up to 2050°F (1120°C)
- Up to eight independently controllable zones



### Features and Benefits

#### Multiple, independently controllable zones

- Allows process temperature uniformity not possible with any other single sheathed heater

#### Radiant design of heater

- Allows for loose insertion in boiling holes and piping holes
- Permits easy removal and replacement with minimal down time since it will not bind or seize in the hole

#### Oxidized sheath

- Provides high emissivity and improves the heater's performance as oxidation increases

#### Individually metal-sheathed coils swaged into a larger, high-temperature alloy outer sheath

- Provides maximum protection against element burnout through the outer sheath

#### Quick disconnect plug and jack

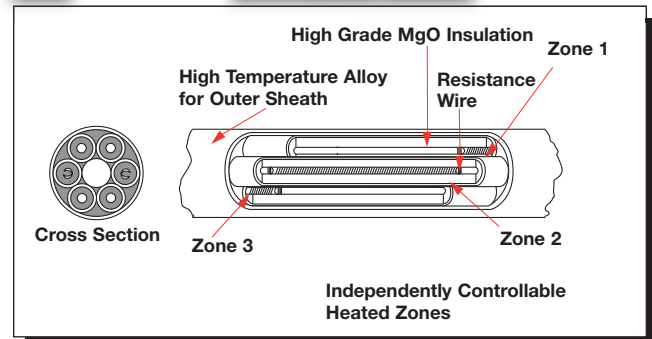
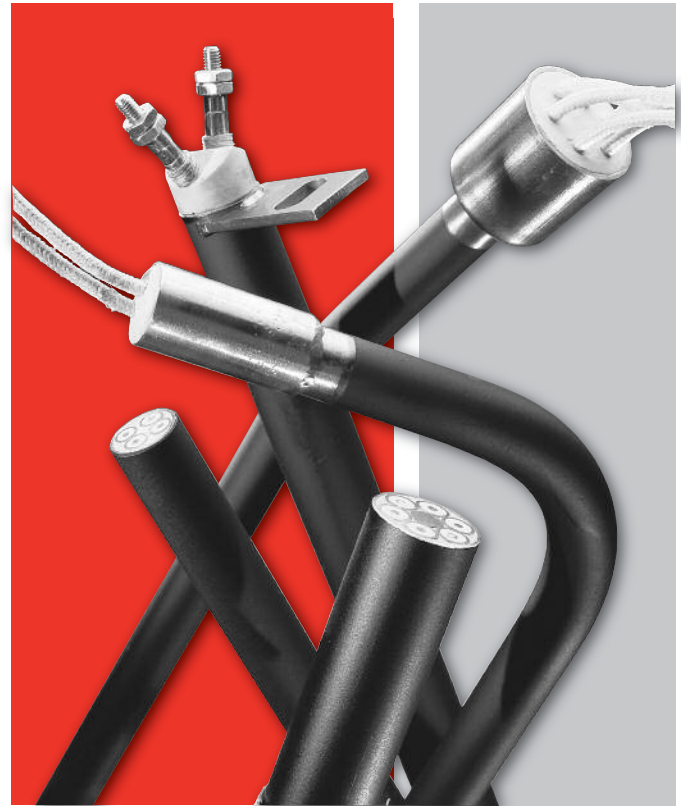
- Permits fast replacement of individual elements while the press stays at operating temperature

#### Special bending capabilities

- Solves unusual machinery needs and keeps leads away from heated zones

#### Flexible leads up to 842°F (450°C)

- Protects termination from high temperature environment



### Typical Applications

- Hot isothermal forming
- Soil remediation
- Hot forging dies
- Heated platens
- Super plastic forming
- Heated platens (single and multiple zones)
- Heat treating processes
- Super plastic forming with diffusion bonding

# High-Temperature Heaters

## MULTICELL Heaters

### Applications and Technical Data

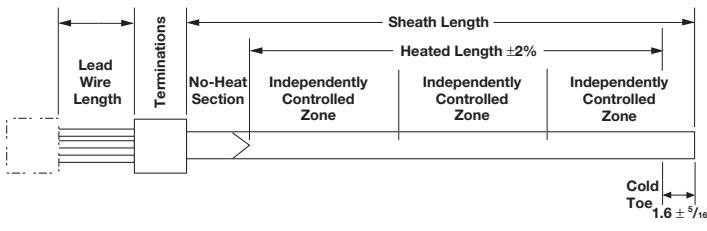
#### Definition of Terms

**Cold Toe:** A physical minimum requirement of  $1\frac{1}{2} \pm \frac{1}{16}$  inch

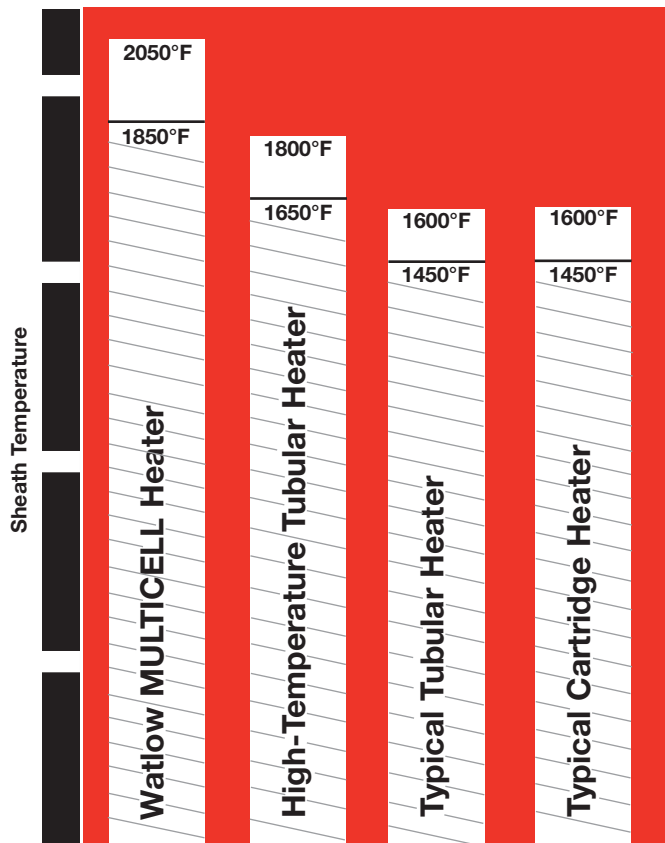
**Independent Zone:** Up to three, separately controlled zones, which can be of varying lengths and wattages

**Heated Length:** The combined sum of all independent zones

**Wattage:** Ratings are the combined sum of all independent zones

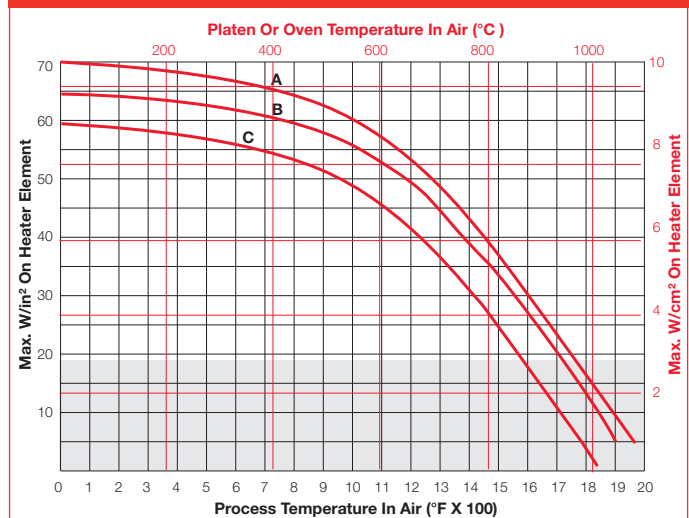


### MULTICELL Heaters: The High Temperature Choice

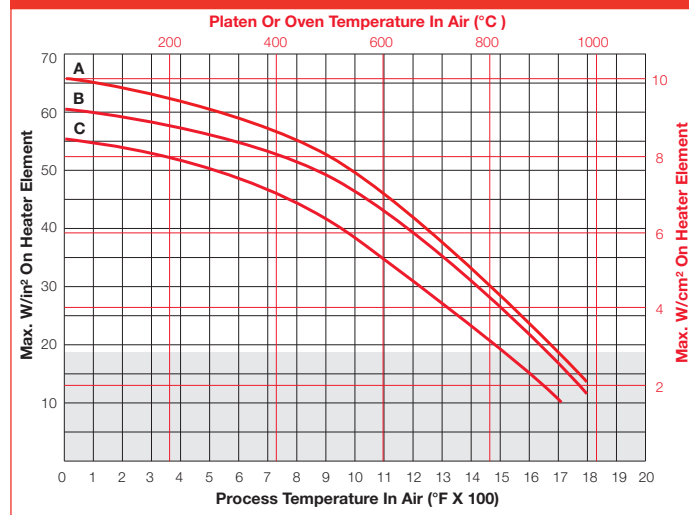


Hatched area represents typical use range. Unhatched area represents capable range. Contact your Watlow representative for use in unhatched range.

Maximum Allowable Watt Density Single Zone ①



Maximum Allowable Watt Density Three Zone ①



A = 6 cell, 0.935 in. diameter, 240VAC, 3-phase  
 B = 6 cell, 0.685 in. diameter, 240VAC, 3-phase  
 C = 6 cell, 0.935 in. diameter, 480VAC, 3-phase

**Note:** Shaded area represents the Watlow offering, non-shaded area contact your Watlow representative.

① Other designs and voltages with higher temperature capabilities are available, Contact your Watlow representative.

to Order Call 1.800.345.0369

# High-Temperature Heaters

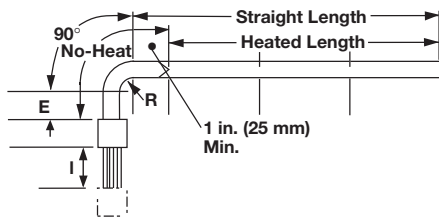
## MULTICELL Heaters

*Applications and Technical Data* (Continued)

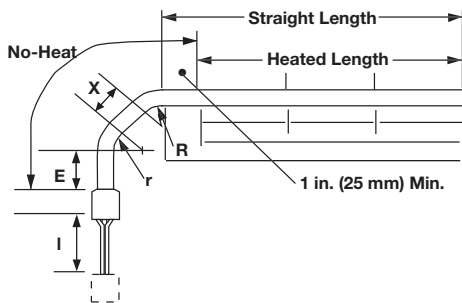
### Physical Design Parameters

All bending of a MULTICELL heater is restricted to the cold area of the heater. All bend radii points must be 1 in. (25 mm) from the hot/cold junction.

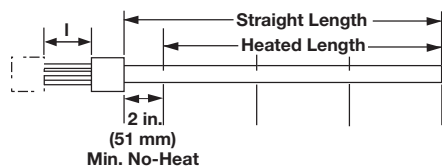
“L”



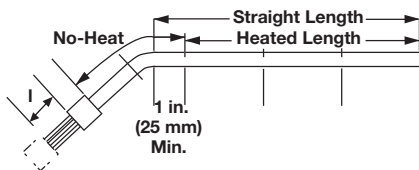
**Droop**



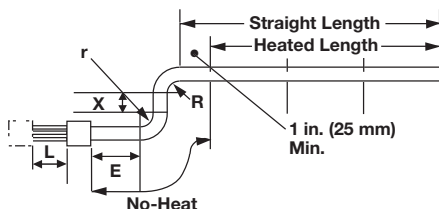
**Straight**



**Angle**



**Crank**



Star Electric

### 0.935 Inch Diameter MULTICELL Heater

Diameter in.	Bending Style	Sheath Length	Min. No-Heat Length	Total Heated Length
		Min./Max. in. (mm)	in. (mm)	Min./Max. in. (mm)
0.935	Straight	14 (356)	Contact Watlow	6 (152.0)
		225 (5715)	Contact Watlow	160 (4064.0)
0.935	Angle	17 (432)	Contact Watlow	6 (152.0)
		225 (5715)	Contact Watlow	172½ (4382.0)
0.935	L	18 (457)	Contact Watlow	6 (152.0)
		225 (5715)	Contact Watlow	170¼ (4324.4)
0.935	Crank	23 (584)	Contact Watlow	6 (152.0)
		225 (5715)	Contact Watlow	163 (4140.0)
0.935	Droop	18 (457)	Contact Watlow	6 (152.0)
		225 (5715)	Contact Watlow	168 (4267.0)

Symbol	E	r	X	R	I
Min. Length in. (mm)	4 (102)	2½ (38)	1½ (38)	2½ (38)	12 (305)

Zones	1	2	3
Min. Heated in. (mm)	6 (152)	6 (152)	6 (152)

### 0.685 Inch Diameter MULTICELL Heater

Diameter in.	Bending Style	Sheath Length	Min. No-Heat Length	Total Heated Length
		Min./Max. in. (mm)	in. (mm)	Min./Max. in. (mm)
0.685	Straight	14 (356)	Contact Watlow	6 (152)
		225 (5715)	Contact Watlow	178 (4521)
0.685	Angle	17 (432)	Contact Watlow	6 (152)
		225 (5715)	Contact Watlow	173½ (4407)
0.685	L	18 (457)	Contact Watlow	6 (152)
		225 (5715)	Contact Watlow	172 (4369)
0.685	Crank	18 (457)	Contact Watlow	6 (152)
		225 (5715)	Contact Watlow	163 (4267)
0.685	Droop	15½ (394)	Contact Watlow	6 (152)
		225 (5715)	Contact Watlow	170 (4331)

Symbol	E	r	X	R	I
Min. Length in. (mm)	4 (102)	1½ (38)	1½ (38)	1½ (38)	12 (305)

Zones	1	2	3
Min. Heated in. (mm)	6 (152)	6 (152)	6 (152)

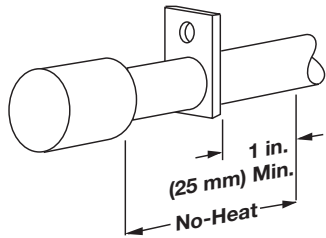
to Order Call 1.800.345.0369

# High-Temperature Heaters

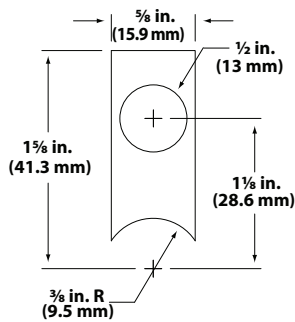
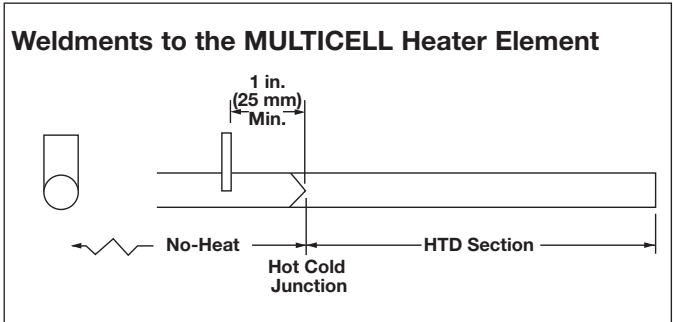
## MULTICELL Heaters

Applications and Technical Data (Continued)

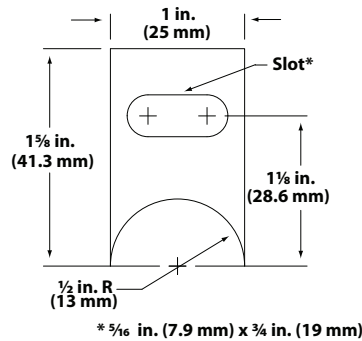
### Tab Styles



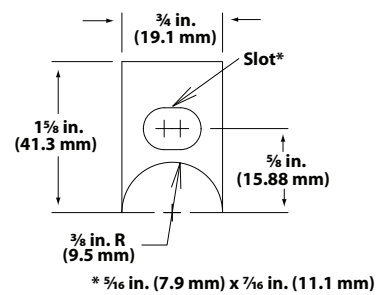
Full View



Style S1



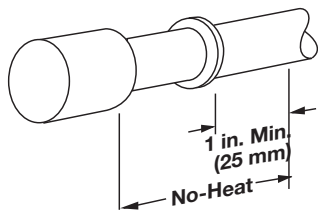
Style S2



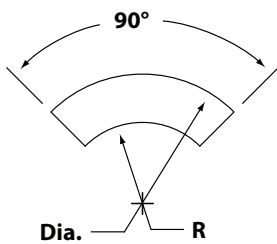
Style S3

Tabs and rings are used to hold the heater in place and keep it from creeping. Available in carbon steel, 304 and 316 SS.

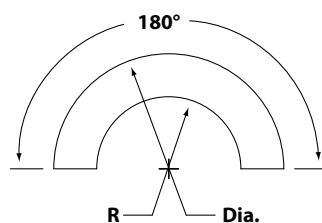
### Ring Styles



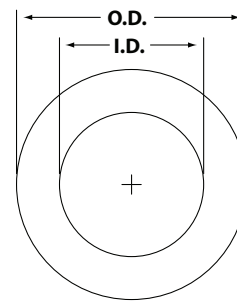
Full View



Style S4



Style S5



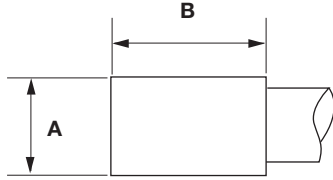
Style H1

# High-Temperature Heaters

## MULTICELL Heaters

### Termination Standards

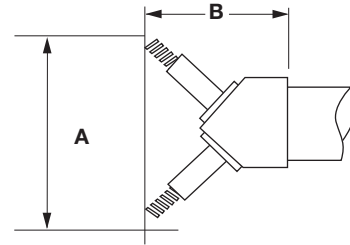
#### Potting Sleeves



Heater O.D. in.	Dimension A in. (mm)	Dimension B in. (mm)	Zone	Phase	Type No.
0.685	3/4 (19)	1 1/2 (38)	1	1	61L
0.935	1 1/16 (27)	1 1/2 (38)	1	1	91L
0.935	1 1/16 (27)	1 1/2 (38)	1	3 <sup>Ⓞ</sup>	91L

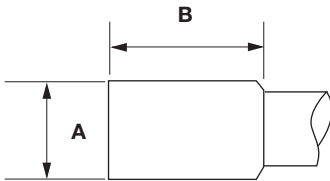
① 3 wire only

#### Ceramic Wedge with 10-32 Threaded Terminals



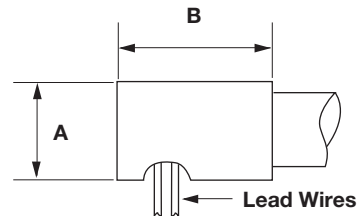
Heater O.D. in.	Dimension A in. (mm)	Dimension B in. (mm)	Zone	Phase	Type No.
0.685	1 1/4 (32.0)	1 1/4 (32.0)	1	1	61T
0.935	1 1/8 (41.3)	1 1/8 (41.3)	1	1	91T

#### Potting Cups



Heater O.D. in.	Dimension A in. (mm)	Dimension B in. (mm)	Zone	Phase	Type No.
0.685	1 1/8 (34.9)	1 1/8 (34.9)	2	1	62L
0.685	1 1/8 (34.9)	1 1/8 (34.9)	3	1	62L
0.685	1 1/8 (34.9)	1 1/8 (34.9)	1	3	62L
0.685	1 1/8 (34.9)	1 1/8 (34.9)	2	3	62L
0.935	1 1/8 (34.9)	1 1/8 (34.9)	2	1	92L
0.935	1 1/8 (34.9)	1 1/8 (34.9)	3	1	92L
0.935	1 1/8 (34.9)	1 1/8 (34.9)	1	3	92L
0.935	1 1/8 (34.9)	1 1/8 (34.9)	2	3	92L

#### Potting Cup for Right Angle Exit



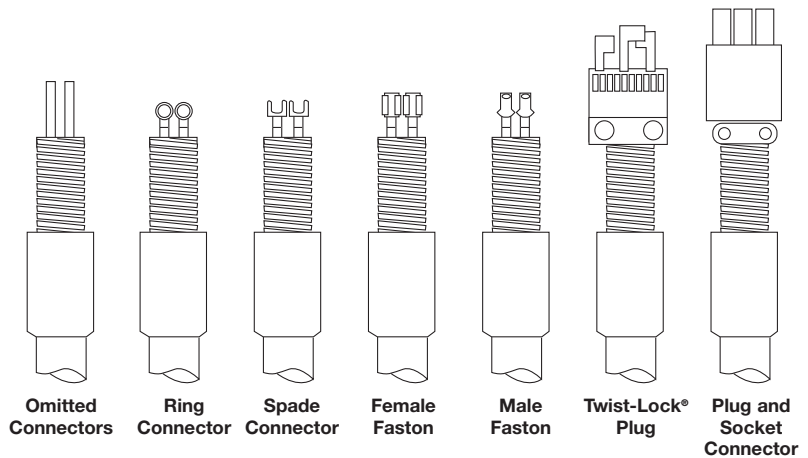
Heater O.D. in.	Dimension A in. (mm)	Dimension B in. (mm)	Zone	Phase	Type No.
0.685	3/4 (19)	1 1/2 (38)	1	1 or 3	RAE1
0.935	1 1/16 (27)	1 1/2 (38)	1	1 or 3	RAE2

# High-Temperature Heaters

## MULTICELL Heaters

### Termination Assemblies

All termination assemblies are available with potting sleeves or cups, with or without armorflex lead wire protection. Please specify **potting vessel** and **lead cover option** when ordering.



Termination illustrations shown with armorflex covering.

### Options

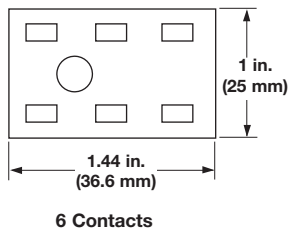
#### Plug and Socket and Twist-Lock® Plug Variations

Three zone heaters requiring a quick disconnect plug will typically be supplied with a six contact plug and socket. Twist-Lock® plug variations are typically supplied with single zone MULTICELL heaters. When ordering a Twist-Lock® plug, please specify the **NEMA type** as shown below.

For any other plug variations, please contact your Watlow representative.

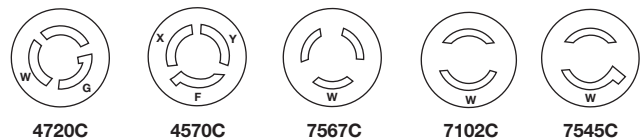
**Note:** Mating connectors are also available for plug terminations listed. Contact your Watlow representative.

#### Plug and Socket



Male Plug	Zones	Type	Voltage	Amperage	Blade Type
P406-CCT	3	6 wire	600	30	Straight
4570C	1	3 wire	250	15	Twist-Lock®
4720C	1	3 wire	125	15	Twist-Lock®
5266C	1	3 wire	125	15	Straight
5666C	1	3 wire	250	15	Straight
7102C	1	2 wire	250	20	Twist-Lock®
7545C	1	2 wire	250	15	Twist-Lock®
7567C	1	3 wire	125	10	Twist-Lock®

#### Twist-Lock®



#### Straight

