

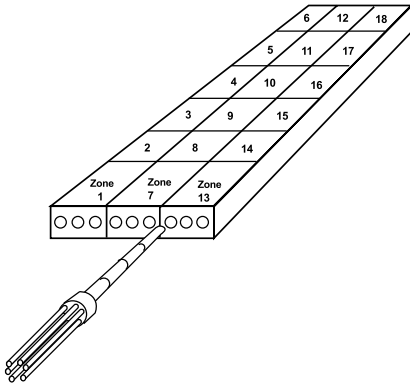
# Cartridge/Insertion Heaters

## 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

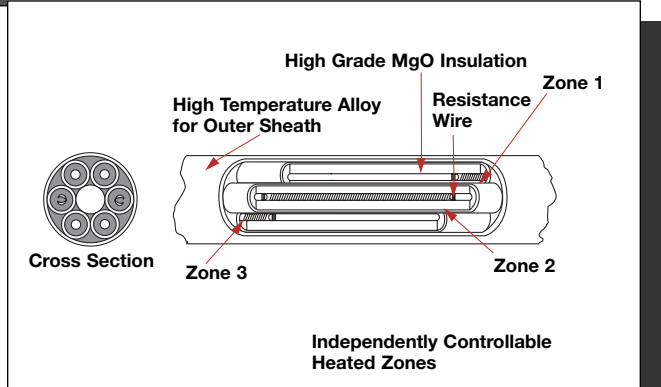
- Permits fast replacement of individual elements while the press stays at operating temperature

#### Special bending capabilities

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

#### Flexible leads up to 986°F (530°C)

- Protects termination from high temperature environment



### 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

# Cartridge/Insertion Heaters

## MULTICELL Heaters

### Applications and Technical Data

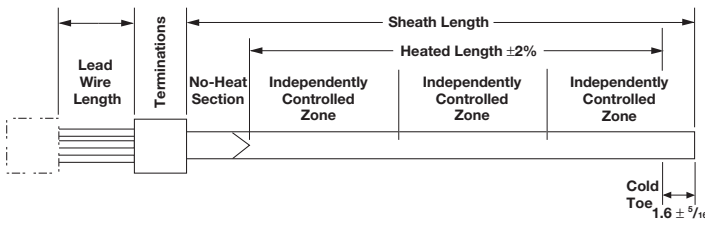
#### Definition of Terms

**Cold Toe:** A physical minimum requirement of  $1\% \pm \frac{5}{16}$  inch

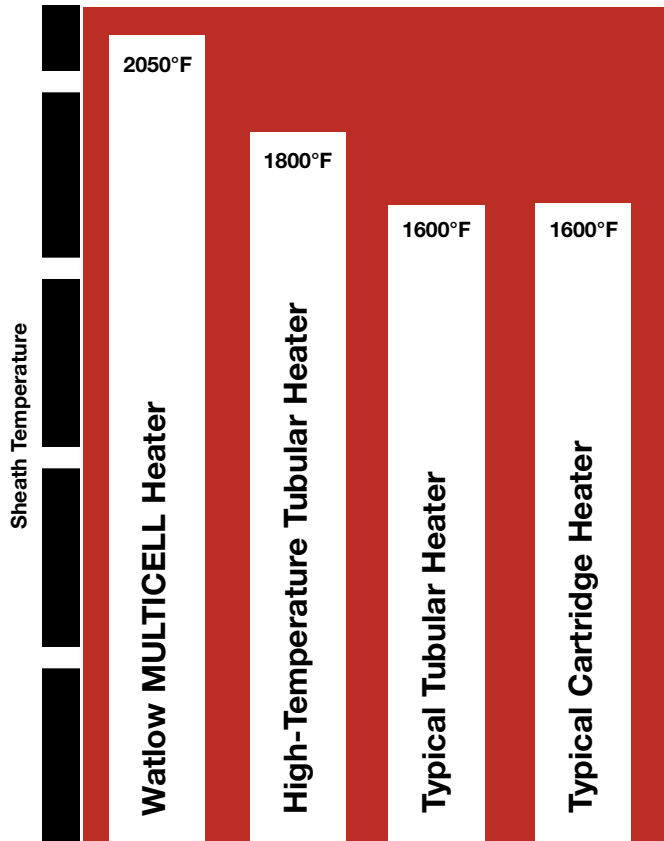
**Independent Zone:** Up to three, separately controlled zones which can be of varying lengths and wattages

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

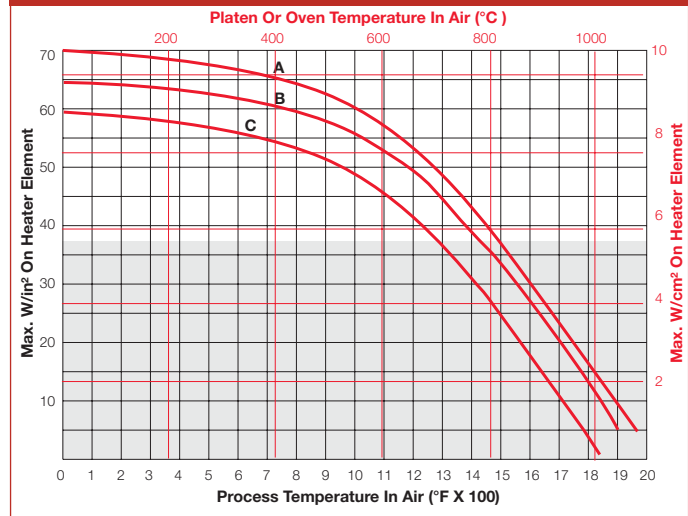
**Wattage:** Ratings are the combined sum of all independent zones



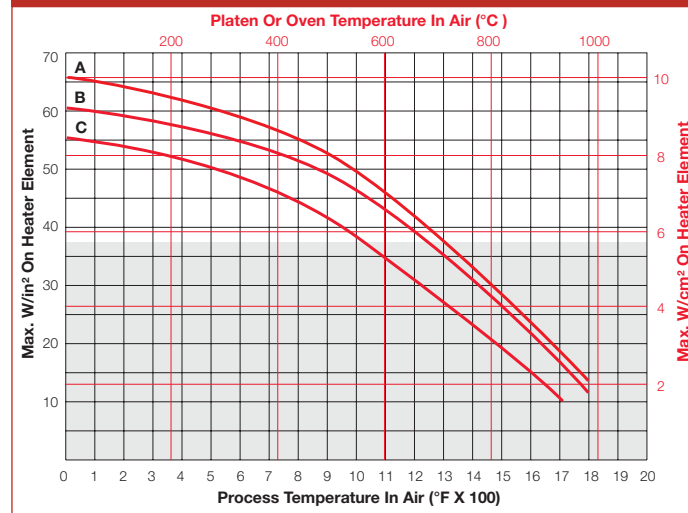
### MULTICELL Heaters: The High Temperature Choice



Maximum Allowable Watt Density Single Zone ①



Maximum Allowable Watt Density Three Zone ①



- A = 6 cell, 0.935 in. diameter, 240V~(ac), 3-phase
- B = 6 cell, 0.685 in. diameter, 240V~(ac), 3-phase
- C = 6 cell, 0.935 in. diameter, 480V~(ac), 3-phase

**Note:** Shaded area is standard, non-shaded area contact your Watlow representative.

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

# Cartridge/Insertion Heaters

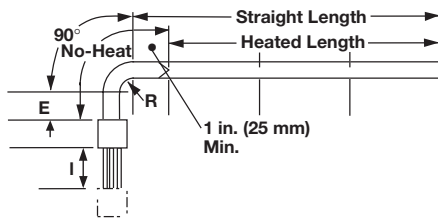
## MULTICELL Heaters

*Applications and Technical Data* (Continued)

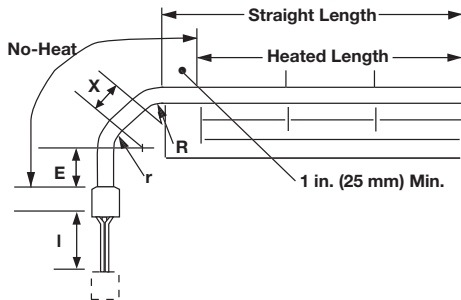
### Physical Design Parameters

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.

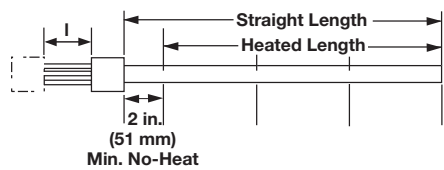
“L”



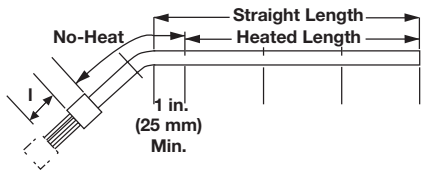
**Droop**



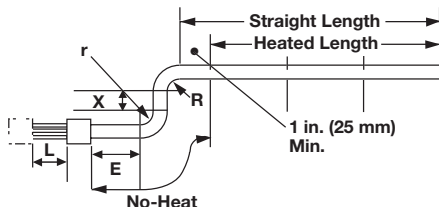
**Straight**



**Angle**



**Crank**



### 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)	in. (mm)	Min./Max. in. (mm)		
0.935	Straight	14 (356)	Contact Watlow	6 (152.0)	6 (152.0)		
		225 (5715)	Contact Watlow	160 (4064.0)	160 (4064.0)		
0.935	Angle	17 (432)	Contact Watlow	6 (152.0)	6 (152.0)		
		225 (5715)	Contact Watlow	172½ (4382.0)	172½ (4382.0)		
0.935	L	18 (457)	Contact Watlow	6 (152.0)	6 (152.0)		
		225 (5715)	Contact Watlow	170¾ (4324.4)	170¾ (4324.4)		
0.935	Crank	23 (584)	Contact Watlow	6 (152.0)	6 (152.0)		
		225 (5715)	Contact Watlow	163 (4140.0)	163 (4140.0)		
0.935	Droop	18 (457)	Contact Watlow	6 (152.0)	6 (152.0)		
		225 (5715)	Contact Watlow	168 (4267.0)	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)	in. (mm)	Min./Max. in. (mm)		
0.685	Straight	14 (356)	Contact Watlow	6 (152)	6 (152)		
		225 (5715)	Contact Watlow	178 (4521)	178 (4521)		
0.685	Angle	17 (432)	Contact Watlow	6 (152)	6 (152)		
		225 (5715)	Contact Watlow	173½ (4407)	173½ (4407)		
0.685	L	18 (457)	Contact Watlow	6 (152)	6 (152)		
		225 (5715)	Contact Watlow	172 (4369)	172 (4369)		
0.685	Crank	18 (457)	Contact Watlow	6 (152)	6 (152)		
		225 (5715)	Contact Watlow	163 (4267)	163 (4267)		
0.685	Droop	15½ (394)	Contact Watlow	6 (152)	6 (152)		
		225 (5715)	Contact Watlow	170 (4331)	170 (4331)		

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

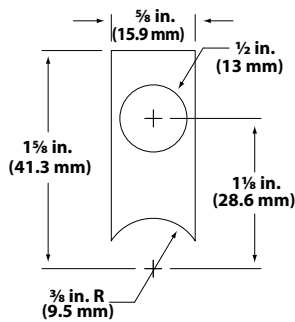
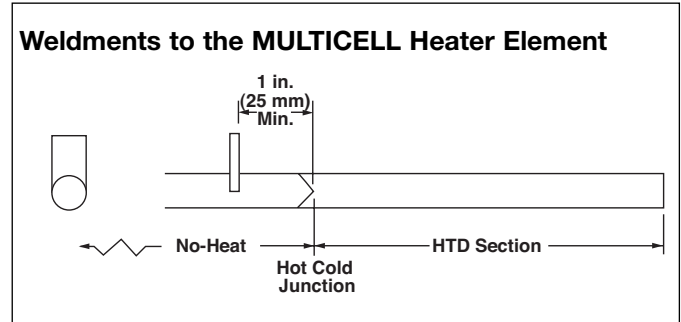
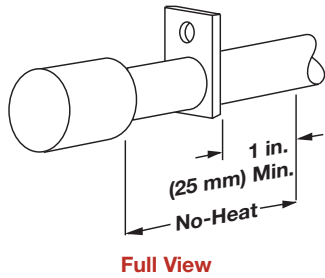
Zones	1	2	3
Min. Heated in. (mm)	6 (152)	6 (152)	6 (152)

# Cartridge/Insertion Heaters

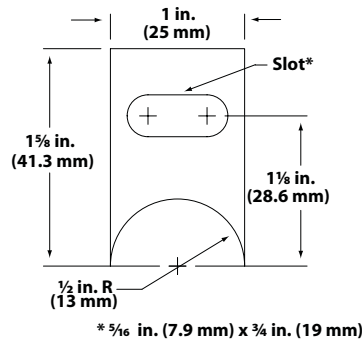
## MULTICELL Heaters

Applications and Technical Data (Continued)

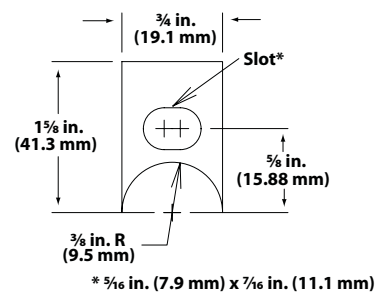
### Tab Styles



**Style S1**



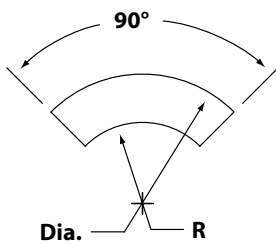
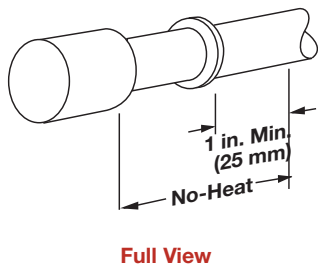
**Style S2**



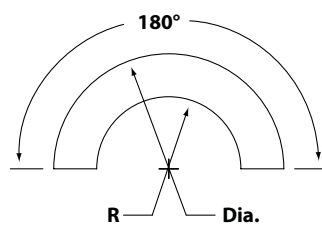
**Style S3**

Tabs and rings are used to hold the heater in place and keep it from creeping.

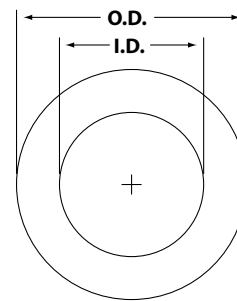
### Ring Styles



**Style S4**



**Style S5**



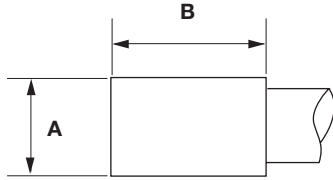
**Style H1**

# Cartridge/Insertion Heaters

## MULTICELL Heaters

### Termination Standards

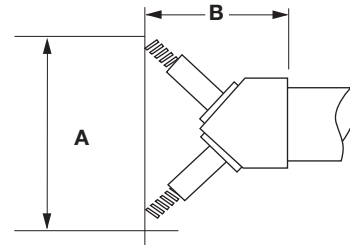
#### Potting Sleeves



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

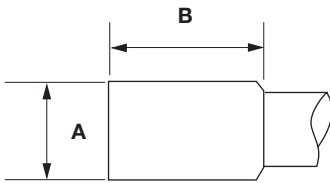
① 3 wire only

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



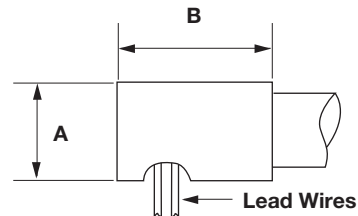
Heater O.D. in.	Dimension A in. (mm)	Dimension B in. (mm)	Zone	Phase	Type No.
0.685	1 1/4 (32.0)	1 1/4 (32.0)	1	1	61T
0.935	1 1/8 (41.3)	1 1/8 (41.3)	1	1	91T

#### 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



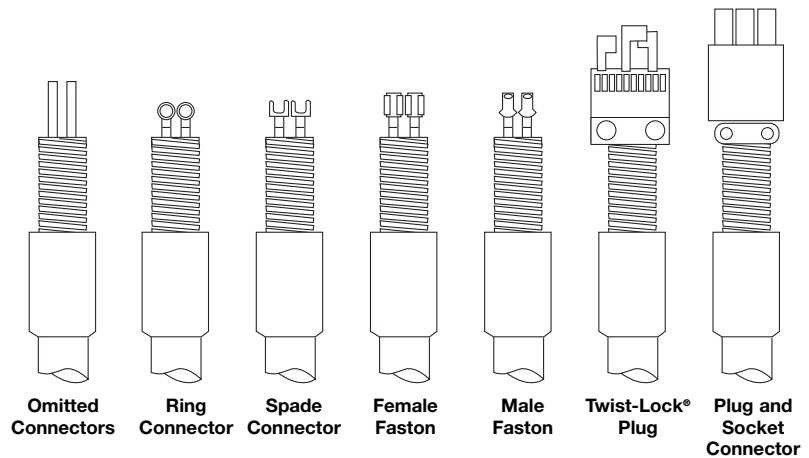
Heater O.D. in.	Dimension A in. (mm)	Dimension B in. (mm)	Zone	Phase	Type No.
0.685	3/4 (19)	1 1/2 (38)	1	1 or 3	RAE1
0.935	1 1/16 (27)	1 1/2 (38)	1	1 or 3	RAE2

# Cartridge/Insertion 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

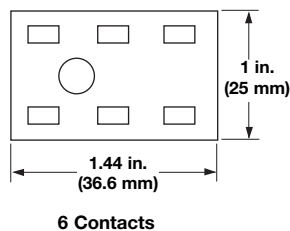
#### Plug and Socket and Twist-Lock® Plug Variations

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.

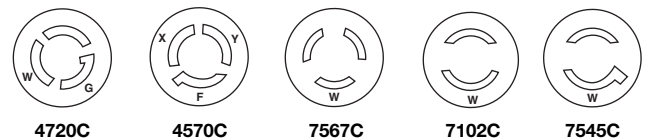
**Note:** Mating connectors are also available for plug terminations listed. Contact your Watlow representative.

#### Plug and Socket

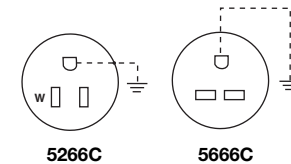


Male Plug	Zones	Type	Voltage	Amperage	Blade Type
P406-CCT	3	6 wire	600	30	Straight
4570C	1	3 wire	250	15	Twist-Lock®
4720C	1	3 wire	125	15	Twist-Lock®
5266C	1	3 wire	125	15	Straight
5666C	1	3 wire	250	15	Straight
7102C	1	2 wire	250	20	Twist-Lock®
7545C	1	2 wire	250	15	Twist-Lock®
7567C	1	3 wire	125	10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

#### Twist-Lock®



#### Straight



### How to Order

To order MULTICELL insertion heaters, please specify:

- Sheath diameter
- Heater length
- Configuration
- Potting vessel
- Connector
- Lead cover
- Flexleads
- Watts
- Volts
- Lead wire length (12 in. [305 mm] standard)
- NEMA type for Twist-Lock®/straight plugs, if required
- Process temperature
- Controller system
- Ground voltage

#### Availability

**Made-to-Order:** Contact your Watlow representative.