## **Silicone Rubber Heaters**

Rugged, yet thin, lightweight and flexible — use of Watlow<sup>®</sup> silicone rubber heaters is limited only by the imagination. Heat can be put exactly where it is needed to improve heat transfer, speed warm ups and decrease wattage requirements in an application process.

Fiberglass-reinforced silicone rubber provides dimensional stability without sacrificing flexibility. Because very little material separates the element from the part, heat transfer is rapid and efficient. Heaters are constructed with a wire-wound element or with an etched foil element. Its thin construction allows it to fit into applications where space is limited.

### **Performance Capabilities**

- Operating temperatures up to 500°F (260°C)
- Watt densities up to 80 W/in<sup>2</sup> (12.5 W/cm<sup>2</sup>), dependent upon application temperature
- Wire-wound element thickness 0.055 in. (1.4 mm)
- Etched foil element 0.022 in. (0.56 mm)
- UR<sup>®</sup>, cUR<sup>®</sup>, VDE and CE recognitions are available on many designs up to 428°F (220°C)

### **Features and Benefits**

#### Designed to the exact shape and size needed

· Conforms to component and/or equipment

## More than 80 designs available immediately from stock

Reduces downtime

## Constructed with wire-wound or etched foil elements

- Enables a thin, lightweight heater
- Provides the desired flexibility for many dynamic applications
- Delivers low mass and easily repeatable distributed watt densities

## Moisture and chemical-resistant silicone rubber material

• Provides longer heater life

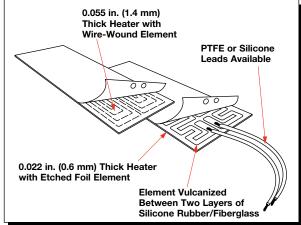
#### Vulcanizing adhesives or fasteners

Allows heaters to be easily bonded to parts

## **Typical Applications**

- Semiconductor processing equipment
- Freeze protection and condensation prevention for many types of instrumentation and equipment
- Medical equipment such as blood analyzers and test tube heaters
- Computer peripherals such as laser printers
- Curing of plastic laminates
- Photo processing equipment





## **Silicone Rubber Heaters**

### **Mounting Methods**

Watlow offers various attachment techniques designed for fast installation.

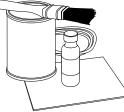
#### Pressure Sensitive Adhesive Surface (PSAS)



For speed, convenience and economy of installation, specify PSAS. Simply peel off the protective backing and roll the heater in place for an even bond to a clean, smooth surface. PSAS is not recommended for curved surfaces or for heaters rated above 10 W/in<sup>2</sup> (1.5 W/cm<sup>2</sup>). It should not be used for applications exceeding 400°F (205°C) on silicone rubber and 300°F (150°C) on polyimide.

**Note:** PSAS has a maximum six-month storage life at or below 86°F (30°C) before heater installation.

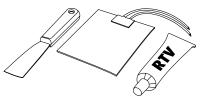
Silicone Contact Cement Kit



This two-part adhesive consists of a resin and catalyst that are easily mixed together and applied with a paintbrush. Recommended usage is for field cementing of silicone rubber heaters to customer parts. Available for immediate delivery, the cement kit handles temperatures up to 350°F (175°C). The resin is available in pint or quart containers. To order, specify **silicone contact cement** and the container size.

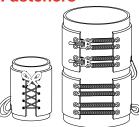
### **Mechanical Fasteners**

## Field Applied Adhesive



For a stronger bond or when long storage is probable, room temperature vulcanizing (RTV) silicone adhesive works well. Watlow offers red RTV for temperatures up to 500°F (260°C). White RTV is available from adhesive suppliers for temperatures up to 400°F (205°C). Watlow's one-part RTV is self-priming and can be ordered in either 3 oz (90 ml) or 12 oz (355 ml) tubes. For larger heaters requiring longer adhesive working time, two-part RTV kits can be purchased from adhesive suppliers. These kits require primer on the surface prior to adhesive application.

Note: Not recommended for polyimide heaters.



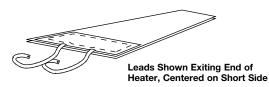
When a wire-wound flexible heater must be detachable, any type of fastener normally used with fabrics can usually be built into the flexible heater's sheath material. The most common types are latch fasteners, boot hooks and grommets. Other styles include snap fasteners, springs and lacing cord. (Hook and loop style fastener strips are only available as part of the extended capabilities offering.) Grommets and boot hooks are commonly used with tension springs to compensate for slight variations in part size.

## **Silicone Rubber Heaters**

#### **Termination Styles**

Watlow offers many types of leads and terminations. Leads can project from any position along the perimeter of the unit. **They are centered on the short side width of rectangular heaters unless specified.** 

### PTFE UL® 1180 CSA



Watlow's leads are 12 in. (305 mm) long, white, PTFE insulated, flexible, plated copper UL<sup>®</sup> 1180 CSA wire. Leads are rated for 392°F (200°C)/300V. Lead connections on or at the heater are insulated with a cap of sheath material vulcanized to the heater body.

#### **PTFE Leads**

Leads Shown Exiting Middle of Heater.

PTFE Type E (MIL-W-16878) and PTFE UL<sup>®</sup> 1199 leads rated for 392°F (200°C)/600V are also available.

### **Silicone Insulated Leads**



For a better moisture seal, specify UL<sup>®</sup> silicone insulated lead wires. This lead type is rated for 302°F (150°C)/ 600V. Any lead length is available. **Note:** Silicone rubber heaters are not designed to be waterproof. Excess exposure to moisture may facilitate premature heater failure.

## Option Thermal Insulation



To increase heating efficiency of your application, silicone rubber heaters can be thermally insulated with silicone sponge rubber bonded to one side in the following thicknesses: 1/16, 1/8, 1/4, 3/8 or 1/2 in. (1.6, 3.2, 6, 9.5 or 13 mm).

An aluminized surface can be added to the back side of the heater to reduce radiated heat losses. This aluminized surface, called "low loss treatment," adds very little to the unit thickness or mass and maintains a very clean appearance.

## **Silicone Rubber Heaters**

### Applications and Technical Data

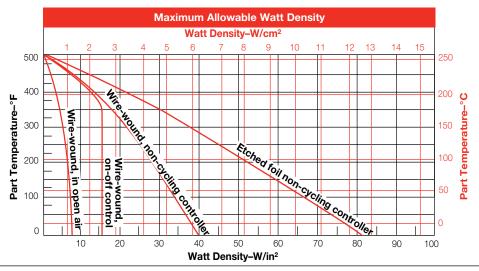
### **Determining Watt Density**

The *Maximum Allowable Watt Density* graph illustrates the maximum recommended heater watt density at various metal parts or ambient air temperatures. However, it does not indicate the watt density necessary to achieve a given part temperature. See the *Surface Temperature vs. Time* graph on the next page for assistance with these calculations. When using this graph, consider:

- Part temperature is measured at the point where the heater contacts the metal part.
- Thermostats and on-off controllers are typically bimetal or capillary bulb.
- Non-cycling controllers are typically solid state, time-proportioning or silicone controlled rectifier (SCR) temperature controllers.

- Watt density values should be de-rated by one third if insulation is used.
- UL<sup>®</sup> recognition temperature limits are not detailed.
- Contact your Watlow representative prior to selecting high watt density etched-foil elements, or operating heaters with back side insulation or non-metallic parts which are poor thermal conductors.

**Example:** A wire-wound heater with a non-cycling controller at a part temperature of 250°F (120°C) can be rated at 24 W/in<sup>2</sup> (3.7 W/cm<sup>2</sup>) maximum. An etched foil heater operating under the same conditions can be rated at 45 W/in<sup>2</sup> (7 W/cm<sup>2</sup>) maximum.



### **Silicone Rubber Specifications**

#### Max. width x max. length

- Wire wound: 36 x 120 in. (914 mm x 3048 mm)
- Etched foil: 18 x 34 in. (457 mm x 863 mm) Thickness
- Wire wound: 0.055 in. (1.4 mm)
- Etched foil: 0.022 in. (0.6 mm)

#### Weight

- Wire wound: 8 oz/ft<sup>2</sup> (0.24 g/cm<sup>2</sup>)
- Etched foil: 3 oz/ft<sup>2</sup> (0.09 g/cm<sup>2</sup>)

Max. operating temperature: 500°F (260°C) Max. temperature for UL® recognition: 428°F (220°C) Min. ambient temperature: -80°F (-62°C)

#### Max. voltage: 600V

Max. wattage: see watt density graph Lead size: sized to load Lead length: 12 +1<sup>1</sup>/<sub>2</sub> -<sup>1</sup>/<sub>2</sub> in. (305 mm +38 mm -13 mm)

#### Wattage tolerance

- Wire: ±5%
- Foil: +5% -10%

#### **Dimensional tolerances**

- 0 to 6 in. (0 to 152 mm): ±1/16 in. (1.59 mm)
- 6 to 18 in. (152 to 457 mm): ±<sup>1</sup>/8 in. (3.18 mm)
- 18 to 36 in. (457 mm to 914 mm): ±<sup>3</sup>/<sub>16</sub> in. (4.76 mm)
- Over 36 in. (914 mm): ±1%



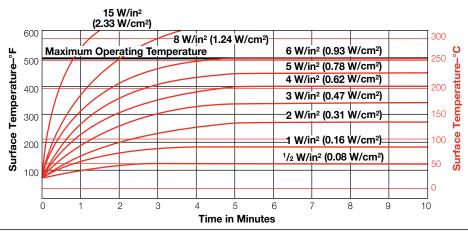
## **Silicone Rubber Heaters**

#### Applications and Technical Data (Continued)

#### Surface Temperature vs. Time

This graph illustrates the surface temperature a silicone rubber heater will reach when uninsulated and suspended vertically in 70°F (20°C) still air.

Data is based on 0.055 in. (1.4 mm) thick construction and is offered as a reference tool.



# UR<sup>®</sup>, cUR<sup>®</sup>, VDE and CE Recognition for Silicone Rubber Heaters

Watlow frequently works with customers requiring agency approvals such as UR<sup>®</sup>, cUR<sup>®</sup>, VDE and CE. Many silicone rubber heaters are available with one or more certifications.



**UL® Component Recognition (UR®)** of factory-bonded heaters is available up to 392°F (200°C) and for customer installed heaters up to 428°F (220°C) (UL<sup>®</sup> File No. E52951).

For Canadian recognition, Watlow offers **cUR® Recognized** silicone rubber heaters under UL® File #E52951. Several constructions are available with ratings to 600V and 428°F (220°C) maximum surface temperature. Contact your Watlow representative for further information.

**VDE Approval** is available on several constructions of both wire-wound (File No. 62533) and etched foil (File No. 62535) silicone rubber heaters. Maximum ratings are 440V and 428°F (220°C) surface temperature. Under VDE guidelines, minimum installed bend radius is <sup>1</sup>/<sub>8</sub> in. (3.2 mm) for etched foil and <sup>1</sup>/<sub>4</sub> in. (6 mm) for wire wound. VDE states that the user is responsible for the safe application, installation and wiring of heaters. Maximum working temperature must be maintained by an appropriate temperature controller.

The **CE mark** is available on UR<sup>®</sup> and/or VDE recognized heaters.

### Options

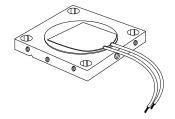
Watlow offers options including attachment techniques, thermostats, special leads, holes and cutouts and three-dimensional shapes as described in the introduction to flexible heaters section.



## **Extended Capabilities For Silicone Rubber Heaters**

## Mounting Methods

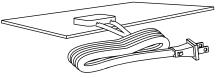




This attachment technique provides a strong, void-free bond for excellent heat transfer and extended heater life that has proven to be successful. Bonding is recommended for applications that reach maximum temperatures of 500°F (260°C) on silicone rubber and 300°F (150°C) on polyimide.

## **Termination Styles**

## **HPN Cord and Plug Set**



Molded Leads are Shown Exiting Edge of Heater; Capped Leads are also Available.

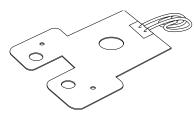
For removable heaters, a 6 ft (1.8 m) HPN cord and plug set provides convenience. It is rated for  $194^{\circ}F$  ( $90^{\circ}C$ )/ 300V. An HPN cord without a plug is also available in any length.

## Construction Formed Heaters



Many three-dimensional shapes, such as cylinders, cones and boxes, can be factory formed. Semi-rigid shapes can self-grip to the part. Special tooling may be required for some designs.

## Holes, Cutouts and Notches



Watlow provides flexible heaters with special holes, cutouts and notches in nearly any position required for your design. The resistance element can be brought to within 1/8 in. (3.2 mm) of all edges. Standard spacing is 1/4 in. (6 mm) from all edges.

### Wire-Wound Elements – RAPID SHIP Offering

120/240VAC	120VAC		.ength	L	Width		dth		Width		
Part Number	Part Number	Watts	(mm) in. (mm)					n. (mm)		in.	
	010020C1*	10	(51)	2	(25)						
	010030C1*	15	(76)	3							
	010040C1*	20	(102)	4							
	010050C1*	25	(127)	5							
010050C2*		6.25/25	(127)	5							
	010100C1	50	(254)	10							
010100C2*		12.50/50	(254)	10							
	010150C1	75	(381)	15							
010150C2		18.75/75	(381)	15							
	010200C1	100	(508)	20							
010200C2		25/100	(508)	20							
	010250C1	125	(635)	25							
	010300C1	150	(762)	30							
	010350C1	175	(889)	35	t						
	010400C1	200	(1016)	40							
	010800C1	400	(2032)	80							
	010F10C1	600	(3048)	120	-						
	020020C1*	20	(51)	2	(51)	2					
	020050C1	50	(127)	5							
020050C2*		12.50/50	(127)	5							
	020100C1	100	(254)	10							
020100C2		25/100	(254)	10							
	020150C1	150	(381)	15							
020150C2		37.50/150	(381)	15							
	020200C1	200	(508)	20							
020200C2		50/200	(508)	20							
	020250C1	250	(635)	25							
	020300C1	300	(762)	30							
	020350C1	350	(889)	35							
	020400C1	400	(1016)	40							
	030030C1	45	(76)	3	(76)	3					
	030050C1	75	(127)	5							
030050C2		18.75/75	(127)	5							
	030100C1			10							
030100C2		37.50/150	(254)	10							
	030150C1	225	(381)	15							
030150C2		56.25/225	(381)	15							
	030200C1	300	(508)	20							
030200C2		75/300	(508)	20							
	030250C1	375	(635)	25							
	030300C1	450	(762)	30							
	030350C1	525	(889)	35							
	030400C1	600	(1016)	40							

CONTINUED

• RS - Next day shipment up to 10 pieces for orders with part number configuration -0001B.

\* Due to their high resistance, these heaters are not recommended for curved or flexing applications. Notes:

• Thickness 0.055 in. (1.4 mm)

• Heaters have lead length of 12 in. (305 mm) UL® 1180 PTFE

• UL<sup>®</sup> component recognition

Silicone rubber wire-wound elements rated at 5 W/in<sup>2</sup> (0.78 W/cm<sup>2</sup>)

**WATLOW®** 

### Wire-Wound Elements - RAPID SHIP Offering (Continued)

Width	L	.ength		120VAC	120/240VAC
in. (mm)	in.	(mm)	Watts	Part Number	Part Number
4 (102)	4	(102)	80	040040C1	
	5	(127)	100	040050C1	
	5	(127)	25/100		040050C2
	10	(254)	200	040100C1	
	10	(254)	50/200		040100C2
	15	(381)	300	040150C1	
	15	(381)	75/300		040150C2
	20	(508)	400	040200C1	
	20	(508)	100/400		040200C2
	25	(635)	500	040250C1	
	30	(762)	600	040300C1	
	35	(889)	700	040350C1	
	40	(1016)	800	040400C1	
5 (127)	5	(127)	125	050050C1	
	5	(127)	31.25/125		050050C2
	10	(254)	250	050100C1	
	10	(254)	62.50/250		050100C2
	15	(381)	375	050150C1	
	15	(381)	9.38/375		050150C2
	20	(508)	500	050200C1	
	20	(508)	125/500		050200C2
	25	(635)	625	050250C1	
	30	(762)	750	050300C1	
	35	(889)	875	050350C1	
	40	(1016)	1000	050400C1	
6 (152)	5	(127)	150	060050C1	
	5	(127)	37.50/150		060050C2
	10	(254)	300	060100C1	
	10	(254)	75/300		060100C2
	15	(381)	450	060150C1	
	15	(381)	112.50/450		060150C2
	20	(508)	600	060200C1	
	20	(508)	150/600		060200C2
	25	(635)	750	060250C1	
	30	(762)	900	060300C1	
	35	(889)	1050	060350C1	
	40	(1016)	1200	060400C1	
	то		1200	000+0001	



• RS - Next day shipment up to 10 pieces for orders with part number configuration -0001B.

\* Due to their high resistance, these heaters are not recommended for curved or flexing applications. Notes:

Thickness 0.055 in. (1.4 mm)
Heaters have lead length of 12 in. (305 mm) UL<sup>®</sup> 1180 PTFE

• UL<sup>®</sup> component recognition

Silicone rubber wire-wound elements rated at 5 W/in<sup>2</sup> (0.78 W/cm<sup>2</sup>)

## **Silicone Rubber Heaters**

## Wire-Wound Elements – RAPID SHIP Offering Coding Configured Options

order, complete the t number with the prmation below:	Wire Wound 0	<u>.</u>		
<ul> <li>Modification Options</li> <li>0 = None</li> <li>A = PSAS bottom</li> <li>B = PSAS top</li> <li>E = With plate, heater on side opposite flange</li> <li>F = With plate, heater on flange side</li> <li>G = Flaps + grommets</li> <li>H = Flaps + boot hooks</li> <li>J = Flaps + latch fasteners</li> <li>K = PSAS and low loss</li> <li>L = Low loss</li> <li>M = Low loss + flaps + grommets</li> <li>N = Low loss + flaps + latch fasteners</li> <li>R = 1/16 in. sponge</li> <li>S = 1/8 in. sponge</li> <li>Y = 1/2 in. sponge</li> <li>W = PSAS + 1/16 in. sponge</li> <li>Y = PSAS + 1/16 in. sponge</li> </ul>	SensorsTypeLOCWIR0 = NoneL = T10STDSTDM = T10STDALTN = T10ALTSTDP = T10ALTALTR = T207STDSTDS = T207STDALTT = T207ALTSTDU = T207ALTSTDU = T207ALTSTDU = T207ALTSTDU = T207EOn heaterSTD4 = JSTDSTDSTD6 = JALTSTDSTD7 = KSTDSTDSTD7 = KSTDSTDSTD8 shown in catalog;standard location isas shown in catalog;standard wiring isintegral or in series withthe heater, alternatelocation is rotatedparallel with heaterwidth, alternate wiring isseparate leads for pilotcontrol• For thermocouples, Type J standard isPFA insulation, Type Jalternate is fiberglassinsulation, Type Kstandard is fiberglassinsulation.	<b>T10 Set</b> ° <b>F</b> * 0 = None A = 125 B = 150 E = 175 F = 200 G = 225 H = 250 J = 275 K = 300 <b>T207 Set</b> ° <b>F</b> * 0 = None 1 = 40/55 2 = 60/75 3 = 95/110 4 = 145/160 <b>T/C Length</b> 0 = None A = 8 in. B = 12 in. E = 18 in. F = 24 in. G = 30 in. H = 36 in. J = 40 in. K = 4  ft L = 5  ft M = 6  ft N = 7  ft P = 8  ft R = 9  ft S = 10  ft T = 12  ft U = 15  ft W = 20  ft Y = 22  ft	Lead Insulation 0 = None $1 = 1180 UL^{®} R/C$ $2 = 1180 C-UL^{®} R/C$ 3 = 3133 22 Ga. 6 = 1199 CSA 7 = HPN 8 = 6 ft HPN set 9 = Type E PTFE A = 1180VDE* B = 1199VDE* C = Silicone leads w/waterproof cap E = SJO cord F = 6 ft SJO set * 1180VDE denotes a C-UL <sup>®</sup> heater plus a VDE stamp.	Lead Length* A = 8 in. B = 12 in. E = 18 in. F = 24 in. G = 30 in. H = 36 in. J = 40 in. K = 4 ft L = 5 ft M = 6 ft N = 7 ft P = 8 ft R = 9 ft S = 10 ft T = 12 ft U = 15 ft V = 18 ft W = 20 ft Y = 22 ft 1 = 25 ft 2 = 30 ft * Customer specified length must be note inches when orderin

\* For all thermostats the heater must be a 2 in. (51 mm) min. width and 5 in. (127 mm) min. length.

1 = 25 ft2 = 30 ft

### Etched Foil Elements – RAPID SHIP Offering

14/;	idth	1.0	nath		-		120VAC	120/240VAC
in.	(mm)	in.	ength (mm)	Watts	W/in <sup>2</sup> (	W/cm <sup>2</sup> )	Part Number	Part Number
1	(25)	5	(127)	25	5	(0.8)	F010050C3	
1	(20)	5	(127)	50	10	(0.6)	F010050C7	
		5	(127)	12.5/50	2.5/10	(0.4/1.6)	101000001	F010050C8
		10	(254)	100	10	(1.6)	F010100C7	
		10	(254)	25/100	2.5/10	(0.4/1.6)		F010100C8
		15	(381)	150	10	(1.6)	F010150C7	
		15	(381)	37.5/150	2.5/10	(0.4/1.6)		F010150C8
		20	(508)	200	10	(1.6)	F010200C7	
		20	(508)	50/200	2.5/10	(0.4/1.6)		F010200C8
2	(51)	5	(127)	100	10	(1.6)	F020050C7	
	( )	5	(127)	25/100	2.5 /10	(0.4/1.6)		F020050C8
		10	(254)	200	10	(1.6)	F020100C7	
		10	(254)	50/200	2.5 /10	(0.4/1.6)		F020100C8
		15	(381)	300	10	(1.6)	F020150C7	
		15	(381)	75/300	2.5/10	(0.4/1.6)		F020150C8
		20	(508)	400	10	(1.6)	F020200C7	
		20	(508)	100/400	2.5/10	(0.4/1.6)		F020200C8
3	(76)	5	(127)	75	5	(0.8)	F030050C3	
		5	(127)	150	10	(1.6)	F030050C7	
		5	(127))	37.5/150	2.5 /10	(0.4/1.6)		F030050C8
		10	(254)	300	10	(1.6)	F030100C7	
		10	(254)	75/300	2.5 /10	(0.4/1.6)		F030100C8
		15	(381)	450	10	(1.6)	F030150C7	
		15	(381)	112/450	2.5 /10	(0.4/1.6)		F030150C8
		20	(508)	600	10	(1.6)	F030200C7	
		20	(508)	150/600	2.5 /10	(0.4/1.6)		F030200C8
4	(102)	5	(127)	200	10	(1.6)	F040050C7	
		5	(127)	50/200	2.5 /10	(0.4/1.6)		F040050C8
		10	(254)	400	10	(1.6)	F040100C7	
		10	(254)	100/400	2.5 /10	(0.4/1.6)		F040100C8
		15	(381)	600	10	(1.6)	F040150C7	
		15	(381)	150/600	2.5/10	(0.4/1.6)		F040150C8
		20	(508)	800	10	(1.6)	F040200C7	
		20	(508)	200/800	2.5/10	(0.4/1.6)		F040200C8
5	(127)	5	(127)	250	10	(1.6)	F050050C7	
		5	(127)	62.5/250	2.5/10	(0.4/1.6)		F050050C8
		10	(254)	500	10	(1.6)	F050100C7	
		10	(254)	125/500	2.5/10	(0.4/1.6)		F050100C8
		15	(381)	750	10	(1.6)	F050150C7	
		15	(381)	187/750	2.5/10	(0.4/1.6)		F050150C8
		20	(508)	1000	10	(1.6)	F050200C7	
		20	(508)	250/1000	2.5/10	(0.4/1.6)		F050200C8
6	(152)	5	(127)	300	10	(1.6)	F060050C7	
		5	(127)	75/300	2.5/10	(0.4/1.6)		F060050C8
		10	(254)	600	10	(1.6)	F060100C7	
		10	(254)	150/600	2.5 /10	(0.4/1.6)		F060100C8
		15	(381)	900	10	(1.6)	F060150C7	
		15	(381)	225/900	2.5/10	(0.4/1.6)		F060150C8
		20	(508)	1200	10	(1.6)	F060200C7	
		20	(508)	300/1200	2.5/10	(0.4/1.6)		F060200C8

## RAPID SHIP

• RS - Next day shipment up to 10 pieces

for orders with part number configuration 0001B.

#### Notes:

Silicone rubber etched foil elements 0.022 in. (0.56 mm) thick
Heaters have standard lead length of 12 in. (305 mm) UL<sup>®</sup> 1180 PTFE
UL<sup>®</sup> component recognition

## **Silicone Rubber Heaters**

## Etched Foil Elements – RAPID SHIP Offering Coding Configured Options

To order, complete the part number with the information below:	Etched Fo FO	oil 		
Options         0 = None         A = PSAS bottom         B = PSAS top         K = PSAS and low loss         L = Low loss         R = 1/16 in. sponge         S = 1/8 in. sponge         U = 3/8 in. sponge         V = 1/2 in. sponge         W = PSAS + 1/16 in. sponge         Y = PSAS + 1/8 in. sponge         Y = PSAS + 1/8 in. sponge         Y = PSAS + 1/8 in. sponge         2 = PSAS + 3/8 in. sponge         3 = PSAS + 1/2 in. sponge	SensorsTypeLOCWIR0 = NoneL = T10STDSTDM = T10STDALTN = T10ALTALTP = T10ALTALTR = T207STDSTDS = T207STDALTT = T207ALTALTU = T207ALTALT4 = JSTDSTDSTD6 = JALTSTDSTD7 = KSTDSTDSTD7 = KSTDSTDSTD9 arallel with heaterwidth, alternate10 control.For thermocouples, Type J offering is PFA insulation, Type J alternate is fiberglass insulation.• Etched foil heaters are not recommended for enclosure heaters.	T10 Set °F*         0         None         A         125         B         150         E         175         F         200         G         225         H         225         H         225         H         225         K         300         T207 Set °F*         0         0         1         40/55         2       60/75         3       95/110         4       145/160         T/C Length         0       None         A       8 in.         B       12 in.         E       18 in.         F       24 in.         G       30 in.         H       36 in.         J       40 in.         K       4 ft         L       5 ft         M       6 ft         N       7 ft         P       8 ft         R       9 ft         S <td< th=""><th>t be</th><th>Lead           Length*           A = 8 in.           B = 12 in.           E = 18 in.           F = 24 in.           G = 30 in.           H = 36 in.           J = 40 in.           K = 4 ft           L = 5 ft           M = 6 ft           N = 7 ft           P = 8 ft           R = 9 ft           S = 10 ft           T = 12 ft           U = 15 ft           V = 18 ft           W = 20 ft           Y = 22 ft           1 = 25 ft           2 = 30 ft           *Customer specified           length must be noted in           inches when ordering.</th></td<>	t be	Lead           Length*           A = 8 in.           B = 12 in.           E = 18 in.           F = 24 in.           G = 30 in.           H = 36 in.           J = 40 in.           K = 4 ft           L = 5 ft           M = 6 ft           N = 7 ft           P = 8 ft           R = 9 ft           S = 10 ft           T = 12 ft           U = 15 ft           V = 18 ft           W = 20 ft           Y = 22 ft           1 = 25 ft           2 = 30 ft           *Customer specified           length must be noted in           inches when ordering.

and a 5 in. min. length.

## **Silicone Rubber Heaters**

### **Composite Bonding Applications**

Watlow offers silicone rubber heaters commonly used for composite bonding and curing. The design includes equal length circuits and a no-heat tab for temperature uniformity. The contact surface is made using smooth silicone to prevent composite surface imperfections. The heaters are fiberglass reinforced to provide lasting field service durability and life.

### **Performance Capabilities**

- Watt density up to 5 W/in<sup>2</sup> (0.8 W/cm<sup>2</sup>)
- Voltage of 120VAC/240VAC (option) single phase
- UL<sup>®</sup> recognized

#### **Features and Benefits**

#### **Customized leads**

• Allows up to 30 feet of lead length

#### **Field service ease**

Enables on-site repairs

## Equal length circuits - min. 2 x 2 in. (51 x 51 mm) tab with radius

• Creates temperature uniformity

#### Smooth contact surface

• Prevents composite surface imperfections

### **Typical Applications**

- Aerospace industry
  - Repair
  - Fabrication
- Composite bonding processes



### Wire-Wound Elements – Composite Bonding Applications

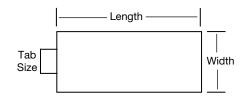
W	ïdth	Ler	ngth		120VAC	120/240VAC
in.	(mm)	in.	(mm)	Watts	Part Number	Part Number
6	(152)	6 (152) 180		L060080C1		
		6	(152)	180		L060080C2
		10	(254)	300	L060120C1	
		10	(254)	300		L060120C2
8	(203)	8	(203)	320	L080100C1	
		8	(203)	320		L080100C2
		12	(305)	480	L080140C1	
		12	(305)	480		L080140C2
10	(254)	10	(254)	500	L100120C1	
		10	(254)	500		L100120C2
		12	(305)	600	L100140C1	
		12	(305)	600		L100140C2
		18	(457)	900	L100200C1**	
		18	(457)	900		L100200C2
12	(305)	12	(305)	720	L120140C1**	
		12	(305)	720		L120140C2
		18	(457)	1080	L120200C1**	
		18	(457)	1080		L120200C2**
		24	(610)	1440	L120260C1**	
		24	(610)	1440		L120260C2**
16	(406)	16	(406)	1280	L160180C1**	
		16	(406)	1280		L160180C2**
18	(457)	18	(457)	1620	L180200C1**	
		18	(457)	1620		L180200C2**
20	(508)	20	(508)	2000	L200220C1*	
		20	(508)	2000		L200220C2**

#### **Composite Heaters "L"**

• M - Manufacturing lead times

#### Notes:

- Thickness 0.055 in. (1.4 mm)
- Lead length 12 in. (305 mm) UL® 1180 PTFE
- UL<sup>®</sup> component recognition
- Silicone rubber wire-wound elements rated at 5 W/in<sup>2</sup>
- Length does not include 2 in. (51 mm) tab for leads
- Smooth surface
- \* Thermostat option is not available for this heater.
- \*\* Only T207 thermostat option is available.

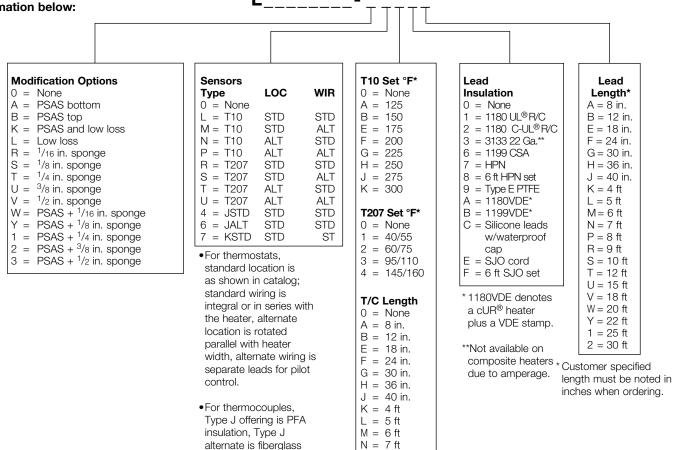


## **Silicone Rubber Heaters**

### Etched Foil Elements – Coding Configured Options Composite Heaters "L"

To order, complete the part number with the information below:

#### **Composite Flexible Stock Heaters**



P = 8 ftR = 9 ft

T = 12 ftU = 15 ft

 $V = 18 \, ft$ 

 $W = 20 \, ft$ 

Y = 22 ft1 = 25 ft 2 = 30 ft

 $S = 10 \, ft$ 

insulation, Type K

insulation.

offering is fiberglass

• Etched foil heaters are

not recommended for

enclosure heaters.