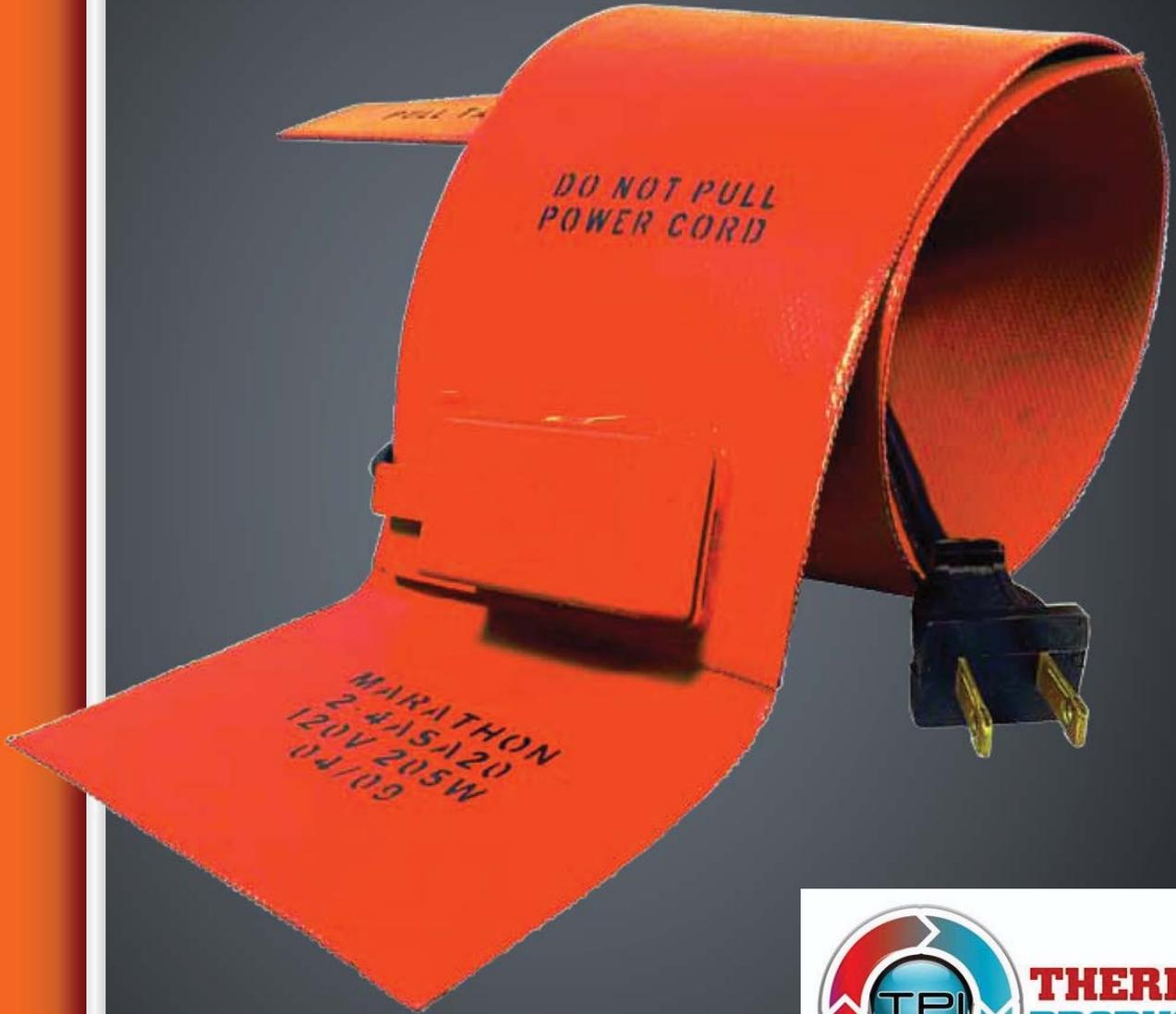




MARATHON HEATER

SILICONE RUBBER HEATERS



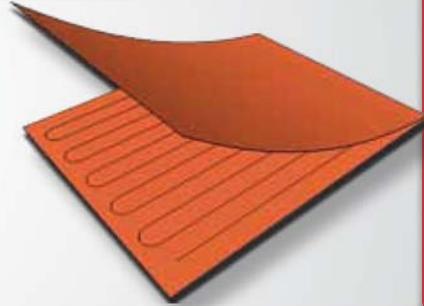
WIRE WOUND SILICONE RUBBER HEATERS

Marathon Heater flexible heaters provide outstanding performance in applications up to 450°F under a variety of operating conditions.

Properly applied silicone rubber heater life routinely exceeds 10 years. Silicone rubber has a high dielectric strength and is flame retardant and non-toxic.

Design versatility permits special heat profiles allowing zones of higher or lower heat concentration as needed. Their flexible construction makes them very easy to install on a variety of surfaces.

Silicone Rubber Heaters can be mounted to flat or curved surfaces. They are not affected by vibration, flexing or repeated mechanical shock.



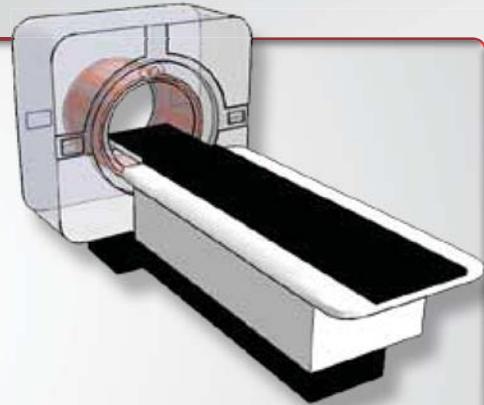
DESIGN AND CONSTRUCTION

Marathon silicone rubber heaters with wire-wound elements provide an excellent source for uniform heat especially on challenging shapes or applications with flexing or vibration.

The wire wound element consists of high temperature resistance wire wound around a fiberglass core for added support and flexibility while still allowing for expansion and contraction during heat up and cool down.

The element is laid out in a computer designed pattern to provide maximum heat transfer and temperature uniformity. After the element is laid out, it is vulcanized between two sheets of silicone rubber until they become one. The silicone rubber sheets also have a layer of fiberglass for added strength and tear resistance. The same vulcanization process is used to attach the power leads and cord sets to the heater windings.

Operating conditions include vacuum applications, high moisture areas and outdoor applications. Silicone rubber heaters are also used in applications involving oils, solvents, radiation and environmental conditions.



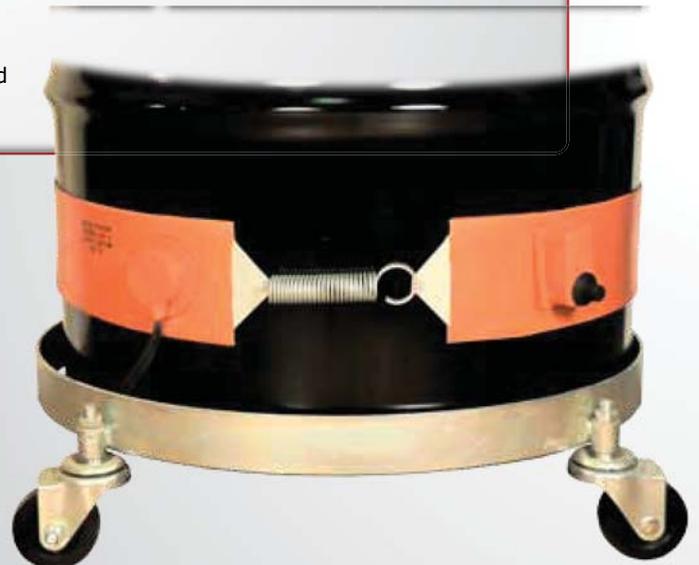
APPLICATIONS

- Condensation prevention
- Freeze protection
- Food service
- Aerospace industry
- Heated platens
- Medical services
- Semiconductor Industry
- Heating of pipes
- Composite curing
- Irregular shapes

STANDARD SPECIFICATIONS

Voltage	12V to 480V, AC or DC
Length	1" to 120"
Width	1" to 36"
Thickness	0.060" (Other sizes available on request)
Lead Wire	22 ga. Teflon (other sizes and insulation materials available on request)
Operating Temperature	-70° to 450°F
Wattage Tolerance	+ 5%, - 10%

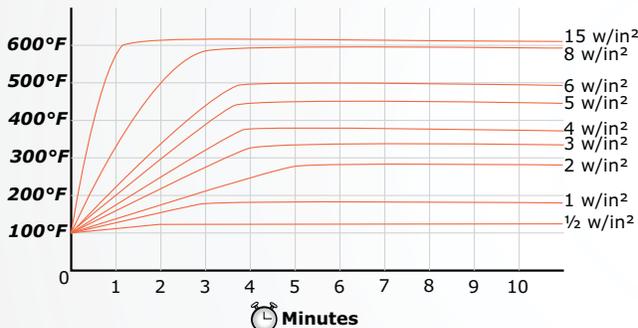
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STANDARD SPECIFICATIONS

Maximum recommended watt density for standard wire wound Silicone Rubber Heaters is 5 watts/sq. in. Please note that higher watt densities are only recommended for very specific conditions. Please consult the chart below to determine the maximum watt density for your application. Using lower than recommended watt densities will result in increased heater life.

Surface Temperature vs. Time for Various Watt Densities



Suggested Maximum Watt Density Per Attachment Method

Watt Density w/sq. in.	Factory Vulcanized	PSA
5	420°F - 356°F	350°F - 335°F
10	356°F - 266°F	335°F - 248°F
15	266°F - 158°F	248°F - 140°F
20	158°F - 68°F	140°F - 32°F
25	40°F - 68°F	32°F - 49°F

DESIGN OPTIONS

Marathon Heater offers several design options to meet various application requirements:

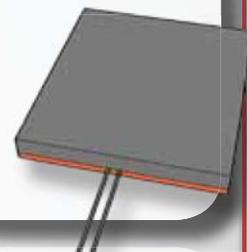
GROUND MESH

- For grounding purposes a second layer of insulating material and a conductive grid can be added to the heater. The heater comes with a ground wire.



SILICONE RUBBER SPONGE INSULATION

- To improve heater efficiency, 1/16", 1/8", 1/4", 3/8" or 1/2" insulation can be bonded to the outside of the heater. Closed cell silicone sponge is extremely flexible and has a Temperature range of -103F to 450 F.



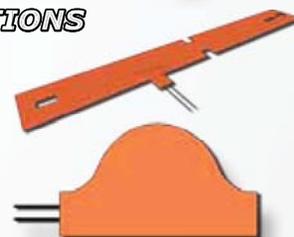
ROUND HEATERS

- Round shapes are also available. Round heaters are best attached to tooling with PSA.



VARIOUS SHAPES FOR VARIOUS APPLICATIONS

- Odd shapes are available to fit those hard to heat devices. Holes and cut-outs help fit those irregular shaped tools.



ENCLOSURE HEATERS



- Enclosure heaters are used to maintain temperature in any type of electrical box. Typical applications include ATM's, control boxes, traffic signals, utility boxes, cabinets and switch gear.
- Enclosure heaters are excellent for controlling humidity or moisture within an electrical box. Silicone rubber heaters are typically mounted to an aluminum plate and have an ambient sensing thermostat.
- The plate has a flange for easy mounting to the tool. Minimum heater widths with a thermostat is 2". Lengths are available to 40". Aluminum plates are 1/2" wider than the heater. See stock page.

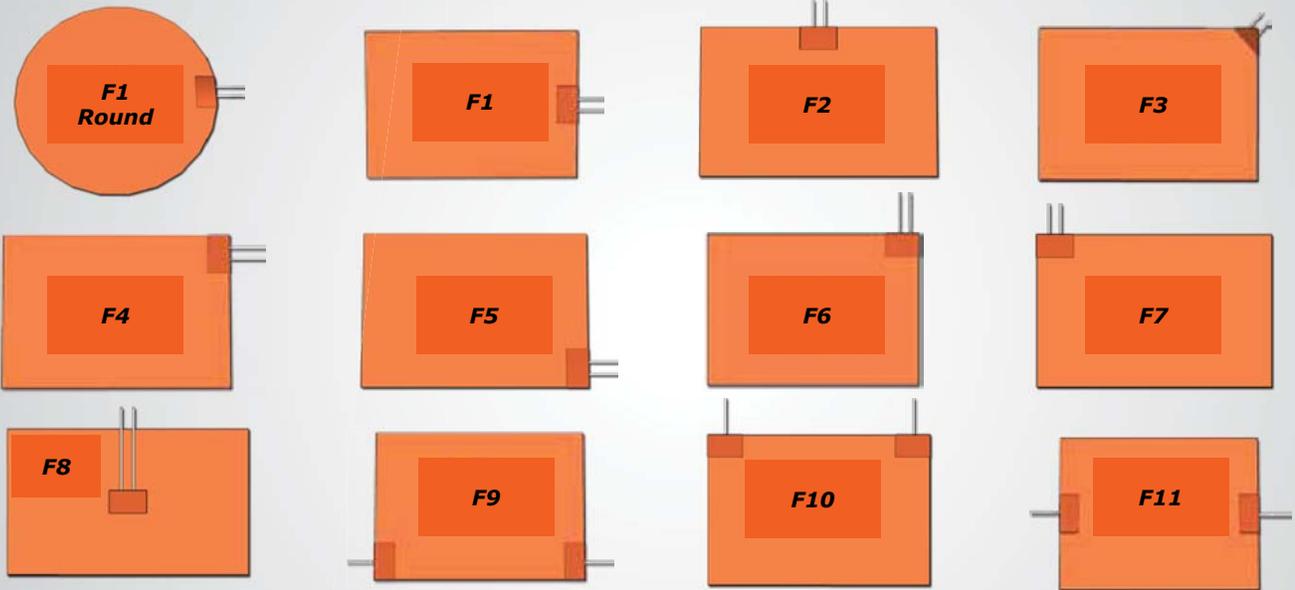
OTHER OPTIONS

- Dual Voltage
- Three Phase
- Distributed Wattage
- Thermocouples
- Thermostats
- Temperature cut-off
- Pull tabs

TERMINATION OPTIONS

- Marathon Flexible Heaters come standard with 10" of 22 ga. Teflon leads. Other gauge leads available upon request.
- The leads are soldered at the lap connection then covered with a vulcanized lead cap.

LEAD LOCATIONS



STANDARD LEAD OPTION SPECIFICATIONS

	Teflon	Silicone	SJO Cable	HPN Cable	HPN Cord Set
A.W.G.	22 GA.	22 GA.	18 GA.	18 GA. Conductor	18 GA. Conductor
Voltage	300 Volt	300 Volt	300 V/10 Amp.	125 V/10 Amp.	125 Volt/10 Amp.
Temp.	250°C/482°F	150°C/302°F	90°C/194°F	90°C/194°F	90°C/194°F
O.D.	.060"	.060"	.285"	Flat	Flat
Advantages	High Temperature, Abrasion Resistant.	Bonds well with silicone. Better moisture seal.	Rugged.	Inexpensive 2 conductor wire.	Plugs in easily.
Cons	Does not bond with silicone.	Lower temperature. Nicks easily.	Bulky lead cap.	Bulky lead cap.	Bulky lead cap.

Consult Factory for Other Options

LEAD TERMINATION OPTIONS

- Insulated terminals or spade lugs
- Crimp connectors
- Standard electrical plugs
- Mini connectors
- Twist lock plugs
- Stripped ends

LEAD TERMINATION OPTIONS

- Heat Shrink
- Silicone Sleeving
- S/S Braid
- S/S Conduit

LEAD TERMINATION OPTIONS

- Lead caps can be placed anywhere on the heater. They can also be extended from the heater in order to allow for a more even heat distribution.
- Extended lead caps are often used to cure composites when tight temperature tolerances are needed.
- 1.5" x 1.5" cold section is required.



MOUNTING METHODS

There are several options for installation or mounting Silicone Rubber Heaters.

Pressure Sensitive Adhesive

An easy mounting method is to peel and stick. PSA is attached directly to one side of the heater. Just peel away the protective liner and attach the heater to the desired tool. PSA is rated to a continuous temperature of 300 F and a maximum intermittent temperature of 400 F. It is not recommended for curved surfaces. The heater should be installed within 6 months of manufacture.

Factory Vulcanizing

Another method of installation is to send your tool to the Marathon Heater factory. The tool is placed in a vacuum table and the SRH is vulcanized directly to the tool. This is the strongest bond available.

Field Applied Adhesive

SRH may also be attached with field applied adhesive. Marathon Heater will supply the required RTV to adhere the heater to the desired surface. We offer a room temperature curing adhesive. Apply a thin film of RTV on the entire bottom of the heater. After positioning the heater on the part, use a roller to remove all air trapped between the heater and the part. The RTV should be allowed to cure for 24 hours.



BOOT HOOKS AND LACE

- Boot hooks and lace is the most common mechanical mount. Boot hooks are usually positioned 1.25" - 2" apart along the length of the heater.
- High temperature lace rated to 1000 F locks the heater in place similar to lacing a boot.



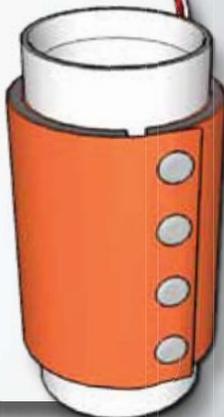
SPRING AND GROMMETS

- Each end of the spring is attached to a grommet, securing the heater to the tool.
- Grommets are spaced approximately 2" apart.



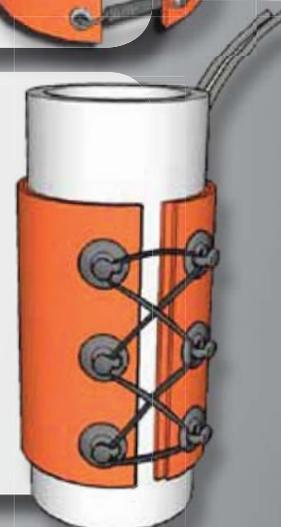
SNAP FASTENERS

- Snaps are only used on heaters with sponge insulation.
- Insulation is available in 1/16", 1/8", 1/4", 3/8" or 1/2" thickness.



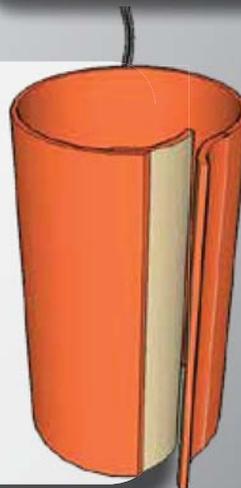
RUBBER RINGS

- High temperature rubber rings rated to 300° F.
- Can be used in conjunction with boot hooks and maintain constant tension through expansion and contraction.



VELCRO

- 1" wide Velcro straps secure the heater to the tool.
- Temperature rating: -30 °F - +380 °F



...heaters that go the distance

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TEMPERATURE CONTROLS

Marathon Silicone Rubber heaters can accommodate pre-set or adjustable thermostats, thermal cut-offs, and Type J thermocouples. The most common type of temperature controls are pre-set thermostats. Each has a specific temperature range and maximum amperage capability. Please contact the factory for availability.

- The most common type of temperature control are pre-set thermostats.
- They can be mounted to sense the temperature of the surrounding atmosphere or to sense the part temperature.
- 10 amps maximum at 240 volts. 14 amps maximum at 120 volts.
- Not recommended for low voltage applications



THERMOCOUPLES

Thermocouples are small and are easily embedded anywhere on the heater. Almost any type of Thermocouple can be used. Type J is the most common.

DRUM HEATERS

Marathon drum Heaters are an easy way to heat up drum contents. Various sizes and lengths allow you to heat up practically any drum, pail or barrel. Uniform heat prevents scorching or degradation of the contents.

The silicone rubber band heater is placed below the level of the fluid. The easy spring lock-up provides movement of the band when content levels fluctuate.

The band style drum heater can be used on plastic, alloy or just about any material.

Applications:

- Freeze protection
- Viscosity control
- Speeding up the flow of liquids
- Maintaining product consistency

Features:

- Easy installation with spring loaded fastener.
- 3 conductor cord set.
- Internally grounded.
- Can be wrapped around any object
- Options thermocouples, RTD's, holes and cut-outs.

STOCK THERMOSTATS

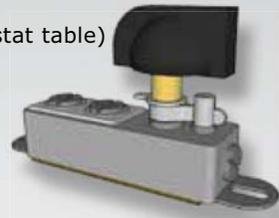
Pre-set: on at 35°F / off at 55 F
Pre-set: on at 80°F / off at 110 F
Pre-set: on at 145°F / off at 175 F
Pre-set: on at 170°F / off at 200 F
Pre-set: on at 270°F / off at 300 F
Adjustable 25°F to 330 F

*Consult factory for other calibrations.

Optional Thermostats

Thermostats can easily be attached to stock drum heaters. Available stock thermostats include:

- Adjustable 25°F - 330°F
- Pre-set (see above stock thermostat table)



STOCK LIST

Stock Drum Heater Specifications*						
All heaters come with 6 ft. SJ0 cord set and easy spring loaded fastener.						
	Capacity	Width	Height	Volts	Watts	
SRD5-31-N	5 Gallon Drum	3	31	120	300	
SRD5-41-N	5 Gallon Drum	4	31	120	550	
SRD55-31-N	55 Gallon Drum	3	64	120	1000	
SRD55-32-N	55 Gallon Drum	3	64	240	1000	
SRD55-41-N	55 Gallon Drum	4	64	120	1500	

* 5 gallon fits 11.5" diameter drum. 55 gallon fits 22.5" diameter drum



STOCK LIST

WIRE WOUND (STANDARD)

- Standard leads- 10" Teflon
- Standard watt density- 5 watts/sq. in.

AVAILABLE OPTIONS:

- Teflon leads with various lead lengths
- Silicone rubber leads with various lead lengths
- 6 ft. SJO cord set
- Pressure sensitive adhesive
- Stock thermostats

Width	Length	Watts	120 Volt	240 Volt
1	3	15	SRW010-030A	*
1	4	20	SRW010-040A	*
1	5	25	SRW010-050A	SRW010-050B
1	10	50	SRW010-100A	SRW010-100B
1	15	75	SRW010-150A	SRW010-150B
1	20	100	SRW010-200A	SRW010-200B
1	25	125	SRW010-250A	SRW010-250B
1	30	150	SRW010-300A	SRW010-300B
1	35	175	SRW010-350A	SRW010-350B
1	40	200	SRW010-400A	SRW010-400B
1	80	400	SRW010-800A	*
2	2	20	SRW020-020A	*
2	5	50	SRW020-050A	SRW020-050B
2	10	100	SRW020-100A	SRW020-100B
2	15	150	SRW020-150A	SRW020-150B
2	20	200	SRW020-200A	SRW020-200B
2	25	250	SRW020-250A	*
2	30	300	SRW020-300A	*
2	35	350	SRW020-350A	*
2	40	400	SRW020-400A	*
3	3	45	SRW030-030A	*
3	5	75	SRW030-050A	SRW030-050B
3	10	150	SRW030-100A	SRW030-100B
3	15	225	SRW030-150A	SRW030-150B
3	20	300	SRW030-200A	SRW030-200B
3	25	375	SRW030-250A	*
3	30	450	SRW030-300A	*

Width	Length	Watts	120 Volt	240 Volt
3	35	525	SRW030-350A	*
3	40	600	SRW030-400A	*
4	4	80	SRW040-040A	*
4	5	100	SRW040-050A	SRW040-050B
4	10	200	SRW040-100A	SRW040-100B
4	15	300	SRW040-150A	SRW040-150B
4	20	400	SRW040-200A	SRW040-200B
4	25	500	SRW040-250A	*
4	30	600	SRW040-300A	*
4	35	700	SRW040-350A	*
4	40	800	SRW040-400A	*
5	5	125	SRW050-050A	SRW050-050B
5	10	250	SRW050-100A	SRW050-100B
5	15	375	SRW050-150A	SRW050-150B
5	20	500	SRW050-200A	SRW050-200B
5	25	625	SRW050-250A	*
5	30	750	SRW050-300A	*
5	35	875	SRW050-350A	*
5	40	1000	SRW050-400A	*
6	5	150	SRW060-050A	SRW060-050B
6	10	300	SRW060-100A	SRW060-100B
6	15	450	SRW060-150A	SRW060-150B
6	20	600	SRW060-200A	SRW060-200B
6	25	750	SRW060-250A	*
6	30	900	SRW060-300A	*
6	35	1050	SRW060-350A	*
6	40	1200	SRW060-400A	*

ENCLOSURE HEATERS

- All come with 48" Teflon leads.

	Width	Length	Volts	Watts	T-Stat Open	T-Stat close
SRE020-050A	2"	5"	120	25	55° F	35° F
SRE020-050B	2"	5"	120	50	55° F	35° F
SRE020-060A	2"	6"	120	60	110° F	80° F
SRE020-100A	2"	10"	120	100	55° F	35° F

Available options include .04" thick aluminum mounting plate with flange. See page 3.



...heaters that go the distance

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OTHER PRODUCTS

CARTRIDGE



AIR



TUBULAR



MICA BAND



CERAMIC BAND



TUBULAR BAND



REFRACTORY STRIP



MICA STRIP



CERAMIC STRIP



SILICONE RUBBER



REFRACTORY DISC



COIL



THERMOCOUPLE



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Calculator

Website