

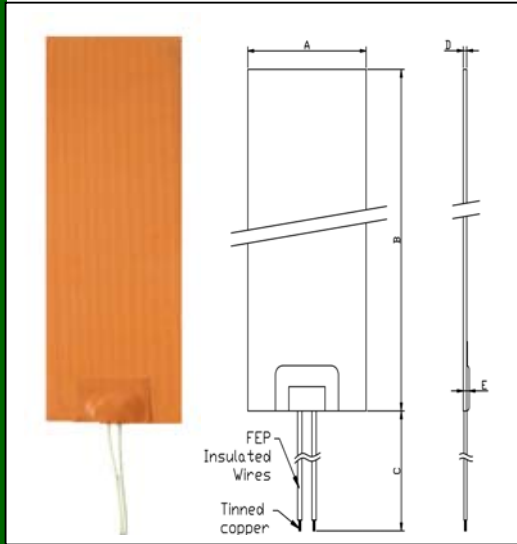


# ULTIMHEAT WEB CATALOG

## 9AR-Flexible Rectangular Silicone Heaters P1/5



### DIMENSIONS



### MAIN FEATURES

ULTIMHEAT silicone heating elements are made of laminated silicone rubber sheets, vulcanized together through heat and high pressure on both sides of an embedded wire wound heating element. Fiberglass-reinforced silicone rubber gives heater dimensional stability without sacrificing flexibility. Silicone is used because of its high temperature resistance (permanent temperature up to 200°C (390°F), high thermal conductivity (~7 10<sup>-4</sup> W/cm.K) and good electrical insulation properties (~12KV/mm) A fiberglass grid, which is visible under the surface, reinforces the silicone rubber sheets. The wire wound heating element web covers the entire surface of the heater. This web could be designed such that holes and cut-outs are incorporated on the heater. This construction makes silicone rubber heaters an ideal solution to the requirements of many low and medium temperature applications, which do not conform to the shapes, sizes and dimensions of band, strip, cartridge, tubular and coil heaters.

#### Other general particularities of these heaters are:

- Not affected by vibration or flexing,
- Precise heating and lightweight
- Comply to UL94-VO (flame retardant) and ROHS

- Low Smoke and Low Toxicity
- Silicone is non-toxic, and moisture and chemical resistant

### TECHNICAL APPLICATIONS

1. Prevent condensation in motors or instrument cabinet's
2. Anti freeze or condensation in of electrical enclosures like: traffic signal boxes, automatic teller machines, temperature control panels.
3. Mirrors defrost and dew removing
4. Catering equipment heating
5. Airplane engine heaters and aerospace industry
6. Medical equipment: blood analyzers, medical respirators, test tube heaters, etc.
7. Curing of plastic laminates
8. Computer peripherals such as laser printers, copy machines
9. Medical and massage heating pads
10. TV and radars parables deicing

### TECHNICAL FEATURES

**Length (B on drawing):** in standard 100 to 400 mm (4 to 16"), on special order up to 1000 mm ( 40")

**Width (A on drawing):** in standard 100 to 400 mm (4 to 16"), on special order up to 1000 mm (40")

*See our band heaters page for width less than 100 mm (4")*

#### Dimensional tolerances:

- 0 to 150 mm (0 to 6 inches): +/- 1.5 mm (+/- 1/16 inch)
- 150 to 500 mm (6 to 20 inches) : +/- 3.5 mm (+/- 1/8 inch)
- 500 mm to 1000 mm (20 to 40 inches): +/- 5 mm (+/- 3/16 inch)

Tighter tolerances are available on custom designs if needed

**Standard heater thickness without adhesive (D on drawing), leads output thickness not included:** 1.60 mm +/- 0.15 mm (0.065 inch +/- 0.005") .Add 0.1 mm (0.005") to above dimensions for foil backing.

#### Maximum total thickness over horizontal wires leads (= E on drawing):

- AWG 22 (0.3 mm<sup>2</sup>) 0.15" (3.8 mm)
- AWG 20 (0.5 mm<sup>2</sup>) 0.16" (4 mm)
- AWG 18 (0.75 mm<sup>2</sup>) 0.17" (4.2 mm)
- AWG 15 (1.5 mm<sup>2</sup>) 0.19" (4.7 mm)

**Silicone foil minimum bending radius:** 0.125" (3.2 mm)

**Standard Weight:** 0.24 gr/cm<sup>2</sup> 240 g/m<sup>2</sup> (8 oz./ft<sup>2</sup>)

**Ingress protection:** IP65

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## 9AR-Flexible Rectangular Silicone Heaters P2/5



**Maximum operating temperature:** peak 230 °C (446°F), continuous: 200 °C (390 °F)\*

Even if silicone heaters can be used at higher temperature, we recommend for a safe and durable use that maximum permanent surface temperature on silicone should not rise more than 160°C and maximum acceptable peak temperature should not rise more than 200°C.

**Minimum ambient temperature:** -60 °C (-80 °F)\*

\* *These maximum and minimum temperatures apply to silicone heaters only. Restriction will apply for controls*

**Voltage:** 12V to 600V, AC or DC (UL rating is 600 VAC, TUV recognition is max 250 VAC)

**Resistance tolerance:** -5%/+10% (tighter tolerances are achievable)

**Power tolerance:** -10% to + 5%

**Watt density:** The limitation factor is the heating foil maximum acceptable temperature. This temperature is dependent upon three factors:

- Temperature exchange with ambient or surface
- The maximum operating temperature
- Heater temperature control

If the element is temperature controlled sufficiently or the heat is taken away by forced air or a heat sink, the Watt density can range up to 0.8w/cm<sup>2</sup>, (5.2 w/inch<sup>2</sup>). More typical designs are equal or below 0.4w/cm<sup>2</sup>, (2.6 w/inch<sup>2</sup>)

**Standard watt density:**

- 0.2 w/cm<sup>2</sup> (1.3 w/inch<sup>2</sup>)
- 0.4 w/cm<sup>2</sup> (2.6 w/inch<sup>2</sup>)
- 0.8 w/cm<sup>2</sup> (5.2 w/inch<sup>2</sup>)

**Quality control routine tests:** Each element is 100% tested for continuity, resistance and insulation. Tests are made according to EN 60335-1 and EN 50106 standards

**Dielectric Strength:** 1500V AC, 2s, 0.5 mA (single insulation models) or the typical approval agency recommendation of 2 x input voltage +1000 volts.

**Insulation resistance:** More than 10 Mohms

**Surface temperature:** Temperature that the silicone rubber heater will attain when suspended in still air at 70 °F (20°C) depends of the watt density. Below 5.2 w/inch<sup>2</sup>, (0.8 w/cm<sup>2</sup>), the temperature will rise during some minutes and stabilize at a temperature below the critical 500 °F (260°C) which is the highest technically acceptable surface temperature.

Surface temperature after stabilization /watt density													
W/cm <sup>2</sup>	0.05	0.10	0.15	0.20	0.30	0.40	0.45	0.50	0.60	0.70	0.8	0.9	1.0
Stabilization Temperature °C	40	70	90	105	135	165	175	190	210	230	250	260	270
W/inch <sup>2</sup>	0.32	0.64	0.97	1.3	1.9	2.6	2.9	3.2	3.9	4.8	5.2	5.8	6.5
Stabilization Temperature °F	104	158	194	221	275	329	320	347	410	446	482	500	518

**Leads(C on Drawing) :** Standard leads for heaters are FEP insulated, flexible stranded plated copper wire. They are UL Style 1330 rated for 180°C/ 600 volt operation. Lead types and exit locations are adaptable to application requirements. Standard length (is 200 mm).

**Standard wire gauges:**

- AWG22 (or 0.3 mm<sup>2</sup>) is standard for rating up 3.5A
- AWG20 (or 0.5 mm<sup>2</sup>) is standard for rating from 3.6 to 5.5A
- AWG18 (or 0.75 mm<sup>2</sup>) is standard for rating from 5.6 to 8A
- AWG15 (or 1.5 mm<sup>2</sup>) is standard for rating from 8.1 to 15A

**Electrical connection output:** standard is wire leads horizontal output. On request we can provide vertical leads output, side output with 6.3 x 0.8 tab terminals or flat cable. Wires can be equipped with terminals on request. Built in connectors must be submitted to our engineering department for feasibility

### Terminal Options

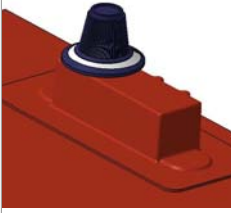
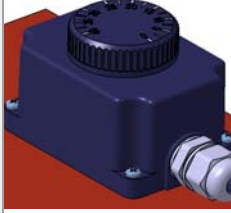

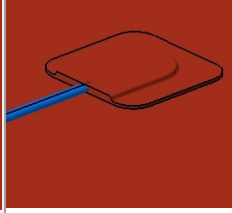
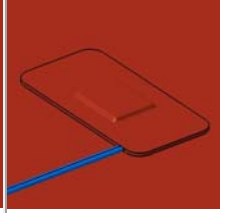
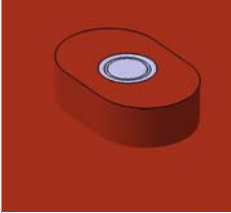



Horizontal wires terminals (standard)	Horizontal tab terminals	Vertical wires terminals	Horizontal Flat cable

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### Built in sensors and safety devices options

On the heaters surface it can be over-molded disc thermostats, temperature sensors, fixed setting bimetal thermostats, thermal cutouts and surface mounting adjustable bimetal thermostat.

				
Adjustable surface thermostat	Adjustable bulb and capillary thermostat (need at least 100 mm width)	Thermal cut out (fuses at preset temperature)	Thermocouple	Pt100
				
Disc thermostat (ambient temperature sensing)	Heater surface temperature sensing (manual or automatic reset)	high limit fixed setting bimetal strip thermostat (snap action, large differential)	Fixed setting creep action thermostat with small differential	

### Other Options:

- Adhesive backside for application on various surfaces such as glass, steel, plastic
- Forming and curving on curved surfaces
- Various size and dimensions to adjust heating to complicated patterns
- Heating foil can be factory vulcanized to metal parts (without adhesive), allows higher wattage levels for faster processing
- Possibility of having areas with different heating power, with two or more circuits on the same element

#### Warning:

Silicone rubber heaters are not suitable for: radiation, vacuum, or prolonged exposure to oil

#### Design Services:

Our experienced designers can assist in your design efforts to build a surface heater specifically for your application. In addition, we can look to optimize your current element designs and recommend proper watt densities, controls and element construction. We will conduct a thorough design review and present a proposal and quotation, followed by sample elements upon approval. We also provide testing services and gather agency approvals to verify and ensure that the element construction and design will be optimal for your application.

#### Custom designs Protection:

We protect your intellectual property in confidential fashion. Many of our large clients and ongoing projects are protected with [NDA's](#).

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## MAIN REFERENCES

**No controls, 200 mm FEP insulated wires, horizontal output, 4 w/ cm<sup>2</sup> (2.6 and 5.2 w/inch<sup>2</sup>)**

Drawings Available at: <http://www.ultimheat.com/blueink/SF%20Rectangular.html>

Reference	Width mm (A)	Width inches	Length mm (B)	Length inches	Power Watts	Voltage (AC)	Amps	wire gauge
9AR0A0A08040H200	100	3,9	100	3,9	40	220/230	0,2	AWG22
9AR0A0B08080H200	100	3,9	200	7,9	80	220/230	0,3	AWG22
9AR0A0C08120H200	100	3,9	300	11,8	120	220/230	0,5	AWG22
9AR0A0D08160H200	100	3,9	400	15,7	160	220/230	0,7	AWG22
9AR0A5A08060H200	150	5,9	100	3,9	60	220/230	0,3	AWG22
9AR0A5B08120H200	150	5,9	200	7,9	120	220/230	0,5	AWG22
9AR0A5C08180H200	150	5,9	300	11,8	180	220/230	0,8	AWG22
9AR0A5D08240H200	150	5,9	400	15,7	240	220/230	1,0	AWG22
9AR0B0C08240H200	200	7,9	300	11,8	240	220/230	1,0	AWG22
9AR0B0D08320H200	200	7,9	400	15,7	320	220/230	1,4	AWG22
9AR0C0C08360H200	300	11,8	300	11,8	360	220/230	1,6	AWG22
9AR0C0D08480H200	300	11,8	400	15,7	480	220/230	2,1	AWG22
9AR0D0D08640H200	400	15,7	400	15,7	640	220/230	2,8	AWG22
9AR0A0A05040H200	100	3,9	100	3,9	40	110/115	0,4	AWG22
9AR0A0B05080H200	100	3,9	200	7,9	80	110/115	0,7	AWG22
9AR0A0C05120H200	100	3,9	300	11,8	120	110/115	1,1	AWG22
9AR0A0D05160H200	100	3,9	400	15,7	160	110/115	1,5	AWG22
9AR0A5A05060H200	150	5,9	100	3,9	60	110/115	0,5	AWG22
9AR0A5B05120H200	150	5,9	200	7,9	120	110/115	1,1	AWG22
9AR0A5C05180H200	150	5,9	300	11,8	180	110/115	1,6	AWG22
9AR0A5D05240H200	150	5,9	400	15,7	240	110/115	2,2	AWG22
9AR0B0C05240H200	200	7,9	300	11,8	240	110/115	2,2	AWG22
9AR0B0D05320H200	200	7,9	400	15,7	320	110/115	2,9	AWG22
9AR0C0C05360H200	300	11,8	300	11,8	360	110/115	3,3	AWG22
9AR0C0D05480H200	300	11,8	400	15,7	480	110/115	4,4	AWG20
9AR0D0D05640H200	400	15,7	400	15,7	640	110/115	5,8	AWG18

Adhesive backside: replace the last character (0) by A

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**No controls, 200 mm FEP insulated wires, horizontal output, 0.8 w/cm<sup>2</sup> (5.2 w/inch<sup>2</sup>).**

Drawings Available at: <http://www.ultimheat.com/blueink/SF%20Rectangular.html>

Reference	Width mm	Width inches	Length mm	Length inches	Power Watts	voltage	amps	wire size
9AR0A0A08080H200	100	3,9	100	3,9	80	220/230	0,3	AWG22
9AR0A0B08160H200	100	3,9	200	7,9	160	220/230	0,7	AWG22
9AR0A0C08240H200	100	3,9	300	11,8	240	220/230	1,0	AWG22
9AR0A0D08320H200	100	3,9	400	15,7	320	220/230	1,4	AWG22
9AR0A5A08120H200	150	5,9	100	3,9	120	220/230	0,5	AWG22
9AR0A5B08240H200	150	5,9	200	7,9	240	220/230	1,0	AWG22
9AR0A5C08360H200	150	5,9	300	11,8	360	220/230	1,6	AWG22
9AR0A5D08480H200	150	5,9	400	15,7	480	220/230	2,1	AWG22
9AR0B0C08480H200	200	7,9	300	11,8	480	220/230	2,1	AWG22
9AR0B0D08640H200	200	7,9	400	15,7	640	220/230	2,8	AWG22
9AR0C0C08720H200	300	11,8	300	11,8	720	220/230	3,1	AWG22
9AR0C0D08960H200	300	11,8	400	15,7	960	220/230	4,2	AWG20
9AR0D0D08A28H200	400	15,7	400	15,7	1280	220/230	5,6	AWG18
9AR0A0A05080H200	100	3,9	100	3,9	80	110/115	0,7	AWG22
9AR0A0B05160H200	100	3,9	200	7,9	160	110/115	1,5	AWG22
9AR0A0C05240H200	100	3,9	300	11,8	240	110/115	2,2	AWG22
9AR0A0D05320H200	100	3,9	400	15,7	320	110/115	2,9	AWG22
9AR0A5A05120H200	150	5,9	100	3,9	120	110/115	1,1	AWG22
9AR0A5B05240H200	150	5,9	200	7,9	240	110/115	2,2	AWG22
9AR0A5C05360H200	150	5,9	300	11,8	360	110/115	3,3	AWG22
9AR0A5D05480H200	150	5,9	400	15,7	480	110/115	4,4	AWG20
9AR0B0C05480H200	200	7,9	300	11,8	480	110/115	4,4	AWG20
9AR0B0D05640H200	200	7,9	400	15,7	640	110/115	5,8	AWG18
9AR0C0C05720H200	300	11,8	300	11,8	720	110/115	6,5	AWG18
9AR0C0D05960H200	300	11,8	400	15,7	960	110/115	8,7	AWG15
9AR0D0D05A28H200	400	15,7	400	15,7	1280	110/115	11,6	AWG15

Adhesive backside: replace the last character (0) by A

**Warning:** These heaters must be used on a power dissipation surface or a heat sink.

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