Mica Insulated Strip Heaters

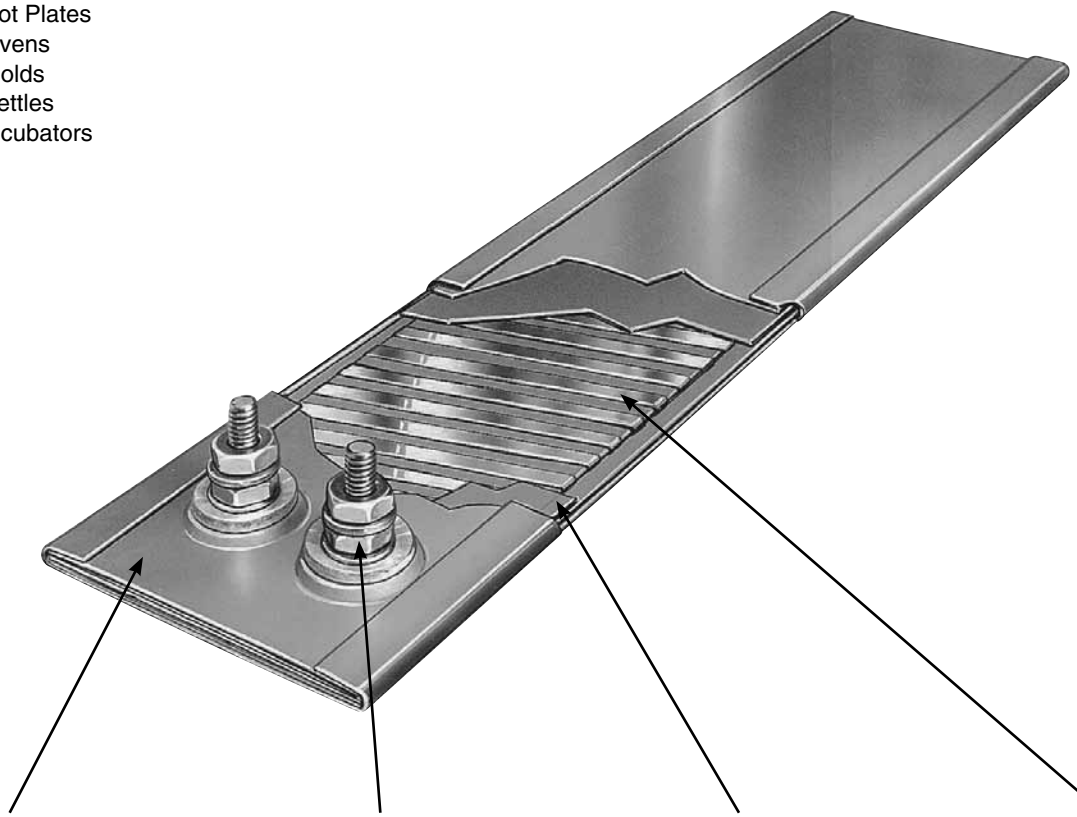
MSH Series

Typical Applications

- Food Warming Equipment
- Packaging Equipment
- Blow Molding Equipment
- Testing Equipment
- Vulcanizing Presses
- Vending Machines
- Hot Plates
- Ovens
- Molds
- Kettles
- Incubators

An economical, practical and reliable heat source capable of providing uniform heat transfer to flat surfaces.

Mica insulated strip heaters are used in hundreds of industrial and commercial heating applications.



Specially treated rust-resistant steel sheath casing provides the best combination of physical strength, high emissivity and good thermal conductivity for sheath temperatures up to 480°C (900°F). For corrosive atmospheres and/or sheath temperatures up to 650°C (1200°F), stainless steel sheath is available.

For maximum connecting surface, the specially designed stainless steel screw terminals are securely fastened to a connecting jumper, assuring positive contact with the windings, providing maximum current carrying capacity. For other terminal or lead arrangements, see pages 3 and 4.

Specially selected mica grade and thickness is used to insulate the windings, providing excellent thermal conductivity and dielectric strength.

A specific nickel-chrome resistance ribbon wire size is properly engineered to achieve the best combination of wire gauge and spacing between turns, thereby providing the lowest winding temperature possible. The ribbon wire is wound on a specially selected Mica Strip, providing even heat distribution for maximum heater life.

** Mica Strip heaters are UL recognized and CSA certified in many design variations. Omega's UL file number is E65652 and CSA file number is 043099. If you require UL, CSA, or other NRTL agency approvals, please specify when ordering.*

Specifications and Tolerances

If tighter tolerances are required consult OMEGA. A heater's physical size combined with electrical ratings will determine the actual minimums and maximums.

Performance Ratings

Maximum Sheath Temperature:
Rust Resistant Steel: 480°C (900°F)
Stainless Steel: 650°C (1200°F)

Nominal Watt Density: 5 to 45 Watt/in^2 (0.8 to 7.0 Watt/cm^2)

Maximum Watt Density: Depends on operating temperature and heater size; 38 Watt/in^2 (5.9 Watt/cm^2) Maximum when UL and CSA approval is required

Electrical Specifications

Maximum Voltage: 480V

Maximum Amperage:
Lead Wire Termination: 10 A
Screw Terminations: 8-32UNF—20 A; 10-32UNF—25 A

Resistance Tolerance: 10%, –5%

Wattage Tolerance: 5%, –10%

Formula for Calculating Watt Density

$$\text{Watt Density} = \frac{\text{Heater Wattage}}{(\text{Heater Width} - 3/8) \times (\text{Heater Length} - \text{Cold Area}^*)}$$

** Cold area consists of holes or cutouts.*

Material Specifications and Physical Sizes

Standard Sheath Material: Rust resistant steel
Optional: Stainless steel or aluminum

Nominal Thickness: 4.76 mm (3⁄16")

Minimum Width: 15.88 mm (5⁄8"), may vary depending on termination

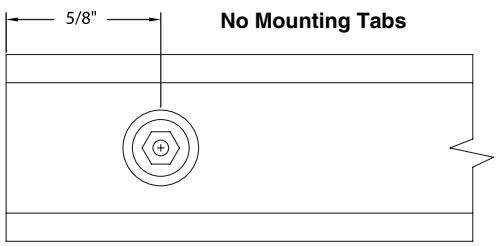
Width Tolerance: ± 0.79 mm (1⁄32")

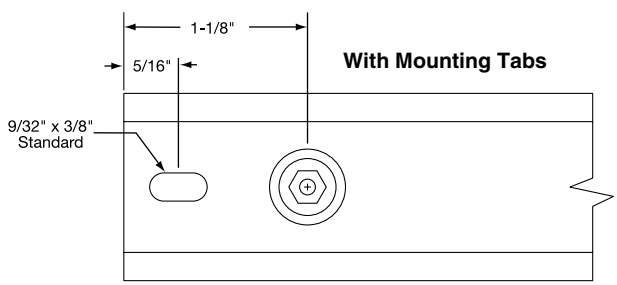
Maximum Length: 1829 mm (72")

Length Tolerance: Up to 610 mm (24") ± 1.59 mm (1⁄16")
Over 610 mm (24") ± 3.18 mm (1⁄8")

Screw Terminals:
25.4 mm (1") Wide Strips: 8-32 threads
Over 25.4 mm (1") Wide Strips: 10-32 threads

Minimum Termination Distance from Edge of Heater





Installation Instructions

1. Mica insulated strip heaters are available with mounting slots at each end for surface mounting applications or without mounting slots for insertion into milled slots.
2. For surface mounting installations, mica strip heaters must be clamped securely along their entire length to a smooth metal surface by using metal clamps 76 to 127 mm (3 to 5") apart.
3. Holes along the body of the strip heater for mounting purposes are not recommended and should only be used when there is no other means of clamping the strip heater down. These holes take up valuable winding space, increasing watt density, resulting in poor heater life.
4. When supported by mounting slots, the terminal end should be secured firmly. Opposite end should be slightly loosened to allow for linear expansion.
5. The surface being heated must be clean and smooth for efficient heat transfer. Small air gaps caused by imperfections can cause hot spots, resulting in heater failure.
6. Contaminants such as oil, plastics, and dirt should not be allowed to collect on heaters, as they will find their way into the heater windings, eventually carbonizing and causing electrical shorts.

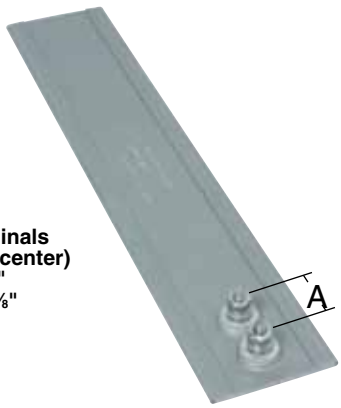
Screw Terminal Terminations

Type T1

Screw terminals at opposite ends. Minimum width required is 22 mm (⅞").

Type T2

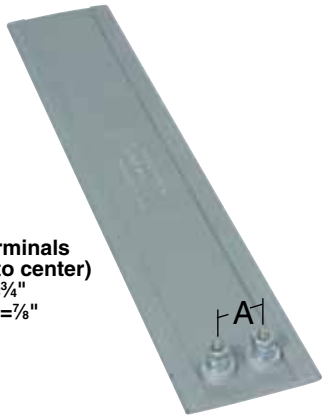
Screw terminals tandem at one end. Minimum width required is 22 mm (⅞").



Post Terminals (center to center)
8-32: A=¾"
10-32: A=⅞"

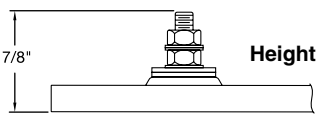
Type T3

Screw terminals parallel at one end. Minimum width required is 51 mm (2").



Post Terminals (center to center)
8-32: A=¾"
10-32: A=⅞"

Note: Typical Termination locations shown (pages 3 and 4). Specify terminal locations when ordering.



Height

Terminal Protection

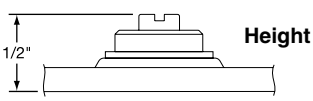
Type B

Low-profile 10-32 button terminals with binding head screws. Same location and minimum width requirements as types T1, T2 and T3. 6-32 threads available.

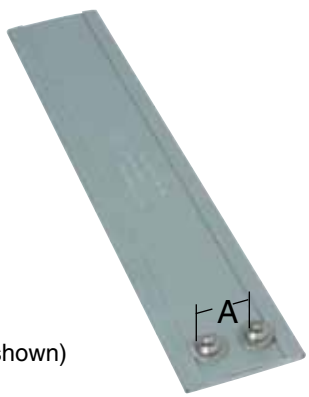
Type B1 Terminals at opposite ends (see T1)

Type B2 Terminals same end (see T2)

Type B3 Terminals same end (shown)



Height



Button Terminals (center to center)
6-32: A= 1⅛"
10-32: A= ⅞"

Type C

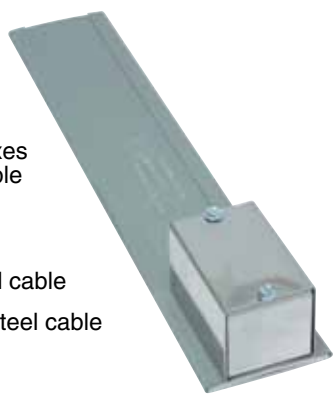
Terminal box has one 13 mm (½") trade size knockout [actual diameter 22 mm (⅞")] for ease of wiring. It provides excellent protection against exposed terminals. Boxes can be prewired with armor cable or wire braid.

Type CA Box only

Type CB Box with galvanized cable

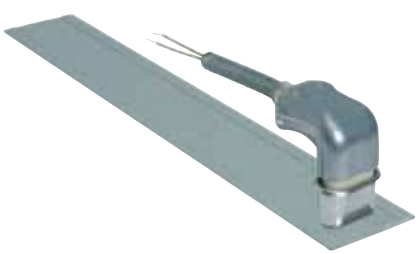
Type CC Box with stainless steel cable

Type CD Box with wire braid



Type P1

High-Temperature quick-disconnect plug. Available on 22 mm (⅞") widths (depending on termination configuration) and wider with cup and plug assembly or just cup. Type P1Q shown with 90° plug and galvanized armor cable. Other options available. Consult OMEGA.



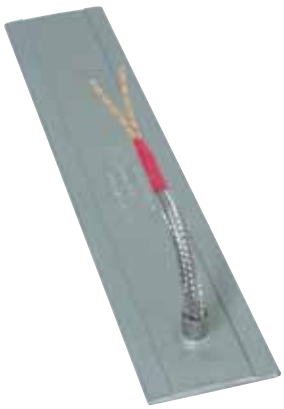
Igloo™

Igloo ceramic terminal covers consist of two ceramic parts. With a tight-fitting cap and a solid base, an Igloo cover will fully insulate any standard 8-32 or 10-32 terminal lug used for electrical wiring hookup. Igloo covers can be assembled onto any standard mica strips with 10-32 screw terminals. Igloo covers are available in 3 different styles: single port, double port in-line and double port 90°. For specific model numbers visit omega.com. Heater with double port in-line Igloo cover shown here.

Lead Wire Terminations

Type W1

Wire braid leads offer sharp bending not possible with armor cable. 254 mm (10") of wire braid over 305 mm (12") leads is standard. If longer braid or leads are required, specify. Minimum width required is 22 mm (⅞").



Type W2

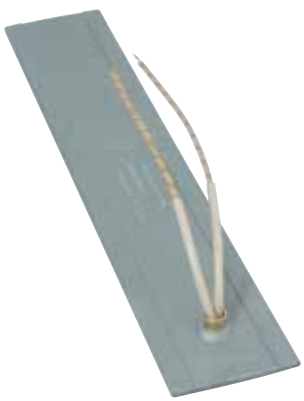
Flexible stainless steel braided lead wires exiting at same end. 254 mm (10") stainless steel braid over 305 mm (12") leads is standard. If longer braid or leads are required, specify. Minimum width required is 29 mm (1⅛").

Type W3

Flexible stainless steel braided lead wires exiting at opposite ends. 254 mm (10") stainless steel braid over 305 mm (12") leads is standard. If longer braid or leads are required, specify. Minimum width required is 19 mm (¾").

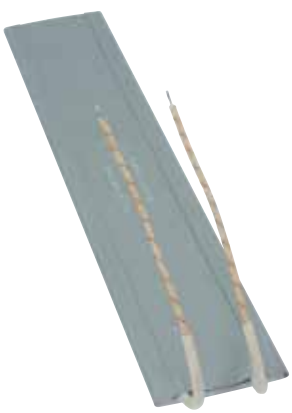
Type L1

Flexible lead wire exiting from the top through a brass eyelet. 254 mm (10") long leads standard; if longer leads are required, specify. Minimum width required is 22 mm (⅞").



Type L2

Flexible lead wire exiting same end. 254 mm (10") long leads standard; if longer leads are required, specify. Minimum width required is 29 mm (1⅛").



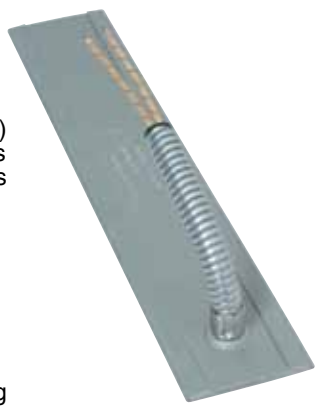
Type L3

Flexible lead wire exiting at opposite ends. 254 mm (10") long leads standard; if longer leads are required, specify. Minimum width required is 19 mm (¾").

Abrasion Resistant Terminations

Type R1

Armor cable provides far superior protection to lead wires where abrasion is a constant problem. Available with 2- or 3-prong plugs. 254 mm (10") of armor cable over 305 mm (12") leads is standard. If longer cable, leads or plugs are required, specify. Minimum width required is 25 mm (1").



Type R1A Galvanized cable, crimped

Type R1B Stainless Steel cable, crimped

Type R1C Galvanized cable, tack welded

Type R1D Stainless Steel cable, tack welded

Type R1E Galvanized cable, full silver brazing

Type R1F Stainless Steel, full silver brazing

Type R2

Right-angle armor cable can be positioned in any direction. 254 mm (10") of armor cable over 305 mm (12") leads is standard. If longer leads are required, specify. Minimum width required is 32 mm (1¼").

Type R2A Galvanized cable, crimped

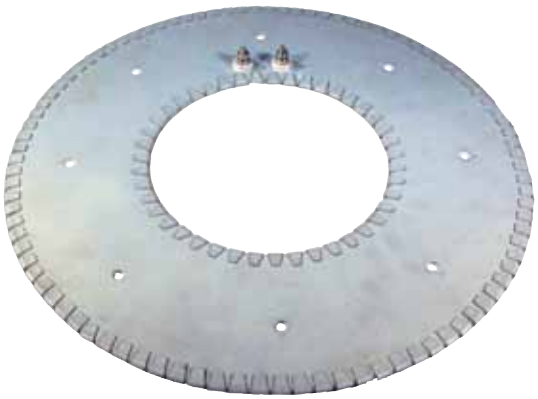
Type R2B Stainless steel cable, crimped

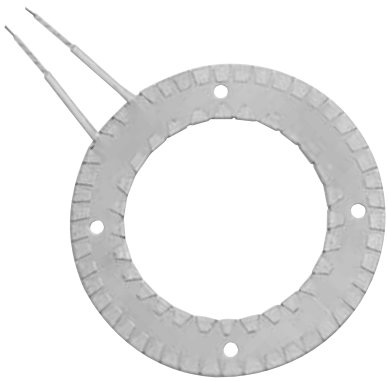
Type R2C Plain leads, no cable

Additional Mica Strip Heater Optional Features

Disc Heater

When ordering disc heaters, specify outside diameter, electrical ratings, and termination type. If mounting holes are required, specify location and hole size.

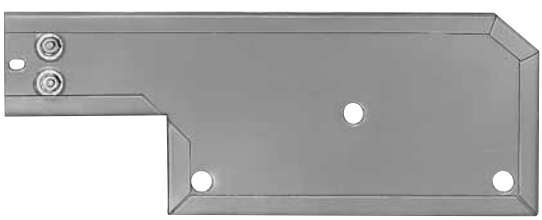




Ring Heaters

When ordering ring heaters, specify inside and outside diameters, electrical ratings, and termination type. If mounting holes are required, specify location and hole size.

Custom Engineered/Manufactured

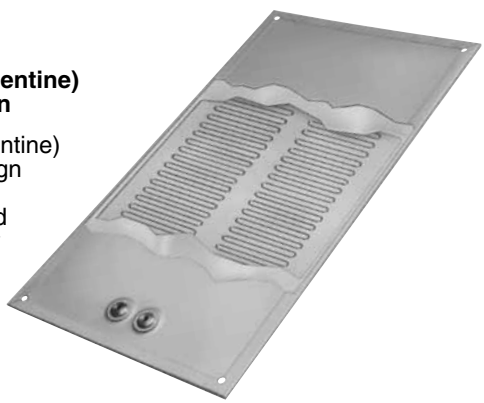


Irregular Shape

Mica strip heaters can be made into any practical shape and electrical rating. We welcome your inquires.

Sinuated (Serpentine) Element Design

Sinuated (serpentine) wound coil design is used for low temperature and low watt density applications within the 3 to 10 A range.



Non-Metal Sheath Custom Mica Heaters

Open Element

This economical heater design without the metal case is commonly used in laminating machines. The heater assembly can be suspended or sandwiched between non-metallic machine parts, eliminating the need for additional and expensive metal cases.

Distributed Wattage

A mica strip heater can be designed with varying heat profile along the length for uneven heat distribution.

Irregular Shape

Non-metal sheath strip heaters can be made into any practical shape and electrical rating. We welcome your inquires.

Strip Heaters shown on this page are a small representation of the many Custom Engineered and Manufactured designs Omega has produced. If you have a special application and need free technical assistance, consult our team of professionals with your requirements. We welcome your inquiries.

Sizes and Ratings

Model numbers shown are for heaters without mounting slots. Termination Types L1 and L2 have 254 mm (10") leads. R1 and R2 have 254 mm (10") galvanized armor cable over 305 mm (12") leads. W1 and W2 have 254 mm (10") stainless steel braid over 305 mm (12") leads.

To Order ***Visit omega.com/msh for Pricing and Details***

Model No.		Width		Length			Watt Density		
120V	240V	mm	inch	mm	inch	Watts	Watt/cm²	Watt/in²	Termination
MSH00001	MSH00002	25.4	1	152.4	6	100	5	32	L2
—	MSH00003	25.4	1	571.5	22½	525	6	39	W1
—	MSH00004	31.8	1¼	1016.0	40	750	5	31	R2
—	MSH00005	38.1	1½	139.7	5½	225	7	44	L1
—	MSH00006	38.1	1½	139.7	5½	225	7	44	L2
MSH00007	—	38.1	1½	139.7	5½	125	4	25	T2
MSH00008	—	38.1	1½	152.4	6	300	8	53	L2
—	MSH00009	38.1	1½	152.4	6	250	7	44	W1
—	MSH00010	38.1	1½	203.2	8	355	7	45	L2
MSH00011	MSH00012	38.1	1½	203.2	8	400	8	51	L2
MSH00013	—	38.1	1½	203.2	8	400	8	51	T2
—	MSH00014	38.1	1½	241.3	9½	200	3	21	L2
—	MSH00015	38.1	1½	254.0	10	450	7	44	L2
MSH00016	—	38.1	1½	266.7	10½	250	4	23	T2
—	MSH00017	38.1	1½	279.4	11	500	7	44	L1
—	MSH00018	38.1	1½	279.4	11	600	8	53	W1
MSH00019	—	38.1	1½	304.8	12	400	5	32	L2
MSH00020	—	38.1	1½	355.6	14	500	5	34	T2
—	MSH00021	38.1	1½	406.4	16	600	6	36	L2
—	MSH00022	38.1	1½	431.8	17	500	4	28	L1
MSH00023	—	38.1	1½	457.2	18	500	4	26	L2
—	MSH00024	38.1	1½	571.5	22½	775	5	32	W1
—	MSH00025	38.1	1½	609.6	24	1000	6	39	L2
—	MSH00026	38.1	1½	762.0	30	1000	5	31	L2
—	MSH00027	38.1	1½	914.4	36	1000	4	25	L2
MSH00028	—	38.1	1½	914.4	36	1000	4	25	T2
—	MSH00029	50.8	2	76.2	3	100	5	31	T2
MSH00030	—	50.8	2	101.6	4	20	1	4	T2
MSH00031	—	50.8	2	101.6	4	30	1	6	T2
MSH00032	—	50.8	2	101.6	4	40	1	8	T2
MSH00033	—	50.8	2	101.6	4	50	2	10	T2
—	MSH00034	50.8	2	101.6	4	100	3	21	T3
—	MSH00035	50.8	2	101.6	4	100	3	21	W1
—	MSH00036	50.8	2	101.6	4	150	5	31	W1
—	MSH00037	50.8	2	101.6	4	200	6	41	W1
—	MSH00038	50.8	2	203.2	8	275	4	24	L1
—	MSH00039	50.8	2	698.5	27½	1200	4	28	L2
—	MSH00040	50.8	2	1092.2	43	1400	3	21	T2
—	MSH00041	61.9	2 7/16	139.7	5½	350	6	38	T3
—	MSH00042	63.5	2½	101.6	4	150	4	24	T1
—	MSH00043	63.5	2½	152.4	6	350	5	33	R1
—	MSH00044	63.5	2½	215.9	8½	350	3	22	T3
MSH00045	MSH00046	63.5	2½	254.0	10	350	3	18	L2
MSH00047	—	63.5	2½	355.6	14	625	4	23	L2
MSH00048	—	73.0	2⅞	152.4	6	300	4	24	T3
—	MSH00049	73.0	2⅞	152.4	6	300	4	24	T3
MSH00050	—	76.2	3	177.8	7	200	2	13	L1
MSH00051	—	76.2	3	177.8	7	500	5	32	L1

Model No.		Width		Length		Watts	Watt Density		Termination
120V	240V	mm	inch	mm	inch		Watt/cm²	Watt/in²	
MSH00052	—	76.2	3	304.8	12	180	1	6	T1
—	MSH00053	76.2	3	317.5	12½	300	2	10	T3
MSH00054	—	76.2	3	381.0	15	500	2	14	L1
—	MSH00055	76.2	3	660.4	26	600	1	9	R1
—	MSH00056	88.9	3½	101.6	4	100	2	11	W2
—	MSH00057	88.9	3½	114.3	4½	500	7	46	W1
MSH00058	—	88.9	3½	190.5	7½	500	4	25	T3
—	MSH00059	88.9	3½	254.0	10	900	5	32	W2
MSH00060	—	88.9	3½	355.6	14	450	2	11	B3
—	MSH00061	101.6	4	101.6	4	275	4	25	R2
—	MSH00062	101.6	4	203.2	8	425	3	17	T3
—	MSH00063	101.6	4	279.4	11	750	3	21	T3
—	MSH00064	101.6	4	508.0	20	1750	4	25	R1
—	MSH00065	111.1	4⅜	179.4	7 1/16	800	5	33	W2
—	MSH00066	120.7	4¾	139.7	5½	700	6	36	T2
—	MSH00067	120.7	4¾	285.8	11¼	200	1	4	T3
—	MSH00068	123.8	4⅞	290.5	11 7/16	1200	4	26	T3
MSH00069	—	149.2	5⅞	279.4	11	425	1	8	R1
—	MSH00070	152.4	6	304.8	12	1200	3	19	T3
—	MSH00071	152.4	6	381.0	15	575	1	7	T3
MSH00072	—	177.8	7	292.1	11½	625	1	9	R1
—	MSH00073	203.2	8	235.0	9¼	450	1	7	T3
—	MSH00074	203.2	8	254.0	10	450	1	7	T3
MSH00075	—	254.0	10	457.2	18	300	0	2	B3

Ordering Example: MSH00052, *76.2 mm (3") wide, 304.8 mm (12") long strip heater, 120V, 180 watts.*

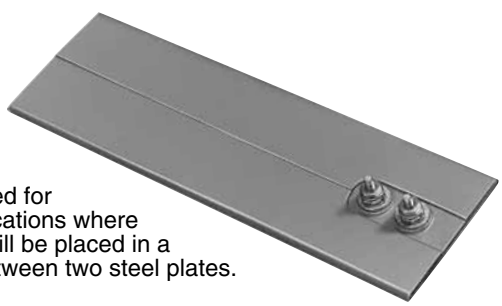
Custom Engineered/Manufactured Heaters

An electric heater can be very application specific; for sizes and ratings not listed, Omega will design and manufacture a mica insulated heater to meet your requirements.

Please Specify the Following:

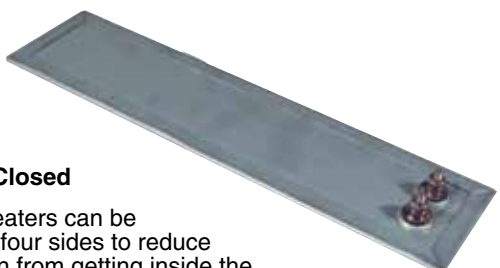
- Width
- Length
- Wattage
- Voltage
- Termination Type
- Lead Length
- Cable/Braid Length
- Optional Features

Additional Mica Strip Heater Optional Features



Butt Case

Recommended for heating applications where strip heater will be placed in a milled slot between two steel plates.



Four Sides Closed

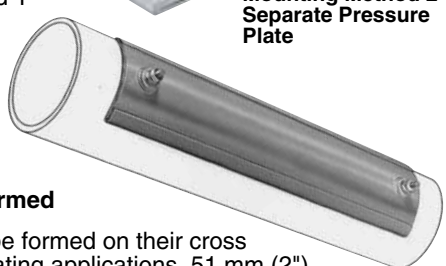
Mica Strip Heaters can be closed on all four sides to reduce contamination from getting inside the heater. Recommended on all strip heaters over 64 mm (2½") in width.

Pressure Plate

Strip Heaters can be made with built-in pressure plate to add rigidity and minimize warping of the heater. Standard plate thickness is 3 mm (⅛"). Specify plate thickness and choice of mounting method 1 or mounting method 2.

Mounting Method 1
Built-In Pressure Plate

Mounting Method 2
Separate Pressure Plate



Cross-Section-Formed

Strip Heaters can be formed on their cross section for pipe heating applications. 51 mm (2") minimum width required. Specify diameter of pipe on which heaters are to be mounted.