SQUARE CARTRIDGE HEATERS

INFORMATION

FOR APPLICATIONS WHERE A DRILLED HOLE IS NOT PRACTICAL, MPI MORHEAT OFFERS SQUARE CARTRIDGE HEATERS. UNLIKE SQUARE CARTRIDGE HEATERS FROM OTHER MANUFACTURERS, OUR SQUARE CARTRIDGE HEATERS ARE SWAGED, ALLOWING THEM TO BE USED IN HIGH TEMPERATURE AND HIGH WATT DENSITY APPLICATIONS.

SQUARE HEATERS ARE IDEAL FOR MILLED SLOTS IN LONG PLATENS WHERE DRILLING A LONG HOLE WOULD BE TOO DIFFICULT. SQUARE HEATERS ARE ALSO MUCH EASIER TO REMOVE FROM A SLOT AFTER EXTENDED HIGH TEMPERATURE USAGE THAN ROUND HEATERS ARE FROM A DRILLED HOLE.

APPLICATIONS

Typical applications for square cartridge heaters include, but are not limited to:

- Bag Sealing
- Long Platens
- Cutting Jaws

SPECIFICATIONS

	3/8	1/2	5/8
Maximum Cross Section	0.374	0.499	0.624
Minimum Cross Section	0.369	0.494	0.619
Standard Lead Wire	22	22	18
Maximum Amp.	9	9	15
Maximum Lead Wire	22	18	18
Maximum Amps With	9	15	15
Maximum Volts	300	300	300
Lead Wire Temp	550 °C	550 °C	550 ° C

COLD SECTION

Heater Length	.375″ Square	.500″ Square	.625″ Square
Under 3″ Long	.25	.30	.38
Over 3″ Long	.90	.90	1.00

LEADS

Wire type	Maximum Recommended Temperature	Comments
Duraflex	550°C	Highest temperature rating, excellent, durable, user friendly. This is our standard lead wire.
MGT	450°C	Good high temperature wire.
Ultralead	450°C	Excellent, durable wire, good for high temperature applications.
Teflon	250°C	Good for areas where a small diameter wire is needed.
Silicone Rubber	200°C	Good moisture resistance
Braided Silicone Rubber	200°C	Inexpensive wire, good for non-abrasive applications.
SJO Cord	90°C	Rubber jacket, resistant to oil and moisture. For use on 3/8” diameter and larger.

Stainless Steel Braid

- Swaged in stainless steel braid provides excellent abrasion protection while allowing the leads to be bent in a tight radius
- Because the braid is swaged in, it is extremely resistant to pulling out of the heater

UNHEATED LENGTH AT LEAD END OF HEATER							
Heater Length	1/4″	5/16″	3/8″	1/2″	5/8″	3/4″	1″
Under 3″ Long	.25	.20	.35	.29	.39	.39	.54
Over 3″ Long	.86	.79	.94	.84	1.01	1.00	1.20

Right Angle Braid

- Right angle stainless steel braid offers the same advantages as swaged in stainless steel braid, but allows use in tight spaces
- When ordering, please specify the overall length

UNHEATED LENGTH AT LEAD END OF HEATER							
Heater Length	1/4″	5/16″	3/8″	1/2″	5/8″	3/4″	1″
Under 3″ Long	.20	.20	.25	.29	.39	.39	.24
Over 3″ Long	.81	.79	.84	.84	1.01	1.00	.31
Extension Length	.31	.31	.37	.37	.44	.44	.75

Stainless Steel Flexible Conduit

- Flexible conduit (also known as armor or hose) provides maximum lead protection from abrasion but cannot be bent quite as sharply as stainless steel braid.
- Flexible conduit is swaged into the heater for maximum protection.

UNHEATED LENGTH AT LEAD END OF HEATER							
Heater Length	1/4″	5/16″	3/8″	1/2″	5/8″	3/4″	1″
Under 3″ Long	.62	.60	.30	.23	.39	.39	.54
Over 3″ Long	1.23	1.20	.89	.84	1.01	1.00	1.2
Conduit O.D.	.25	.303	1.4″	.303	.37	.48	.48

Right Angle Stainless Steel Conduit

- Right angle stainless steel conduit offers the advantages as swaged in stainless steel conduit but allows use in tight spaces.
- When ordering, please specify the overall length.

UNHEATED LENGTH AT LEAD END OF HEATER							
Heater Length	1/4″	5/16″	3/8″	1/2″	5/8″	3/4″	1″
Under 3″ Long	.55	.60	.65	.70	.90	.80	.24
Over 3″ Long	.81	.79	.84	.84	1.01	1.00	.31
Extension Length	.31	.37	.37	.37	.44	.44	.75
Conduit O.D.	.25	.25	.33	.37	.37	.37	.37

Sleeving

Type	Max Rec.	Comments
Silicone Rubber Fiberglass Sleeving	200°C	Can sleeve both leads together or each lead separately.
Fiberglass Sleeving	240°C	Good for lead protection and used over crimps.

CONFIGURATIONS

Standard Swaged-In Leads

- Available in .375″, .500″ and .625″ diameters

Right Angle Leads

- Right angle leads are ideal for applications where space is limited
- Leads are covered with silicone impregnated fiber-glass sleeve where they exit the heater
- When ordering, please specify the overall length

UNHEATED LENGTH AT LEAD END OF HEATER							
Heater Length	1/4″	5/16″	3/8″	1/2″	5/8″	3/4″	1″
Under 3″ Long	.20	.20	.25	.29	.39	.39	.24
Over 3″ Long	.81	.79	.84	.84	1.01	1.00	.31
Extension Length	.25	.25	.31	.37	.37	.37	.75

OTHER OPTIONS

Tab Stops

- Tab Stops are ideal for preventing heaters from sliding too far into the hole

End Seals

Cement	Provides protection against some thicker liquids and dust, however it is not waterproof. It is also somewhat brittle and subject to cracking in high impact or high vibration applications. Up to 2600°F.
Ceramic	A steatite endpiece provides excellent strength and temperature resistance. However it offers little protection against moisture or other contaminats.
Epoxy Potting	Provides a very good seal with excellent mechanical strength. However, it's adherence to Teflon or silicone rubber lead wire is only fair. It is rated up to 265°F and bonds well to Duraflex lead wire.

Epoxylite Potting	Provides similar mechanical properties as epoxy potting. Up to 600°F.
RTV	• RTV Potting, when used in combination with silicone rubber insulated lead wire, provides the best seal of all options. • The down side to silicone is that it is limited to 500ºF and while extremely flexible, it is not as strong mechanically as other options. • Although the RTV is rated for 500ºF, silicone rubber leads are only rated to 392ºF. An option is to use Duraflex lead wire instead. Duraflex is rated to 1000ºF and has a heavy silicone coating. • While Duraflex is not sold as a waterproof wire, it performs very well in wet environments. • Another option is to use crimped on leads, then the power pins are sealed where they enter the heater and the type of lead wire does not matter.

End Seal Type	Max Temp	Moisture Protection	Contamination	Mechanical Strength	Vibration Resistance	Moisture Applications	Vibration or Flexing
Cement Potting	2600°F	Poor	Fair	Good	Poor	Poor	Poor
Mica End Piece (Standard)	2500°F	Poor	Fair	Good	Fair	Poor	Good
Epoxylite Potting	600°F	Fair	Very Good	Very Good	Excellent	Good	Excellent
RTV w/ Silicone Rubber Leads	392°F	Excellent	Excellent	Fair	Good	Excellent	Average
Epoxy Potting	265°F	Good	Good	Excellent	Excellent	Good	Good

DISTRIBUTED WATTAGE

- Distributed wattage heaters are often used in platens and sealing bars. Wattage is usually increased on the ends of the heater to compensate for end losses and maintain a constant temperature along the heated product.
- Specify desired lengths in inches and wattages in percentage.

WATT DENSITY

Clearance (Inches)	1200°F	1000°F	800°F	600°F	400°F	200°F
0.002	105	200	225	225	225	225
0.003	90	150	220	225	225	225
0.004	75	130	160	225	225	225
0.005	65	105	150	210	225	225
0.007	50	75	110	150	175	225
0.010	45	65	80	110	150	170
0.015	35	55	70	80	105	120
0.030	30	45	60	65	75	80
0.060	20	30	35	40	45	50
0.100	15	25	30	35	35	35