

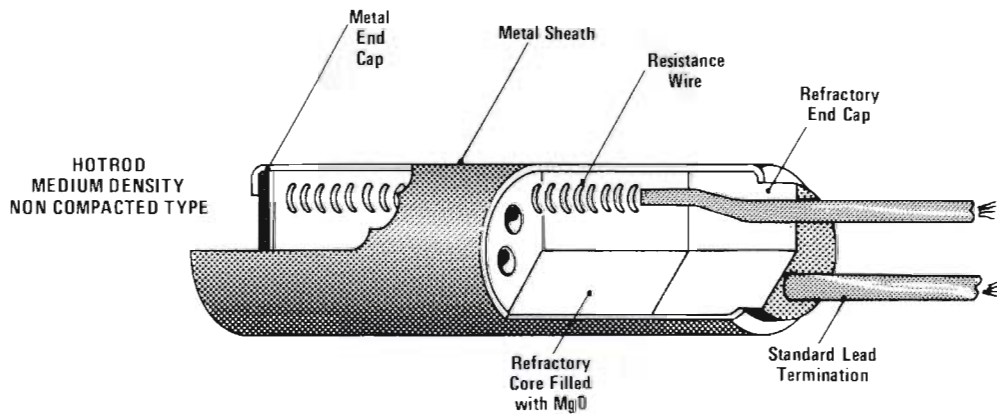
HELIOS CARTRIDGE HEATERS



HOT ROD PRECISION UNITS - STANDARD WATT DENSITY TYPE

Helios 'Hotrod' cartridge heaters provide a convenient, dependable and efficient method of applying concentrated heat to solid metal components such as die blocks, moulds, platens, heat sealing tools etc., or practically any application where a compact, insert type heating is desirable.

GENERAL CONSTRUCTION



HOT ROD CARTRIDGES FEATURE

- * Long trouble free service.
- * Sheaths of precision dimensions and tolerances for intimate contact with reamed holes.
- * High watt density units with stainless steel sheaths providing stable non-oxidising surfaces.
- * Heating elements positioned close to the outside surface for maximum heat transfer, minimum core temperature, and faster heating.
- * Heating element supported on high quality ceramic and solidly packed magnesium oxide.
- * Variety of connections, including plated steel screws and nuts or glass insulated nickel wires.
- * When specified, units can be provided liquid tight.
- * Basic design readily adaptable to a wide variety of special requirements, sizes or ratings.

INSTALLATION

Holes in metal blocks for cartridge installation should be drilled and reamed to listed sizes.

Finished units are sufficiently undersized to provide a slip installation, when expanded by heat, the cartridge will fit snugly to give maximum heat transfer. If air gaps are permitted due to rough drilling or improper sizing of the bore, 'Hot Spots' on the sheath surface will result with consequent deterioration of the heater. Hole must also be free from oil to avoid heater contamination, again shortening life.

MOUNTING AND EXTRACTING LUGS

Heaters can be fitted with flanged or tab mounting lugs to hold heater firmly in place and lead wires should be supported when in a moving die or platen. Also, lugs ease heater removal.

REMOVAL OF UNITS

To facilitate easy removal, it is recommended that a knock out hole be provided at back of bore where possible.

CONTROL POSITION

To prevent overheating when using units rated at maximum watt density as listed, it is recommended that the control point be located within 12 mm (½") of the 'HOT ROD' unit.

HELIOS CARTRIDGE HEATERS

HELIOS "HOTROD" PRECISION HEATERS -STANDARD WATT DENSITY TYPE

240 VOLTS, MAXIMUM WATT DENSITY 62kW/m² (40 w/in²)

METRIC RANGE

LENGTH (mm)	50	60	70	75	80	90	100	125	150	175	200	225	250	275	300
Recommended Maximum Wattage															
8mm Diameter	80	95	110	120	130	150	160	200	240	280	320	360	400	440	480
10mm Diameter	90	115	130	140	150	165	185	230	275	320	370	415	460	505	550
11mm Diameter	110	130	155	165	175	200	220	275	330	385	440	500	550	600	660
12mm Diameter	120	140	165	175	190	210	240	300	355	415	470	530	590	650	700
13mm Diameter	130	150	180	190	200	230	255	320	385	450	510	575	640	700	770
14mm Diameter	135	165	190	205	220	250	275	345	410	480	550	620	690	755	820
15mm Diameter	150	180	210	225	240	270	300	375	450	525	600	675	750	825	900
16mm Diameter	160	190	224	240	255	285	320	400	480	560	640	720	800	880	960
18mm Diameter	175	210	250	265	280	320	355	445	530	620	710	800	890	975	1065
20mm Diameter	195	235	270	290	310	350	390	490	580	680	780	880	980	1070	1170
26mm Diameter	255	300	350	380	400	460	510	640	765	895	1020	1150	1280	1400	1530

IMPERIAL RANGE

LENGTH	2	2 1/2	3	3 1/2	4	4 1/2	5	5 1/2	6	7	8	9	10	11	12
Recommended Maximum Wattage															
1/4" Diameter	60	75	90	105	120	135	150	165	180	210	240	270	300	330	360
5/16" Diameter	80	100	120	140	160	180	200	220	240	280	320	360	400	440	480
3/8" Diameter	95*	115*	140*	165*	185*	210	235*	255	280*	330	375	420	470	515	560
7/16" Diameter	110	135	165	190	220	250	275	300	330	385	440	495	550	600	660
1/2" Diameter	125*	155*	190*	220*	250*	280	315*	340	375*	400	500*	560	630	690	750
9/16" Diameter	140	175	210	240	280	300	350	380	420	490	560	630	700	770	840
5/8" Diameter	150*	180	225*	260	300*	330	375*	400	450*	525*	600*	675*	750	820	900
3/4" Diameter	180	225	270	300	360	400	450	500	540	630	720	810	900	990	1080
7/8" Diameter	220	275	330	380	440	500	550	600	660	770	880	990	1100	1200	1300
1" Diameter	250	300	375	430	500	560	625	680	750	870	1000	1100	1200	1350	1500
1 1/4" Diameter	300	375	450	520	600	670	750	820	900	1000	1200	1300	1500	1600	1800

* NORMALLY HELD IN STOCK

HELIOS CARTRIDGE HEATERS

RED HOTRODS – HIGH WATT DENSITY

The efficiency of a sheathed electric heating element is determined by the rate at which the heat developed in the resistance wire can be dissipated from the surface of the sheath.

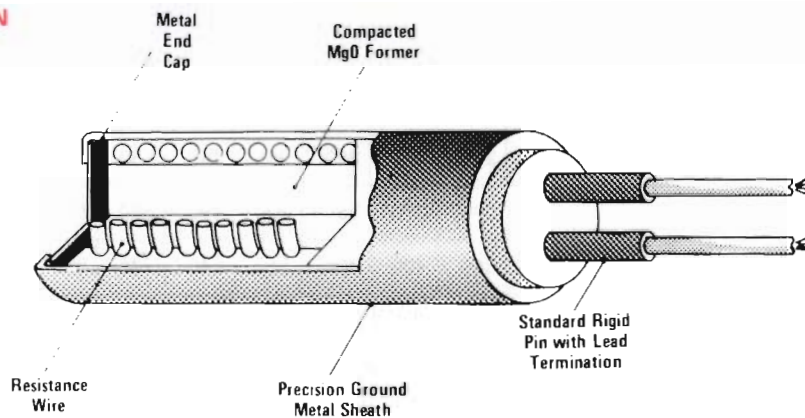
Employing this principle, the 'RED HOTROD' cartridge unit is of special construction in which the resistance wire is positioned in close proximity to the sheath and insulated by a high grade mineral insulating material which is compacted to rock-like hardness.

This construction ensures that the resistance wire temperatures are dissipated much more rapidly through the sheath than is possible with conventional cartridge construction. Since this fast rate of heat transfer greatly reduces the temperature difference between the resistance wire and sheath, it is possible for a 'RED HOTROD' unit to be operated at elevated temperatures without the resistance wire over-heating.

These factors make it possible to provide concentrated heat in small, in fact, as much as 2½ time more heat than provided by a standard unit by the same size. Ratings between 60 and 150 kW/m² (40 - 100 w/in.²) of heated surface are available.

GENERAL CONSTRUCTION

RED HOTROD
HIGH DENSITY
COMPACTED TYPE



SIZE AVAILABILITY

These units are available in both imperial and metric diameters.

As shown on page 23

TOLERANCES

Diameters:

+0, -.004". Lengths + 3 mm (1/8")

Wattage:

Plus 5% minus 5%

Heated Surface Length:

Sheath Length minus 16 mm (0.625")

Sheath Material:

The RED HOTROD is manufactured with a stainless steel sheath allowing for continued operation at elevated temperatures

Lead Wires:

Standard length is 250 mm long (10") of double fibreglass covered stranded nickel wire.

SPECIAL FEATURES

Consult factory with complete application details for information regarding the following available features.

- 1) Special terminal assemblies for unusually severe applications.
- 2) End opposite leads can be sealed.
- 3) Intermediate lengths or ratings, other than those listed.

ORDERING

Specify the following: Diameter,
Length,
Voltage,
Wattage,
Lead length and special features if required.

HELIOS CARTRIDGE HEATERS

RED HOTRODS

IMPORTANCE OF CONTACT SURFACE

In selecting a RED HOTROD unit for a special application it is essential to realize that a good contact surface and provision of a sensing control medium positioned correctly, determine the capacity and type of unit required. The surface of each RED HOTROD is machined to close specifications, and since a good heat transfer and the life of the heater depends upon the accuracy of fit between the heat and the material to be heated, it is imperative to ensure that holes be reamed to exact size and smoothness. This becomes increasingly important at high temperatures and Watt densities.

TEMPERATURE CONTROL

It is recommended that a temperature control medium be used in conjunction with RED HOTROD cartridge heaters. The control point should be located within 12 mm (1/2") of the heater to ensure maximum life, particularly when operating at high watt densities and elevated temperatures.

RED HOTROD CARTRIDGE HEATERS. 240 VOLTS, MAXIMUM WATT DENSITY 155 kW/m² (100 w/in.²)

IMPERIAL RANGE

LENGTH (INCHES)	2	3	4	5	6	7	8	9	10	11	12
RECOMMENDED MAXIMUM WATTAGE											
3/8" DIAMETER	160	280	400	510	630	750	870	980	1100	1200	1300
1/2" DIAMETER	220	370	520	680	840	1000	1150	1300	1450	1600	1750
5/8" DIAMETER	250	450	650	850	1000	1200	1400	1600	1800	2000	2200

METRIC RANGE

LENGTH (mm)	50	75	100	125	150	175	200	225	250	275	300
RECOMMENDED MAXIMUM WATTAGE											
10mm DIAMETER	160	280	400	500	650	750	880	1000	1100	1250	1400
11mm DIAMETER	180	300	450	580	720	850	1000	1100	1200	1400	1500
13mm DIAMETER	220	370	520	680	840	1000	1150	1300	1450	1600	1750
16mm DIAMETER	260	460	660	860	1000	1300	1500	1650	1800	2000	2200
19mm DIAMETER	300	500	750	1000	1200	1500	1700	1900	2100	2400	2500

SUPERWATT CARTRIDGE HEATERS IMPERIAL

1/4" DIAMETER 240V

LENGTH (INCHES)	1 1/4	1 1/2	2	2	3 3/4
WATTAGE	90	160	200	250	300

1/4" DIAMETER WITH J TYPE THERMOCOUPLE

LENGTH (INCHES)	2 1/2	3	3 1/4	3 3/4	5 1/2	5 3/4
WATTAGE	200	200	300	220	200	350

3/8" DIAMETER 240V

LENGTH (INCHES)	1 1/2	1 1/2	2	2	2	2
WATTAGE	100	160	100	160	200	250

3/8" DIAMETER WITH J TYPE THERMOCOUPLE

LENGTH (INCHES)	2	2 1/2	3	3 1/2	4
WATTAGE	120	250	260	320	370

1/2" DIAMETER

LENGTH (INCHES)	1 5/16
WATTAGE	100, 150

METRIC

8MM DIAMETER 240V

LENGTH(mm)	40	60
WATTAGE	150	250

12MM DIAMETER

LENGTH (mm)	50
WATTAGE	200

HELIOS CARTRIDGE HEATERS

AVAILABLE LEADS AND TERMINAL CONSTRUCTION

STANDARD

Flexible nickel wire leads, double glass insulated and Silicone varnished. Available on all diameters.



TYPE F

ABRASION PROTECTION

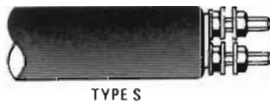
To protect lead wires against abrasion or mechanical damage, a flexible conduit can be securely fitted to cartridge unit sheath.

This also provides a high safety factor where lead wires are exposed to operator.



SPECIAL CONSTRUCTION

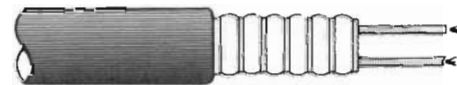
Steel screw and nut connections. Available on units min. diameter 20 mm (1").



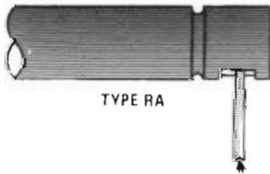
TYPE S

MOISTURE PROOFING AND HERMETIC SEALING

Certain operating conditions such as high humidity, presence of vapours, free oil, wax, or plastics, require that units be sealed. This can be achieved by silver soldering or welding bottom end of unit and similarly attaching to terminal ends a solid or flexible liquid proof tubing. Another method is to employ a silicone rubber seal (where temperature conditions permit) at lead end of unit. Alternatively, for temperatures above 200°C (400°F) a glass or ceramic to metal seal may be used.

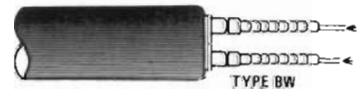


Right angle leads for use on units where straight leads are unsuitable.



TYPE R.A.

Ceramic beaded, solid, or flexible heat resisting nickel conductors can be supplied for high temperature applications. Available on all diameters. Specify exact requirements.



TYPE B.W.

TERMINATION OF SPECIAL DESIGN CAN BE SUPPLIED UPON REQUEST.

NOTE: AS SEALING OF HOTROD UNITS IS A SPECIAL FEATURE, AND CAN ONLY BE CARRIED OUT DURING MANUFACTURE, IT IS ADVISABLE TO CONSULT FACTORY FOR RECOMMENDATIONS.

GENERAL ORDERING INFORMATION

SPECIFY –

Diameter, Volts, Watts, Sheath length and Material, Type of terminal or lead construction, Length of leads.

TOLERANCES

Diameter tolerances are +0.000 - .10 mm (0.004") for any given size. This sizing is maintained so that units are a slide fit into a standard reamed hole. Thermal action will expand unit to a snug fit for best heat conduction.

Length tolerances are ± 1.6 mm (1/16") wattage tolerances are held to $\pm 5\%$ at voltage specified.

Heated Length is sheath length minus 10 mm (3/8") from connection end.

SELECTION

Generally in selecting cartridge heaters it is necessary to ensure that the element sheath temperature does not exceed its designed maximum limitation. For a low temperature application choose a unit with a higher watt density rating than that selected for high temperature applications.

HOT ROD SPECIAL UNITS AND APPLICATION