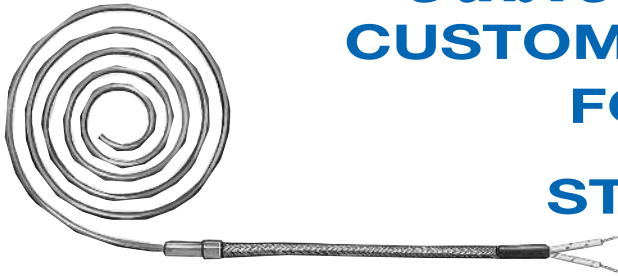




Cable HEATERS

CUSTOM ENGINEERED FORMED & STRAIGHT



Spiral-wound Tempco-Pak heater cables are low profile and capable of generating high operating temperatures in restricted areas. The built-in thermocouple eliminates the need for a separate thermocouple. Works especially well as an alternative heat source for flat surface heating applications where other types of heaters cannot be used due to space restrictions. Consult Tempco with your requirements.



Compression fittings are available on straight cable heaters of various diameters (1/8", 3/16", 1/4", 5/16" and 3/8"). This fitting enables adjustment of the insertion length during installation. Compression fittings are available in Brass or Stainless Steel with standard male NPT threads. When ordering, specify heater sheath material, NPT size and material for compression fittings, insertion length, thermocouple type and type of junction (grounded or ungrounded), thermocouple and heater lead lengths, watts and volts. Optional—thermocouple location and cooler or unheated cable lengths. Consult Tempco with your requirements.

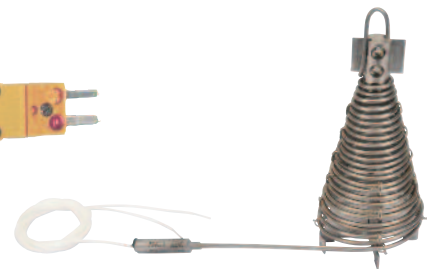
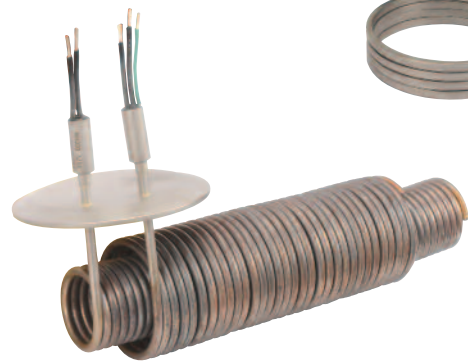
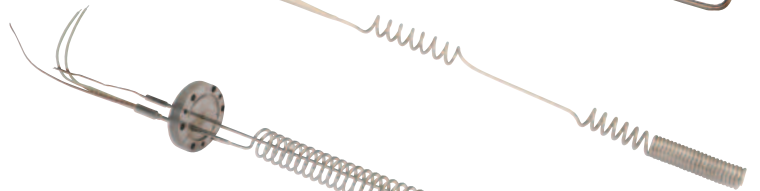


Sinuated (formed) Tempco-Pak heater cables are low profile and capable of generating high operating temperatures in restricted areas. The built-in thermocouple eliminates the need for a separate thermocouple. Works especially well as an alternative heat source for flat surface heating applications where other types of heaters cannot be used due to space restrictions. The sinuated cable can also be formed to conform to a cylindrical inside or outside surface. Consult Tempco with your requirements.



Lab Equipment: Gas Analyzer Heaters

This heater heats gas analyzer samples quickly and uniformly. Low mass construction allows for a fast cool down, increasing cycle times. Adding a T/C or RTD to an assembly is not a problem. Straight lengths are also available for manual custom bending requirements.





Coil & Cable Heaters

Tempco-Pak Heaters

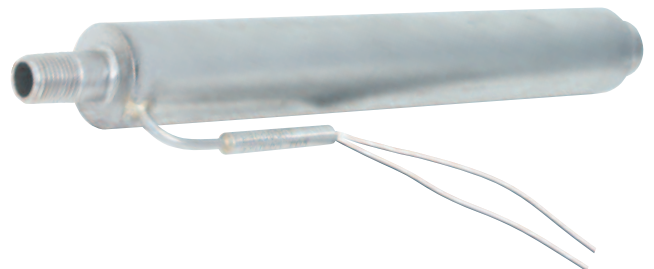
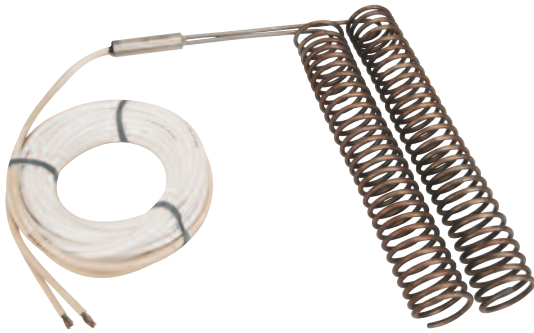


Miniature-Coil heaters are made for special applications. Cable diameter is less than .100". They work especially well as an alternative heat source for demanding and high temperature applications where other types of heaters have failed. Available with cooler or unheated cable section toward lead end. Consult Tempco with your requirements.



Stainless steel mounting flange is 1" diameter x .060" thick with two 1/4" holes on a 3/4" bolt circle. When ordering, specify location of mounting flange, cable diameter, length, sheath material, thermocouple type and type of junction (grounded or ungrounded), thermocouple and heater lead lengths, watts and volts—optional: thermocouple location and cooler or unheated cable lengths. Consult Tempco with your requirements.

NOTE: Mounting flange to be located over a cold or cooler section.



Gas or Air Heaters rated 1050 watts at 240 volts. One end has 1/4" MNPT and the other end has 1/4" FNPT so that you can have a series of the heaters for higher wattage requirements. It has 1-1/8" OD x 8" long stainless steel tubing body with 9-3/8" overall length.



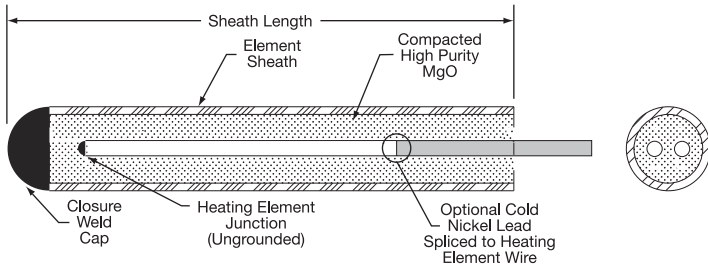
Star-Wound Coil

Star wound formations are usually inserted into pipes or ducts and are used to heat moving air or liquids. The offset coils create a turbulent flow. This allows the flowing material to have better contact with the heater surface resulting in more efficient heat transfer.



Tempco-Pak Heaters — Design Constructions

Tempco-Pak Heaters with Straight Wire



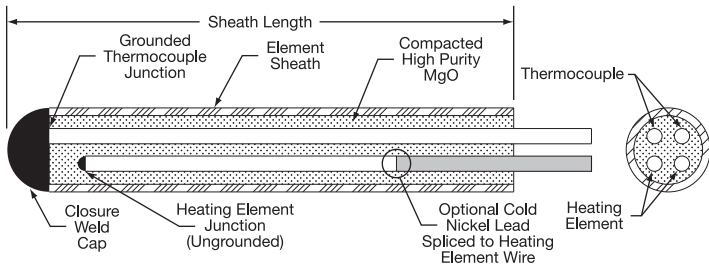
Tempco-Pak heaters are made from M.I. cable having 2 straight heating element wires insulated from the sheath by high purity MgO.

Available in nominal sheath diameters from 0.040" to 0.375" (1mm to 9.5mm) in 304 stainless steel and Inconel® 600 for Tempco-Pak heaters with straight wire. Optional cold nickel lead spliced to heating element wire is available in 0.125" diameter or larger depending on conductor material.

Nominal Sheath O.D.		Maximum Heater Length		Nominal Sheath O.D.		Maximum Heater Length	
in	mm	ft	meters	in	mm	ft	meters
.040	1.00	25	7.6	.188	4.77	100	30.5
.063	1.60	70	21.0	.250	6.35	59	18.0
.125	3.18	120	36.5	.312	7.93	38	11.5
.163	4.14	130	39.6	.375	9.53	26	8.0

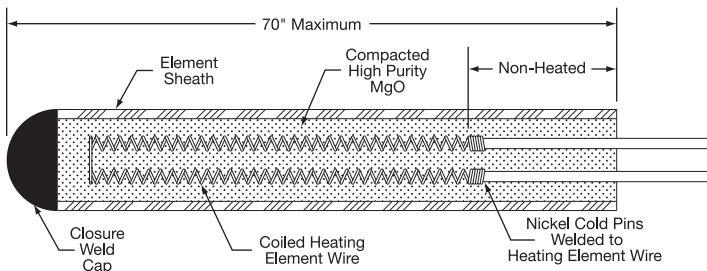


Note: Consult Tempco for diameters other than those listed above.



Tempco-Pak Heaters with Straight Wire and Built-In Thermocouple

Tempco-Pak heaters with 0.125" or larger diameter are also made from M.I. cable having 2 straight heating element wires and 2 straight thermocouple wires insulated from the sheath by high purity MgO. Optional cold nickel lead spliced to heating element wire is available in 0.125" diameter or larger depending on conductor material.



Tempco-Pak Heaters with Helically Coiled Wire

Hi-Density Tempco-Pak heaters are manufactured from sheathed M.I. cable having 2 coiled heating element wires or 2 coiled heating element wires and 2 straight thermocouple wires. The non-heated portion has the largest possible diameter solid nickel cold pins attached to the heating element wires, providing maximum current carrying capacity within the same continuous sheath.

Available in nominal sheath diameters from 0.120" to 0.153" (3.05 mm to 3.9 mm) including 0.125" O.D., 0.132" O.D. and 0.143" O.D. Tempco also manufactures 0.110" x 0.160" rectangular cable as well as 0.125" square cable.

Maximum sheath length including non-heated section is 70 inches (1778 mm).

Optional Built-in Thermocouple is ANSI Type J or Type K grounded at tip (end farthest from cold end) or ungrounded anywhere along heater length for .125" diameter and larger.



Tempco-Pak Cable Heaters

The densely compacted MgO insulation used in Tempco-Pak heaters produces excellent high temperature insulation resistance and dielectric strength. Heaters can be manufactured with the optional cold nickel leads internally spliced to the heating element wires within the same continuous sheath.

Generally speaking, there is very little temperature difference between the sheath and heater wires. Tempco recommends not exceeding 150 watts per square inch of sheath surface area with the sheath operating temperature at 1000°F (537°C) or less. As temperature increases above 1000°F, the maximum watt density should be decreased.

The maximum recommended operating temperature is 1800°F (982°C) with Inconel® 600 sheath and ANSI Type K thermocouple if required. Heater life in any specific situation or application is impossible to predict. However, heater life generally decreases as temperature and/or the number of thermal cycles increases.

Tempco-Pak heaters are flexible and can be readily formed or bent by hand or production machinery, with the minimum bend radius equal to twice the sheath diameter. The heater sheath can be welded, brazed or soldered without changing its electrical characteristics.

Performance Ratings

- Watt Density:** 75 watts per square inch of sheath surface area maximum with factory approval
- Maximum temperature:** 1500°F (815°C) for 304 stainless steel sheath
1800°F (982°C) for Inconel® 600 sheath

Specifications

Electrical

- Resistance:** ±10% unless otherwise specified
- Voltage:** 120V and 240V standard
- Thermocouples:** ANSI Type J to 1500°F (815°C)
Type K to 1800°F (982°C)

All thermocouples and their junctions are internal to the heater sheath. A grounded junction at the heater tip is standard. An ungrounded junction anywhere along the heater's length is optional. Available in sheath diameters .125" and larger.

Dimensional

- Heater cable diameters:** 0.040", 0.062", 0.115", 0.120",
0.125", 0.132", 0.153", 0.163",
0.174", 0.188", 0.220", 0.250".
Others available upon request.
- Cable diameter tolerance:** ±.005
- Heater length tolerance:** 0 to 6" (+1/8", -0), 6 to 18" (+1/4", -0)
18 to 24" (+3/8", -0), 24 to 120" (+3/4", -0)
120 to 300" (±1")

Transition and Termination Construction Specifications

Transition (potting) adapters: 5/16" O.D. × 1-1/2" long for heater cable 0.163" diameter and smaller. 1/2" O.D. × 1-1/2" long for heater cable diameters above 0.163"

Transition Temperature Rating: Standard transition is rated to 482°F (250°C).

Optional High Temperature Transition is rated to 842°F (450°C).

Standard heater lead wire insulation is TGGT (Teflon®, double fiberglass, Teflon® impregnation), which is rated to 482°F (250°C).

Optional high temperature insulation is MGT (mica, fiberglass, Teflon® impregnation) which is rated to 842°F (450°C).

Thermocouple: Standard leads use a fiberglass insulation rated to 900°F (482°C). Teflon® insulation is available upon request.

Optional lead protection: Stainless steel overbraid or galvanized armor cable.

Ordering Information

Standard Heaters

Order by Part Number for standard heaters listed in Tables on pages 5-21 through 5-23.

Part Numbers are for heaters with standard lead length of 24" unless otherwise specified. Longer lead length as well as stainless steel wire braid protection or armored cable protection are available upon request.

Heaters under 72" (1829 mm) will be shipped straight; longer heaters will be shipped in coils a minimum of 24" (610 mm) in diameter.

Custom Engineered/Manufactured Heaters

For sizes, ratings and terminations not listed, **TEMPCO** will design and manufacture a Tempco-Pak heater to meet your requirements. **Standard lead time is 3-4 weeks.**

Please Specify the following:

- Wattage and Voltage
- Sheath Diameter
- Heater length
- Sheath material— 304 stainless steel or Inconel® 600
- Length of internal nickel cold, or if a neck down design, length of cold section. See page 5-5.
- Thermocouple if required— Type J or K
- Thermocouple Junction— Grounded or Ungrounded. If ungrounded, specify location (.115" and larger).
- Transition type: M1, M2, M3, A1, A2, A3, B1, B2, B3, C1, C2, C3, S1, S2 or S3. See page 5-5.
- Lead length if other than 24"
- Supply a sketch or drawing.

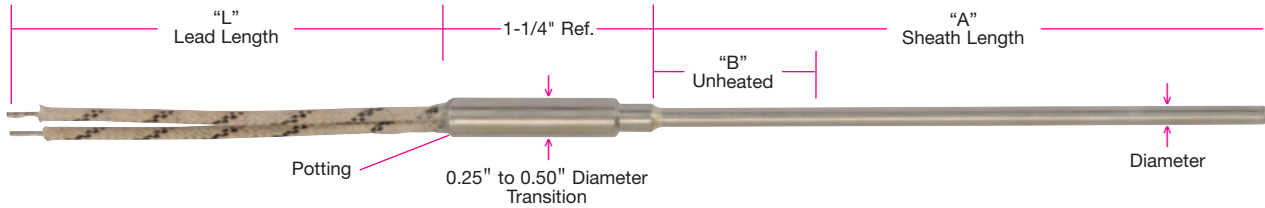
⚠ WARNING: Cancer and Reproductive Harm - www.P65Warnings.ca.gov.

Coil & Cable Heaters



Tempco-Pak Heaters

.125 & .153 Diameter Cable Heaters With and Without Thermocouples



Design Features

- * For temperatures up to 1500°F (815°C) with 304 SS sheath or 1800°F (982°C) with Inconel 600 sheath.
- * Heater can be formed into almost any shape.
- * Available with optional type J or K thermocouples.
- * Watt densities up to 40 watts /square inch and as high as 75 watts/square inch in certain applications.

Ordering Code:

1	2	3	4	5	6	7	8	9	10	11	12	13	14
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	H	S											

Heater Type BOX 1
M = With thermocouple
H = Without thermocouple

Diameter BOX 2
F = .125"
G = .153"

Thermocouple Type BOX 3
0 = No Thermocouple
J = Type J Thermocouple
K = Type K Thermocouple

Thermocouple Junction BOX 4
0 = No Thermocouple
G = Grounded at Tip
U = Ungrounded at Tip
M = Ungrounded in the Middle

Sheath Material BOX 5
B = 304 SS
A = Inconel® 600

"A" Dimension (Heater Length) BOX 6
 Whole inches
00 to **99**

"A" Dimension (Heater Length) BOX 7
 Fractional inches
0 = 0" **4** = 1/2"

"B" Dimension (Unheated Length) BOX 8
 Whole inches
0 to **9**

Wattage BOX 9
 Examples: Enter **090** for 90 watts
 Enter **250** for 250 watts

Voltage BOX 10
1 = 120 Volts
2 = 240 Volts

"L" Dimension BOX 11
 Whole inches
001 to **999**

Lead Insulation BOX 12
M = Plain Leads
B = Stainless Steel Overbraid
C = Galvanized Armor Cable
A = Stainless Steel Armor Cable
S = Fiberglass Sleeve

Transition Temperature Rating BOX 13
1 = 482°F (250°C) — TGGT Wire with High Temperature Cement Potting
2 = 392°F (200°C) — TFE Wire with Epoxy Potting
3 = 842°F (450°C) — MGT Wire with High Temperature Cement Potting

Special Requirement BOX 14
X = Specify
0 = None

Ordering Information

Cable Heaters are offered with the options listed in the worksheet. Create an ordering code by filling in the boxes with the appropriate number and/or letter designation for your requirements, and a part number will be assigned.

WARNING: Cancer and Reproductive Harm - www.P65Warnings.ca.gov.



Coil & Cable Heaters

Tempco-Pak Heaters

Standard (Non-Stock) Round Straight Tempco-Pak Cable Heaters

Part numbers are for 304 SS sheath heaters (except HHS00003 with Inconel® 600) with 24" plain leads, and a type J thermocouple junction grounded at the tip of the cable, except those marked with a ⚡ (0.062" cable).

Longer lead length as well as optional stainless steel wire braid (B), fiberglass sleeve (S), stainless steel armored cable (A), or galvanized armored cable (C) protection is available upon request. See ordering code worksheet below for lead wire protection and lead length desired.

Cable Diameter	Sheath Length		Watts	Watt Density		Volts	Part Number
	in	mm		W/in ²	W/cm ²		
⚡ .062" (1.57 mm)	34	863.6	400	60	9.30	120	HHS00001
	42	1066.8	400	49	7.59	120	HHS00002
	60	1524.0	200	19	2.94	120	HHS00003
	88	2235.2	450	26	4.03	120	HHS00004
.115" (2.92 mm)	49	1244.6	425	24	3.72	120	MHS00002
	73	1854.2	450	17	2.63	120	MHS00003
	87	2209.8	750	24	3.72	240	MHS00004
.125" (3.18 mm)	30	762.0	300	30	4.65	120	MHS00005
	35	889.0	330	24	3.72	240	MHS00006
	41	1041.4	365	23	3.56	120	MHS00007
	52	1320.8	400	20	3.10	240	MHS00008
	62	1574.8	780	32	4.96	240	MHS00009
	68	1727.2	300	11	1.70	120	MHS00010
	68	1727.2	300	11	1.70	240	MHS00011
	84	2133.6	780	24	3.72	120	MHS00012
	90	2286.0	660	19	2.94	120	MHS00013
.153" (3.89 mm)	17	431.8	200	24	3.72	240	MHS00014
	17	431.8	375	46	7.13	240	MHS00015
	18	457.2	250	29	4.49	240	MHS00016
	20	508.0	125	13	2.01	230	MHS00017
	20	508.0	250	26	4.03	230	MHS00018
	22	558.8	250	24	3.72	240	MHS00019
	25	635.0	380	32	4.96	240	MHS00020
	34	863.6	480	29	4.49	240	MHS00021
	40	1016.0	550	29	4.49	240	MHS00022
.174" (4.42 mm)	51	1295.4	650	27	4.18	240	MHS00023
	88	2235.2	1800	37	5.73	220	MHS00024
	93	2362.2	1700	33	5.11	220	MHS00025
	109	2768.6	1500	25	3.87	220	MHS00026
	166	4216.4	3350	37	5.73	220	MHS00027
	220	5588.0	2850	24	3.72	220	MHS00028
.188" (4.78 mm)	77	1955.8	1700	34	5.27	220	MHS00029 [Ⓛ]
	90	2286.0	2000	37	5.73	220	MHS00030
	105	2667.0	1800	29	4.49	220	MHS00031
	180	4572.0	3900	37	5.73	220	MHS00032
	191	4851.4	1000	9	1.39	220	MHS00033
	198	5029.2	3600	31	4.80	220	MHS00034
.203" (5.16 mm)	146	3708.4	2850	31	4.80	380	MHS00035
	182	4622.8	3900	34	5.27	480	MHS00036
	200	5080.0	4300	34	5.27	220	MHS00037
	223	5664.2	4000	28	4.34	220	MHS00038
.220" (5.59 mm)	107	2717.8	2500	32	4.96	220	MHS00039
	123	3124.2	2100	31	4.80	220	MHS00040
	205	5207.0	4800	34	5.27	220	MHS00041
	217	5511.8	3800	25	3.87	220	MHS00042
.232" (5.89 mm)	109	2768.6	2700	34	5.27	220	MHS00043
	119	3022.6	2550	29	4.49	220	MHS00044
	204	5181.6	4500	30	4.65	480	MHS00045
	211	5359.4	5000	32	4.96	220	MHS00046
	222	5638.8	4800	30	4.65	220	MHS00047
.250" (6.35 mm)	89	2260.6	2600	37	5.73	220	MHS00048
	100	2540.0	2200	38	5.89	220	MHS00049
	103	2616.2	2750	34	5.27	220	MHS00050
	105	2667.0	2100	25	3.87	220	MHS00051
	115	2921.0	2450	27	4.18	220	MHS00052
	118	2997.2	2600	28	4.34	220	MHS00053
	123	3124.2	2700	28	4.34	220	MHS00054
	130	3302.0	2600	25	3.87	220	MHS00055
	138	3505.2	2300	21	3.25	220	MHS00056
	205	5207.0	4200	30	4.65	220	MHS00057
	215	5461.0	4000	28	4.34	220	MHS00058
	240	6096.0	5500	26	4.03	220	MHS00059
281	7137.4	4700	19	2.94	220	MHS00060	

NOTE: Complete termination descriptions are on page 5-5.

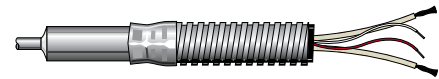
Type A__ – Stainless Steel Armor Cable



Type B__ – Stainless Steel Overbraid



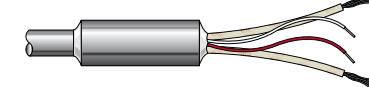
Type C__ – Galvanized Armor Cable



Type S__ – Fiberglass Sleeve



Type M__ – Plain Leads



Potting Adapter Size without Crimping

5/16" O.D. × 1-1/2" long for 0.062" to 0.163" dia. cable
1/2" O.D. × 1-1/2" long for 0.174" to 0.250" dia. cable

Ordering Information

Standard Straight Tempco-Pak heaters are offered with plain lead wires. Use the part numbers at the left for 24" plain lead wires. If you need other than standard 24" leads and/or wire protection use the following ordering codes and a part number will be assigned.

Ordering Code:



Lead Length BOX 1

Whole inches 000 to 999

Termination Type BOX 2

- A = Stn. Stl. Cable
- B = Stn. Stl. Wire Braid
- C = Galvanized Cable
- S = Fiberglass Sleeve
- M = Plain Leads (Do not fill Box 3)

Length of Protection BOX 3

Whole inches 000 to 999

NOTE: Ⓛ Maximum Operating Temperature 500°C.

WARNING: Cancer and Reproductive Harm - www.P65Warnings.ca.gov.

Coil & Cable Heaters



Tempco-Pak Heaters

Standard (Non-Stock) Square Straight Tempco-Pak Cable Heaters

Part Numbers are for heaters with 48" plain leads.

Longer lead length as well as optional stainless steel wire braid (B), fiberglass sleeve (S), stainless steel armored cable (A) or galvanized armored cable (C) protection is available upon request. See ordering code worksheet below for lead wire protection and lead length desired.

Standard Tempco-Pak Heaters are made with 304 Stainless Steel Sheath.

Cable Cross Section	Sheath Length		Cold Length		Watts	Watt Density		Volts	"J" T/C Junction	Part Number
	in	mm	in	mm		W/in ²	W/cm ²			
.125" x .125" (Square)	14 $\frac{1}{8}$	359	2	51	250	41.2	6.39	240	UG-T	MHS00128
	18 $\frac{1}{4}$	464	1 $\frac{3}{4}$	44	250	30.3	4.70	240	UG-T	MHS00129
	22 $\frac{1}{8}$	581	2 $\frac{1}{8}$	54	250	24.0	3.72	240	GRD	MHS00121
	23 $\frac{1}{4}$	591	1 $\frac{1}{2}$	38	450	41.3	6.40	240	UG-M	MHS00122
	26	660	4	101	300	27.2	4.22	240	GRD	MHS00123
	29	737	1 $\frac{1}{2}$	38	450	32.7	5.06	240	UG-N	MHS00124
	36 $\frac{1}{8}$	936	2	51	300	17.2	2.66	240	GRD	MHS00125
	41 $\frac{1}{8}$	1045	1 $\frac{7}{8}$	47	300	15.2	2.35	240	UG-M	MHS00126
	43 $\frac{3}{8}$	1108	1 $\frac{7}{8}$	47	300	14.3	2.21	240	UG-M	MHS00127
	20	508	2 $\frac{1}{2}$	64	315	36.0	5.58	240	N/A	HHS00167
	31 $\frac{1}{2}$	800	2 $\frac{1}{2}$	64	315	21.7	3.36	240	N/A	HHS00168
	31 $\frac{3}{4}$	806	2 $\frac{1}{2}$	64	600	41.0	6.36	240	N/A	HHS00169

(UG-M) — Ungrounded T/C junction is at the middle of the hot section

(UG-T) — Ungrounded T/C junction is at the tip

(UG-N) — Ungrounded T/C junction is 7" from the tip

Lead Wire Abrasion Protection Terminations

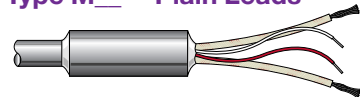
Type A — Stainless Steel Armor Cable



Type C — Galvanized Armor Cable



Type M — Plain Leads



Type B — Stainless Steel Overbraid



Type S — Fiberglass Sleeve



Potting Adapter Size without Crimping

5/16" O.D. x 1-1/2" long

NOTE: Complete termination descriptions are on page 5-5.

Ordering Code:



Ordering Information

Part Numbers above are for Square Rectangular Tempco-Pak heaters with 48" plain lead wires. If you need other than standard 48" leads and/or wire protection use the ordering codes at the right and a part number will be assigned.

Lead Length BOX 1
Whole inches 000 to 999

Termination Type BOX 2
A = Stn. Stl. Cable
B = Stn. Stl. Wire Braid
C = Galvanized Cable
S = Fiberglass Sleeve
M = Plain Leads (Do not fill Box 3)

Length of Protection BOX 3
Whole inches 000 to 999

WARNING: Cancer and Reproductive Harm - www.P65Warnings.ca.gov.



Standard (Non-Stock) Rectangular Straight Tempco-Pak Cable Heaters

Part Numbers are for heaters with 48" plain leads.

Longer lead length as well as optional stainless steel wire braid (B), fiberglass sleeve (S), stainless steel armored cable (A) or galvanized armored cable (C) protection is available upon request.
See ordering code worksheet below for lead wire protection and lead length desired.

Standard Tempco-Pak Heaters are made with 304 Stainless Steel Sheath.

Cable Cross Section	Sheath Length		Cold Length		Watts	Watt Density		Volts	"J" T/C Junction	Part Number
	in	mm	in	mm		W/in ²	W/cm ²			
.110" x .160" (Rectangular)	21 $\frac{1}{8}$	537	1 $\frac{3}{8}$	41	300	28.5	4.41	240	UG-M	MHS00107
	27 $\frac{1}{2}$	698	1 $\frac{3}{8}$	41	350	25.0	3.87	240	UG-M	MHS00108
	30 $\frac{3}{4}$	781	1 $\frac{3}{8}$	48	400	25.6	3.97	240	UG-M	MHS00109
	32 $\frac{1}{4}$	819	1 $\frac{3}{8}$	41	400	24.2	3.74	240	UG-M	MHS00110
	35 $\frac{1}{4}$	895	1 $\frac{3}{4}$	44	450	24.8	3.86	240	UG-M	MHS00111
	35 $\frac{7}{8}$	911	1 $\frac{3}{8}$	41	425	23.0	3.56	240	UG-M	MHS00112
	40 $\frac{1}{4}$	1022	1 $\frac{1}{4}$	32	550	26.0	4.03	240	UG-M	MHS00113
	44 $\frac{1}{4}$	1124	1 $\frac{3}{8}$	41	500	21.7	3.36	240	UG-M	MHS00114
	44 $\frac{3}{4}$	1137	1 $\frac{1}{4}$	32	700	29.8	4.62	240	UG-M	MHS00115
	53 $\frac{1}{2}$	1359	1 $\frac{3}{8}$	41	800	28.8	4.46	240	UG-M	MHS00116
	57	1448	1 $\frac{3}{8}$	41	500	16.7	2.58	240	UG-M	MHS00117
	57 $\frac{3}{8}$	1464	1 $\frac{3}{8}$	41	550	18.1	2.81	240	UG-M	MHS00118
	62 $\frac{3}{4}$	1594	1 $\frac{3}{8}$	41	900	27.2	4.22	240	UG-M	MHS00119
	72	1829	1 $\frac{3}{8}$	41	1000	26.3	4.07	240	UG-M	MHS00120
	13 $\frac{3}{4}$	349	1 $\frac{3}{8}$	48	225	35.0	5.42	240	No T/C	HHS00159
	20 $\frac{1}{2}$	521	1 $\frac{3}{8}$	41	250	24.5	3.79	240	No T/C	HHS00160
	24 $\frac{3}{8}$	619	1 $\frac{3}{8}$	41	300	24.4	3.78	240	No T/C	HHS00161
	32 $\frac{3}{8}$	822	1 $\frac{3}{8}$	41	350	21.0	3.25	240	No T/C	HHS00162
	40 $\frac{1}{4}$	1022	1 $\frac{3}{8}$	41	400	19.1	2.96	240	No T/C	HHS00163
	48 $\frac{1}{4}$	1226	1 $\frac{3}{8}$	41	425	16.8	2.60	240	No T/C	HHS00164
53 $\frac{1}{2}$	1359	1 $\frac{3}{8}$	41	800	28.5	4.41	240	No T/C	HHS00165	
64 $\frac{1}{8}$	1629	1 $\frac{3}{8}$	41	500	14.8	2.29	240	No T/C	HHS00166	

UG-M: — Ungrounded T/C junction is 8" to 11" from the tip

Lead Wire Abrasion Protection Terminations

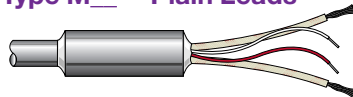
Type A__ — Stainless Steel Armor Cable



Type C__ — Galvanized Armor Cable



Type M__ — Plain Leads



Type B__ — Stainless Steel Overbraid



Type S__ — Fiberglass Sleeve



Potting Adapter Size without Crimping

5/16" O.D. x 1-1/2" long

Ordering Code:



NOTE: Complete termination descriptions are on page 5-5.

Ordering Information

Part Numbers above are for Standard Rectangular Tempco-Pak heaters with 48" plain lead wires. If you need other than standard 48" leads and/or wire protection use the ordering codes at the right and a part number will be assigned.

Lead Length BOX 1

Whole inches 000 to 999

Termination Type BOX 2

- A = Stn. Stl. Cable
- B = Stn. Stl. Wire Braid
- C = Galvanized Cable
- S = Fiberglass Sleeve
- M = Plain Leads (Do not fill Box 3)

Length of Protection BOX 3

Whole inches 000 to 999

⚠ WARNING: Cancer and Reproductive Harm - www.P65Warnings.ca.gov.

Coil & Cable Heaters



Bulk Round Heater Cable

Bulk Round Heater Cable



Typical Applications

- ◆ Blown Film Die Heaters
- ◆ Heat Tracing
- ◆ De-icing Car Wash Door Rails
- ◆ De-icing Outside Stairways

Design and Construction Specifications

Terminations

See page 5-5 for potted lead transitions. There are two choices of potting compounds. Either cement potting for a high temperature application or high temperature epoxy for 450°F (232°C) maximum temperature. Also, there are three major choices of lead wires:

- M1** — TGGT (Teflon® tape, fiberglass, Teflon® treated fiberglass overbraid) insulated lead wire for 482°F (250°C).
- M2** — Teflon® insulated lead wire, which is normally potted with a high temperature epoxy rated 450°F (232°C)
- M3** — MGT (mica tape, Teflon® treated fiberglass overbraid) insulated lead wire for 842°F (450°C).

Minimum Bending Radius

Minimum bending radius for all mineral insulated cable heaters is two times the sheath diameter.

Power Calculation

The required wattage can be calculated using the following formula:

$$\text{Wattage} = \frac{(\text{Voltage})^2}{\text{Cable length (in feet)} \times \text{Ohms/foot (from table)}}$$

Standard Single Conductor Heater Cable

Sheath OD		Resistance (+/-10%)		Maximum Length		Sheath Material	Maximum Current Allowed (Amps)	Part Number
in	mm	ohms/ft.	ohms/mtr.	feet	meters			
.125	3.17	0.67	2.2	250	75	Inconel® 600	13.3	CAS01125
.125	3.17	0.72	2.4	250	75	Inconel® 600	12.5	CAS02125
.125	3.17	0.78	2.6	250	75	Inconel® 600	12.0	CAS03125



Standard Double Conductor (Duplex) Heater Cable

Sheath OD		Resistance (+/-10%)		Maximum Length		Sheath Material	Maximum Current Allowed (Amps)	Part Number
in	mm	ohms/ft.	ohms/mtr.	feet	meters			
.040	1.00	37.0	122.0	500	152	Inconel® 600	1.5	CAW00040
.055	1.39	16.4	54.1	500	152	Inconel® 600	2.3	CAW00055
.062	1.59	13.7	45.2	400	121	Inconel® 600	2.9	CAW00062
.062	1.59	13.2	43.6	400	121	304 SS	3.0	CAW01062
.062	1.59	8.1	26.7	400	121	304 SS	4.0	CAW02062
.062	1.59	7.9	26.1	400	121	304 SS	4.1	CAW03062
.062	1.59	4.6	15.1	400	121	304 SS	5.8	CAW05062
.064	1.62	6.5	21.4	400	121	304 SS	4.7	CAW04064
.125	3.18	7.0	23.1	250	75	304 SS	4.7	CAC53125
.125	3.18	3.4	11.2	250	75	Inconel® 600	7.3	CAW00125
.147	3.73	4.8	15.8	200	60	304 SS	5.9	CAC53147
.147	3.73	2.5	8.2	200	60	Inconel® 600	9.0	CAW00147
.153	3.88	4.5	14.8	150	45	304 SS	6.0	CAC53153
.153	3.88	2.3	7.6	150	45	Inconel® 600	9.2	CAW00153
.153	3.88	1.9	6.3	150	45	304 SS	9.7	CAW01153
.153	3.88	1.6	5.3	150	45	304 SS	11.5	CAW02153
.153	3.88	1.4	4.6	150	45	304 SS	13.0	CAW03153
.163	4.14	4.0	13.2	130	39	304 SS	6.5	CAC53163
.163	4.14	2.1	6.9	130	39	Inconel® 600	9.6	CAW00163
.163	4.14	1.7	5.6	130	39	304 SS	10.5	CAW01163
.163	4.14	1.5	4.9	130	39	304 SS	12.5	CAW02163
.163	4.14	1.2	3.9	130	39	304 SS	14.0	CAW03163
.188	4.77	3.0	9.9	100	30	304 SS	7.0	CAC53188
.188	4.77	1.5	5.0	100	30	Inconel® 600	12.0	CAW00188
.188	4.77	1.3	4.3	100	30	304 SS	13.3	CAW01188
.188	4.77	1.06	3.5	100	30	304 SS	15.5	CAW02188
.188	4.77	0.86	2.8	100	30	304 SS	17.0	CAW03188
.210	5.33	1.18	3.9	80	24	Inconel® 600	15.4	CAW00210
.210	5.33	1.17	3.8	80	24	304 SS	15.5	CAW01210
.210	5.33	0.84	2.7	80	24	304 SS	18.3	CAW02210
.210	5.33	0.75	2.5	80	24	304 SS	20.0	CAW03210
.220	5.59	2.17	7.1	75	22	304 SS	9.5	CAC53220
.220	5.59	0.98	3.2	75	22	304 SS	16.5	CAW01220
.220	5.59	0.76	2.5	75	22	304 SS	19.5	CAW02220
.250	6.35	1.8	5.9	58	17	304 SS	11.3	CAC53250
.250	6.35	0.9	2.9	58	17	Inconel® 600	18.3	CAW00250
.250	6.35	0.87	2.9	58	17	304 SS	20.0	CAW01250
.250	6.35	0.59	1.9	58	17	304 SS	23.0	CAW02250
.250	6.35	0.48	1.6	58	17	304 SS	25.0	CAW03250



Note: Maximum lengths shown are manufactured lengths. Cable is shipped in random lengths unless specific lengths are ordered.

Coil & Cable Heaters

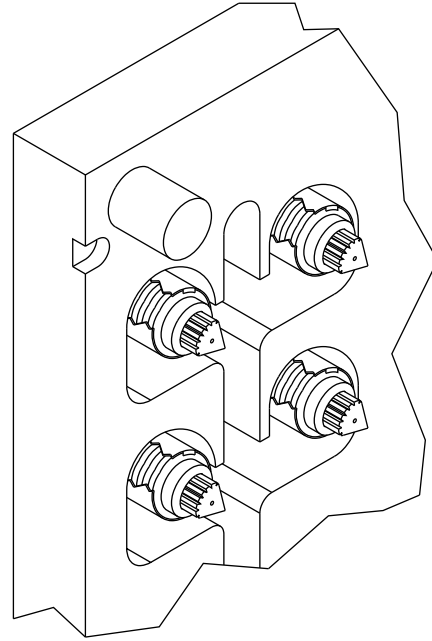


OEM Replacement Heaters

Tempco Replacement Mini-Coil Heaters (Round Cable) for OEM Hot Runner Systems

Tempco's Mini-Coil Band Heaters are designed and manufactured under the tightest tolerances so that they may be used in hot runner/runnerless injection mold tooling with complete confidence on maintaining the manufacturer's original balanced heating when using a minimum of thermocouples and temperature control zones.

- $\pm 2\%$ Resistance Tolerance
- 5" and 7" Staggered Cold Lead Length
- 72" Insulated Lead Wire Length
White/Black for 250W and White/Red for 125W



Specifications

Mechanical

- Coil Heater Diameter:** 0.055", ± 0.002 "
- Thermocouple:** Type J, 0.055" dia., ± 0.002 "
- Inner Diameter:** ± 0.002 "
- Width/Length:** ± 0.020 "
- Axial Clamp Hex:** Tempered 416 series SS
Hex size: 1/8"
Rotation: 150 degrees
- Clamp Screw:** (2) 6-32 \times 1/2", SS,
Hex size 7/64"
- Heater Leads:** 18 ga. silver coated copper, Teflon[®]
insulation, 200°C/392°F
Staggered 5" and 7"
- Thermocouple Leads:** Fiberglass insulation, 1000°F

Electrical

- Resistance Tolerance:** $\pm 2\%$
- Wattage Tolerance:** $\pm 2\%$
- Voltage:** Standard voltages are 120 and 240VAC;
other voltages can be designed.
Consult Tempco with your requirements.



Clamping

Screw operated clamping for the traditional style.

Cam Operated Clamping

Cam operated axial clamping allows tool room personnel to replace the heating element or the thermocouple of the gate bushing without having to remove the bushing from the mold. This can even be done in emergencies while the mold is still in the press, saving hours of downtime. The hex head cam is accessed from the front, parallel to the bushing's shaft.

Clamp Screw