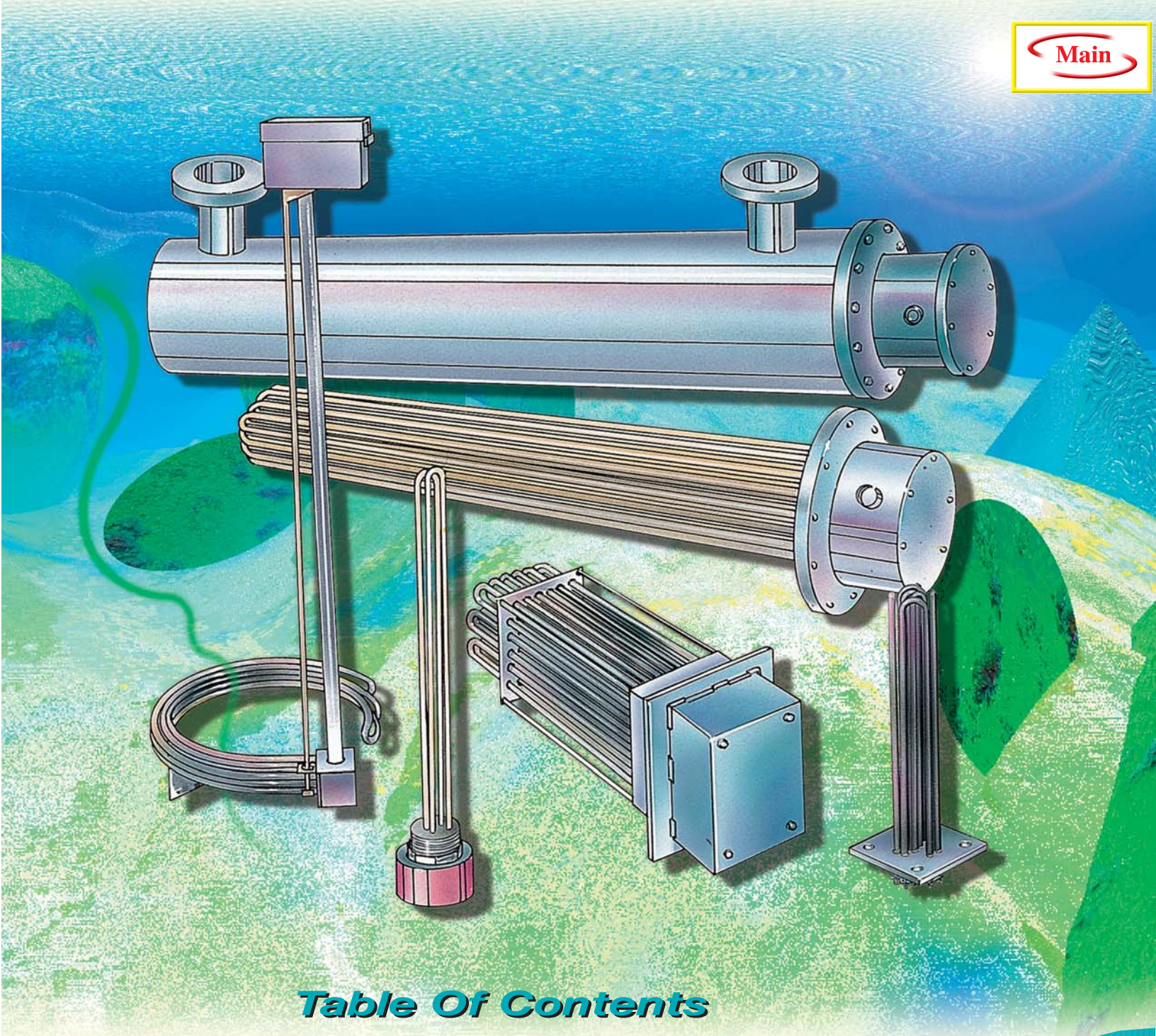

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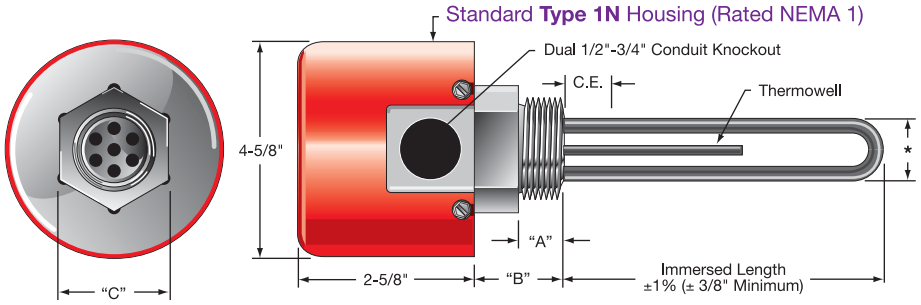
11 section

Process Heaters

Screw Plug Immersion Heaters

Screw Plug Immersion Heaters consist of tubular elements welded or brazed into a threaded screw plug which can then be inserted into a threaded opening in a tank wall or through a mating full or half coupling.



Note: For detailed information on the tubular elements used in Screw Plug Immersion Heaters, see Section 10.

Standard Screw Plug Heater Specifications

Screw Plug NPT	*Minimum Hole Diameter in	mm	"A" in	mm	"B" in	mm	"C" in	mm	Thermowell Bulb Size in	mm	Standard Cold Ends (CE) in	mm	Element Diameter in	mm
1"	1⅛	29	⅞	22	1¼	32	1⅜	35	¼	6.4	1	25	.315	8
1-1/4"	1⅜	35	15/16	24	1 5/16	33	1¾	44	¼	6.4	1	25	.315	9
2"	2¼	57	1 1/16	27	1 7/16	40	2½	64	⅜	9.5	2	50	.430	11
2-1/2"	2½	64	1 1/16	33	2 1/16	52	3	76	⅜	9.5	2	50	.475	12

Design Features

- *Stainless Steel, Brass or Steel Screw Plugs*
- *Four Standard NPT Screw Plug Sizes—1", 1-1/4", 2", 2-1/2"*
- *Recompacted element bends restore insulation resistance after forming*
- *Thermowell for thermostat bulb*
- *Corrosion-Resistant electrical wiring hardware*
- *Four standard sheath materials — Copper, Incoloy®800, Steel and 316 Stainless Steel*
- *NEMA 1 round terminal housing*

Typical Applications

Copper Sheath—Process water, water with very weak chemical solutions, demineralized, deionized or pure water, hot water storage for washrooms, showers, cleaning and rinsing parts, for freeze protection of cooling towers and sprinkler systems and other aqueous solutions not corrosive to copper sheath. Sheath temperatures to 350°F (177°C).

Incoloy® Sheath—Weak chemical solutions, oils, tar, caustic soda, detergent, alkaline solutions, molten salts, demineralized, deionized or pure water (sheath passivation is recommended), and other aqueous solutions not corrosive to Incoloy® sheath. Air, gas mixtures and superheated steam. Sheath temperatures to 1600°F (871°C).

Steel Sheath—Fluid heat transfer media, tar, high to low viscosity petroleum oils, asphalt, wax, paraffin, degreasing solvents, alcohol, molten salt, and other solutions not corrosive to steel sheath. Sheath temperatures to 750°F (399°C).

Agency Approval

Screw Plug Immersion Heaters for use in water and water based solutions are UL recognized in many design variations under UL File Number E234452, Vol 2.

Please specify if you require UL Agency Approval.

Optional Features

- *NEMA 4 Moisture-Proof and/or NEMA 7 Explosion-Resistant terminal housings*
- *Integral Single or Double Pole Thermostats in several temperature ranges*
- *Passivation, Electro-Polishing or Bright Annealing of Stainless Steel and Incoloy® heaters to remove free iron from the sheath*
- *Type J or K Thermocouples for sensing process temperatures, or when attached to the sheath for over-temperature protection*
- *Special sheath materials*
- *Special or European thread fittings*

Selecting the proper Screw Plug Heater

Tempco Screw Plug Immersion Heaters will provide long life and dependable trouble-free service—provided the sheath materials, watt densities and operating temperatures are properly matched for the medium being heated.

Observe the following guidelines:

1. Match your process to the most suitable heater alloy sheath material. See Section 16 of this catalog for the recommended sheath materials for many common materials.
2. Do not exceed the maximum allowable heater watt density (w/in^2) and recommended operating temperature for the material being heated.
3. Select the proper terminal enclosure to protect the heater wiring and provide safety to personnel and equipment.

Need Customer Assistance? We take pride in our record in working with customers to develop the right heater for the job.
Call Tempco with your requirements.

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Screw Plug Immersion Heater Standard Terminal Housings

Standard catalog screw plug immersion heaters are supplied with the **Type 1N** general purpose (NEMA 1) terminal housing with a single Dual 1/2-3/4 conduit knockout as shown on page 11-2. Additional housings with and without a thermostat include:

Moisture Resistant (NEMA 4)

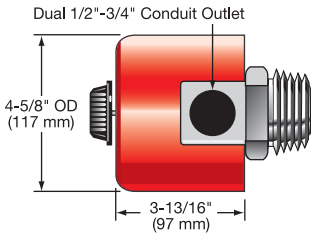
Explosion Resistant (NEMA 7)

Moisture/Explosion Resistant (NEMA 4/7)

If the housings on this page do not meet the size, construction or other criteria of your application, consult Tempco with your requirements.

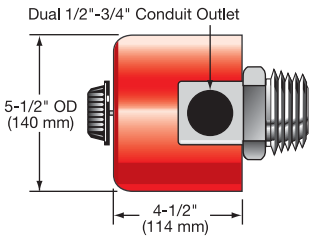
CAUTION ***Explosion resistant terminal housings are intended to provide containment of an explosion in the enclosure only. No portion of the heater assembly outside the enclosure is covered under this NEMA rating. Abnormal use of a heater which results in excessive temperature can create hazardous conditions such as a fire. Never perform any type of service nor remove the housing cover prior to disconnecting all electrical power to the heater.***

NEMA 1 Housings



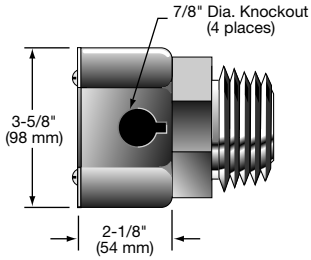
Type 1T

Single-pole thermostat housing for 1", 1-1/4", 2" and 2-1/2" Screw Plug Heaters.



Type 6T

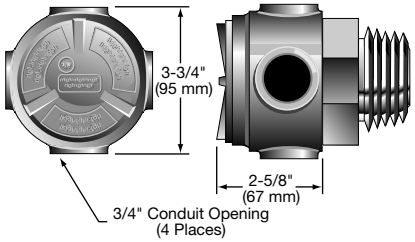
Double-pole thermostat housing for 1", 1-1/4", 2" and 2-1/2" Screw Plug Heaters.



Type 3N

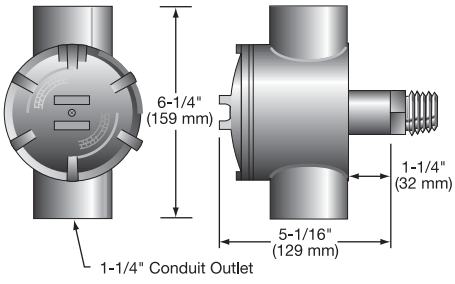
Alternate NEMA 1 housing for 1", 1-1/4", 2" and 2-1/2" Screw Plug Heaters having no thermostat.

Standard NEMA 4 and/or 7 Housings



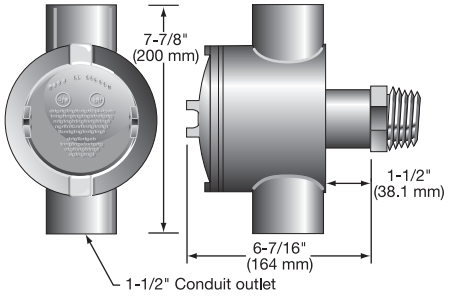
Type 2N

NEMA 4 and/or 7 housing for 1", 1-1/4", 2" and 2-1/2" Screw Plug Heaters having no thermostat. NEMA 4 rating requires the use of the cover gasket supplied.



Type 2T

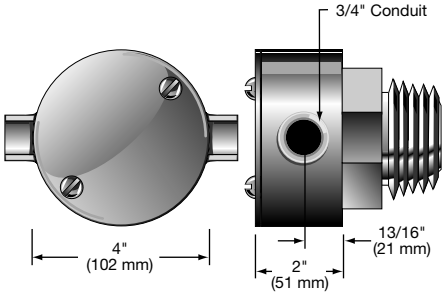
NEMA 4 and/or 7 housing for 1" and 1-1/4" Screw Plug Heaters with a single-pole thermostat. NEMA 4 rating requires the use of the cover gasket supplied.



Type 3T

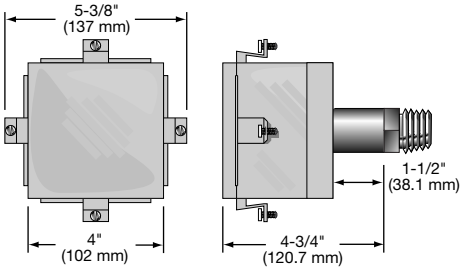
NEMA 4 and/or 7 housing for 2" and 2-1/2" Screw Plug Heaters with a double-pole thermostat. NEMA 4 rating requires the use of the cover gasket supplied.

Alternate NEMA 4 Housings



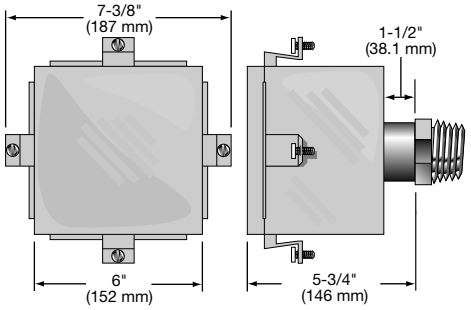
Type 4N

For 1", 1-1/4", 2" and 2-1/2" Screw Plug Heaters having no thermostat.



Type 4T

For 1" and 1-1/4" Screw Plug Heaters with a single-pole thermostat.

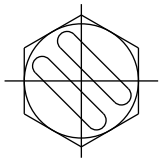


Type 5T

For 2" and 2-1/2" Screw Plug Heaters with a single-pole or double-pole thermostat.

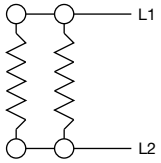
Screw Plug Immersion Heater Typical Wiring Diagrams

Wiring Diagrams — Screw Plug Heaters with Two Elements



Two Element
1-1/4" and 2" NPT Plugs

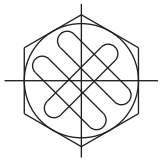
Single-Phase—Series Connection
Element Voltage
Equals
One Half-Line Voltage



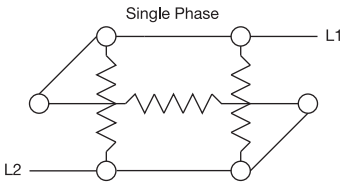
Single-Phase—Parallel Connection
Element Voltage
Equals
Full Line Voltage

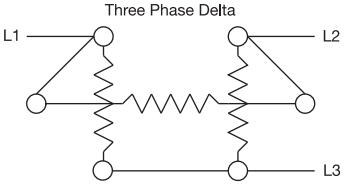
Note: Dual-Voltage heaters are factory wired for the higher voltage (series connection) unless otherwise specified. Easily rewired for lower voltage operation (parallel connection).

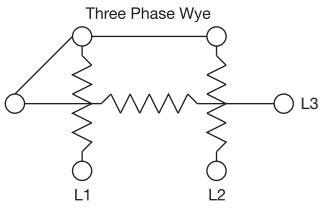
Wiring Diagrams — Screw Plug Heaters with Three Elements

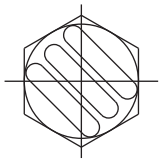


Three Element
Crisscross Pattern
2" NPT Plugs
(Optional on 2-1/2" NPT Plugs)

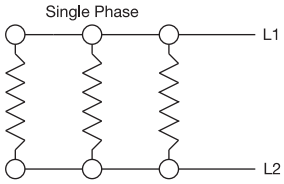


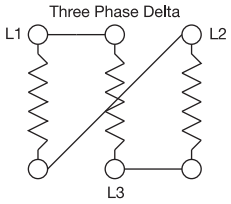


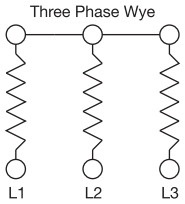




Three Element
Parallel Pattern
2-1/2" NPT Plugs







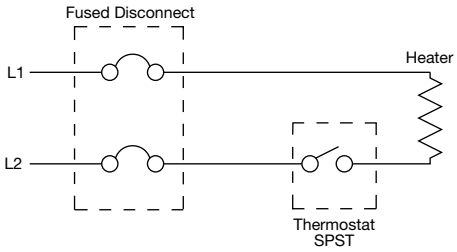
Standard screw plug immersion heaters with three elements, factory wired for three-phase delta, can be rewired for single-phase operation with no wattage change. Wattage can be reduced to one third of the designed wattage by switching from three-phase delta to wye connection.

CAUTION

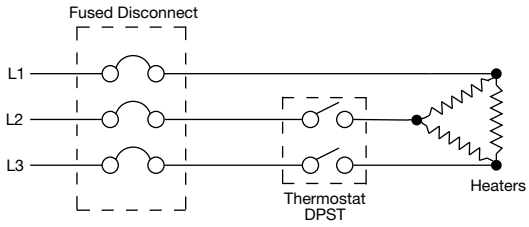
Heaters wired for three-phase wye should not be changed to single-phase or three-phase delta connection, since this will increase wattage and watt density on the elements by three times the original designed wattage, causing premature heater failure.

Typical Wiring Diagrams for Heaters with Thermostats

Wiring Diagrams — When Heater Amperage Does Not Exceed the Amperage Rating of the Thermostat

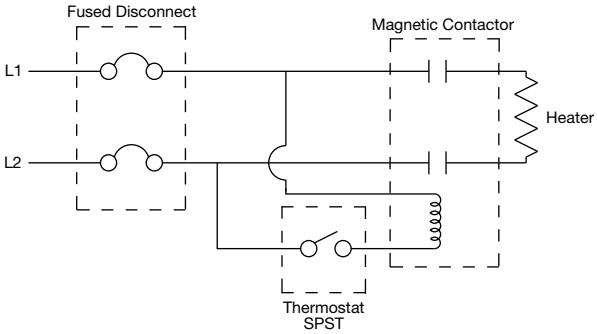


120V Single-Phase Heater



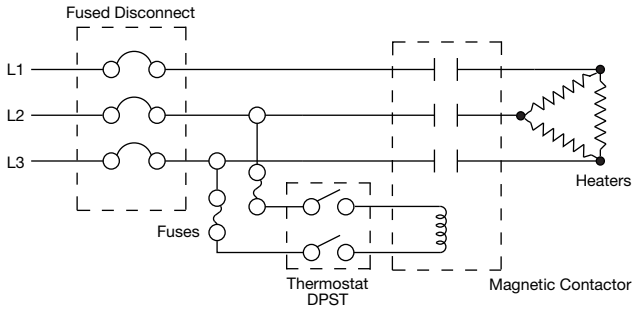
Three-Phase Heater

Wiring Diagrams — When Heater Amperage Exceeds the Amperage Rating of the Thermostat



Any Voltage Single-Phase Heater

Use a Single Pole/Single Throw (SPST) thermostat wired in series with the holding coil of a magnetic contactor or mercury relay (pilot duty).



Three-Phase Heater

Use a Double Pole/Single Throw (DPST) thermostat wired in series with the holding coil of a magnetic contactor or mercury relay (pilot duty).

Need Customer Assistance? We take pride in our record of working with customers to develop the right heater for the job.
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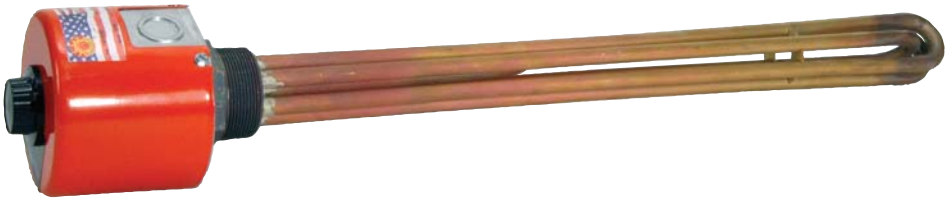


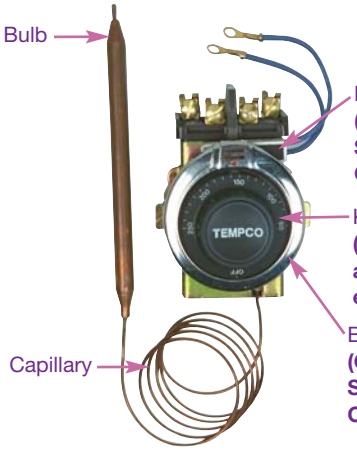
Thermostat Styles and Selection

Construction Characteristics

This type of control operates by expansion and contraction of a liquid in response to temperature change. Liquid contained within the sensing bulb and capillary flexes a diaphragm, causing the opening and closing of a snap-action switch. For heating applications the contacts are normally closed and open on temperature rise. See Page 16-11 for typical wiring diagrams.

Style A
Single-Pole Thermostat

- *General purpose thermostat recommended for most applications.*
- *Capable of controlling loads from 120V/30A up to 480V/20A*



Style B
Double-Pole Thermostat

- *Recommended for directly controlling high wattage loads due to its heavy duty contacts.*
- *Capable of controlling loads up to 30 Amps at 277 VAC and 10 Amps at 480 VAC*

Style C
Double-Pole Thermostat

- *Secondary high limit circuit with manual reset*
- *High limit tracks 25°F above setpoint temperature*
- *High limit latches open until manual reset is pushed in the event that temperature goes up to 25°F above setpoint*
- *Capable of controlling loads up to 30 Amps at 277 VAC*

Style D
Single-Pole Thermostat

- *General purpose thermostat recommended for most applications*
- *Capable of controlling loads up to 25 Amps at 240 VAC*

All Items Available from Stock

Thermostat Electrical Ratings: Normally Closed, Open on Temperature Rise – Adjustable

Control Type	Style	Temp Range °F	Ampacity at Line Voltage 120V	240V	277V	480V	Bulb Dia. in.	Bulb Length in.	Capillary Length in.	Terminal/ Leads in.	Thermostat Part Number	Optional Thermostat Parts Knob	Bezel	Pilot Lamp
SPST	A	60–250	30	30	30	20	.265	6.0	12	screw	TST-101-112	TST-104-106	n/a	n/a
		150–560	30	30	30	20	.326	3.7	12	screw	TST-101-113	TST-104-109	n/a	n/a
DPST	B	30–110	30	30	30	10	.375	6.312	36	screw	TST-110-101	TST-104-110	TST-111-101	EHD-109-103
		60–250	30	30	30	10	.380	3.88	60	screw	TST-110-102	TST-104-103	TST-111-101	EHD-109-103
		100–550	30	30	30	10	.380	3.88	48	screw	TST-110-103	TST-104-104	TST-111-101	EHD-109-103
DPST	C	60–250	30	30	30	—	.375	4.5	72	screw	TST-110-113	TST-104-103	TST-111-102	EHD-109-103
SPDT	D	60-250	25	25	22	—	.265	4.1	12	screw	TST-101-116	TST-104-114	n/a	n/a
SPST	D	60-250	25	25	—	—	.280	3.0	12	6" leads	TST-101-101	TST-104-101	n/a	n/a
		60-250	25	25	—	—	.260	3.35	70	¼" quick disconnect	TST-101-111	TST-104-101	n/a	n/a
		60-180	22	22	18	—	.280	4.2	6	6" leads	TST-101-105	screw adj.	n/a	n/a
		55-115	25	25	—	—	.260	3.7	42	6" leads	TST-101-118	TST-104-102	n/a	n/a
		47–107	25	25	25	—	.322	2.85	8	6" leads	TST-101-106	TST-104-102	n/a	n/a
		40-107	25	25	—	—	.265	5.88	6	6" leads	TST-101-119	TST-104-102	n/a	n/a
		20–120	25	25	—	—	.260	4.15	24	6" leads	TST-101-109	TST-104-105	n/a	n/a

Notes:
1. Knobs, Bezels and Pilot Lamps are optional and must be ordered separately from the thermostat. For part numbers refer to Optional Thermostat Parts in the chart above.
2. Knob **TST-104-105** is a plain pointer knob, not calibrated for the range.
3. Knob **TST-104-102** is printed with 4 through 10, not calibrated for the range.
4. For Thermostat Enclosures refer to page 11-7

Product Inventory Available for Viewing and Selection @ www.tempco.com

Stock Thermostat Accessories

Thermostat Kits

Double-Pole Thermostat Kits include the following components:

Kit Number TSTR-1008 with Style B Thermostat	
TST-110-103	Thermostat with 100 to 550°F Range
TST-104-104	Knob
EHD-109-103	Pilot lamp
TST-111-101	Bezel
—	Mounting Hardware

Kit Number TSTR-1009 with Style B Thermostat	
TST-110-102	Thermostat with 60 to 250°F Range
TST-104-103	Knob
EHD-109-103	Pilot lamp
TST-111-101	Bezel
—	Mounting Hardware

Thermostat Enclosures

NEMA 1 Enclosure
For Single-Pole Thermostats
Size: 4-1/4"H × 3"W × 2"D with 1/2" trade size knockout
Part Number: **HSGR-1003**

NEMA 1 Enclosure
For Double-Pole Thermostats
Size: 5-3/4"H × 3"W × 2"D with 1/2" trade size knockout
Part Number: **HSGR-1004**

Stuffing Box Assembly

The Stuffing Box Assembly is used to seal the thermostat capillary when the sensing bulb is immersed directly in a liquid rather than in a thermowell. The Stuffing Box consists of six slotted washers used to compress a graphite packing into a 3/8" NPT male pipe thread fitting.

Assembly Instructions
Feed sensing bulb through hole in upper and lower fitting. Insert washers and packing into top cavity of lower fitting. Upper fitting then screws into lower fitting, creating the seal.

Part Number: TST-109-101

Thermostat Installation Warnings & Recommendations

CAUTION

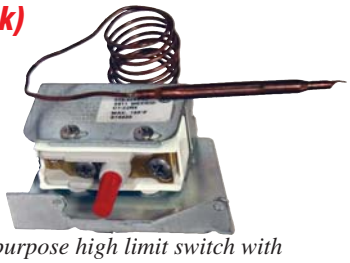
1. ***Do not use the thermostat as a power switch. Use some other means of disconnecting power to the heater for servicing.***
2. ***Thermostats are not a fail-safe device. Use an approved high temperature limit control and/or pressure limit control for safe operation.***
3. ***Avoid kinking or bending the capillary tube too sharply as this will alter the calibration and/or render the thermostat inoperable.***
4. ***Excess capillary tube should be coiled neatly in junction box.***
5. ***The capillary tube must never touch the thermostat contacts as this will create an electrical short capable of harming personnel and/or equipment.***

For wiring Examples See Section 16 – Engineering

Style F Temperature High Limit Switch with Manual Reset (Stock)

Thermostat Electrical Ratings: High Limit – Manual Reset, Normally Closed, Open on Temperature Rise, Fixed Temperature

Control Type	Style	Temp Range °F	Ampacity at Line V				Bulb Dia. in.	Bulb Length in.	Capillary Length in.	Terminal Leads in.	Thermostat Part Number
			120V	240V	277V	480V					
SPST	F	118 ±3	30	30	20	20	0.23	3	8	screw	TST-103-102
SPST	F	200 ±5	30	30	20	20	0.25	4	12	screw	TST-103-104
SPST	F	165 ±15	30	30	20	20	0.20	2.75	30	screw	TST-103-107
SPST	F	125 ±2	30	30	20	20	0.25	3.37	36	screw	TST-103-108
SPST	F	118 ±4	30	30	20	20	0.26	3.5	6	screw	TST-103-109



- *General purpose high limit switch with manual reset*
- *Once fixed trip point is reached, the high limit switch will remain open until the manual reset button is pushed*

Thermowells *(Stainless Steel or Plain Steel)*

Thermowells provide protection for bulb and capillary sensors. They are supplied with a 1/2" NPT male thread for mounting and a 3/8" NPT internal thread that can be used with the stuffing box assembly to secure the capillary to the well.

ID: 0.50", OD: 0.56"

Immersed Length in	Immersed Length mm	Part Number Steel	Part Number Stainless Steel
12	305	*MPT-120-101	*MPT-121-101
18	457	MPT-120-102	MPT-121-102
24	610	MPT-120-103	MPT-121-103
36	914	MPT-120-104	MPT-121-104

An * indicates a stock item.

See pages 14-76 through 14-83 for other thermowell styles.

Standard (Non-Stock) and Stock Screw Plug Immersion Heaters

Design Features

- *Steel Screw Plug*
- *NEMA 1 Terminal Housing*
- *Three-Phase Wye only*
- *Steel Sheath Heating Elements*
- *Watt Density of 8 watts/in² (1.3 watts/cm²)*

Typical Heating Applications: Fuel Oils (Bunker C and Number 6)

Nominal Pipe Size	Immersed Length in	Immersed Length mm	KW	Part Number 120V	120/240V	240V-3Ph	240/480V	480V-3Ph	Approximate Net Weight lbs	Approximate Net Weight kgs
2½" NPT 3 elements	17¼	438	1	—	—	✻TSP01600	—	✻TSP01601	8	4
	24¾	629	1.5	—	—	✻TSP01602	—	✻TSP01603	9	4
	32¼	819	2	—	—	✻TSP01604	—	✻TSP01605	11	5
	39¾	1010	2.5	—	—	✻TSP01606	—	✻TSP01607	12	5
	47¼	1200	3	—	—	✻TSP01608	—	✻TSP01609	13	6
	63¾	1619	4	—	—	✻TSP01610	—	✻TSP01611	16	7
	76¼	1937	5	—	—	✻TSP01612	—	✻TSP01613	18	8

Design Features

- *Steel Screw Plug*
- *NEMA 1 Terminal Housing*
- *Three-Phase convertible to Single-Phase unless otherwise noted*
- *Steel Sheath Heating Elements*
- *Watt Density of 15 watts/in² (2.3 watts/cm²)*

Typical Heating Applications: Medium Weight Oils • Heat Transfer Oils

Nominal Pipe Size	Immersed Length in	Immersed Length mm	KW	Part Number 120V	120/240V	240V-3Ph	240/480V	480V-3Ph	Approximate Net Weight lbs	Approximate Net Weight kgs
2" NPT 3 elements	13¼	337	1.5	—	—	TSP01614	—	①TSP01615	6	3
	17½	445	2	—	—	TSP01616	—	TSP01617	7	3
	20½	521	2.5	—	—	TSP01618	—	TSP01619	7	3
	25	635	3	—	—	TSP01620	—	TSP01621	8	4
	32½	826	4	—	—	TSP01622	—	TSP01623	9	4
	40	1016	5	—	—	TSP01624	—	TSP01625	10	5
	47½	1207	6	—	—	TSP01626	—	TSP01627	11	5
	58½	1486	7.5	—	—	TSP01628	—	TSP01629	12	5
	69¾	1772	9	—	—	TSP01630	—	TSP01631	14	6

① ***3-Phase Wye only***

Design Features

- *Steel Screw Plug*
- *NEMA 1 Terminal Housing*
- *Steel Sheath Heating Elements*
- *Watt Density of 23 watts/in² (3.6 watts/cm²)*

Typical Heating Applications: Lightweight Oils • Degreasing Solutions • Heat Transfer Oils

Nominal Pipe Size	Immersed Length in	Immersed Length mm	KW	Part Number 120V	240V	Approximate Net Weight lbs	Approximate Net Weight kgs
1" NPT 1 element	6½	165	0.25	TSP01632	TSP01633	2	1
	7⅞	200	0.3	TSP01634	TSP01635	2	1
	9¼	235	0.35	TSP01636	TSP01637	2	1
	9⅜	238	0.5	TSP01638	TSP01639	2	1
	13½	343	0.75	TSP01640	TSP01641	3	1
	16¾	425	1	TSP01642	TSP01643	3	1
	23¾	603	1.5	TSP01644	TSP01645	3	1

Single-Phase only

CONTINUED

An asterisk (✻) next to the Part Number guarantees in-stock availability for same-day shipping when ORDERED BY 2 PM CST

Standard (Non-Stock) and Stock Screw Plug Immersion Heaters

Continued from previous page...

Typical Heating Applications: Lightweight Oils • Degreasing Solutions • Heat Transfer Oils

Nominal Pipe Size	Immersed Length in	Immersed Length mm	KW	Part Number 120V	120/240V	240V-3Ph	240/480V	480V-3Ph	Approximate Net Weight lbs	Approximate Net Weight kgs
1¼" NPT 2 elements	6⅜	162	0.5	—	TSP01646	—	—	—	3	1
	8⅞	225	0.7	—	TSP01647	—	—	—	3	1
	10 1/16	256	0.75	—	TSP01648	—	—	—	4	2
	12¾	324	1	—	TSP01649	—	—	—	4	2
	19⅜	492	1.5	—	TSP01650	—	—	—	4	2
	25⅜	645	2	—	TSP01651	—	—	—	5	2
	36⅞	937	3	—	TSP01652	—	—	—	5	2
2" NPT 2 elements	9½	241	1	—	TSP01653	—	TSP01654	—	5	2
	13½	343	1.5	—	TSP01655	—	TSP01656	—	5	2
	17½	445	2	—	TSP01657	—	TSP01658	—	6	3
	20½	521	2.5	—	TSP01659	—	TSP01660	—	6	3
	25	635	3	—	TSP01661	—	TSP01662	—	6	3
	32½	826	4	—	TSP01663	—	TSP01664	—	7	3
	40	1016	5	—	TSP01665	—	TSP01666	—	8	4
	47½	1207	6	—	—	—	TSP01667	—	8	4
2" NPT 3 elements	9½	241	1.5	TSP01668	—	TSP01669	—	①TSP01670	5	2
	17½	445	3	TSP01671	—	TSP01672	—	TSP01673	6	3
	22	559	3.75	TSP01674	—	TSP01675	—	TSP01676	7	3
	25	635	4.5	TSP01677	—	TSP01678	—	TSP01679	7	3
	32½	826	6	—	—	TSP01680	—	TSP01681	8	4
	40	1016	7.5	—	—	TSP01682	—	TSP01683	9	4
	47½	1207	9	—	—	TSP01684	—	TSP01685	10	5
	64	1626	12.5	—	—	TSP01686	—	TSP01687	12	5
2½" NPT 3 elements	17¼	438	3	*TSP01688	—	TSP01689	—	*TSP01690	8	4
	19 1/16	484	3.75	TSP01691	—	TSP01692	—	TSP01693	8	4
	24¾	629	4.5	*TSP01694	—	*TSP01695	—	*TSP01696	9	4
	32¼	819	6	—	—	*TSP01697	—	*TSP01698	11	5
	39¾	1010	7.5	—	—	*TSP01699	—	*TSP01700	12	5
	47¼	1200	9	—	—	*TSP01701	—	*TSP01702	13	6
	63¾	1619	12.5	—	—	*TSP01703	—	TSP01704	16	7
	76¼	1937	15	—	—	*TSP01705	—	*TSP01706	18	8

① ***3-Phase Wye only***

Note: **120V and Dual-Voltage** heaters are Single-Phase. Dual-Voltage heaters are wired for the higher voltage unless otherwise specified.
Three-Phase convertible to Single-Phase unless otherwise noted.

Design Features

- *304 Stainless Steel Screw Plug*
- *NEMA 1 Terminal Housing*
- *Three-Phase Wye only*
- *Incoloy® 800 Sheath Heating Elements*
- *Watt Density of 16 watts/in² (2.5 watts/cm²)*

Typical Heating Applications: Medium Weight Oils • Heat Transfer Oils • Liquid Paraffin

Nominal Pipe Size	Immersed Length in	Immersed Length mm	KW	Part Number 120V	120/240V	240V-3Ph	240/480V	480V-3Ph	Approximate Net Weight lbs	Approximate Net Weight kgs
2" NPT 3 elements	9¾	248	1	—	—	TSP01707	—	TSP01708	4	2
	13¼	337	1.5	—	—	TSP01709	—	TSP01710	5	2
	17¾	451	2	—	—	TSP01711	—	TSP01712	6	3
	20¼	514	2.5	—	—	TSP01713	—	TSP01714	6	3
	25¼	641	3	—	—	TSP01715	—	TSP01716	7	3
	32¾	832	4	—	—	TSP01717	—	TSP01718	8	4
	40¼	1022	5	—	—	TSP01719	—	TSP01720	9	4
	47¾	1213	6	—	—	TSP01721	—	TSP01722	10	5
2½" NPT 3 elements	9⅜	238	1	—	—	*TSP01723	—	TSP01724	7	3
	12⅞	327	1.5	—	—	*TSP01725	—	*TSP01726	8	4
	17⅜	441	2	—	—	*TSP01727	—	*TSP01728	8	4
	19⅞	505	2.5	—	—	*TSP01729	—	*TSP01730	9	4
	24⅞	632	3	—	—	*TSP01731	—	TSP01732	10	5
	32⅜	822	4	—	—	*TSP01733	—	TSP01734	11	5
	39⅞	1013	5	—	—	*TSP01735	—	*TSP01736	12	5
	47⅜	1203	6	—	—	*TSP01737	—	*TSP01738	13	6

Standard (Non-Stock) and Stock Screw Plug Immersion Heaters

Design Features

- *304 Stainless Steel Screw Plug*
- *NEMA 1 Terminal Housing*
- *Incoloy®800 Sheath Heating Elements*
- *Watt Density of 23 watts/in² (3.6 watts/cm²)*

Typical Heating Application: Forced Air and Gases • Caustic Solutions • Degreasing Solutions

Nominal Pipe Size	Immersed Length in	Immersed Length mm	KW	Part Number 120V	120/240V	240V-3Ph	240/480V	480V-3Ph	Approximate Net Weight lbs	Approximate Net Weight kgs
1¼" NPT 2 elements	13⅜	340	1	—	TSP01739	—	—	—	3	1
	19	483	1.5	—	TSP01740	—	—	—	3	1
	24⅜	619	2	—	TSP01741	—	—	—	4	2
2" NPT 3 elements	17¾	451	3	*TSP01742	—	TSP01743	—	TSP01744	5	2
	25¼	641	4.5	*TSP01745	—	TSP01746	—	TSP01747	6	3
	32¾	832	6	—	—	TSP01748	—	TSP01749	7	3
	40¼	1022	7.5	—	—	TSP01750	—	TSP01751	9	4
	47¾	1213	9	—	—	TSP01752	—	TSP01753	10	5
	64¼	1632	12.5	—	—	TSP01754	—	TSP01755	12	5
	76¾	1950	15	—	—	TSP01756	—	TSP01757	13	6
2½" NPT 3 elements	17⅜	441	3	TSP01758	—	TSP01759	—	*TSP01760	8	4
	24⅞	632	4.5	*TSP01761	—	*TSP01762	—	TSP01763	9	4
	32⅜	822	6	—	—	*TSP01764	—	*TSP01765	11	5
	39⅞	1013	7.5	—	—	TSP01766	—	*TSP01767	12	5
	47⅜	1203	9	—	—	*TSP01768	—	*TSP01769	13	6
	63⅞	1622	12.5	—	—	*TSP01770	—	*TSP01771	16	7
	76⅜	1940	15	—	—	*TSP01772	—	TSP01773	18	8

Note: **120V and Dual-Voltage** heaters are Single-Phase. Dual-Voltage heaters are wired for the higher voltage unless otherwise specified.
Three-Phase convertible to Single-Phase.

Design Features

- *304 Stainless Steel Screw Plug*
- *NEMA 1 Terminal Housing*
- *Incoloy®800 Sheath Heating Elements*
- *Watt Density of 48 watts/in² (7.5 watts/cm²)*

Typical Heating Application: Process Water

Nominal Pipe Size	Immersed Length in	Immersed Length mm	KW	Part Number 120V	120/240V	240V-3Ph	240/480V	480V-3Ph	Approximate Net Weight lbs	Approximate Net Weight kgs
2" NPT 2 elements	9¾	248	2	—	TSP01774	—	TSP01775	—	4	2
	13¼	337	3	—	TSP01776	—	TSP01777	—	4	2
	17¾	451	4	—	TSP01778	—	TSP01779	—	5	2
	20¼	514	5	—	TSP01780	—	TSP01781	—	5	2
	25¼	641	6	—	—	—	TSP01783	—	6	3
	32¾	832	8	—	—	—	TSP01784	—	6	3
	40¼	1022	10	—	—	—	TSP01785	—	7	3
2" NPT 3 elements	9¾	248	3	TSP01786	—	TSP01787	—	TSP01788	5	2
	13¼	337	4.5	TSP01789	—	TSP01790	—	TSP01791	5	2
	17¾	451	6	—	—	TSP01792	—	TSP01793	6	3
	20¼	514	7.5	—	—	TSP01794	—	TSP01795	6	3
	25¼	641	9	—	—	TSP01796	—	TSP01797	7	3
	32¾	832	12	—	—	TSP01798	—	TSP01799	8	4
	40¼	1022	15	—	—	TSP01800	—	TSP01801	9	4
	47¾	1213	18	—	—	TSP01802	—	TSP01803	10	5
2½"NPT 3 elements	9⅜	238	3	*TSP01804	—	*TSP01805	—	*TSP01806	7	3
	12⅞	327	4.5	TSP01807	—	TSP01808	—	TSP01809	8	4
	17⅜	441	6	—	—	TSP01810	—	TSP01811	8	4
	19⅞	505	7.5	—	—	*TSP01812	—	TSP01813	9	4
	24⅞	632	9	—	—	TSP01814	—	*TSP01815	10	5
	32⅜	822	12	—	—	TSP01816	—	TSP01817	11	5
	39⅞	1013	15	—	—	*TSP01818	—	*TSP01819	12	5
	47⅜	1203	18	—	—	TSP01820	—	TSP01821	13	6

Note: **120V and Dual-Voltage** heaters are Single-Phase. Dual-Voltage heaters are wired for the higher voltage unless otherwise specified.
Three-Phase convertible to Single-Phase.

Product Inventory Available for Viewing and Selection @ www.tempco.com

Standard (Non-Stock) and Stock Screw Plug Immersion Heaters

Design Features

- *Brass Screw Plug*
- *NEMA 1 Terminal Housing*
- *Copper Sheath Heating Elements*
- *Watt Density of 60 watts/in² (9.3 watts/cm²)*

Typical Heating Application: Clean Water

Nominal Pipe Size	Immersed Length in	Immersed Length mm	KW	Part Number 120V	Part Number 120/240V	Part Number 240V	Approximate Net Weight lbs	Approximate Net Weight kgs
1" NPT 1 element	4½	114	.5	TSP01840	—	TSP01841	2	1
	6½	165	.75	TSP01842	—	TSP01843	2	1
	6⅝	168	1	TSP01844	—	TSP01845	2	1
	8	203	1.25	TSP01846	—	TSP01847	2	1
	9¼	235	1.5	TSP01848	—	TSP01849	3	1
	12½	318	2	TSP01850	—	TSP01851	3	1
	14¾	375	2.5	TSP01852	—	TSP01853	3	1
	16¾	426	3	TSP01854	—	TSP01855	3	1
	21	533	4	—	—	TSP01856	3	1
1¼" NPT 1 element	4⅜	111	.5	TSP01857	—	TSP01858	3	1
	6⅜	162	.75	TSP01859	—	TSP01860	3	1
1¼" NPT 2 elements	4⅜	111	1	—	TSP01861	—	3	1
	6⅜	162	1.5	—	TSP01862	—	3	1
	8½	216	2	—	TSP01863	—	3	1
	10¾	273	2.5	—	TSP01864	—	4	2
	15	381	3	—	TSP01865	—	4	2
	19	483	4	—	—	TSP01866	4	2
	23½	597	5	—	—	TSP01867	4	2
	27½	699	6	—	—	TSP01868	5	2

Single-Phase

Typical Heating Application: Clean Water

Nominal Pipe Size	Immersed Length in	Immersed Length mm	KW	Part Number 120V	Part Number 120/240V	Part Number 240V-3Ph	Part Number 240/480V	Part Number 480V-3Ph	Approximate Net Weight lbs	Approximate Net Weight kgs
2" NPT 2 elements	8⅛	206	2	—	TSP01869	—	TSP01870	—	4	2
	11⅛	283	3	—	TSP01871	—	TSP01872	—	4	2
	15⅛	384	4	—	TSP01873	—	TSP01874	—	5	2
	18⅛	460	5	—	TSP01875	—	TSP01876	—	5	2
	21⅛	537	6	—	—	—	TSP01877	—	6	3
	26⅝	676	8	—	—	—	TSP01878	—	6	3
	32⅛	816	10	—	—	—	TSP01879	—	6	3
2" NPT 3 elements	8⅛	206	3	TSP01880	—	TSP01881	—	TSP01882①	4	2
	11⅛	283	4.5	TSP01883	—	TSP01884	—	TSP01885	5	2
	15⅛	384	6	—	—	TSP01886	—	TSP01887	5	2
	18⅛	460	7.5	—	—	TSP01888	—	TSP01889	6	3
	21⅛	537	9	—	—	TSP01890	—	TSP01891	6	3
	26⅝	676	12	—	—	TSP01892	—	TSP01893	7	3
	32⅛	816	15	—	—	TSP01894	—	TSP01895	8	4
2½" NPT 3 elements	7⅞	194	3	*TSP01896	—	*TSP01897	—	*TSP01898①	4	2
	8⅞	225	3.75	—	—	TSP01899	—	TSP01900①	5	2
	10⅝	270	4.5	*TSP01901	—	TSP01902	—	TSP01903①	5	2
	14⅝	371	6	—	—	*TSP01904	—	*TSP01905	6	3
	17⅝	448	7.5	—	—	*TSP01906	—	TSP01907	6	3
	20⅝	524	9	—	—	*TSP01908	—	TSP01909	7	3
	26⅛	664	12	—	—	TSP01910	—	TSP01911	8	4
	31⅝	803	15	—	—	*TSP01912	—	TSP01913	9	4
	37⅛	943	18	—	—	TSP01914	—	*TSP01915	10	5

① ***3-Phase Wye only***

An asterisk (*) next to the Part Number guarantees in-stock availability for same-day shipping when ORDERED BY 2 PM CST

Note: **120V and Dual-Voltage** heaters are Single-Phase. Dual-Voltage heaters are wired for the higher voltage unless otherwise specified. **Three-Phase** convertible to Single-Phase unless otherwise noted.

Screw Plug Immersion Heaters

Standard (Non-Stock) and Stock Screw Plug Immersion Heaters

Design Features

- *316 Stainless Steel Screw Plug*
- *NEMA 1 Terminal Housing*
- *316 Stainless Steel Sheath Heating Elements*
- *Watt Density of 60 watts/in² (9.3 watts/cm²)*

Typical Heating Applications: Deionized Water • Demineralized Water

Nominal Pipe Size	Immersed Length in	Immersed Length mm	KW	Part Number 120V	120/240V	240V-3Ph	240/480V	480V-3Ph	Approximate Net Weight lbs	Approximate Net Weight kgs
2½" NPT 3 elements	7⅝	194	3	TSP01822	—	TSP01823	—	TSP01824	7	3
	10⅝	270	4.5	*TSP01825	—	TSP01826	—	TSP01827	7	3
	14⅝	372	6	—	—	TSP01828	—	TSP01829	8	4
	17⅝	448	7.5	—	—	TSP01830	—	TSP01831	8	4
	20⅝	524	9	—	—	TSP01832	—	TSP01833	9	4
	26⅛	664	12	—	—	TSP01834	—	TSP01835	10	5
	31⅝	803	15	—	—	TSP01836	—	TSP01837	11	5
	37⅛	943	18	—	—	TSP01838	—	TSP01839	12	5

Note: **120V and Dual-Voltage** heaters are Single-Phase. Dual-Voltage heaters are wired for the higher voltage unless otherwise specified.
Three-Phase convertible to Single-Phase.

An asterisk (*) next to the Part Number guarantees in-stock availability for same-day shipping when ORDERED BY 2 PM CST

Ordering Information

Catalog Heaters

Screw Plug Immersion Heaters whose Part Numbers are preceded by an asterisk (*) are Guaranteed In Stock for immediate delivery.

Part Numbers with no asterisk (*) are stocked as sub-assemblies for 2-3 week delivery.

Custom Engineered/Manufactured Heaters

Understanding that an electric heater can be very application specific, for sizes and ratings not listed, **TEMPCO** will design and manufacture a Screw Plug Immersion Heater to meet your requirements.
Standard lead time is 4 weeks.

Please Specify the following:

- ❑ Wattage, Voltage and Phase
- ❑ Screw Plug Size and Material
- ❑ Element Sheath Material
- ❑ Element Watt Density
- ❑ Element Immersion Length
- ❑ Electrical Enclosure Type
- ❑ Thermostat— if required
- ❑ Optional Features

Product Inventory Available for Viewing and Selection @ www.tempco.com

Standard (Non Stock) Self-Contained Immersion Heaters

Design Features

This immersion heater is specifically designed for commercial dishwashers and sterilizing equipment. However, due to the unique construction characteristics of these heaters, they are readily adaptable for use in other water heating applications. The heating elements are prewired to a Definite Purpose contactor, thermostat and high limit cutout. The thermowell is located at the top of the element bundle for fast shut-off response, preventing overheating due to low water level conditions.

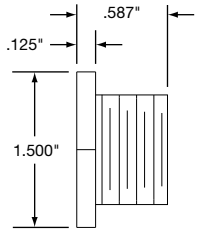
- *2" NPT Brass screw plug*
- *Three Incoloy® 800 tubular elements*
- *Thermostat — 60°F (15°C) to 250°F (120°C) range*
- *Over-temperature cutout with manual reset*
- *Internal Definite Purpose contactor with 120V holding coil*
- *NEMA 4 housing (Moisture resistant)*

Optional Mounting Kit (Part Number KTT00281) — Clamping nut, flat washer and gasket for mounting heater in thin wall tanks with a 2-3/8" (60 mm) diameter opening.

Immersed Length in	Immersed Length mm	KW	Part Number 208-1Ph	208-3Ph	240V-1Ph	240V-3Ph	480V-3Ph	Approximate Net Weight lbs	kgs
13⅛	333	5	TSP01550	TSP01551	TSP01552	TSP01553	TSP01554	3	1
18¾	476	7.5	TSP01555	TSP01556	TSP01557	TSP01558	TSP01559	3	1
23⅞	606	10	TSP01560	TSP01561	TSP01562	TSP01563	TSP01564	4	2
30¼	768	12	—	TSP01566	—	TSP01568	TSP01569	5	2
32½	826	15	—	TSP01570	—	TSP01571	TSP01572	6	3
35¾	908	16	—	TSP01573	—	TSP01574	TSP01575	7	3
45¾	1162	20	—	—	—	TSP01576	TSP01577	9	4

Standard lead time is 2 to 3 weeks.

Standard (Non-Stock) General Purpose Hot Water Tank Heaters

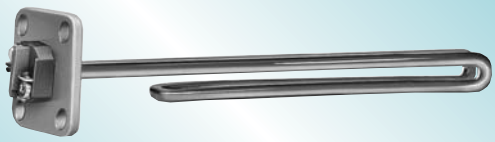


Design Features

- *1"-11½ NPSM Plug*
- *Incoloy® 800 Tubular Element*
- *Gasket*

Immersed Length in	Immersed Length mm	KW	Voltage	Plug Material	Element Configuration	Part Number
9	229	3.0	208	Steel	Foldback	TSP01200
9	229	3.0	230	Steel	Foldback	TSP01198
9	229	3.0	460	Steel	Foldback	TSP01161
10	254	2.0	230	Steel	No Foldback	TSP01259
10	254	2.0	460	Steel	No Foldback	TSP01195
13¼	337	4.0	230	Steel	Foldback	TSP01324
7⅜	187	1.5	240	Brass	Foldback	TSP01286
15⅞	403	4.5	240	Brass	Foldback	TSP01148

Standard lead time is stock to 3 weeks.



For 2-1/2" Square Flange Type Hot Water Tank Heaters see page 11-53.

Flanged Immersion Heaters

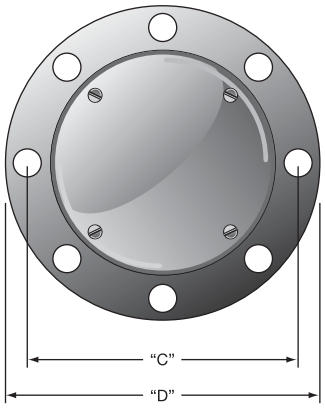
Flanged Immersion Heaters are designed for use in tanks and pressurized vessels to heat both liquids and gases. They mate to a companion flange that is either welded to a tank wall or, for circulating type heaters, to a pipe. See pages 11-28 through 11-47 for TEMPCO circulation heaters, which consist of a flange heater and a pipebody pressure vessel assembly.

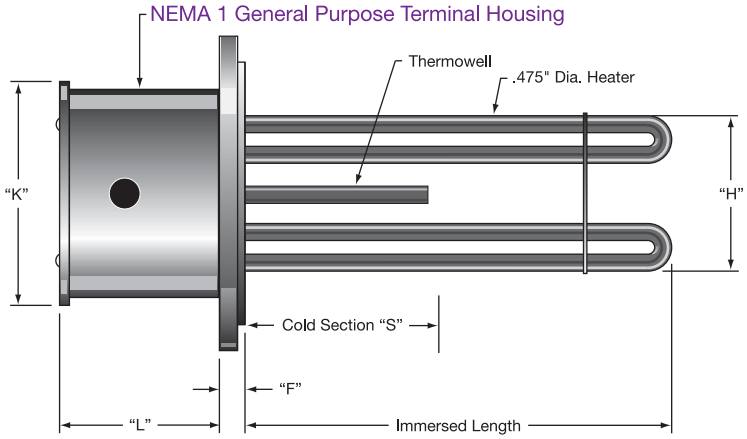
Design Features

The catalog items listed on pages 11-19 through 11-27 have the following features, making them suitable for many applications:

- 150-lb forged steel or 316 stainless steel flanges
- Incoloy® 800, 316 stainless steel, steel or copper elements
- 1/2" OD thermowell for a 3/8" diameter sensing bulb
- NEMA 1 electrical enclosure

The items listed in this catalog are only a small sample of the heaters that can be supplied by TEMPCO. The next few pages will describe both standard and optional materials and features available to meet the requirements of your application.





Type 1N — Standard housing without thermostat

Type 1T — NEMA 1 housing for optional thermostat. Consult Tempco for housing dimensions.

Flanged Immersion Heater Specifications

Flange size	Flange Mounting Hole Size		No.	Flange Thickness "F"		Mounting Bolt Circle "C"		Flange Diameter "D"		Cold Section "S"		Bundle Diameter "H"		NEMA 1 Housing "K"		NEMA 1 Housing "L"		Number of Elements	
in	in	mm		in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	Std.	Max.
3	¾	19	4	15/16	24	6	152	7½	191	4	102	2¾	70	4⅝	117	2⅝	67	3	6
4	¾	19	8	15/16	24	7½	191	9	229	4	102	3⅞	98	6	152	4	102	6	6
5	⅞	22	8	15/16	24	8½	216	10	254	4	102	5	127	7	178	4	102	6	9
6	⅞	22	8	1	25	9½	241	11	279	4	102	6	152	8	203	6	152	12	15
8	⅞	22	8	1⅛	29	11¾	298	13½	343	6	152	7 13/16	198	10	254	6	152	18	24
10	1	25	12	1 3/16	30	14¼	362	16	406	6	152	9¾	248	11⅞	295	6	152	27	36
12	1	25	12	1¼	32	17	432	19	483	6	152	11¾	298	13½	343	6	152	36	54
14	1⅛	29	12	1⅜	35	18¾	476	21	533	6	152	12¾	324	15⅛	384	6	152	45	72

Note: 2" and 2-1/2" flange sizes are available. Consult Tempco for specifications.

Construction

Flanged Immersion Heaters are constructed with tubular heating elements that have a compacted MgO powder insulation to insure excellent dielectric strength and heat transfer properties.

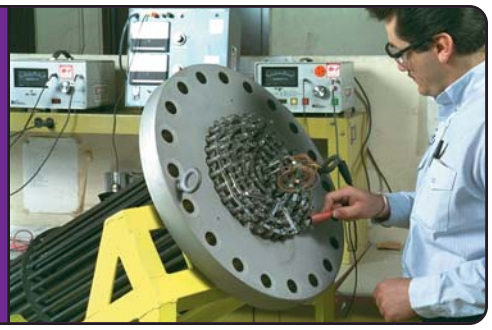
To maintain the integrity of this insulation after the elements are formed, the hairpin bends are spanked in specially designed dies to re-compact the MgO powder. The elements are then TIG welded or Silver Brazed to a pipe flange and pressure tested. Electrical wiring is enclosed in a protective housing.

All heaters must pass the following factory tests prior to shipment:

1. Resistance test — to verify wattage
2. Insulation test — to measure leakage current resistance
3. High voltage test — to "proof-test" the insulation against grounds and short circuits
4. Hydrostatic or air pressure testing — to leakproof test all welding of the elements to the flange

Branch Circuit Wiring

Flanged heater elements are wired into branch circuits having a maximum current of 48 Amps. The number of circuits are listed next to the heater's voltage and phase in the standard sizes and ratings chart. For different circuit wiring configurations consult Tempco.



A technician conducting a quality control electrical test on a 14" 300 lb Stainless Steel flanged heater rated at 110 KW, 480V-3PH.

Product Inventory Available for Viewing and Selection @ www.tempco.com

Flanged Heater Selection and Watt Density Calculation

Selecting the proper Flanged Heater

Tempco Flanged Immersion Heaters will provide long life and dependable trouble-free service provided the sheath materials, watt densities and operating temperatures are properly matched for the medium being heated.

Observe the following guidelines:

1. Match your process to the most suitable heater alloy sheath material. See Section 16 of this catalog for the recommended sheath materials for many common materials.
2. Do not exceed the maximum allowable heater watt density (w/in^2) and recommended operating temperature for the material being heated.
3. Select the proper terminal enclosure to protect the heater wiring and provide safety to personnel and equipment.
4. On large tanks, use several smaller KW rated heaters rather than one large heater for uniform heat and watt density distribution.

Need Customer Assistance? We take pride in our record of working with customers to develop the right heater for the job.
Call Tempco with your requirements.

Watt Density

Element Watt Density is the wattage dissipated per square inch of the element sheath surface and is calculated with the following formula.

$$\text{Watt Density} = \frac{\text{element wattage}}{\pi \times \text{element dia.} \times \text{element heated length}}$$

For a particular application, element watt density will govern element sheath temperature. Factors to consider when choosing a suitable watt density are:

1. Many materials are heat sensitive and can decompose or be damaged if the element is running too hot.
2. Air and other gases that are poor conductors of heat require watt densities matched to the velocity of the gas flow to prevent element overheating.
3. Mineral deposits when heating hard water and cleaning solutions can build up on the element sheath, acting as a heat insulator and raising the internal element temperature. If these deposits cannot be periodically removed, use a lower watt density element to increase heater life expectancy.

Element Sheath Material Selections

Sheath Material Selection

CORROSION. In addition to selecting a sheath material that is compatible with the heated medium, other factors that affect corrosion need to be considered.

1. The temperature of the corrodent. As temperature increases the degree of corrosion increases. Also remember that usually the element temperature is higher than the material it is heating.
2. The degree of aeration to which a corrodent is exposed. Stagnant conditions can deprive the stainless steels of oxygen, which is required to maintain their corrosion resistant surface.
3. Velocity of the corrodent. Increased velocity can increase the corrosion rate.

Note: **See pages** 16-12 through 16-20 for the recommended sheath materials for many immersion heating applications. If you are purchasing the material you are heating, check with the supplier for their recommendations.

Standard Element Sheath Materials

Incoloy® 800 — A Nickel (30-35%), Chromium (19-23%), Iron alloy. The high nickel content of this alloy contributes to its resistance to scaling and corrosion. Used in air heating (also see Incoloy® 840 on page 10-3) and immersion heating of potable water and other liquids that are not corrosive to an Incoloy® 800 sheath.

Low Carbon Steel — Applications include fluid heat transfer media, tar, high to low viscosity petroleum oils, asphalt, wax, molten salt, and other solutions not corrosive to a steel sheath.

316 Stainless Steel — A Chromium (16-18%), Nickel (11-14%), Iron Alloy with Molybdenum (2-3%) added to improve corrosion resistance in certain environments, especially those that would tend to cause pitting due to the presence of chlorides. Applications include deionized water.

Copper — Mainly used in clean water heating for washrooms, showers, rinse tanks and freeze protection of storage tanks.

Optional Element Sheath Materials

304 Stainless Steel — A Chromium (18-20%), Nickel (8-11%), Iron Alloy used in the food industry, sterilizing solutions, air heating and many organic and inorganic chemicals.

321 Stainless Steel — A Chromium (17-20%), Nickel (9-13%), Iron Alloy modified with the addition of titanium to prevent carbide precipitation and the resulting intergranular corrosion that can take place in certain mediums when operating in the 800-1200°F (427-649°C) temperature range.

Incoloy® 840 — A Nickel (18-20%), Chromium (18-22%), Iron alloy. Incoloy 840 has about 10% less nickel than Incoloy 800. Used in many air heating applications where it has exhibited superior oxidation resistance at less cost than Incoloy 800.

Surface Metal Treatments

Flanged Immersion Heater surfaces in contact with the material being heated can be passivated or electro-polished to improve their resistance to corrosion.

Passivation removes surface contamination, usually iron, so that the optimum corrosion resistance of the stainless steel is maintained. Surface contamination would come from the small amount of steel that may be worn off a tool during the manufacturing process. Passivating is accomplished by dipping the heater in a warm solution of nitric acid.

Electro-Polishing is an electrochemical process that removes surface imperfections and contaminants, enhancing the corrosion resisting ability of the stainless steels. The resultant surface is clean, smooth and bright. Many medical and food applications require this finish.

Standard Flanges Specifications

Construction Characteristics

Catalog heaters have Forged Steel or 316 Stainless Steel flanges, depending on application. Flanges are Class 150-lb Pressure-Temperature rated per ASME/ANSI Standard B16.5.

A compressed fiber ring gasket is supplied with each heater.

The following table lists the maximum operating pressure at various temperatures for these flange materials. For higher operating pressures requiring Class 300-lb and higher construction, consult Tempco.

Pressure-Temperature Ratings Class 150-LB

(Pressure in PSIG)

Flange Material	Temperature °F (°C) -20 to 100 (-28.9 to 37.8)	200 (93.3)	300 (148.9)	400 (204.4)	500 (260.0)	600 (315.6)	650 (343.3)	700 (371.1)	750 (398.9)	800 (426.7)	850 (454.4)	900 (482.2)	950 (510.0)	1000 (537.8)
A105 Steel	285	260	230	200	170	140	125	110	95	80	—	—	—	—
316 Stainless	275	240	215	195	170	140	125	110	95	80	65	50	35	20
304 Stainless	275	235	205	180	170	140	125	110	95	80	65	50	35	20

Optional Flanges and Flange Gaskets

Optional flange materials include:

- *304, 304L Stainless Steel*
- *316L Stainless Steel*
- *Incoloy® 800*

Note: **Gaskets of different types,** including spiral wound metal with non-metallic filler are available to properly seal any flanged heater. Gasket material choice depends on operating conditions and fluid compatibility. Consult TEMPCO for help with your selection.

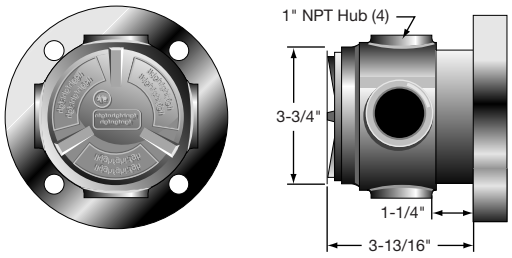
Standard Terminal Housings

Catalog flanged immersion heaters are supplied with the general purpose **Type 1N** (NEMA 1) terminal housing as shown on page 11-14. If an optional thermostat is installed, the housing supplied is the **Type 1T** (NEMA 1). See pages 11-6 and 11-7 for thermostats and accessories.

Additional housing types for use with and without a thermostat include:

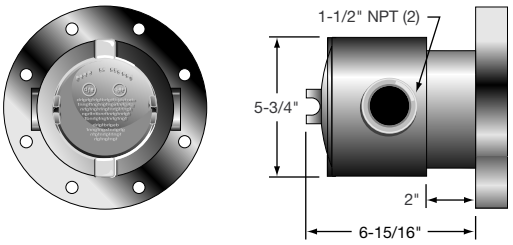
Moisture Resistant (NEMA 4) ***Explosion Resistant*** (NEMA 7) ***Moisture/Explosion Resistant*** (NEMA 4/7).

If the housings on this and the following page do not meet the size, construction or other criteria of your application, consult Tempco with your requirements.



TYPE 2N

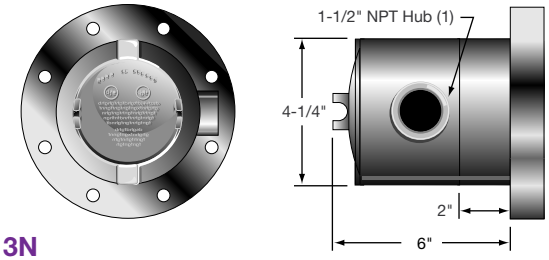
Standard NEMA 4 and/or 7 housing for 3" Flanged Immersion Heaters having no thermostat. NEMA 4 rating requires the use of the cover gasket.



TYPE 2T

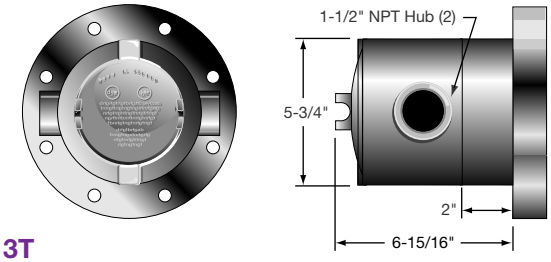
Standard NEMA 4 and/or 7 housing for 3" Flanged Immersion Heaters with a thermostat. NEMA 4 rating requires the use of the cover gasket.

Standard Terminal Housing Specifications



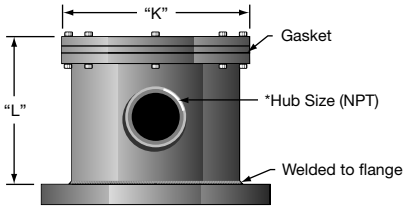
TYPE 3N

Standard NEMA 4 and/or 7 housing for 4" and 5" Flanged Immersion Heaters having no thermostat. NEMA 4 rating requires the use of the cover gasket.



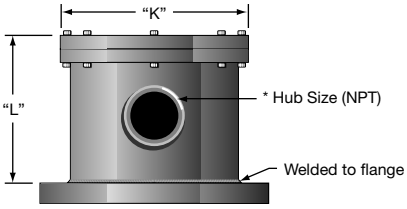
TYPE 3T

Standard NEMA 4 and/or 7 housing for 4" and 5" Flanged Immersion Heaters with a thermostat. NEMA 4 rating requires the use of the cover gasket.



TYPE 4N w/o thermostat; TYPE 4T with thermostat

Standard NEMA 4 housing with and without thermostat for 6" through 14" Flanged Immersion Heaters.



TYPE 5N w/o thermostat; TYPE 5T with thermostat

Standard NEMA 7 housing with and without thermostat for 6" through 14" Flanged Immersion Heaters.

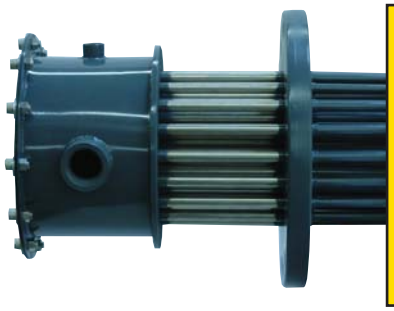
Flange Size	"K" in	"K" mm	without thermostat "L" in	without thermostat "L" mm	with thermostat "L" in	with thermostat "L" mm	Hub Size (NPT)
6	8	203	6	152	6	152	2
8	10	254	6	152	6	152	2
10	13¾	349	6	152	7½	191	2½
12	15⅜	397	6	152	7½	191	2½
14	17¼	438	6	152	7½	191	2½

Flange Size	"K" in	"K" mm	without thermostat "L" in	without thermostat "L" mm	with thermostat "L" in	with thermostat "L" mm	Hub Size (NPT)
6	9⅜	238	6	152	7½	191	2
8	11½	292	6	152	7½	191	2
10	13¾	349	6	152	7½	191	2½
12	15⅜	397	6	152	7½	191	2½
14	17½	445	6	152	7½	191	2½

CAUTION

Explosion resistant terminal housings are intended to provide containment of an explosion in the enclosure only. No portion of the heater assembly outside the enclosure is covered under this NEMA rating. Abnormal use of a heater which results in excessive temperature can create hazardous conditions such as a fire. Never perform any type of service nor remove the housing cover prior to disconnecting all electrical power to the heater.

Optional Flanged Heater Features



Terminal Housing Riser

The electrical housing is separated from the flange by an air gap (six-inch standard) to lower the ambient temperature of the electrical wiring. This option is used on flanged immersion heaters where the flange temperature exceeds 482°F (250°C).

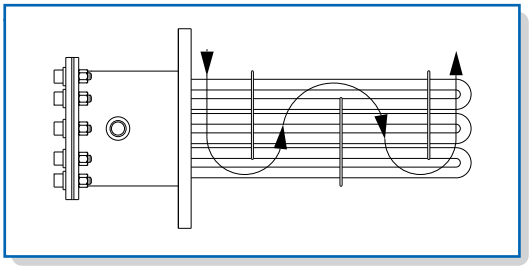
CONTINUED

Optional Flanged Heater Features

Continued from previous page...

Flow Control Baffles

For flange heaters used in circulation tanks, to aid heat transfer by forcing the liquid or gas back and forth across the elements. Baffles can be custom designed and positioned for your application.



Temperature Control

Thermostats

Thermostats are an optional feature for flanged immersion heaters. This type of control operates by expansion and contraction of a liquid in response to temperature change. Liquid contained within the sensing bulb and capillary flexes a diaphragm, causing the opening and closing of a snap action switch. For heating applications the contacts are normally closed, and open on temperature rise.

Thermocouples

Type J or Type K thermocouples can be supplied for process temperature or over-temperature control. Type J is reliable and accurate for temperatures up to 1000°F (537.8°C). Type K should be used for higher temperatures.

For measuring process temperatures, the thermocouple can be mounted in a thermowell in the center of the element bundle. Note that a location somewhere away from the heater may give a more accurate measurement of process temperature.

For over-temperature protection, the thermocouple is usually attached to one of the elements and any unusual rise in element temperature would shut the heater down. This thermocouple may also be mounted in a thermowell, which is then attached to one of the heating elements if desired. This protects the thermocouple from the solution being heated and allows you to replace it without removing the heater, but does increase its response time.

Temperature and over-temperature controls and how to choose the best control for your application can be found in Section 14.

Installation Warnings and Recommendations

CAUTION

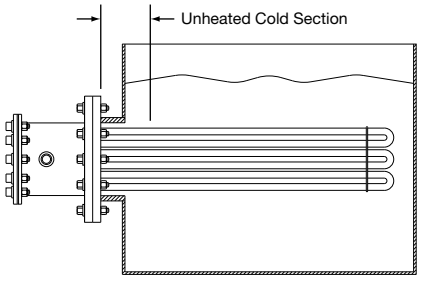
1. ***Do not use the thermostat as a power switch. Use some other means of disconnecting power to the heater for servicing.***
2. ***A thermostat is not a fail-safe device. Use an approved high temperature limit control and/or pressure limit control for safe operation.***
3. ***Avoid kinking or bending the capillary tube too sharply as this will alter the calibration and/or render the thermostat inoperable.***
4. ***Excess capillary tube should be coiled neatly in junction box.***
5. ***The capillary tube must never touch the thermostat contacts as this will create an electrical short capable of harming personnel and/or equipment.***

Flanged Heater Installation and Maintenance

1. Immersion heaters should be positioned to insure they are completely covered with the liquid they are heating. However, do not position the unit too low in structures where sludge buildup could cover it. Either of these conditions could cause overheating and subsequent premature failure of the elements.
2. Heated section should start sufficiently inside tank to assure good heat transfer.
3. Install adequate controls and safety devices to prevent buildup of temperature and/or pressure.
4. Make sure gasket surface is clean and dry before seating the heater.
5. Do not operate heater at a voltage in excess of that stamped on the heater. A heater can be run at a reduced voltage, remembering that this will decrease the heater's output wattage.
6. A wiring diagram is supplied in the electrical enclosure and as required, circuits on the heater are labeled.
7. All heater terminal connections should be wrench or screwdriver tight with maximum torque consistent with terminal strength. To prevent twisting heater terminals when tightening connections, use backup wrench for countertorque. Periodically check that electrical connections are clean and tight.
8. The electrical insulating material used in electric heaters is hygroscopic and may absorb moisture when subjected to a humid environment during shipping, while in storage or during long equipment shutdowns. This moisture may lower the insulation resistance enough to cause heater failure.

   A meg-ohmmeter should be used to check the insulation resistance before applying power to any questionable heater.

   If a moisture condition exists it can be corrected by baking the heater in an oven at approximately 350°F (176.7°C) until the moisture is expelled and the meg-ohms have risen to an acceptable level.
9. For heaters supplied with an integral thermostat, this thermostat functions as a temperature control only and is not a fail-safe device.



Standard (Non-Stock) Flanged Immersion Heaters

Design Features

- *150-lb Raised Face Forged Carbon Steel Flange*
- *NEMA 1 Terminal Housing*
- *Compressed Fiber Ring Gasket*
- *Steel Sheath Heating Elements*
- *Watt Density of 8 watts/in² (1.3 watts/cm²)*
- *Three-Phase Only*

Typical Heating Applications: Fuel Oils (Bunker C and Number 6)

ANSI Flange Size	Immersed Length in	Immersed Length mm	KW	Part Number 240V-1Ph	(C*)	240V-3Ph	(C*)	480V-1Ph	(C*)	480V-3Ph	(C*)	Approximate Net Weight lbs	Approximate Net Weight kgs
3"—150lb 3 elements	33	838	2	—		TFP02001	(1)	—		TFP02002	(1)	18	8
	48	1219	3	—		TFP02003	(1)	—		TFP02004	(1)	21	10
	64½	1638	4	—		TFP02005	(1)	—		TFP02006	(1)	24	11
	77	1956	5	—		TFP02007	(1)	—		TFP02008	(1)	26	12
4"—150lb 6 elements	40½	1029	5	—		TFP02009	(1)	—		TFP02010	(1)	35	16
	48	1219	6	—		TFP02011	(1)	—		TFP02012	(1)	38	17
	64½	1638	8	—		TFP02013	(1)	—		TFP02014	(1)	44	20
	77	1956	10	—		TFP02015	(1)	—		TFP02016	(1)	48	22
5"—150lb 6 elements	40½	1029	5	—		TFP02017	(1)	—		TFP02018	(1)	39	18
	48	1219	6	—		TFP02019	(1)	—		TFP02020	(1)	42	19
	64½	1638	8	—		TFP02021	(1)	—		TFP02022	(1)	48	22
	77	1956	10	—		TFP02023	(1)	—		TFP02024	(1)	52	24
5"—150lb 9 elements	40½	1029	7.5	—		TFP02025	(1)	—		TFP02026	(1)	46	21
	48	1219	9	—		TFP02027	(1)	—		TFP02028	(1)	50	23
	64½	1638	12	—		TFP02029	(1)	—		TFP02030	(1)	59	27
	77	1956	15	—		TFP02031	(1)	—		TFP02032	(1)	65	29
6"—150lb 12 elements	32⅞	835	8	—		TFP02033	(1)	—		TFP02034	(1)	56	25
	40⅜	1026	10	—		TFP02035	(1)	—		TFP02036	(1)	61	28
	47⅞	1216	12	—		TFP02037	(1)	—		TFP02038	(1)	66	30
	64⅜	1635	16.5	—		TFP02039	(1)	—		TFP02040	(1)	78	35
	76⅞	1953	20	—		TFP02041	(1)	—		TFP02042	(1)	86	39
6"—150lb 15 elements	32⅞	835	10	—		TFP02043	(1)	—		TFP02044	(1)	62	28
	40⅜	1026	12.5	—		TFP02045	(1)	—		TFP02046	(1)	68	31
	47⅞	1216	15	—		TFP02047	(1)	—		TFP02048	(1)	75	34
	64⅜	1635	21	—		TFP02049	(5)	—		TFP02050	(1)	89	40
	76⅞	1953	25	—		TFP02051	(5)	—		TFP02052	(1)	99	45
8"—150lb 18 elements	43¼	1099	12.5	—		TFP02053	(1)	—		TFP02054	(1)	99	45
	51¼	1302	16.5	—		TFP02055	(1)	—		TFP02056	(1)	107	49
	61¾	1569	20	—		TFP02057	(1)	—		TFP02058	(1)	117	53
	70¼	1784	24	—		TFP02059	(2)	—		TFP02060	(1)	126	57
	79¼	2013	27	—		TFP02061	(2)	—		TFP02062	(1)	136	62
8"—150lb 24 elements	43¼	1099	17	—		TFP02063	(1)	—		TFP02064	(1)	114	52
	51¼	1302	22	—		TFP02065	(2)	—		TFP02066	(1)	125	57
	61¾	1569	27	—		TFP02067	(2)	—		TFP02068	(1)	139	63
	70¼	1784	32	—		TFP02069	(2)	—		TFP02070	(1)	151	68
	79¼	2013	36	—		TFP02071	(2)	—		TFP02072	(1)	162	73
10"—150lb 27 elements	51¾	1314	25	—		TFP02073	(3)	—		TFP02074	(1)	155	70
	62¼	1581	30	—		TFP02075	(3)	—		TFP02076	(1)	171	78
	70¾	1797	35	—		TFP02077	(3)	—		TFP02078	(1)	184	83
	78¾	2000	40	—		TFP02079	(3)	—		TFP02080	(1)	196	89
12"—150lb 36 elements	51⅝	1311	34	—		TFP02081	(2)	—		TFP02082	(1)	216	98
	62⅛	1578	40	—		TFP02083	(2)	—		TFP02084	(1)	239	108
	70⅝	1794	47	—		TFP02085	(3)	—		TFP02086	(2)	267	121
	78⅝	1997	54	—		TFP02087	(3)	—		TFP02088	(2)	273	124
14"—150lb 45 elements	51½	1308	42	—		TFP02089	(3)	—		TFP02090	(3)	282	128
	62	1575	50	—		TFP02091	(3)	—		TFP02092	(3)	309	140
	70½	1791	60	—		TFP02093	(3)	—		TFP02094	(3)	330	150
	78½	1994	67	—		TFP02095	(5)	—		TFP02096	(3)	351	159

(C*) = Number of Branch Circuits per heater

Ordering Information
See page 11-27

Standard (Non-Stock) and Stock Flanged Immersion Heaters

Design Features

- *150-lb Raised Face Forged Carbon Steel Flange*
- *NEMA 1 Terminal Housing*
- *Compressed Fiber Ring Gasket*
- *Steel Sheath Heating Elements*
- *Watt Density of 15 watts/in² (2.3 watts/cm²)*

Typical Heating Applications: Fuel Oils (Number 4 and 5)

ANSI Flange Size	Immersed Length in	Immersed Length mm	KW	Part Number 240V-1Ph	(C*)	240V-3Ph	(C*)	480V-1Ph	(C*)	480V-3Ph	(C*)	Approximate Net Weight lbs	Approximate Net Weight kgs
3"—150lb 3 elements	25 3/16	640	3	TFP02097	(1)	TFP02098	(1)	TFP02099	(1)	TFP02100	(1)	17	8
	33 1/16	840	4	TFP02101	(1)	TFP02102	(1)	TFP02103	(1)	TFP02104	(1)	18	8
	48 1/16	1221	6	TFP02105	(1)	TFP02106	(1)	TFP02107	(1)	TFP02108	(1)	21	10
5"—150lb 6 elements	33 1/16	840	8	—		TFP02109	(1)	—		TFP02110	(1)	37	17
	40 5/16	1030	10	—		TFP02111	(1)	—		TFP02112	(1)	39	18
	48 1/16	1221	12	—		TFP02113	(1)	—		TFP02114	(1)	42	19
	57 1/16	1449	15	—		TFP02115	(1)	—		TFP02116	(1)	45	20
	68 1/16	1729	18	—		TFP02117	(1)	—		TFP02118	(1)	49	22
8"—150lb 18 elements	32 7/8	835	20	—		TFP02119	(1)	—		TFP02120	(1)	89	40
	43 11/16	1110	25	—		TFP02121	(2)	—		TFP02122	(1)	100	45
	51 7/8	1318	30	—		TFP02123	(2)	—		TFP02124	(1)	108	49
	61 3/8	1559	35	—		TFP02125	(2)	—		TFP02126	(1)	118	54
	69 7/8	1775	40	—		TFP02127	(2)	—		TFP02128	(1)	125	57
	78 7/8	2003	45	—		TFP02129	(3)	—		TFP02130	(2)	135	61

(C*) = Number of Branch Circuits per heater

Design Features

- *150-lb Raised Face Forged Carbon Steel Flange*
- *NEMA 1 Terminal Housing*
- *Compressed Fiber Ring Gasket*
- *Steel Sheath Heating Elements*
- *Watt Density of 23 watts/in² (3.6 watts/cm²)*

Typical Heating Applications: Lightweight Oils • Heat Transfer Oils • Degreasing Solutions

ANSI Flange Size	Immersed Length in	Immersed Length mm	KW	Part Number 240V-1Ph	(C*)	240V-3Ph	(C*)	480V-1Ph	(C*)	480V-3Ph	(C*)	Approximate Net Weight lbs	Approximate Net Weight kgs
3"—150lb 3 elements	18	457	3	TFP02131	(1)	TFP02132	(1)	TFP02133	(1)	TFP02134	(1)	16	7
	25½	648	4.5	TFP02135	(1)	TFP02136	(1)	TFP02137	(1)	TFP02138	(1)	17	8
	33	838	6	TFP02139	(1)	TFP02140	(1)	TFP02141	(1)	TFP02142	(1)	18	8
	40½	1029	7.5	TFP02143	(1)	TFP02144	(1)	TFP02145	(1)	TFP02146	(1)	19	9
	48	1219	9	TFP02147	(1)	TFP02148	(1)	TFP02149	(1)	TFP02150	(1)	21	10
	64½	1638	12.5	—		TFP02151	(1)	TFP02152	(1)	TFP02153	(1)	24	11
	77	1956	15	—		TFP02154	(1)	TFP02155	(1)	TFP02156	(1)	26	12
4"—150lb 6 elements	18	457	6	TFP02157	(1)	TFP02158	(1)	TFP02159	(1)	TFP02160	(1)	28	13
	25½	648	9	TFP02161	(1)	TFP02162	(1)	TFP02163	(1)	TFP02164	(1)	30	14
	33	838	12	TFP02165	(2)	TFP02166	(1)	TFP02167	(1)	TFP02168	(1)	33	15
	40½	1029	15	TFP02169	(2)	TFP02170	(1)	TFP02171	(1)	TFP02172	(1)	35	16
	48	1219	18	TFP02173	(2)	TFP02174	(1)	TFP02175	(1)	TFP02176	(1)	38	17
	64½	1638	25	—		TFP02177	(2)	TFP02178	(2)	TFP02179	(1)	44	20
	77	1956	30	—		TFP02180	(2)	TFP02181	(2)	TFP02182	(1)	48	22
5"—150lb 6 elements	18	457	6	TFP02183	(1)	TFP02184	(1)	TFP02185	(1)	TFP02186	(1)	32	15
	25½	648	9	TFP02187	(1)	TFP02188	(1)	TFP02189	(1)	TFP02190	(1)	34	15
	33	838	12	TFP02191	(2)	TFP02192	(1)	TFP02193	(1)	TFP02194	(1)	37	17
	40½	1029	15	TFP02195	(2)	TFP02196	(1)	TFP02197	(1)	TFP02198	(1)	39	18
	48	1219	18	TFP02199	(2)	TFP02200	(1)	TFP02201	(1)	TFP02202	(1)	42	19
	52 1/16	1322	20	TFP02203	(2)	TFP02204	(1)	TFP02205	(1)	TFP02206	(1)	43	20
	64½	1638	25	—		TFP02207	(2)	TFP02208	(2)	TFP02209	(1)	48	22
	77	1956	30	—		TFP02210	(2)	TFP02211	(2)	TFP02212	(1)	52	24

(C*) = Number of Branch Circuits per heater

CONTINUED

Standard (Non-Stock) Flanged Immersion Heaters

Typical Heating Applications: Lightweight Oils • Heat Transfer Oils • Degreasing Solutions

ANSI Flange Size	Immersed Length in	Immersed Length mm	KW	Part Number 240V-1Ph	(C*)	240V-3Ph	(C*)	480V-1Ph	(C*)	480V-3Ph	(C*)	Approximate Net Weight lbs	kgs
5"—150lb 9 elements	18	457	9	TFP02213	(1)	TFP02214	(1)	TFP02215	(1)	TFP02216	(1)	35	16
	25½	648	14	TFP02217	(3)	TFP02218	(1)	TFP02219	(1)	TFP02220	(1)	39	18
	33	838	18	TFP02221	(3)	TFP02222	(1)	TFP02223	(1)	TFP02224	(1)	43	20
	40½	1029	23	TFP02225	(3)	TFP02226	(3)	TFP02227	(1)	TFP02228	(1)	46	21
	48	1219	27	TFP02229	(3)	TFP02230	(3)	TFP02231	(3)	TFP02232	(1)	50	23
	64½	1638	38	—		TFP02233	(3)	TFP02234	(3)	TFP02235	(1)	59	27
	77	1956	45	—		TFP02236	(3)	TFP02237	(3)	TFP02238	(3)	65	30
6"—150lb 12 elements	17⅞	454	12	TFP02239	(1)	TFP02240	(1)	TFP02241	(1)	TFP02242	(1)	46	21
	25⅜	645	18	TFP02243	(2)	TFP02244	(1)	TFP02245	(1)	TFP02246	(1)	51	23
	32⅞	835	24	TFP02247	(2)	TFP02248	(2)	TFP02249	(1)	TFP02250	(1)	56	25
	40⅜	1026	30	TFP02251	(2)	TFP02252	(2)	TFP02253	(2)	TFP02254	(1)	61	28
	47⅞	1216	36	TFP02255	(3)	TFP02256	(2)	TFP02257	(2)	TFP02258	(1)	66	30
	64⅜	1635	50	—		TFP02259	(4)	TFP02260	(4)	TFP02261	(2)	78	35
	76⅞	1953	60	—		TFP02262	(4)	TFP02263	(4)	TFP02264	(2)	86	39
6"—150lb 15 elements	17⅞	454	15	TFP02265	(3)	TFP02266	(1)	TFP02267	(1)	TFP02268	(1)	49	22
	25⅜	645	23	TFP02269	(3)	TFP02270	(5)	TFP02271	(1)	TFP02272	(1)	55	25
	32⅞	835	30	TFP02273	(3)	TFP02274	(5)	TFP02275	(3)	TFP02276	(1)	62	28
	40⅜	1026	38	TFP02277	(5)	TFP02278	(5)	TFP02279	(3)	TFP02280	(1)	68	31
	47⅞	1216	45	TFP02281	(5)	TFP02282	(5)	TFP02283	(3)	TFP02284	(5)	75	34
	64⅜	1635	63	—		TFP02285	(5)	TFP02286	(3)	TFP02287	(5)	89	40
	76⅞	1953	75	—		TFP02288	(5)	TFP02289	(5)	TFP02290	(5)	99	45
8"—150lb 18 elements	32¾	832	30	TFP02291	(3)	TFP02292	(2)	TFP02293	(2)	TFP02294	(1)	88	40
	43¼	1099	40	—		TFP02295	(2)	TFP02296	(2)	TFP02297	(1)	99	45
	51¼	1302	50	—		TFP02298	(3)	TFP02299	(3)	TFP02300	(2)	107	49
	61¾	1568	60	—		TFP02301	(3)	TFP02302	(3)	TFP02303	(2)	117	53
	70¼	1784	70	—		TFP02304	(6)	TFP02305	(3)	TFP02306	(2)	126	57
	79¼	2013	80	—		TFP02307	(6)	—		TFP02308	(2)	136	62
8"—150lb 24 elements	32¾	832	40	TFP02309	(4)	TFP02310	(2)	TFP02311	(2)	TFP02312	(1)	100	45
	43¼	1099	53	—		TFP02313	(4)	TFP02314	(3)	TFP02315	(2)	114	52
	51¼	1302	67	—		TFP02316	(4)	TFP02317	(3)	TFP02318	(2)	125	57
	61¾	1568	80	—		TFP02319	(4)	TFP02320	(4)	TFP02321	(2)	139	63
	70¼	1784	93	—		TFP02322	(8)	TFP02323	(6)	TFP02324	(4)	151	68
	79¼	2013	107	—		TFP02325	(8)	—		TFP02326	(4)	162	73
10"—150lb 27 elements	33¼	845	45	—		TFP02327	(3)	—		TFP02328	(3)	127	58
	43¾	1111	60	—		TFP02329	(3)	—		TFP02330	(3)	143	65
	51¾	1314	75	—		TFP02331	(9)	—		TFP02332	(3)	155	70
	62¼	1581	90	—		—		—		TFP02333	(3)	171	78
	70¾	1797	105	—		—		—		TFP02334	(3)	184	83
	78¾	2000	120	—		—		—		TFP02335	(3)	196	89
12"—150lb 36 elements	33⅛	841	60	—		—		—		TFP02336	(3)	180	82
	43⅝	1108	80	—		—		—		TFP02337	(3)	201	91
	51⅝	1311	100	—		—		—		TFP02338	(3)	216	98
	62⅛	1578	120	—		—		—		TFP02339	(3)	239	108
	70⅝	1794	140	—		—		—		TFP02340	(4)	267	121
	78⅝	1997	160	—		—		—		TFP02341	(4)	273	124
14"—150lb 45 elements	33	838	75	—		—		—		TFP02342	(3)	235	107
	43½	1105	100	—		—		—		TFP02343	(3)	262	119
	51½	1308	125	—		—		—		TFP02344	(5)	282	128
	62	1575	150	—		—		—		TFP02345	(5)	309	140
	70½	1791	175	—		—		—		TFP02346	(5)	330	150
	78½	1994	200	—		—		—		TFP02347	(5)	351	159

(C) = Number of Branch Circuits per heater*

Standard (Non-Stock) Flanged Immersion Heaters

Design Features

- *150-lb Raised Face Forged Carbon Steel Flange*
- *NEMA 1 Terminal Housing*
- *Compressed Fiber Ring Gasket*
- *Incoloy® 800 sheath heating elements*
- *Watt Density of 16 watts/in² (2.5 watts/cm²)*
- *Three-Phase Only*

Typical Heating Applications: Heat Transfer Oils • Liquid Paraffin

ANSI Flange Size	Immersed Length in	Immersed Length mm	KW	Part Number 240V-1Ph	(C*)	240V-3Ph	(C*)	480V-1Ph	(C*)	480V-3Ph	(C*)	Approximate Net Weight lbs	Approximate Net Weight kgs
3"—150lb 3 elements	13½	343	1.5	—		TFP02348	(1)	—		TFP02349	(1)	15	7
	18	457	2	—		TFP02350	(1)	—		TFP02351	(1)	16	7
	20½	521	2.5	—		TFP02352	(1)	—		TFP02353	(1)	16	7
	25½	648	3	—		TFP02354	(1)	—		TFP02355	(1)	17	8
	33	838	4	—		TFP02356	(1)	—		TFP02357	(1)	18	8
	40½	1029	5	—		TFP02358	(1)	—		TFP02359	(1)	19	9
	48	1219	6	—		TFP02360	(1)	—		TFP02361	(1)	21	10
4"—150lb 6 elements	13½	343	3	—		TFP02362	(1)	—		TFP02363	(1)	26	12
	18	457	4	—		TFP02364	(1)	—		TFP02365	(1)	28	13
	20½	521	5	—		TFP02366	(1)	—		TFP02367	(1)	29	13
	25½	648	6	—		TFP02368	(1)	—		TFP02369	(1)	30	14
	33	838	8	—		TFP02370	(1)	—		TFP02371	(1)	33	15
	40½	1029	10	—		TFP02372	(1)	—		TFP02373	(1)	35	16
	48	1219	12	—		TFP02374	(1)	—		TFP02375	(1)	38	17
5"—150lb 6 elements	13½	343	3	—		TFP02376	(1)	—		TFP02377	(1)	30	14
	18	457	4	—		TFP02378	(1)	—		TFP02379	(1)	32	15
	20½	521	5	—		TFP02380	(1)	—		TFP02381	(1)	33	15
	25½	648	6	—		TFP02382	(1)	—		TFP02383	(1)	34	15
	33	838	8	—		TFP02384	(1)	—		TFP02385	(1)	37	17
	40½	1029	10	—		TFP02386	(1)	—		TFP02387	(1)	39	18
	48	1219	12	—		TFP02388	(1)	—		TFP02389	(1)	42	19
5"—150lb 9 elements	13½	343	4.5	—		TFP02390	(1)	—		TFP02391	(1)	33	15
	18	457	6	—		TFP02392	(1)	—		TFP02393	(1)	35	16
	20½	521	7.5	—		TFP02394	(1)	—		TFP02395	(1)	36	16
	25½	648	9	—		TFP02396	(1)	—		TFP02397	(1)	39	18
	33	838	12	—		TFP02398	(1)	—		TFP02399	(1)	43	20
	40½	1029	15	—		TFP02400	(1)	—		TFP02401	(1)	46	21
	48	1219	18	—		TFP02402	(1)	—		TFP02403	(1)	50	23
6"—150lb 12 elements	13⅜	340	6	—		TFP02404	(1)	—		TFP02405	(1)	43	20
	17⅞	454	8	—		TFP02406	(1)	—		TFP02407	(1)	46	21
	20⅜	518	10	—		TFP02408	(1)	—		TFP02409	(1)	48	22
	25⅜	645	12	—		TFP02410	(1)	—		TFP02411	(1)	51	23
	32⅞	835	16	—		TFP02412	(1)	—		TFP02413	(1)	56	25
	40⅜	1026	20	—		TFP02414	(1)	—		TFP02415	(1)	61	28
	47⅞	1216	24	—		TFP02416	(2)	—		TFP02417	(1)	66	30
6"—150lb 15 elements	13⅜	340	7.5	—		TFP02418	(1)	—		TFP02419	(1)	45	20
	17⅞	454	10	—		TFP02420	(1)	—		TFP02421	(1)	49	22
	20⅜	518	12.5	—		TFP02422	(1)	—		TFP02423	(1)	51	23
	25⅜	645	15	—		TFP02424	(1)	—		TFP02425	(1)	55	25
	32⅞	835	20	—		TFP02426	(1)	—		TFP02427	(1)	62	28
	40⅜	1026	25	—		TFP02428	(5)	—		TFP02429	(1)	68	31
	47⅞	1216	30	—		TFP02430	(5)	—		TFP02431	(1)	75	34
8"—150lb 18 elements	25¾	654	17	—		TFP02432	(1)	—		TFP02433	(1)	81	37
	35¾	908	25	—		TFP02434	(2)	—		TFP02435	(1)	91	41
	44¼	1124	33	—		TFP02436	(2)	—		TFP02437	(1)	100	45
	54¼	1378	42	—		TFP02438	(3)	—		TFP02439	(2)	110	50
	63¼	1607	50	—		—		—		TFP02440	(2)	119	54
	72¾	1848	58	—		—		—		TFP02441	(2)	129	59
	82¼	2089	67	—		—		—		TFP02442	(2)	139	63
8"—150lb 24 elements	25¾	654	23	—		TFP02443	(2)	—		TFP02444	(1)	90	41
	35¾	908	33	—		TFP02445	(2)	—		TFP02446	(1)	104	47
	44¼	1124	44	—		TFP02447	(4)	—		TFP02448	(2)	115	52
	54¼	1378	56	—		TFP02449	(4)	—		TFP02450	(2)	129	59
	63¼	1607	67	—		—		—		TFP02451	(2)	141	64
	72¾	1848	77	—		—		—		TFP02452	(2)	154	70
	82¼	2089	89	—		—		—		TFP02453	(4)	167	76

(C*) = Number of Branch Circuits per heater

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Standard (Non-Stock) and Stock Flanged Immersion Heaters

Continued from previous page...

Typical Heating Applications: Heat Transfer Oils • Liquid Paraffin

ANSI Flange Size	Immersed Length in	Immersed Length mm	KW	Part Number 240V-1Ph	(C*)	240V-3Ph	(C*)	480V-1Ph	(C*)	480V-3Ph	(C*)	Approximate Net Weight lbs	Approximate Net Weight kgs
10"—150lb 27 elements	54¾	1391	63	—		—		—		TFP02454	(3)	160	73
	63¾	1619	75	—		—		—		TFP02455	(3)	173	78
	73¼	1861	87	—		—		—		TFP02456	(3)	188	85
12"—150lb 36 elements	54⅝	1387	83	—		—		—		TFP02457	(3)	224	102
	63¾	1619	100	—		—		—		TFP02458	(3)	242	110
	73⅛	1857	117	—		—		—		TFP02459	(3)	262	119
14"—150lb 45 elements	54½	1384	105	—		—		—		TFP02460	(3)	290	132
	63½	1613	125	—		—		—		TFP02461	(5)	313	142

(C*) = Number of Branch Circuits per heater

Design Features

- *150-lb Raised Face Forged Carbon Steel Flange*
- *NEMA 1 Terminal Housing*
- *Compressed Fiber Ring Gasket*
- *Incoloy® 800 Sheath Heating Elements*
- *Watt Density of 23 watts/in² (3.6 watts/cm²)*

Typical Heating Applications: Forced Air • Caustic Solutions • Degreasing Solutions

ANSI Flange Size	Immersed Length in	Immersed Length mm	KW	Part Number 240V-1Ph	(C*)	240V-3Ph	(C*)	480V-1Ph	(C*)	480V-3Ph	(C*)	Approximate Net Weight lbs	Approximate Net Weight kgs
3"—150lb 3 elements	18	457	3	TFP02462	(1)	TFP02463	(1)	TFP02464	(1)	TFP02465	(1)	16	7
	25½	648	4.5	TFP02466	(1)	TFP02467	(1)	TFP02468	(1)	TFP02469	(1)	17	8
	33	838	6	TFP02470	(1)	TFP02471	(1)	TFP02472	(1)	TFP02473	(1)	18	8
	40½	1029	7.5	TFP02474	(1)	TFP02475	(1)	TFP02476	(1)	TFP02477	(1)	19	9
	48	1219	9	TFP02478	(1)	TFP02479	(1)	TFP02480	(1)	TFP02481	(1)	21	10
	64½	1638	12.5	—		TFP02482	(1)	TFP02483	(1)	TFP02484	(1)	24	11
	77	1956	15	—		TFP02485	(1)	TFP02486	(1)	TFP02487	(1)	26	12
4"—150lb 6 elements	18	457	6	TFP02488	(1)	TFP02489	(1)	TFP02490	(1)	TFP02491	(1)	28	13
	25½	648	9	TFP02492	(1)	TFP02493	(1)	TFP02494	(1)	TFP02495	(1)	30	14
	33	838	12	TFP02496	(2)	TFP02497	(1)	TFP02498	(1)	TFP02499	(1)	33	15
	40½	1029	15	TFP02500	(2)	TFP02501	(1)	TFP02502	(1)	TFP02503	(1)	35	16
	48	1219	18	TFP02504	(2)	TFP02505	(1)	TFP02506	(1)	TFP02507	(1)	38	17
	64½	1638	25	—		TFP02508	(2)	TFP02509	(2)	TFP02510	(1)	44	20
	77	1956	30	—		TFP02511	(2)	TFP02512	(2)	TFP02513	(1)	48	22
5"—150lb 6 elements	18	457	6	TFP02514	(1)	TFP02515	(1)	TFP02516	(1)	TFP02517	(1)	32	15
	25½	648	9	TFP02518	(1)	TFP02519	(1)	TFP02520	(1)	TFP02521	(1)	34	15
	33	838	12	TFP02522	(2)	TFP02523	(1)	TFP02524	(1)	TFP02525	(1)	37	17
	40½	1029	15	TFP02526	(2)	TFP02527	(1)	TFP02528	(1)	✻TFP02529	(1)	39	18
	48	1219	18	TFP02530	(2)	TFP02531	(1)	TFP02532	(1)	TFP02533	(1)	42	19
	64½	1638	25	—		TFP02534	(2)	TFP02535	(2)	TFP02536	(1)	48	22
	77	1956	30	—		TFP02537	(2)	TFP02538	(2)	TFP02539	(1)	52	24
5"—150lb 9 elements	18	457	9	TFP02540	(1)	TFP02541	(1)	TFP02542	(1)	TFP02543	(1)	35	16
	25½	648	14	TFP02544	(3)	TFP02545	(1)	TFP02546	(1)	TFP02547	(1)	39	18
	33	838	18	TFP02548	(3)	TFP02549	(1)	TFP02550	(1)	TFP02551	(1)	43	20
	40½	1029	23	TFP02552	(3)	TFP02553	(3)	TFP02554	(1)	TFP02555	(1)	46	21
	48	1219	27	TFP02556	(3)	TFP02557	(3)	TFP02558	(3)	TFP02559	(1)	50	23
	64½	1638	38	—		TFP02560	(3)	TFP02561	(3)	TFP02562	(1)	59	27
	77	1956	45	—		TFP02563	(3)	TFP02564	(3)	TFP02565	(3)	65	30

(C*) = Number of Branch Circuits per heater

An asterisk (✻) next to the Part Number guarantees in-stock availability for same-day shipping when ORDERED BY 2 PM CST

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Standard (Non-Stock) and Stock Flanged Immersion Heaters

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Typical Heating Applications: Forced Air • Caustic Solutions • Degreasing Solutions

ANSI Flange Size	Immersed Length in	Immersed Length mm	KW	Part Number 240V-1Ph	(C*)	240V-3Ph	(C*)	480V-1Ph	(C*)	480V-3Ph	(C*)	Approximate Net Weight lbs	Approximate Net Weight kgs
6"—150lb 12 elements	17⅞	454	12	TFP02566	(2)	TFP02567	(1)	TFP02568	(1)	TFP02569	(1)	46	21
	25⅜	645	18	TFP02570	(2)	TFP02571	(1)	TFP02572	(1)	TFP02573	(1)	51	23
	32⅞	835	24	TFP02574	(2)	TFP02575	(2)	TFP02576	(2)	TFP02577	(1)	56	25
	40⅜	1026	30	TFP02578	(3)	TFP02579	(2)	TFP02580	(2)	TFP02581	(1)	61	28
	47⅞	1216	36	TFP02582	(3)	TFP02583	(2)	TFP02584	(2)	TFP02585	(1)	66	30
	64⅜	1635	50	—		TFP02586	(4)	TFP02587	(3)	TFP02588	(2)	78	35
	76⅞	1953	60	—		TFP02589	(4)	TFP02590	(3)	TFP02591	(2)	86	39
6"—150lb 15 elements	17⅞	454	15	TFP02592	(3)	TFP02593	(1)	TFP02594	(1)	TFP02595	(1)	49	22
	25⅜	645	23	TFP02596	(3)	TFP02597	(5)	TFP02598	(1)	TFP02599	(1)	55	25
	32⅞	835	30	TFP02600	(3)	TFP02601	(5)	TFP02602	(3)	TFP02603	(1)	62	28
	40⅜	1026	38	TFP02604	(5)	TFP02605	(5)	TFP02606	(3)	TFP02607	(1)	68	31
	47⅞	1216	45	TFP02608	(5)	TFP02609	(5)	TFP02610	(3)	TFP02611	(5)	75	34
	64⅜	1635	63	—		TFP02612	(5)	TFP02613	(3)	TFP02614	(5)	89	40
	76⅞	1953	75	—		TFP02615	(5)	TFP02616	(5)	TFP02617	(5)	99	45
8"—150lb 18 elements	32¾	832	30	TFP02618	(3)	TFP02619	(2)	TFP02620	(2)	TFP02621	(1)	88	40
	43¼	1099	40	—		TFP02622	(2)	TFP02623	(2)	TFP02624	(1)	99	45
	51¼	1302	50	—		TFP02625	(3)	TFP02626	(3)	TFP02627	(2)	107	49
8"—150lb 24 elements	32¾	832	40	TFP02628	(4)	TFP02629	(2)	TFP02630	(2)	TFP02631	(1)	100	45
	43¼	1099	53	—		TFP02632	(4)	TFP02633	(3)	TFP02634	(2)	115	52
	51¼	1302	67	—		TFP02635	(4)	TFP02636	(3)	TFP02637	(2)	125	57
10"—150lb 27 elements	33¼	845	45	—		TFP02638	(3)	—		TFP02639	(3)	127	58
	43¾	1111	60	—		TFP02640	(3)	—		TFP02641	(3)	143	65
	51¼	1314	75	—		TFP02642	(9)	—		TFP02643	(3)	155	70
12"—150lb 36 elements	33⅛	841	60	—		—		—		TFP02644	(3)	180	82
	43⅜	1108	80	—		—		—		TFP02645	(3)	201	91
	51⅝	1311	100	—		—		—		TFP02646	(3)	216	98
14"—150lb 45 elements	33	838	75	—		—		—		TFP02647	(3)	235	107
	43½	1105	100	—		—		—		TFP02648	(3)	262	119
	51½	1308	125	—		—		—		TFP02649	(5)	282	128

(C*) = Number of Branch Circuits per heater

Design Features

- *150-lb Raised Face Forged Carbon Steel Flange*
- *NEMA 1 Terminal Housing*
- *Compressed Fiber Ring Gasket*
- *Incoloy® 800 Sheath Heating Elements*
- *Watt Density of 48 watts/in² (7.4 watts/cm²)*

Typical Heating Application: Process Water

ANSI Flange Size	Immersed Length in	Immersed Length mm	KW	Part Number 240V-1Ph	(C*)	240V-3Ph	(C*)	480V-1Ph	(C*)	480V-3Ph	(C*)	Approximate Net Weight lbs	Approximate Net Weight kgs
3"—150lb 3 elements	13½	343	4.5	TFP02650	(1)	TFP02651	(1)	TFP02652	(1)	TFP02653	(1)	15	7
	18	457	6	TFP02654	(1)	TFP02655	(1)	TFP02656	(1)	TFP02657	(1)	16	7
	20½	521	7.5	TFP02658	(1)	TFP02659	(1)	TFP02660	(1)	TFP02661	(1)	16	7
	25½	648	9	TFP02662	(1)	TFP02663	(1)	TFP02664	(1)	TFP02665	(1)	17	8
	33	838	12	—		TFP02666	(1)	TFP02667	(1)	TFP02668	(1)	18	8
	40½	1029	15	—		TFP02669	(1)	TFP02670	(1)	TFP02671	(1)	19	9
	48	1219	18	—		TFP02672	(1)	TFP02673	(1)	*TFP02674	(1)	21	10
4"—150lb 6 elements	13½	343	9	TFP02675	(1)	TFP02676	(1)	TFP02677	(1)	TFP02678	(1)	26	12
	18	457	12	TFP02679	(2)	TFP02680	(1)	TFP02681	(1)	TFP02682	(1)	28	13
	20½	521	15	TFP02683	(2)	TFP02684	(1)	TFP02685	(1)	TFP02686	(1)	29	13
	25½	648	18	TFP02687	(2)	TFP02688	(1)	TFP02689	(1)	TFP02690	(1)	30	14
	33	838	24	TFP02691	(2)	TFP02692	(2)	TFP02693	(2)	TFP02694	(1)	33	15
	40½	1029	30	—		TFP02695	(2)	TFP02696	(2)	TFP02697	(1)	35	16
	48	1219	36	—		TFP02698	(2)	TFP02699	(2)	TFP02700	(1)	38	17

(C*) = Number of Branch Circuits per heater

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Standard (Non-Stock) and Stock Flanged Immersion Heaters

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Typical Heating Application: Process Water

ANSI Flange Size	Immersed Length in	Immersed Length mm	KW	Part Number 240V-1Ph	(C*)	240V-3Ph	(C*)	480V-1Ph	(C*)	480V-3Ph	(C*)	Approximate Net Weight lbs	Approximate Net Weight kgs
5"—150lb 6 elements	13½	343	9	TFP02701	(1)	TFP02702	(1)	TFP02703	(1)	TFP02704	(1)	30	14
	18	457	12	TFP02705	(2)	TFP02706	(1)	TFP02707	(1)	TFP02708	(1)	32	15
	20½	521	15	TFP02709	(2)	TFP02710	(1)	TFP02711	(1)	TFP02712	(1)	33	15
	25½	648	18	TFP02713	(2)	TFP02714	(1)	TFP02715	(1)	TFP02716	(1)	34	15
	33	838	24	TFP02717	(2)	TFP02718	(2)	TFP02719	(2)	*TFP02720	(1)	37	17
	40½	1029	30	—		TFP02721	(2)	TFP02722	(2)	TFP02723	(1)	39	18
	48	1219	36	—		TFP02724	(2)	TFP02725	(2)	TFP02726	(1)	42	19
5"—150lb 9 elements	13½	343	14	TFP02727	(3)	TFP02728	(1)	TFP02729	(1)	TFP02730	(1)	33	15
	18	457	18	TFP02731	(3)	TFP02732	(1)	TFP02733	(1)	TFP02734	(1)	35	16
	20½	521	23	TFP02735	(3)	TFP02736	(3)	TFP02737	(1)	TFP02738	(1)	36	16
	25½	648	27	TFP02739	(3)	TFP02740	(3)	TFP02741	(3)	TFP02742	(1)	39	18
	33	838	36	—		TFP02743	(3)	TFP02744	(3)	TFP02745	(1)	43	20
	40½	1029	45	—		TFP02746	(3)	TFP02747	(3)	TFP02748	(3)	46	21
	48	1219	54	—		TFP02749	(3)	TFP02750	(3)	*TFP02751	(3)	50	23
6"—150lb 12 elements	13⅜	340	18	TFP02752	(2)	TFP02753	(1)	TFP02754	(1)	TFP02755	(1)	43	20
	17⅞	454	24	TFP02756	(2)	TFP02757	(2)	TFP02758	(2)	TFP02759	(1)	46	21
	20⅜	518	30	TFP02760	(3)	TFP02761	(2)	TFP02762	(2)	TFP02763	(1)	48	22
	25⅜	645	36	TFP02764	(3)	TFP02765	(2)	TFP02766	(2)	TFP02767	(1)	51	23
	32⅞	835	48	—		TFP02768	(4)	TFP02769	(3)	TFP02770	(2)	56	25
	40⅜	1026	60	—		TFP02771	(4)	TFP02772	(3)	TFP02773	(2)	61	28
	47⅞	1216	72	—		TFP02774	(4)	—		TFP02775	(2)	66	30
6"—150lb 15 elements	13⅜	340	23	TFP02776	(3)	TFP02777	(5)	TFP02778	(1)	TFP02779	(1)	45	20
	17⅞	454	30	TFP02780	(3)	TFP02781	(5)	TFP02782	(3)	TFP02783	(1)	49	22
	20⅜	518	38	TFP02784	(5)	TFP02785	(5)	TFP02786	(3)	TFP02787	(1)	51	23
	25⅜	645	45	TFP02788	(5)	TFP02789	(5)	TFP02790	(3)	TFP02791	(5)	55	25
	32⅞	835	60	—		TFP02792	(5)	TFP02793	(3)	TFP02794	(5)	62	28
	40⅜	1026	75	—		TFP02795	(5)	TFP02796	(5)	TFP02797	(5)	68	31
	47⅞	1216	90	—		TFP02798	(5)	—		TFP02799	(5)	75	34
8"—150lb 18 elements	25¾	654	50	—		TFP02800	(3)	TFP02801	(3)	TFP02802	(2)	81	37
	35¾	908	75	—		TFP02803	(6)	—		TFP02804	(2)	91	41
	44¼	1124	100	—		TFP02805	(6)	—		TFP02806	(3)	100	45
	54¼	1378	125	—		TFP02807	(6)	—		TFP02808	(6)	110	50
	63¼	1607	150	—		—		—		TFP02809	(6)	119	54
	72¾	1848	175	—		—		—		TFP02810	(6)	129	59
	82¼	2089	200	—		—		—		TFP02811	(6)	139	63
8"—150lb 24 elements	25¾	654	67	—		TFP02812	(4)	TFP02813	(3)	TFP02814	(2)	90	41
	35¾	908	100	—		TFP02815	(8)	—		TFP02816	(4)	104	47
	44¼	1124	133	—		TFP02817	(8)	—		TFP02818	(4)	115	52
	54¼	1378	167	—		TFP02819	(8)	—		TFP02820	(8)	129	59
	63¼	1607	200	—		—		—		TFP02821	(8)	141	64
	72¾	1848	233	—		—		—		TFP02822	(8)	154	70
	82¼	2089	267	—		—		—		TFP02823	(8)	167	76
10"—150lb 27 elements	54¾	1391	190	—		—		—		TFP02824	(9)	160	73
	63¾	1619	225	—		—		—		TFP02825	(9)	173	78
	73¼	1861	262	—		—		—		TFP02826	(9)	188	85
12"—150lb 36 elements	54⅞	1387	250	—		—		—		TFP02827	(6)	224	102
	63⅝	1616	300	—		—		—		TFP02828	(12)	242	110
	73⅛	1857	350	—		—		—		TFP02829	(12)	262	119
14"—150lb 45 elements	54½	1384	315	—		—		—		TFP02830	(15)	290	132
	63⅛	1603	375	—		—		—		TFP02831	(15)	312	142

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An asterisk (*) next to the Part Number guarantees in-stock availability for same-day shipping when ORDERED BY 2 PM CST

Standard (Non-Stock) and Stock Flanged Immersion Heaters

Design Features

- *150-lb Raised Face Forged Carbon Steel Flange*
- *NEMA 1 Terminal Housing*
- *Compressed Fiber Ring Gasket*
- *Copper Sheath Heating Elements*
- *Watt Density of 60 watts/in² (9.3 watts/cm²)*
- *Three-Phase Only*

Typical Heating Application: Clean Water

ANSI Flange Size	Immersed Length in	Immersed Length mm	KW	Part Number 240V-1Ph	(C*)	240V-3Ph	(C*)	480V-1Ph	(C*)	480V-3Ph	(C*)	Approximate Net Weight lbs	Approximate Net Weight kgs
3"—150lb 3 elements	15½	394	6	TFP02832	(1)	*TFP02833	(1)	TFP02834	(1)	TFP02835	(1)	15	7
	21½	546	9	TFP02836	(1)	TFP02837	(1)	TFP02838	(1)	TFP02839	(1)	16	7
	27	686	12	—		TFP02840	(1)	TFP02841	(1)	TFP02842	(1)	17	8
	32½	826	15	—		*TFP02843	(1)	TFP02844	(1)	TFP02845	(1)	18	8
	38	965	18	—		TFP02846	(1)	TFP02847	(1)	TFP02848	(1)	19	9
	51	1295	25	—		—		TFP02849	(1)	TFP02850	(1)	21	10
	60½	1537	30	—		—		TFP02851	(1)	TFP02852	(1)	23	10
4"—150lb 6 elements	15½	394	12	TFP02853	(2)	TFP02854	(1)	TFP02855	(1)	TFP02856	(1)	27	12
	21½	546	18	TFP02857	(2)	TFP02858	(1)	TFP02859	(1)	TFP02860	(1)	29	13
	27	686	24	TFP02861	(2)	TFP02862	(2)	TFP02863	(2)	TFP02864	(1)	31	14
	32½	826	30	—		TFP02865	(2)	TFP02866	(2)	TFP02867	(1)	33	15
	38	965	36	—		TFP02868	(2)	TFP02869	(2)	TFP02870	(1)	35	16
	51	1295	50	—		—		—		TFP02871	(2)	39	18
	60½	1537	60	—		—		—		TFP02872	(2)	42	19
5"—150lb 6 elements	15½	394	12	TFP02873	(2)	TFP02874	(1)	TFP02875	(1)	TFP02876	(1)	31	14
	21½	546	18	TFP02877	(2)	TFP02878	(1)	TFP02879	(1)	TFP02880	(1)	33	15
	27	686	24	TFP02881	(2)	TFP02882	(2)	TFP02883	(2)	TFP02884	(1)	35	16
	32½	826	30	—		TFP02885	(2)	TFP02886	(2)	*TFP02887	(1)	37	17
	38	965	36	—		TFP02888	(2)	TFP02889	(2)	TFP02890	(1)	39	18
	51	1295	50	—		—		—		TFP02891	(2)	43	20
	60½	1537	60	—		—		—		TFP02892	(2)	46	21
5"—150lb 9 elements	15½	394	18	TFP02893	(3)	TFP02894	(1)	TFP02895	(1)	TFP02896	(1)	34	15
	21½	546	27	TFP02897	(3)	TFP02898	(3)	TFP02899	(3)	TFP02900	(3)	37	17
	27	686	36	—		TFP02901	(3)	TFP02902	(3)	TFP02903	(3)	40	18
	32½	826	45	—		TFP02904	(3)	TFP02905	(3)	TFP02906	(3)	42	19
	38	965	54	—		TFP02907	(3)	TFP02908	(3)	TFP02909	(3)	45	20
	51	1295	75	—		—		—		TFP02910	(3)	52	24
	60½	1537	90	—		—		—		TFP02911	(3)	57	26
6"—150lb 12 elements	15⅜	391	24	TFP02912	(2)	TFP02913	(2)	TFP02914	(2)	TFP02915	(1)	44	20
	21⅜	543	36	TFP02916	(3)	TFP02917	(2)	TFP02918	(2)	TFP02919	(1)	48	22
	26⅞	683	48	—		TFP02920	(4)	TFP02921	(4)	TFP02922	(2)	52	24
	32⅜	822	60	—		TFP02923	(4)	TFP02924	(4)	TFP02925	(2)	56	25
	37⅞	962	72	—		TFP02926	(4)	—		TFP02927	(2)	60	27
	50⅞	1292	100	—		—		—		TFP02928	(4)	68	31
	60⅜	1534	120	—		—		—		TFP02929	(4)	75	34
6"—150lb 15 elements	15⅜	391	30	TFP02930	(3)	TFP02931	(5)	TFP02932	(3)	TFP02933	(1)	47	21
	21⅜	543	45	TFP02934	(5)	TFP02935	(5)	TFP02936	(3)	TFP02937	(5)	52	24
	26⅞	683	60	—		TFP02938	(5)	TFP02939	(3)	TFP02940	(5)	57	26
	32⅜	822	75	—		TFP02941	(5)	TFP02942	(5)	TFP02943	(5)	61	28
	37⅞	962	90	—		TFP02944	(5)	—		TFP02945	(5)	66	30
	50⅞	1292	125	—		—		—		TFP02946	(5)	77	35
	60⅜	1534	150	—		—		—		TFP02947	(5)	85	39
8"—150lb 18 elements	21¼	553	50	—		TFP02948	(3)	TFP02949	(3)	TFP02950	(2)	77	35
	29¾	756	75	—		TFP02951	(6)	—		TFP02952	(2)	85	39
	37¼	946	100	—		TFP02953	(6)	—		TFP02954	(3)	93	42
	45¼	1149	125	—		TFP02955	(6)	—		TFP02956	(6)	101	46
	52¾	1340	150	—		—		—		TFP02957	(6)	109	49
	60¾	1543	175	—		—		—		TFP02958	(6)	117	53
	68¼	1734	200	—		—		—		TFP02959	(6)	125	57

(C*) = Number of Branch Circuits per heater

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Standard (Non-Stock) Flanged Immersion Heaters

Design Features

- *150-lb Raised Face 316 Stainless Steel Flange*
- *NEMA 1 Terminal Housing*
- *Compressed Fiber Ring Gasket*
- *316 Stainless Steel Sheath Heating Elements*
- *Watt Density of 60 watts/in² (9.3 watts/cm²)*

Typical Heating Application: Deionized Water

ANSI Flange Size	Immersed Length in	Immersed Length mm	KW	Part Number 240V-1Ph	(C*)	240V-3Ph	(C*)	480V-1Ph	(C*)	480V-3Ph	(C*)	Approximate Net Weight lbs	Approximate Net Weight kgs
4"—150lb 6 elements	16	406	12	TFP02960	(2)	TFP02961	(1)	TFP02962	(1)	TFP02963	(1)	27	12
	22	559	18	TFP02964	(2)	TFP02965	(1)	TFP02966	(1)	TFP02967	(1)	29	13
	27½	699	24	TFP02968	(2)	TFP02969	(2)	TFP02970	(1)	TFP02971	(1)	31	14
	33	838	30	—		TFP02972	(2)	TFP02973	(2)	TFP02974	(1)	32	15
	38½	978	36	—		TFP02975	(2)	TFP02976	(2)	TFP02977	(1)	35	16
	51½	1308	50	—		—		—		TFP02978	(2)	39	18
	61	1549	60	—		—		—		TFP02979	(2)	42	19
6"—150lb 12 elements	15¾	400	24	TFP02980	(3)	TFP02981	(2)	TFP02982	(2)	TFP02983	(1)	45	20
	21¾	552	36	TFP02984	(3)	TFP02985	(2)	TFP02986	(2)	TFP02987	(1)	49	22
	27¼	692	48	—		TFP02988	(4)	TFP02989	(3)	TFP02990	(2)	52	24
	32¾	832	60	—		TFP02991	(4)	TFP02992	(3)	TFP02993	(2)	56	25
	38¼	972	72	—		TFP02994	(4)	—		TFP02995	(2)	60	27
	51¼	1302	100	—		—		—		TFP02996	(4)	69	31
	60¾	1543	120	—		—		—		TFP02997	(4)	75	34
6"—150lb 15 elements	15¾	400	30	TFP02998	(3)	TFP02999	(5)	TFP03000	(3)	TFP03001	(1)	47	21
	21¾	552	45	TFP03002	(5)	TFP03003	(5)	TFP03004	(3)	TFP03005	(5)	52	24
	27¼	692	60	—		TFP03006	(5)	TFP03007	(3)	TFP03008	(5)	57	26
	32¾	832	75	—		TFP03009	(5)	TFP03010	(5)	TFP03011	(5)	62	28
	38¼	972	90	—		TFP03012	(5)	—		TFP03013	(5)	66	30
	51¼	1302	125	—		—		—		TFP03014	(5)	77	35
	60¾	1543	150	—		—		—		TFP03015	(5)	86	39

(C*) = Number of Branch Circuits per heater

Ordering Information

Catalog Heaters

Flanged Immersion Heaters whose Part Numbers are preceded by an asterisk (*) are Guaranteed In Stock for immediate delivery.

Part Numbers with no asterisk (*) are stocked as sub-assemblies for 2-3 week delivery.

Custom Engineered/Manufactured Heaters

Understanding that an electric heater can be very application specific, for sizes and ratings not listed, **TEMPCO** will design and manufacture a Flanged Immersion Heater to meet your requirements. ***Standard lead time is 4 weeks.***

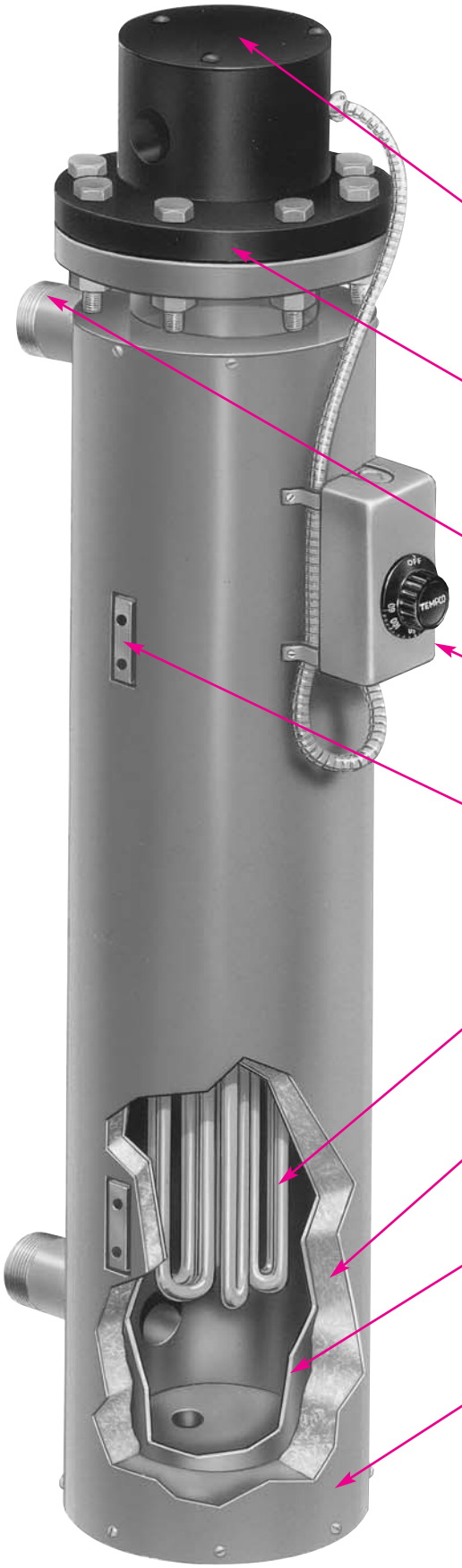
Please Specify the following:

- ❑ Wattage, Voltage and Phase
- ❑ Flange Size and Material
- ❑ Element Sheath Material
- ❑ Element Watt Density
- ❑ Element Immersion Length
- ❑ Electrical Enclosure Type
- ❑ Thermostat— if required
- ❑ Optional Features

Power Control Panels for Process Heaters

Note: **Power Control Panels** featuring mechanical or solid state controls with all other necessary components can be provided by TEMPCO for any size flanged heater. Refer to Section 13, pages 13-42 through 13-49 for complete details.

Circulation Heaters



Self-contained heating units designed for optimum operating efficiency and performance—
Providing *trouble-free service* and *application flexibility*!

All of the heat generated by the elements is immediately transferred to the medium being processed with minimal losses.

Standard and optional features include...

A General purpose (NEMA 1) terminal housing is standard. Moisture proof (NEMA 4) and/or explosion resistant (NEMA 7) housings are optional. A set of installation and maintenance instructions along with a wiring diagram can be found inside the terminal housing of each unit.

B Heating source—1-1/4" and 2-1/2" Screw Plug Heaters are used on smaller units. 3" to 14" size heaters use Flanged Immersion Heaters. The flanges are made from forged steel rated for 150 lbs with raised face. Supplied with threaded eyebolts for ease of handling and installation. Optional stainless steel flanges or 300 lb ratings available.

C Inlet-outlet connections are NPT pipe threads for 3" to 8" Circulation Heaters (flanges are optional). Standard inlet-outlet connections on 10" and larger units are 150 lb. rated flanges.

D Optional feature double-pole non-indicating bulb and capillary type thermostat can be located in the terminal box or attached to the insulation jacket as pictured. Solid state temperature controllers and indicating thermostats are available. Over-temperature protection can be provided by attaching a thermocouple to one of the elements.

E Threaded mounting lugs to support the unit are welded to the steel vessel. Custom supports can be designed to fit your structure.

F Wide selection of heating element sheath materials for maximum corrosion resistance to the medium being processed. On smaller circulation units with screw plug heaters, the element diameter is .315" or .475". On larger units with flanged heaters, the element diameter is .475".

G The vessel is surrounded with 1" thick insulation rated to 750°F (399°C) to minimize heat loss. Additional insulation or a high temperature ceramic fiber insulation is optional. Vessels can also be supplied uninsulated.

H Vessel material is SA53B or SA106B steel. Good for up to 750°F (399°C) operating temperature. For drainage and cleaning purposes, a drain plug is located in the base of the tank. Optional: Stainless steel vessel.

I Outer steel sheet metal jacket protects and keeps the insulation dry from the environment. It is painted with rust and corrosion resistant paint. Optional: Stainless steel outer jacket and rain-tight seal.

Product Inventory Available for Viewing and Selection @ www.tempco.com

Selecting the Correct Circulation Heater Materials

Selecting the proper Circulation Heater

Tempco Circulation Heaters will provide long life and dependable trouble-free service—provided the sheath materials, watt densities and operating temperatures are properly matched for the medium being heated.

Observe the following guidelines:

1. Match your process to the most suitable heater alloy sheath material. See pages 16-12 through 16-20 for the recommended sheath materials for many common materials.
2. Do not exceed the maximum allowable heater watt density (w/in^2) and recommended operating temperature for the material being heated. Refer to the engineering section (16) of this catalog or consult Tempco with your requirements.
3. Pressure–Temperature Rating. See page 11-16.
4. Select the proper terminal enclosure to protect the heater wiring and provide safety to personnel and equipment.
5. For uniform heat distribution and reduction of power in large storage tank applications, several smaller circulation heaters are recommended rather than a single large unit.

Need Customer Assistance? We take pride in our record of working with customers to develop the right heater for the job.
Call Tempco with your requirements.

Wetted Surface Metal Treatments

Stainless Steel and Incoloy circulation heater surfaces in contact with the material being heated can be passivated or electro-polished to improve their resistance to corrosion.

Passivation removes surface contamination, usually iron, so that the optimum corrosion resistance of the stainless steel is maintained. Surface contamination would come from the small amount of steel that may be worn off a tool during the manufacturing process.

Electro-Polishing is an electrochemical process that removes surface imperfections and contaminants, enhancing the corrosion resisting ability of the stainless steels. The resultant surface is clean, smooth and bright. Many medical and food applications require this type finish.

Vessel Construction

Catalog heaters have Class 150lb rated carbon steel pressure vessels. For higher pressures and/or temperatures, vessel construction to Class 600lb is available in steel and stainless steel.

Flanges are Forged Steel or 316 Stainless Steel, depending on the application.

Sheath Material Selection

CORROSION. In addition to selecting a sheath material that is compatible with the heated medium, other factors that affect corrosion need to be considered.

1. The temperature of the corrodent. As temperature increases, the degree of corrosion increases. Also remember that the element temperature is usually higher than the material it is heating.
2. Velocity of the corrodent. Increased velocity can increase the corrosion rate.

Note: **See pages** 16-12 through16-20 for recommended sheath materials for many immersion heating applications. If you are purchasing the material you are heating, check with the supplier for their recommendations.

Standard Element Sheath Materials

Incoloy® 800 — A Nickel (30-35%), Chromium (19-23%), Iron alloy. The high nickel content of this alloy contributes to its resistance to scaling and corrosion. Used in air heating (also see Incoloy 840 on page 10-3) and immersion heating of potable water and other liquids that are not corrosive to an Incoloy 800 sheath.

Low Carbon Steel — Applications include fluid heat transfer media, tar, high to low viscosity petroleum oils, asphalt, wax, molten salt, and other solutions not corrosive to a steel sheath.

316 Stainless Steel — A Chromium (16-18%), Nickel (11-14%), Iron Alloy with Molybdenum (2-3%) added to improve corrosion resistance in certain environments, especially those which would tend to cause pitting due to the presence of chlorides. Applications include deionized water.

Copper — Mainly used in clean water heating for washrooms, showers, rinse tanks and freeze protection of storage tanks.

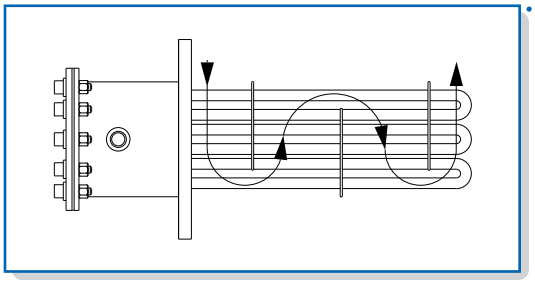
Optional Element Sheath Materials

304 Stainless Steel — A Chromium (18-20%), Nickel (8-11%), Iron Alloy used in the food industry, sterilizing solutions, air heating, and many organic and inorganic chemicals.

321 Stainless Steel — A Chromium (17-20%), Nickel (9-13%), Iron Alloy modified with the addition of titanium to prevent carbide precipitation and resulting intergranular corrosion that can take place in certain mediums when operating in the 800-1200°F (427-649°C) temperature range.

Incoloy® 840 — A Nickel (18-20%), Chromium (18-22%), Iron alloy. Incoloy 840 has about 10% less nickel than Incoloy 800. Used in many air heating applications where it has exhibited superior oxidation resistance at less cost than Incoloy 800.

Optional Circulation Heater Features



Flow Control Baffles

Used on circulation tank heaters to aid heat transfer by forcing the liquid or gas back and forth across the elements. Baffles can be custom designed and positioned for your application.

CONTINUED

Optional Circulation Heater Features

Continued from previous page...

Terminal Housings

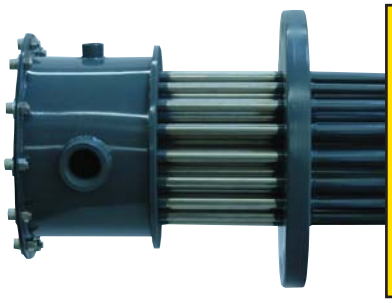
Tempco Circulation Heaters are supplied with a NEMA 1 general purpose housing as standard unless otherwise specified. Moisture Resistant (NEMA 4) and/or Explosion Resistant (NEMA 7) housings are optional.

Descriptions and dimensions of housings for circulation heaters with screw plug heaters can be found on on page 11-3, and for flange heaters on pages 11-16 and 11-17. If none of these housings meet the size, construction or other criteria of your application, consult Tempco with your requirements.

CAUTION

Explosion resistant terminal housings are intended to provide containment of an explosion in the enclosure only. No portion of the heater assembly outside the enclosure is covered under this NEMA rating. Abnormal use of a heater which results in excessive temperature can create hazardous conditions such as a fire. Never perform any type of service nor remove the housing cover prior to disconnecting all electrical power to the heater.

Terminal Housing Riser Option



The electrical housing is separated from the flange by a six-inch air gap to lower the ambient temperature of the electrical wiring. This option is used on flanged immersion heaters where the flange temperature exceeds 482°F (250°C).

Temperature Control

Thermostats

Thermostats are an optional feature on flanged immersion heaters. This type of control operates by expansion and contraction of a liquid in response to temperature change. Liquid contained within the sensing bulb and capillary flexes a diaphragm, causing the opening and closing of a snap action switch. For heating applications the contacts are normally closed and open on temperature rise.

Installation Warnings and Recommendations

CAUTION

1. ***Do not use the thermostat as a power switch. Use some other means of disconnecting power to the heater for servicing.***
2. ***A Thermostat is not a fail-safe device. Use an approved high temperature limit control and/or pressure limit control for safe operation.***
3. ***Avoid kinking or bending the capillary tube too sharply as this will alter the calibration and/or render the thermostat inoperable.***
4. ***Excess capillary tube should be coiled neatly in junction box.***
5. ***The capillary tube must never touch the thermostat contacts as this will create an electrical short capable of harming personnel and/or equipment.***

Note: **Branch Circuit Wiring:** Flange heater elements are wired into branch circuits having a maximum current of 48 Amps. The number of circuits is listed next to the heater's voltage and phase in the standard sizes and ratings chart. For different circuit wiring configurations, consult Tempco.

Thermocouples

Type J or Type K thermocouples can be supplied for process temperature or over-temperature control. Type J is reliable and accurate for temperatures up to 1000°F (538°C). Type K should be used for higher temperatures.

For measuring process temperatures the thermocouple can be mounted in a thermowell in the center of the element bundle. Note that a location somewhere away from the heater may give a more accurate measurement of process temperature.

For over-temperature protection the thermocouple is usually attached to one of the elements (Figure A) and any unusual rise in element temperature would shut the heater down. This thermocouple may also be mounted in a thermowell (Figure B), which is then attached to one of the heating elements if desired. This protects the thermocouple from the solution being heated and allows you to replace it without removing the heater, but does increase its response time.

Temperature and over-temperature controls for using the signal generated by thermocouples and how to select the best control for your application can be found in Section 13.

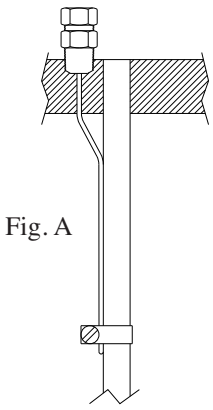


Fig. A

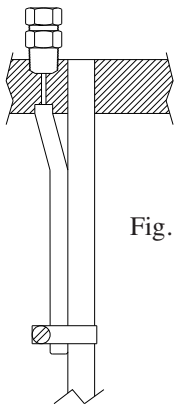


Fig. B

Circulation Heater Installation Recommendations

Tempco Circulation Heaters will have a long life and provide dependable, trouble-free service if properly installed, operated and maintained as per the following recommendations:

Installation

1. Flange heaters are supplied with two drilled and tapped holes for threaded eye bolts, providing ease of handling during installation and flange removal during maintenance cleaning or heater replacement.
2. Replacement of heater is inevitable. Therefore, provide adequate space for installation, allowing ample room to remove the flange heater for cleaning or replacement.
3. In applications requiring the circulation heater to be fed by an inline pump, install the pump at the inlet end.
4. To maintain the lowest possible temperature at the terminal box, place the outlet at the end opposite to the terminal box. If your process temperature is circulating at 450°F (232°C) or above (at the nozzle closest to the flange), stand-off terminal box construction is recommended.
5. To prevent temperature and/or pressure buildup on closed loop circulation heater systems, adequate and strategically located thermocouples for temperature controllers and pressure relief valves should be installed. Never over-rate pressure relief valves beyond the pressure temperature rating of the flange being used.
6. During the process cycle, flow rate of the medium being heated should never be interrupted or reduced, thus creating an overheating condition. Excess temperature can result in damage to the medium being processed and premature heater failure.

7. Make sure that your circulation heater is equipped with the proper terminal housing for the environment in which the heater is being used. NEMA 1—General purpose, NEMA 4—Moisture resistant, and NEMA 7—Explosion resistant.

Wiring

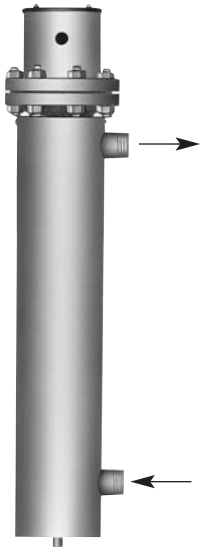
1. All heater installations must be properly earth grounded to eliminate electric shock hazard. Electrical wiring must be in accordance with Local and/or National Electrical Codes.
2. Circulation heaters are supplied standard with NEMA 1 terminal housings. All power to heaters must be disconnected before removing the terminal housing cover and performing any type of service.
3. Electrical connections on heater terminals must be kept tight. Loose connections will create arcing, over-heating, and eventually will destroy the heater terminal and cause premature heater failure.
4. If the amperage rating of your circulation heater exceeds the amperage capacity of the supplied thermostat, mercury relays or magnetic contactors should be used with the thermostat. See pages 13-74 through 13-78.
5. Over-temperature protection thermocouples require a separate conduit to the control panel for the thermocouple wire.
6. Tempco offers a large selection of Power Control Panels for circulation heaters. See pages 13-42 through 13-49.

Maintenance

1. Never perform any type of service on the unit prior to disconnecting all electrical power and shutting off all intake lines.
2. Remove sludge deposits through the drain plug.
3. Check flange bolts for tightness.
4. Check terminal connections for tightness.
5. Check thermocouple or thermostat bulb for response to temperature changes. If defective, replace immediately.
6. Check for leaks.
7. Depending on operating conditions and medium being processed, the flange or screw plug heater should be periodically removed for physical inspection and cleaning of the element bundle.

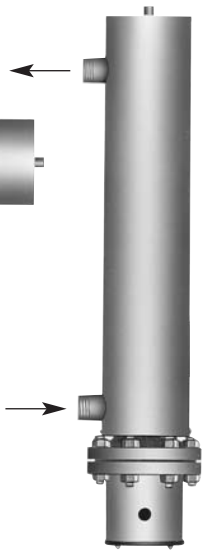
Vertical Mounting—Liquids

With terminal housing up and inlet pipe on the bottom, the heating elements will be immersed at all times to prevent premature failure.



Horizontal Mounting—Liquids and Gases

Always mount heater with inlet-outlet pipes facing up to ensure the heating elements will be immersed at all times to prevent premature failure. For liquid heating, outlet may be at either end. When heating gases the inlet should be closest to the terminal enclosure to minimize terminal box wiring temperatures.



Vertical Mounting—Gases

Mount with terminal enclosure and inlet pipe at bottom of tank to minimize terminal box wiring temperatures.

Mightybooster™ Circulation Heater — Point of Use

Design Features

- *Integral 60°F (15°C) to 180°F (82°C) Thermostat*
- *NEMA 1 Terminal Housing*
- *Insulated Carbon Steel or Bronze Vessel*
- *1" NPT Inlet and Outlet*
- *Copper Sheath Heating Elements*
- *Watt Density of 60 watts/in² (9.3 watts/cm²)*

Typical Heating Application: Clean Water • Aqueous Solutions

Pipebody Material	KW	OAL in	OAL mm	Inlet-Outlet in	Inlet-Outlet mm	Part Number 120/240V	Approximate Net Weight lbs	Approximate Net Weight kgs
Carbon steel	1.5	18	457	12⅜	314	CHF02097	8	3.6
	2.0	18	457	12⅜	314	CHF02098	8	3.6
	2.5	22	559	16⅜	416	CHF02099	11	5.0
	3.0	22	559	16⅜	416	CHF02100	11	5.0
Bronze	1.5	18	457	12⅜	314	CHF02101	12.5	5.7
	2.0	18	457	12⅜	314	CHF02102	12.5	5.7
	2.5	22	559	16⅜	416	CHF02103	14.5	6.6
	3.0	22	559	16⅜	416	CHF02104	14.5	6.6

Design Features

- *Integral 150°F (65°C) to 560°F (300°C) Thermostat*
- *NEMA 1 Terminal Housing*
- *Insulated Carbon Steel Vessel*
- *1" NPT Inlet and Outlet*
- *Steel Sheath Heating Elements*
- *Watt Density of 23 watts/in² (3.6 watts/cm²)*

Typical Heating Application: Lubricating Oils

Pipebody Material	KW	OAL in	OAL mm	Inlet-Outlet in	Inlet-Outlet mm	Part Number 120/240V	Approximate Net Weight lbs	Approximate Net Weight kgs
Carbon Steel	0.5	22	559	16⅜	416	CHF02105	11	5.0
	0.75	22	559	16⅜	416	CHF02106	11	5.0
	1.0	22	559	16⅜	416	CHF02107	11	5.0

Ordering Information

Catalog Heaters

Order by Part Number for catalog heaters listed above.

Custom Engineered/Manufactured Heaters

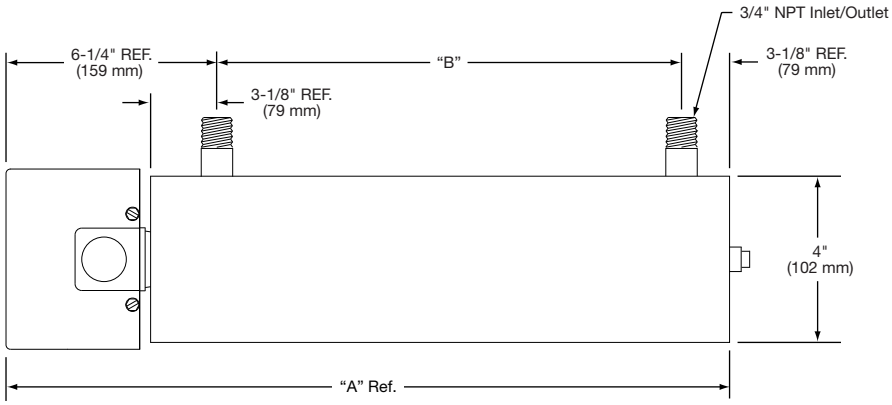
For ratings not listed, **TEMPCO** will design and manufacture a Mightybooster Heater to meet your requirements. ***Standard lead time is 3-4 weeks.***

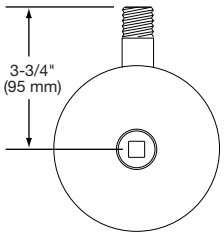
Please Specify the following:

- ❑ Application, including operating temperature/pressure
- ❑ Wattage and Voltage
- ❑ Screw Plug Material
- ❑ Element Sheath Material
- ❑ Element Watt Density
- ❑ Element Immersion Length
- ❑ Electrical Enclosure Type
- ❑ Thermostat— if required
- ❑ Vessel Material
- ❑ Additional Insulation
- ❑ Other Optional Features

Product Inventory Available for Viewing and Selection @ www.tempco.com

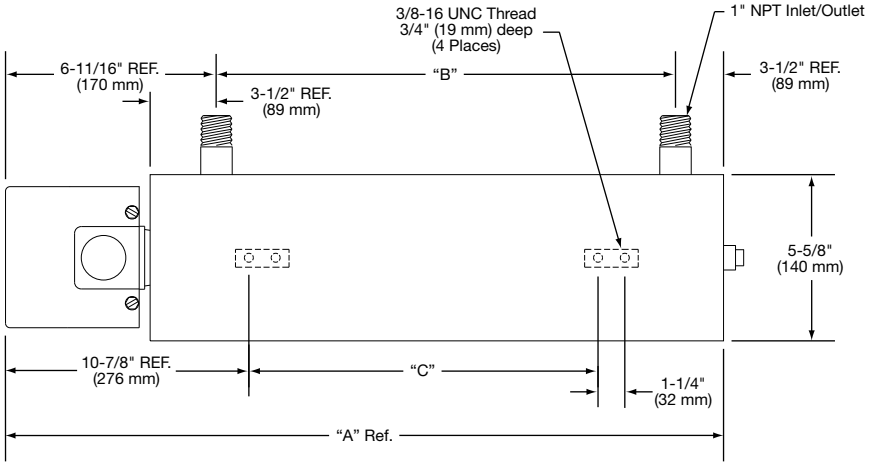
Standard 1-1/4" NPT Screw Plug Circulation Heater Dimensions

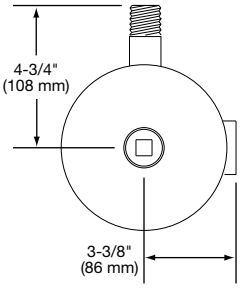




Dimensions Reference Number	"A"		"B"	
	in	mm	in	mm
1.1	24⅜	619	15	381
1.2	32⅜	822	23	584

Standard 2-1/2" NPT Screw Plug Circulation Heater Dimensions

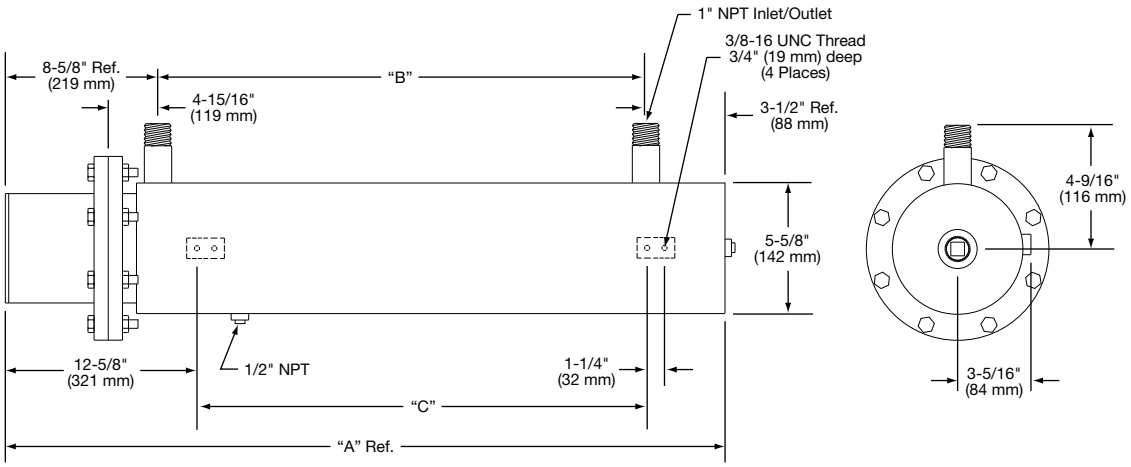




Dimensions Reference Number	"A"		"B"		"C"	
	in	mm	in	mm	in	mm
2.1	32 11/16	830	22½	572	16½	419
2.2	42 11/16	1084	32½	826	26½	673
2.3	55 3/16	1402	45	1143	39	991

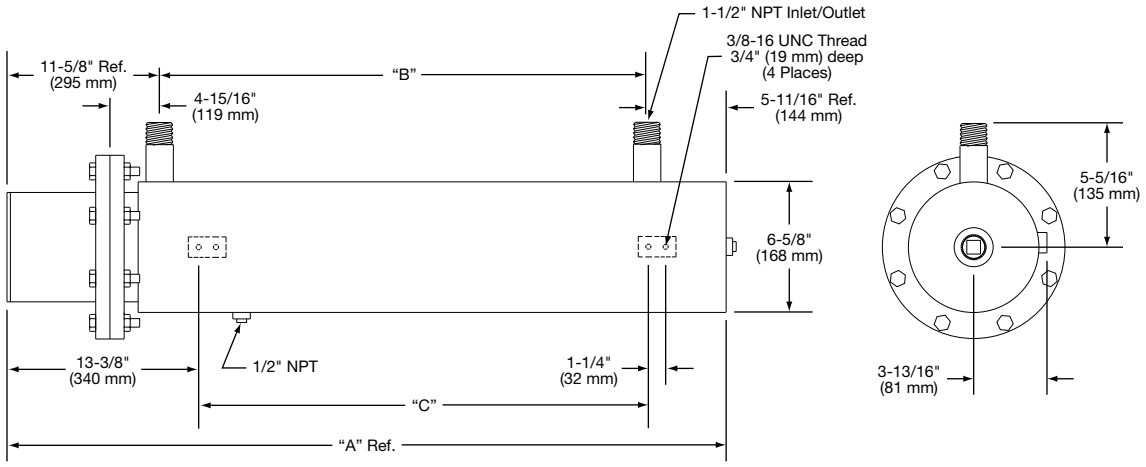
Circulation Heater Shown with Optional Thermostat in NEMA 1 Housing.

Standard 3" Flanged Circulation Heater Dimensions



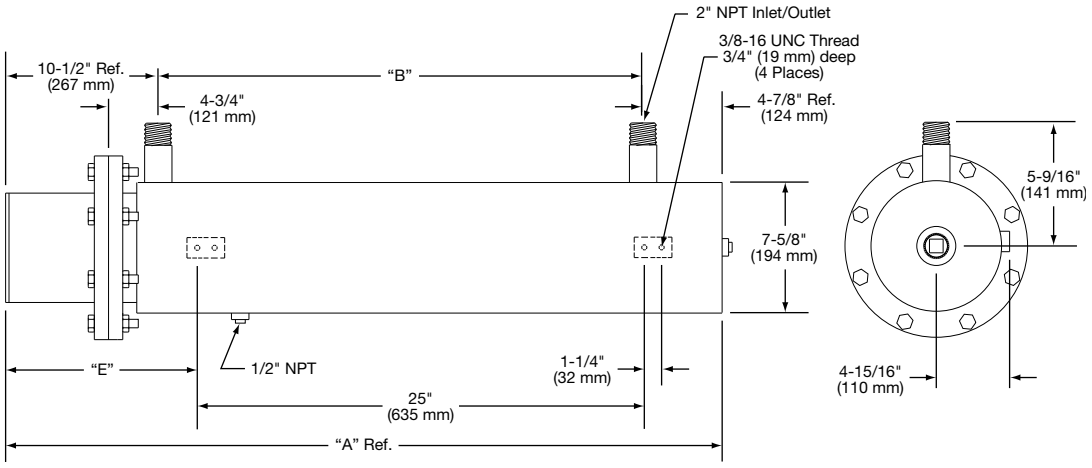
Dimensions Reference Number	"A"		"B"		"C"	
	in	mm	in	mm	in	mm
3.1	34⅝	879	22½	572	16½	419
3.2	44⅝	1133	32½	826	26½	673
3.3	57⅛	1451	45	1143	39	991

Standard 4" Flanged Circulation Heater Dimensions



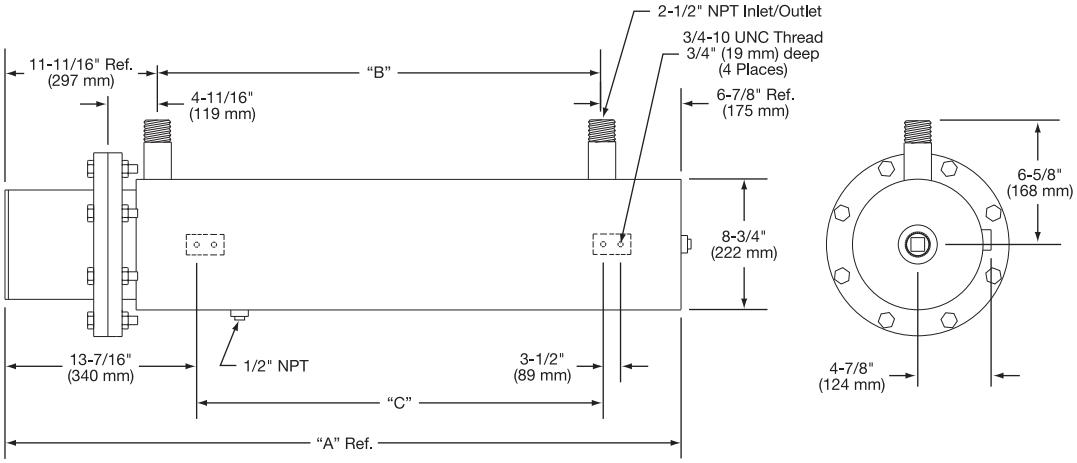
Dimensions Reference Number	"A"		"B"		"C"	
	in	mm	in	mm	in	mm
4.1	37 1/16	960	20½	521	17	432
4.2	48 5/16	1227	31	787	27½	699
4.3	69 5/16	1761	52	1321	48½	1232
4.4	90 5/16	2294	73	1854	69½	1765

Standard 5" Flanged Circulation Heater Dimensions



Dimensions Reference Number	"A"		"B"		"E"	
	in	mm	in	mm	in	mm
5.1	45⅜	1153	30	762	11½	292
5.2	52⅜	1330	37	940	15¼	387
5.3	63⅞	1622	48½	1232	21	533
5.4	77¼	1962	61⅞	1572	27½	698
5.5	90¼	2292	74⅞	1902	34¼	870

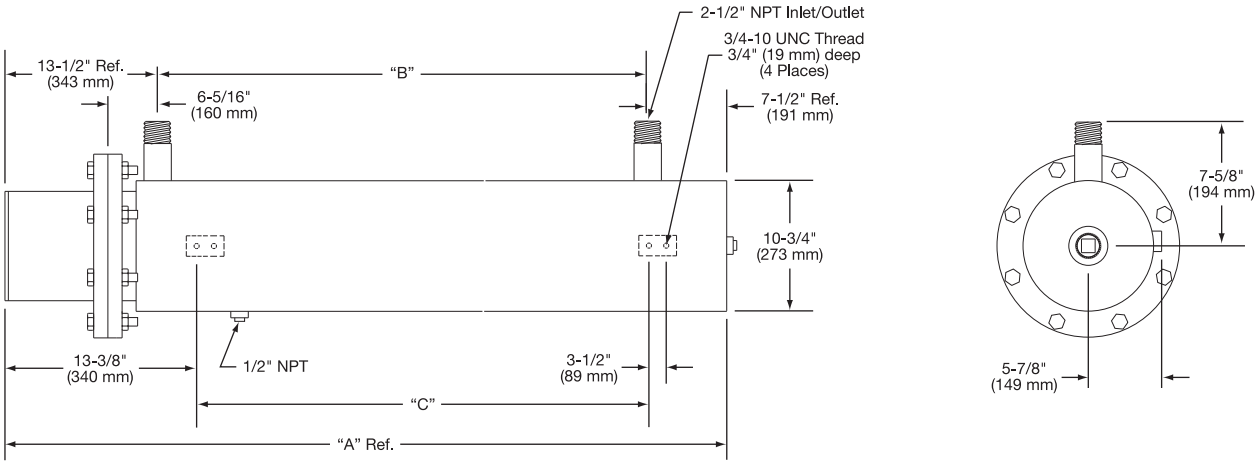
Standard 6" Flanged Circulation Heater Dimensions



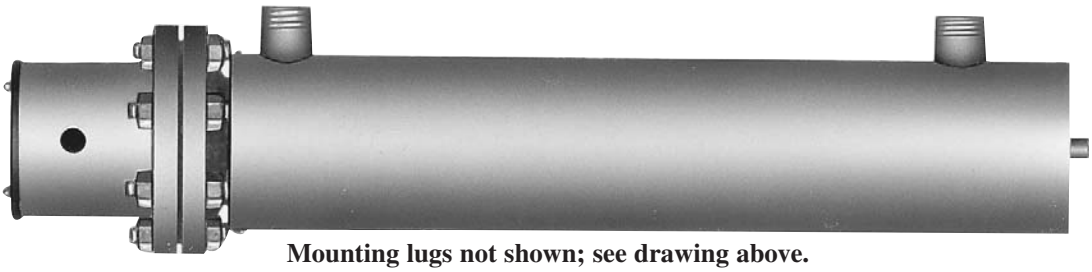
Dimensions Reference Number	"A"		"B"		"C"	
	in	mm	in	mm	in	mm
6.1	39 1/16	992	20½	521	17	432
6.2	49 9/16	1259	31	787	27½	699
6.3	70 9/16	1792	52	1321	48½	1232
6.4	91 9/16	2326	73	1854	69½	1765

Note: **Circulation heater** mounting lug design and location in the assembly drawings shown are standard. Designs can be modified to fit customer installation. Consult Tempco with your requirements.

Standard 8" Flanged Circulation Heater Dimensions



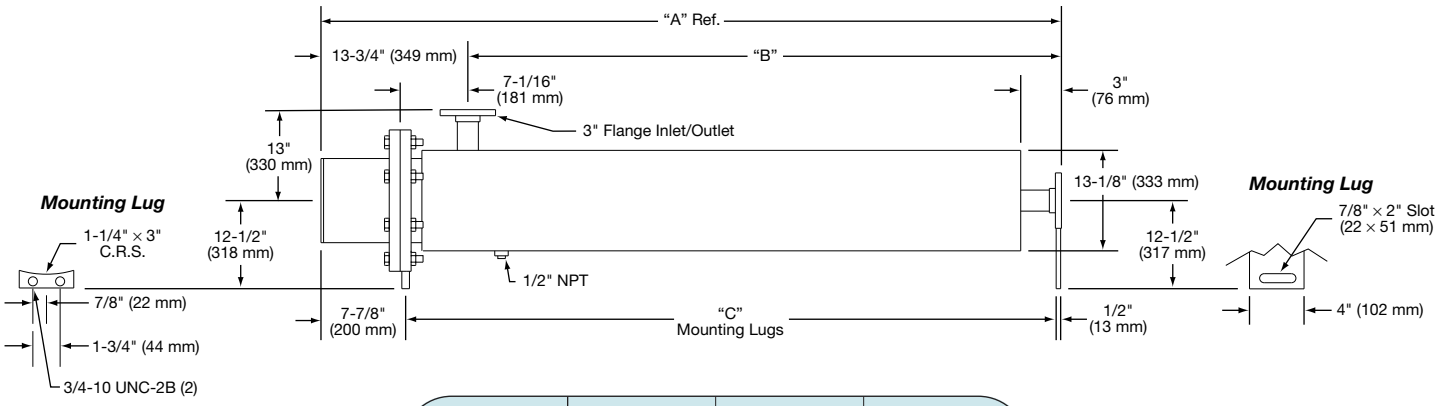
Dimensions Reference Number	"A"		"B"		"C"	
	in	mm	in	mm	in	mm
8.1	46	1168	24 11/16	627	21 3/16	538
8.2	53 3/4	1365	32 11/16	830	29 3/16	741
8.3	60 3/4	1543	39 11/16	1008	36 3/16	919
8.4	68 3/4	1746	47 5/16	1202	43 13/16	1113
8.5	77 7/8	1978	56 13/16	1443	53 5/16	1354
8.6	86 7/8	2207	65 13/16	1672	62 5/16	1583
8.7	96 7/8	2461	75 13/16	1926	72 5/16	1837



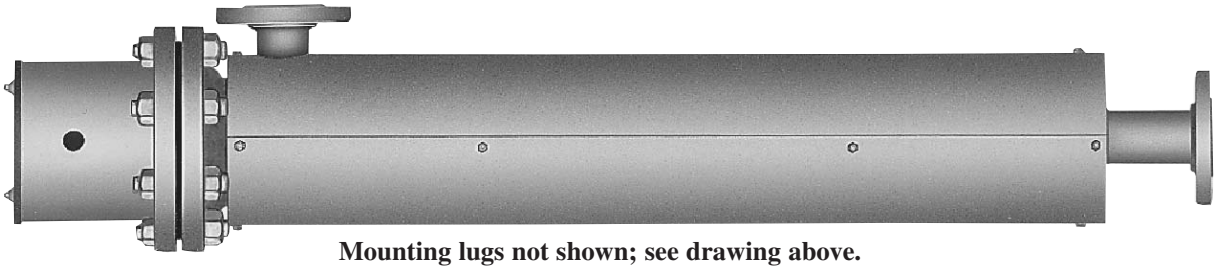
Mounting lugs not shown; see drawing above.

Note: **Circulation heater** mounting lug design and location in the assembly drawings shown are standard. Designs can be modified to fit customer installation. Consult Tempco with your requirements.

Standard 10" Flanged Circulation Heater Dimensions



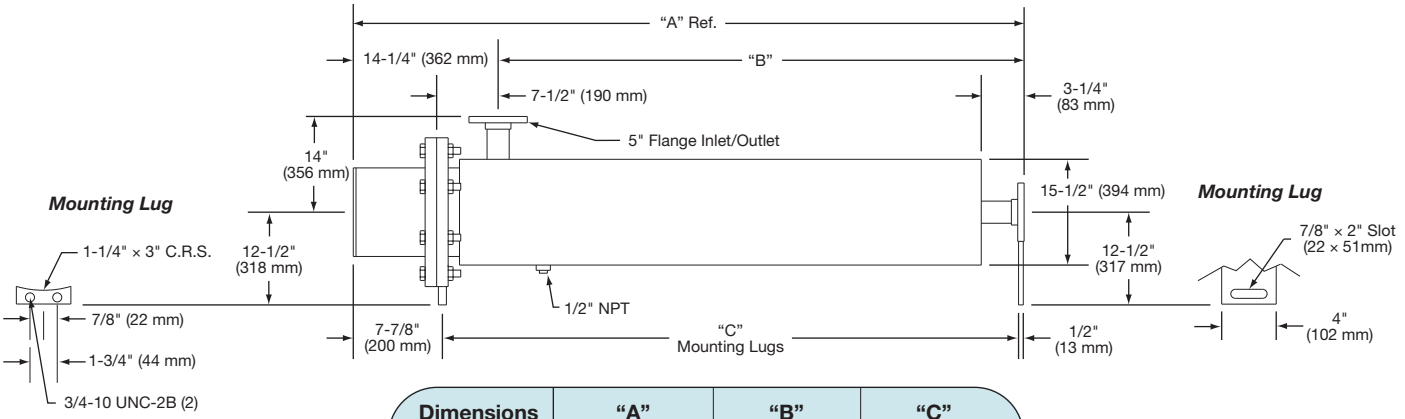
Dimensions Reference Number	"A"		"B"		"C"	
	in	mm	in	mm	in	mm
10.1	74	1880	60¼	1531	66	1676
10.2	81½	2070	67¾	1721	73½	1867
10.3	89	2261	75¼	1911	81	2057
10.4	96½	2451	82¾	2102	88½	2248
10.5	104	2642	90¼	2292	96	2438



Mounting lugs not shown; see drawing above.

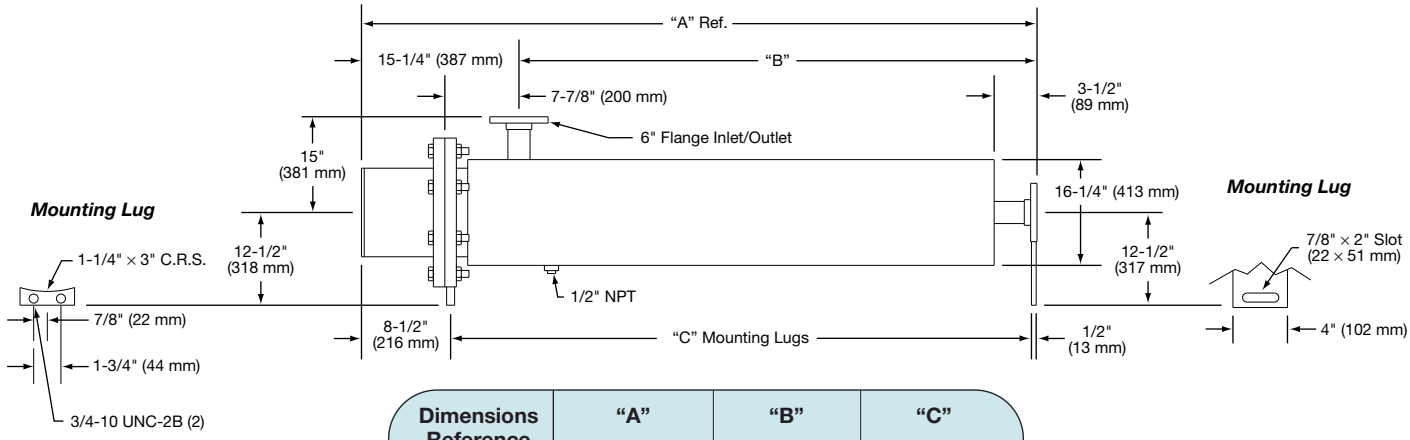
Horizontal Mount
Custom Circulation Heater
and Control Panel

Standard 12" Flanged Circulation Heater Dimensions



Dimensions Reference Number	"A"		"B"		"C"	
	in	mm	in	mm	in	mm
12.1	74¼	1886	60	1524	66⅛	1680
12.2	81¾	2076	67½	1715	73⅝	1870
12.3	89¼	2267	75	1905	81⅛	2061
12.4	96¾	2457	82½	2096	88⅝	2251
12.5	104¼	2648	90	2286	96⅛	2442

Standard 14" Flanged Circulation Heater Dimensions



Dimensions Reference Number	"A"		"B"		"C"	
	in	mm	in	mm	in	mm
14.1	74⅝	1895	59⅜	1508	66¼	1683
14.2	82⅛	2086	66⅞	1699	73¾	1873
14.3	89⅝	2276	74⅜	1889	81¼	2064
14.4	97⅛	2467	81⅞	2080	88¾	2254
14.5	104⅝	2657	89⅜	2270	96¼	2445

Note: **Circulation heater** mounting lug design and location in the assembly drawings shown are standard. Designs can be modified to fit customer installation. Consult Tempco with your requirements.

Standard (Non-Stock) Circulation Heaters

Design Features

- *Steel Screw Plug and Steel 150-lb Flanged Heater Sizes*
- *NEMA 1 Terminal Housing*
- *Steel Tank*
- *Steel Sheath Heating Elements*
- *Watt Density of 8 watts/in² (1.3 watts/cm²)*
- *Three-Phase Only*

Typical Heating Applications: Fuel Oils (Bunker C and Number 6)

Nominal Pipe Size	Dimensions Reference Number	KW	Part Number 120V	240V-1Ph (C*)	240V-3Ph (C*)	480V-1Ph (C*)	480V-3Ph (C*)	Approximate Net Weight lbs	kgs
2½" NPT	2.2	2	—	—	CHF01100 (1)	—	CHF01101 (1)	37	17
3 elements	2.3	3	—	—	CHF01102 (1)	—	CHF01103 (1)	46	21
3"—150lb	3.2	2	—	—	CHF01104 (1)	—	CHF01105 (1)	62	28
3 elements	3.3	3	—	—	CHF01106 (1)	—	CHF01107 (1)	76	34
	4.3	5	—	—	CHF01108 (1)	—	CHF01109 (1)	117	53
4"—150lb	4.3	6	—	—	CHF01110 (1)	—	CHF01111 (1)	120	54
6 elements	4.4	8	—	—	CHF01112 (1)	—	CHF01113 (1)	147	67
	4.4	10	—	—	CHF01114 (1)	—	CHF01115 (1)	151	68
	5.2	5	—	—	CHF01116 (1)	—	CHF01117 (1)	128	58
5"—150lb	5.3	6	—	—	CHF01118 (1)	—	CHF01119 (1)	146	66
6 elements	5.4	8	—	—	CHF01120 (1)	—	CHF01121 (1)	172	78
	5.5	10	—	—	CHF01122 (1)	—	CHF01123 (1)	192	87
	5.2	7.5	—	—	CHF01124 (1)	—	CHF01125 (1)	135	61
5"—150lb	5.3	9	—	—	CHF01126 (1)	—	CHF01127 (1)	154	70
9 elements	5.4	12	—	—	CHF01128 (1)	—	CHF01129 (1)	183	83
	5.5	15	—	—	CHF01130 (1)	—	CHF01131 (1)	205	93
	6.2	8	—	—	CHF01132 (1)	—	CHF01133 (1)	157	71
6"—150lb	6.3	10	—	—	CHF01134 (1)	—	CHF01135 (1)	197	80
12 elements	6.3	12	—	—	CHF01136 (1)	—	CHF01137 (1)	202	92
	6.4	16.5	—	—	CHF01138 (1)	—	CHF01139 (1)	249	113
	6.4	20	—	—	CHF01140 (1)	—	CHF01141 (1)	257	117
	6.2	10	—	—	CHF01142 (1)	—	CHF01143 (1)	163	74
6"—150lb	6.3	12.5	—	—	CHF01144 (1)	—	CHF01145 (1)	204	93
15 elements	6.3	15	—	—	CHF01146 (1)	—	CHF01147 (1)	211	96
	6.4	21	—	—	CHF01148 (5)	—	CHF01149 (1)	260	118
	6.4	25	—	—	CHF01150 (5)	—	CHF01151 (1)	273	124
	8.3	12.5	—	—	CHF01152 (1)	—	CHF01153 (1)	272	123
8"—150lb	8.4	16.5	—	—	CHF01154 (1)	—	CHF01155 (1)	300	136
18 elements	8.5	20	—	—	CHF01156 (1)	—	CHF01157 (1)	334	151
	8.6	24	—	—	CHF01158 (2)	—	CHF01159 (1)	367	166
	8.7	27	—	—	CHF01160 (2)	—	CHF01161 (1)	402	182
	8.3	17	—	—	CHF01162 (1)	—	CHF01163 (1)	287	130
8"—150lb	8.4	22	—	—	CHF01164 (2)	—	CHF01165 (1)	318	144
24 elements	8.5	27	—	—	CHF01166 (2)	—	CHF01167 (1)	356	161
	8.6	32	—	—	CHF01168 (2)	—	CHF01169 (1)	386	175
	8.7	36	—	—	CHF01170 (2)	—	CHF01171 (1)	428	194
10"—150lb	10.3	30	—	—	CHF01172 (3)	—	CHF01173 (1)	537	244
27 elements	10.4	35	—	—	CHF01174 (3)	—	CHF01175 (1)	580	263
	10.5	40	—	—	CHF01176 (3)	—	CHF01177 (1)	623	283
12"—150lb	12.4	47	—	—	CHF01178 (3)	—	CHF01179 (2)	751	341
36 elements	12.5	54	—	—	CHF01180 (3)	—	CHF01181 (2)	793	360
14"—150lb	14.4	60	—	—	CHF01182 (3)	—	CHF01183 (3)	885	401
45 elements	14.5	67	—	—	CHF01184 (5)	—	CHF01185 (3)	941	427

(C*) = Number of Branch Circuits per heater

Ordering Information
See page 11-46

Standard (Non-Stock) Circulation Heaters

Design Features

- *Steel Screw Plug and Steel 150-lb Flanged Heater Sizes*
- *NEMA 1 Terminal Housing*
- *Steel Tank*
- *Steel Sheath Heating Elements*
- *Watt Density of 23 watts/in² (3.6 watts/cm²)*

Typical Heating Applications: Lightweight Oils • Heat Transfer Oils • Degreasing Solutions

Nominal Pipe Size	Dimensions Reference Number	KW	Part Number 120V	240V-1Ph (C*)	240V-3Ph (C*)	480V-1Ph (C*)	480V-3Ph (C*)	Approximate Net Weight lbs	kgs
1¼" NPT 2 elements	1.1	1.5	CHF01186	CHF01187 (1)	—	—	—	14	6
	1.2	2	CHF01188	CHF01189 (1)	—	—	—	18	8
2½" NPT 3 elements	2.1	3	—	CHF01190 (1)	CHF01191 (1)	CHF01192 (1)	CHF01193 (1)	28	13
	2.1	4.5	—	CHF01194 (1)	CHF01195 (1)	CHF01196 (1)	CHF01197 (1)	29	13
	2.2	6	—	CHF01198 (1)	CHF01199 (1)	CHF01200 (1)	CHF01201 (1)	37	17
	2.3	7.5	—	CHF01202 (1)	CHF01203 (1)	CHF01204 (1)	CHF01205 (1)	45	20
	2.3	9	—	CHF01206 (1)	CHF01207 (1)	CHF01208 (1)	CHF01209 (1)	46	21
3"—150lb 3 elements	3.1	3	—	CHF01210 (1)	CHF01211 (1)	CHF01212 (1)	CHF01213 (1)	53	24
	3.1	4.5	—	CHF01214 (1)	CHF01215 (1)	CHF01216 (1)	CHF01217 (1)	54	24
	3.2	6	—	CHF01218 (1)	CHF01219 (1)	CHF01220 (1)	CHF01221 (1)	62	28
	3.3	7.5	—	CHF01222 (1)	CHF01223 (1)	CHF01224 (1)	CHF01225 (1)	74	34
	3.3	9	—	CHF01226 (1)	CHF01227 (1)	CHF01228 (1)	CHF01229 (1)	76	34
4"—150lb 6 elements	4.1	6	—	CHF01230 (1)	CHF01231 (1)	CHF01232 (1)	CHF01233 (1)	78	35
	4.1	9	—	CHF01234 (1)	CHF01235 (1)	CHF01236 (1)	CHF01237 (1)	91	41
	4.2	12	—	CHF01238 (2)	CHF01239 (1)	CHF01240 (1)	CHF01241 (1)	94	43
	4.3	15	—	CHF01242 (2)	CHF01243 (1)	CHF01244 (1)	CHF01245 (1)	117	53
	4.3	18	—	CHF01246 (2)	CHF01247 (1)	CHF01248 (1)	CHF01249 (1)	120	54
	4.4	25	—	—	CHF01250 (2)	CHF01251 (2)	CHF01252 (1)	147	67
	4.4	30	—	—	CHF01253 (2)	CHF01254 (2)	CHF01255 (1)	151	68
5"—150lb 6 elements	5.2	12	—	CHF01256 (2)	CHF01257 (1)	CHF01258 (1)	CHF01259 (1)	126	57
	5.2	15	—	CHF01260 (2)	CHF01261 (1)	CHF01262 (1)	CHF01263 (1)	128	58
	5.3	18	—	CHF01264 (2)	CHF01265 (1)	CHF01266 (1)	CHF01267 (1)	146	66
	5.3	20	—	CHF01268 (2)	CHF01269 (1)	CHF01270 (1)	CHF01271 (1)	147	67
	5.4	25	—	—	CHF01272 (2)	CHF01273 (2)	CHF01274 (1)	172	78
	5.5	30	—	—	CHF01275 (2)	CHF01276 (2)	CHF01277 (1)	192	87
5"—150lb 9 elements	5.2	18	—	CHF01278 (3)	CHF01279 (1)	CHF01280 (1)	CHF01281 (1)	132	60
	5.2	23	—	CHF01282 (3)	CHF01283 (3)	CHF01284 (1)	CHF01285 (1)	135	61
	5.3	27	—	CHF01286 (3)	CHF01287 (3)	CHF01288 (3)	CHF01289 (1)	154	70
	5.4	38	—	—	CHF01290 (3)	CHF01291 (3)	CHF01292 (1)	183	83
	5.5	45	—	—	CHF01293 (3)	CHF01294 (3)	CHF01295 (3)	205	93
6"—150lb 12 elements	6.1	12	—	CHF01296 (1)	CHF01297 (1)	CHF01298 (1)	CHF01299 (1)	127	58
	6.2	18	—	CHF01300 (2)	CHF01301 (1)	CHF01302 (1)	CHF01303 (1)	152	69
	6.2	24	—	CHF01304 (2)	CHF01305 (2)	CHF01306 (1)	CHF01307 (1)	157	71
	6.3	30	—	CHF01308 (2)	CHF01309 (2)	CHF01310 (2)	CHF01311 (1)	197	89
	6.3	36	—	CHF01312 (3)	CHF01313 (2)	CHF01314 (2)	CHF01315 (1)	202	92
	6.4	50	—	—	CHF01316 (4)	CHF01317 (3)	CHF01318 (2)	249	113
	6.4	60	—	—	CHF01319 (4)	CHF01320 (3)	CHF01321 (2)	257	117
6"—150lb 15 elements	6.1	15	—	CHF01322 (3)	CHF01323 (1)	CHF01324 (1)	CHF01325 (1)	130	59
	6.2	23	—	CHF01326 (3)	CHF01327 (5)	CHF01328 (1)	CHF01329 (1)	156	71
	6.2	30	—	CHF01330 (3)	CHF01331 (5)	CHF01332 (3)	CHF01333 (1)	163	74
	6.3	38	—	CHF01334 (5)	CHF01335 (5)	CHF01336 (3)	CHF01337 (1)	204	93
	6.3	45	—	CHF01338 (5)	CHF01339 (5)	CHF01340 (3)	CHF01341 (5)	211	96
	6.4	63	—	—	CHF01342 (5)	CHF01343 (3)	CHF01344 (5)	260	118
	6.4	75	—	—	CHF01345 (5)	CHF01346 (5)	CHF01347 (5)	270	122
8"—150lb 18 elements	8.2	30	—	CHF01348 (3)	CHF01349 (2)	CHF01350 (2)	CHF01351 (1)	241	109
	8.3	40	—	—	CHF01352 (2)	CHF01353 (2)	CHF01354 (1)	272	123
	8.4	50	—	—	CHF01355 (3)	CHF01356 (3)	CHF01357 (2)	300	136
	8.5	60	—	—	CHF01358 (3)	CHF01359 (3)	CHF01360 (2)	334	151
	8.6	70	—	—	CHF01361 (6)	CHF01362 (3)	CHF01363 (2)	367	166
	8.7	80	—	—	CHF01364 (6)	—	CHF01365 (2)	402	182

(C*) = Number of Branch Circuits per heater

CONTINUED

Standard (Non-Stock) Circulation Heaters

Continued from previous page...

Typical Heating Applications: Lightweight Oils • Heat Transfer Oils • Degreasing Solutions

Nominal Pipe Size	Dimensions Reference Number	KW	Part Number 120V	240V-1Ph (C*)	240V-3Ph (C*)	480V-1Ph (C*)	480V-3Ph (C*)	Approximate Net Weight lbs	kgs
8"—150lb 24 elements	8.2	40	—	CHF01366 (4)	CHF01367 (2)	CHF01368 (2)	CHF01369 (1)	253	115
	8.3	53	—	—	CHF01370 (4)	CHF01371 (3)	CHF01372 (2)	287	130
	8.4	67	—	—	CHF01373 (4)	CHF01374 (3)	CHF01375 (2)	318	144
	8.5	80	—	—	CHF01376 (4)	CHF01377 (4)	CHF01378 (2)	356	161
	8.6	93	—	—	CHF01379 (8)	CHF01380 (6)	CHF01381 (4)	392	178
	8.7	107	—	—	CHF01382 (8)	—	CHF01383 (4)	428	194
10"-150lb 27 elements	10.3	90	—	—	—	—	CHF01384 (3)	537	244
	10.4	105	—	—	—	—	CHF01385 (3)	580	263
	10.5	120	—	—	—	—	CHF01386 (3)	623	283
12"-150lb 36 elements	12.4	140	—	—	—	—	CHF01387 (4)	751	341
	12.5	160	—	—	—	—	CHF01388 (4)	793	360
14"-150lb 45 elements	14.3	150	—	—	—	—	CHF01389 (5)	824	374
	14.4	175	—	—	—	—	CHF01390 (5)	885	401
	14.5	200	—	—	—	—	CHF01391 (5)	941	427

(C*) = *Number of Branch Circuits per heater*

Design Features

- *304 Stainless Steel Screw Plug and Steel 150-lb Flanged Heater Sizes*
- *NEMA 1 Terminal Housing*
- *Steel Tank*
- *Incoloy® 800 Sheath Heating Elements*
- *Watt Density of 16 watts/in² (2.5 watts/cm²)*
- *Three-Phase Only*

Typical Heating Applications: Medium Weight Oils • Heat Transfer Oils • Liquid Paraffin

Nominal Pipe Size	Dimensions Reference Number	KW	Part Number 120V	240V-1Ph (C*)	240V-3Ph (C*)	480V-1Ph (C*)	480V-3Ph (C*)	Approximate Net Weight lbs	kgs
2½" NPT 3 elements	2.1	2	—	—	CHF01392 (1)	—	CHF01393 (1)	28	13
	2.1	2.5	—	—	CHF01394 (1)	—	CHF01395 (1)	29	13
	2.1	3	—	—	CHF01396 (1)	—	CHF01397 (1)	30	14
	2.2	4	—	—	CHF01398 (1)	—	CHF01399 (1)	37	17
	2.3	5	—	—	CHF01400 (1)	—	CHF01401 (1)	45	20
	2.3	6	—	—	CHF01402 (1)	—	CHF01403 (1)	46	21
3"-150lb 3 elements	3.1	2	—	—	CHF01404 (1)	—	CHF01405 (1)	53	24
	3.1	2.5	—	—	CHF01406 (1)	—	CHF01407 (1)	53	24
	3.2	3	—	—	CHF01408 (1)	—	CHF01409 (1)	61	28
	3.2	4	—	—	CHF01410 (1)	—	CHF01411 (1)	62	28
	3.3	5	—	—	CHF01412 (1)	—	CHF01413 (1)	74	34
	3.3	6	—	—	CHF01414 (1)	—	CHF01415 (1)	76	34
4"-150lb 6 elements	4.1	3	—	—	CHF01416 (1)	—	CHF01417 (1)	76	34
	4.1	4	—	—	CHF01418 (1)	—	CHF01419 (1)	78	35
	4.1	5	—	—	CHF01420 (1)	—	CHF01421 (1)	79	36
	4.2	6	—	—	CHF01422 (1)	—	CHF01423 (1)	91	41
	4.2	8	—	—	CHF01424 (1)	—	CHF01425 (1)	94	43
	4.3	10	—	—	CHF01426 (1)	—	CHF01427 (1)	117	53
	4.3	12	—	—	CHF01428 (1)	—	CHF01429 (1)	120	54
5"-150lb 6 elements	5.1	8	—	—	CHF01430 (1)	—	CHF01431 (1)	117	53
	5.2	10	—	—	CHF01432 (1)	—	CHF01433 (1)	128	58
	5.3	12	—	—	CHF01434 (1)	—	CHF01435 (1)	146	66

(C*) = *Number of Branch Circuits per heater*

Ordering Information
See page 11-46

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Standard (Non-Stock) Circulation Heaters

Continued from previous page...

Typical Heating Applications: Medium Weight Oils • Heat Transfer Oils • Liquid Paraffin

Nominal Pipe Size	Dimensions Reference Number	KW	Part Number 120V	240V-1Ph (C*)	240V-3Ph (C*)	480V-1Ph (C*)	480V-3Ph (C*)	Approximate Net Weight lbs	kgs
5"-150lb 9 elements	5.1	12	—	—	CHF01436 (1)	—	CHF01437 (1)	123	56
	5.2	15	—	—	CHF01438 (1)	—	CHF01439 (1)	135	61
	5.3	18	—	—	CHF01440 (1)	—	CHF01441 (1)	154	70
6"-150lb 12 elements	6.1	6	—	—	CHF01442 (1)	—	CHF01443 (1)	124	56
	6.1	8	—	—	CHF01444 (1)	—	CHF01445 (1)	127	58
	6.1	10	—	—	CHF01446 (1)	—	CHF01447 (1)	129	59
	6.2	12	—	—	CHF01448 (1)	—	CHF01449 (1)	152	69
	6.2	16	—	—	CHF01450 (1)	—	CHF01451 (1)	157	71
	6.3	20	—	—	CHF01452 (1)	—	CHF01453 (1)	197	89
	6.3	24	—	—	CHF01454 (2)	—	CHF01455 (1)	202	92
6"-150lb 15 elements	6.1	7.5	—	—	CHF01456 (1)	—	CHF01457 (1)	126	57
	6.1	10	—	—	CHF01458 (1)	—	CHF01459 (1)	130	59
	6.1	12.5	—	—	CHF01460 (1)	—	CHF01461 (1)	133	60
	6.2	15	—	—	CHF01462 (1)	—	CHF01463 (1)	156	71
	6.2	20	—	—	CHF01464 (1)	—	CHF01465 (1)	163	74
	6.3	25	—	—	CHF01466 (5)	—	CHF01467 (1)	164	74
	6.3	30	—	—	CHF01468 (5)	—	CHF01469 (1)	211	96
8"-150lb 18 elements	8.2	17	—	—	CHF01470 (1)	—	CHF01471 (1)	234	106
	8.3	25	—	—	CHF01472 (2)	—	CHF01473 (1)	264	120
	8.4	33	—	—	CHF01474 (2)	—	CHF01475 (1)	293	133
	8.5	42	—	—	CHF01476 (3)	—	CHF01477 (2)	327	148
	8.6	50	—	—	—	—	CHF01478 (2)	360	163
	8.7	58	—	—	—	—	CHF01479 (2)	395	179
	8.7	67	—	—	—	—	CHF01480 (2)	405	184
8"-150lb 24 elements	8.2	23	—	—	CHF01481 (2)	—	CHF01482 (1)	243	110
	8.3	33	—	—	CHF01483 (2)	—	CHF01484 (1)	277	126
	8.4	44	—	—	CHF01485 (4)	—	CHF01486 (2)	308	140
	8.5	56	—	—	CHF01487 (4)	—	CHF01488 (2)	346	157
	8.6	67	—	—	—	—	CHF01489 (2)	382	173
	8.7	77	—	—	—	—	CHF01490 (2)	420	191
	8.7	89	—	—	—	—	CHF01491 (4)	433	196
10"-150lb 27 elements	10.3	75	—	—	—	—	CHF01492 (3)	539	244
	10.5	87	—	—	—	—	CHF01493 (3)	615	279
12"-150lb 36 elements	12.3	100	—	—	—	—	CHF01494 (3)	694	315
	12.5	117	—	—	—	—	CHF01495 (3)	782	355
14"-150lb 45 elements	14.2	105	—	—	—	—	CHF01496 (3)	771	350
	14.3	125	—	—	—	—	CHF01497 (5)	828	376

(C*) = Number of Branch Circuits per heater

Design Features

- *304 Stainless Steel Screw Plug and Steel 150-lb Flanged Heater Sizes*
- *NEMA 1 Terminal Housing*
- *Steel Tank*
- *Incoloy® 800 Sheath Heating Elements*
- *Watt Density of 23 watts/in² (3.6 watts/cm²)*

Typical Heating Applications: Forced Air • Caustic Solutions • Degreasing Solutions

Nominal Pipe Size	Dimensions Reference Number	KW	Part Number 120V	240V-1Ph (C*)	240V-3Ph (C*)	480V-1Ph (C*)	480V-3Ph (C*)	Approximate Net Weight lbs	kgs
1¼" NPT 2 elements	1.1	1	CHF01498	CHF01499 (1)	—	—	—	13	6
	1.1	1.5	CHF01500	CHF01501 (1)	—	—	—	13	6
	1.2	2	CHF01502	CHF01503 (1)	—	—	—	17	8
2½" NPT 3 elements	2.1	3	—	CHF01504 (1)	CHF01505 (1)	CHF01506 (1)	CHF01507 (1)	28	13
	2.2	4.5	—	CHF01508 (1)	CHF01509 (1)	CHF01510 (1)	CHF01511 (1)	35	16
	2.2	6	—	CHF01512 (1)	CHF01513 (1)	CHF01514 (1)	CHF01515 (1)	37	17
	2.3	7.5	—	CHF01516 (1)	CHF01517 (1)	CHF01518 (1)	CHF01519 (1)	45	20
	2.3	9	—	CHF01520 (1)	CHF01521 (1)	CHF01522 (1)	CHF01523 (1)	46	21

(C*) = Number of Branch Circuits per heater

CONTINUED

Standard (Non-Stock) Circulation Heaters

***Typical Heating Applications:* Forced Air • Caustic Solutions • Degreasing Solutions**

Nominal Pipe Size	Dimensions Reference Number	KW	Part Number 120V	240V-1Ph (C*)	240V-3Ph (C*)	480V-1Ph (C*)	480V-3Ph (C*)	Approximate Net Weight lbs	kgs
3"-150lb 3 elements	3.1	3	—	CHF01524 (1)	CHF01525 (1)	CHF01526 (1)	CHF01527 (1)	53	24
	3.2	4.5	—	CHF01528 (1)	CHF01529 (1)	CHF01530 (1)	CHF01531 (1)	61	28
	3.2	6	—	CHF01532 (1)	CHF01533 (1)	CHF01534 (1)	CHF01535 (1)	62	28
	3.3	7.5	—	CHF01536 (1)	CHF01537 (1)	CHF01538 (1)	CHF01539 (1)	74	34
	3.3	9	—	CHF01540 (1)	CHF01541 (1)	CHF01542 (1)	CHF01543 (1)	76	34
4"-150lb 6 elements	4.1	6	—	CHF01544 (1)	CHF01545 (1)	CHF01546 (1)	CHF01547 (1)	78	35
	4.2	9	—	CHF01548 (1)	CHF01549 (1)	CHF01550 (1)	CHF01551 (1)	91	41
	4.2	12	—	CHF01552 (2)	CHF01553 (1)	CHF01554 (1)	CHF01555 (1)	94	43
	4.3	15	—	CHF01556 (2)	CHF01557 (1)	CHF01558 (1)	CHF01559 (1)	117	53
	4.3	18	—	CHF01560 (2)	CHF01561 (1)	CHF01562 (1)	CHF01563 (1)	120	54
	4.4	25	—	—	CHF01564 (2)	CHF01565 (2)	CHF01566 (1)	147	67
	4.4	30	—	—	CHF01567 (2)	CHF01568 (2)	CHF01569 (1)	151	68
5"-150lb 6 elements	5.1	9	—	CHF01570 (1)	CHF01571 (1)	CHF01572 (1)	CHF01573 (1)	114	52
	5.2	12	—	CHF01574 (2)	CHF01575 (1)	CHF01576 (1)	CHF01577 (1)	126	57
	5.2	15	—	CHF01578 (2)	CHF01579 (1)	CHF01580 (1)	CHF01581 (1)	128	58
	5.3	18	—	CHF01582 (2)	CHF01583 (1)	CHF01584 (1)	CHF01585 (1)	146	66
	5.4	25	—	—	CHF01586 (2)	CHF01587 (2)	CHF01588 (1)	172	78
	5.5	30	—	—	CHF01589 (2)	CHF01590 (2)	CHF01591 (1)	192	87
5"-150lb 9 elements	5.1	14	—	CHF01592 (3)	CHF01593 (1)	CHF01594 (1)	CHF01595 (1)	119	54
	5.2	18	—	CHF01596 (3)	CHF01597 (1)	CHF01598 (1)	CHF01599 (1)	132	60
	5.2	23	—	CHF01600 (3)	CHF01601 (3)	CHF01602 (1)	CHF01603 (1)	135	61
	5.3	27	—	CHF01604 (3)	CHF01605 (3)	CHF01606 (3)	CHF01607 (1)	150	68
	5.4	38	—	—	CHF01608 (3)	CHF01609 (3)	CHF01610 (1)	183	83
	5.5	45	—	—	CHF01611 (3)	CHF01612 (3)	CHF01613 (3)	205	93
6"-150lb 12 elements	6.1	12	—	CHF01614 (2)	CHF01615 (1)	CHF01616 (1)	CHF01617 (1)	127	58
	6.2	18	—	CHF01618 (2)	CHF01619 (1)	CHF01620 (1)	CHF01621 (1)	152	69
	6.2	24	—	CHF01622 (2)	CHF01623 (2)	CHF01624 (2)	CHF01625 (1)	157	71
	6.3	30	—	CHF01626 (3)	CHF01627 (2)	CHF01628 (2)	CHF01629 (1)	197	89
	6.3	36	—	CHF01630 (3)	CHF01631 (2)	CHF01632 (2)	CHF01633 (1)	202	92
	6.4	50	—	—	CHF01634 (4)	CHF01635 (4)	CHF01636 (2)	249	113
	6.4	60	—	—	CHF01637 (4)	CHF01638 (4)	CHF01639 (2)	257	117
6"-150lb 15 elements	6.1	15	—	CHF01640 (3)	CHF01641 (1)	CHF01642 (1)	CHF01643 (1)	130	59
	6.2	23	—	CHF01644 (3)	CHF01645 (5)	CHF01646 (1)	CHF01647 (1)	156	71
	6.2	30	—	CHF01648 (3)	CHF01649 (5)	CHF01650 (3)	CHF01651 (1)	163	74
	6.3	38	—	CHF01652 (5)	CHF01653 (5)	CHF01654 (3)	CHF01655 (1)	204	93
	6.3	45	—	CHF01656 (5)	CHF01657 (5)	CHF01658 (3)	CHF01659 (5)	211	96
	6.4	63	—	—	CHF01660 (5)	CHF01661 (3)	CHF01662 (5)	260	118
	6.4	75	—	—	CHF01663 (5)	CHF01664 (5)	CHF01665 (5)	270	122
8"-150lb 18 elements	8.2	30	—	CHF01666 (3)	CHF01667 (2)	CHF01668 (2)	CHF01669 (1)	244	111
	8.3	40	—	—	CHF01670 (2)	CHF01671 (2)	CHF01672 (1)	274	124
	8.4	50	—	—	CHF01673 (3)	CHF01674 (3)	CHF01675 (2)	303	137
8"-150lb 24 elements	8.2	40	—	CHF01676 (4)	CHF01677 (2)	CHF01678 (2)	CHF01679 (1)	253	115
	8.3	53	—	—	CHF01680 (4)	CHF01681 (3)	CHF01682 (2)	287	130
	8.4	67	—	—	CHF01683 (4)	CHF01684 (3)	CHF01685 (2)	318	144
10"-150lb 27 elements	10.1	60	—	—	CHF01686 (3)	—	CHF01687 (3)	204	93
	10.2	75	—	—	CHF01688 (9)	—	CHF01689 (3)	223	101
12"-150lb 36 elements	12.1	80	—	—	—	—	CHF01690 (3)	265	120
	12.2	100	—	—	—	—	CHF01691 (3)	287	130
14"-150lb 45 elements	14.1	100	—	—	—	—	CHF01692 (3)	319	145
	14.2	125	—	—	—	—	CHF01693 (5)	346	157

(C*) = Number of Branch Circuits per heater

Ordering Information
See page 11-46

Standard (Non-Stock) Circulation Heaters

Design Features

- *304 Stainless Steel Screw Plug and Steel 150-lb Flanged Heater Sizes*
- *NEMA 1 Terminal Housing*
- *Incoloy® 800 Sheath Heating Elements*
- *Watt Density of 48 watts/in² (7.4 watts/cm²)*
- *Steel Tank*

Typical Heating Applications: Process Water

Nominal Pipe Size	Dimensions Reference Number	KW	Part Number 120V	240V-1Ph (C*)	240V-3Ph (C*)	480V-1Ph (C*)	480V-3Ph (C*)	Approximate Net Weight lbs	kgs
2½" NPT 3 elements	2.1	6	—	CHF01694 (1)	CHF01695 (1)	CHF01696 (1)	CHF01697 (1)	28	13
	2.1	7.5	—	CHF01698 (1)	CHF01699 (1)	CHF01700 (1)	CHF01701 (1)	29	13
	2.1	9	—	CHF01702 (1)	CHF01703 (1)	CHF01704 (1)	CHF01705 (1)	30	14
	2.2	12	—	—	CHF01706 (1)	CHF01707 (1)	CHF01708 (1)	37	17
	2.3	15	—	—	CHF01709 (1)	CHF01710 (1)	CHF01711 (1)	45	20
	2.3	18	—	—	CHF01712 (1)	CHF01713 (1)	CHF01714 (1)	46	21
3"-150lb 3 elements	3.1	6	—	CHF01715 (1)	CHF01716 (1)	CHF01717 (1)	CHF01718 (1)	53	24
	3.1	7.5	—	CHF01719 (1)	CHF01720 (1)	CHF01721 (1)	CHF01722 (1)	53	24
	3.2	9	—	CHF01723 (1)	CHF01724 (1)	CHF01725 (1)	CHF01726 (1)	61	28
	3.2	12	—	—	CHF01727 (1)	CHF01728 (1)	CHF01729 (1)	62	28
	3.3	15	—	—	CHF01730 (1)	CHF01731 (1)	CHF01732 (1)	74	34
	3.3	18	—	—	CHF01733 (1)	CHF01734 (1)	CHF01735 (1)	76	34
4"-150lb 6 elements	4.1	9	—	CHF01736 (1)	CHF01737 (1)	CHF01738 (1)	CHF01739 (1)	76	34
	4.1	12	—	CHF01740 (2)	CHF01741 (1)	CHF01742 (1)	CHF01743 (1)	78	35
	4.1	15	—	CHF01744 (2)	CHF01745 (1)	CHF01746 (1)	CHF01747 (1)	79	36
	4.2	18	—	CHF01748 (2)	CHF01749 (1)	CHF01750 (1)	CHF01751 (1)	91	41
	4.2	24	—	CHF01752 (2)	CHF01753 (2)	CHF01754 (2)	CHF01755 (1)	94	43
	4.3	30	—	—	CHF01756 (2)	CHF01757 (2)	CHF01758 (1)	117	53
	4.3	36	—	—	CHF01759 (2)	CHF01760 (2)	CHF01761 (1)	120	54
5"-150lb 6 elements	5.1	24	—	CHF01762 (2)	CHF01763 (2)	CHF01764 (2)	CHF01765 (1)	117	53
	5.2	30	—	—	CHF01766 (2)	CHF01767 (2)	CHF01768 (1)	128	58
	5.3	36	—	—	CHF01769 (2)	CHF01770 (2)	CHF01771 (1)	146	66
5"-150lb 9 elements	5.1	36	—	—	CHF01772 (3)	CHF01773 (3)	CHF01774 (1)	123	56
	5.2	45	—	—	CHF01775 (3)	CHF01776 (3)	CHF01777 (3)	135	61
	5.3	54	—	—	CHF01778 (3)	CHF01779 (3)	CHF01780 (3)	154	70
6"-150lb 12 elements	6.1	18	—	CHF01781 (2)	CHF01782 (1)	CHF01783 (1)	CHF01784 (1)	124	56
	6.1	24	—	CHF01785 (2)	CHF01786 (2)	CHF01787 (2)	CHF01788 (1)	127	58
	6.1	30	—	CHF01789 (3)	CHF01790 (2)	CHF01791 (2)	CHF01792 (1)	129	59
	6.2	36	—	CHF01793 (3)	CHF01794 (2)	CHF01795 (2)	CHF01796 (1)	152	69
	6.2	48	—	—	CHF01797 (4)	CHF01798 (3)	CHF01799 (2)	157	71
	6.3	60	—	—	CHF01800 (4)	CHF01801 (3)	CHF01802 (2)	197	89
	6.3	72	—	—	CHF01803 (4)	—	CHF01804 (2)	202	92
6"-150lb 15 elements	6.1	23	—	CHF01805 (3)	CHF01806 (5)	CHF01807 (1)	CHF01808 (1)	126	57
	6.1	30	—	CHF01809 (3)	CHF01810 (5)	CHF01811 (3)	CHF01812 (1)	130	59
	6.1	38	—	CHF01813 (5)	CHF01814 (5)	CHF01815 (3)	CHF01816 (1)	132	60
	6.2	45	—	CHF01817 (5)	CHF01818 (5)	CHF01819 (3)	CHF01820 (5)	156	71
	6.2	60	—	—	CHF01821 (5)	CHF01822 (3)	CHF01823 (5)	163	74
	6.3	75	—	—	CHF01824 (5)	CHF01825 (5)	CHF01826 (5)	204	93
	6.3	90	—	—	CHF01827 (5)	—	CHF01828 (5)	211	96
8"-150lb 18 elements	8.2	50	—	—	CHF01829 (3)	CHF01830 (3)	CHF01831 (2)	234	106
	8.3	75	—	—	CHF01832 (6)	—	CHF01833 (2)	264	120
	8.4	100	—	—	CHF01834 (6)	—	CHF01835 (3)	293	133
	8.5	125	—	—	CHF01836 (6)	—	CHF01837 (6)	327	148
	8.6	150	—	—	—	—	CHF01838 (6)	360	163
	8.7	175	—	—	—	—	CHF01839 (6)	395	179
	8.7	200	—	—	—	—	CHF01840 (6)	405	184
8"-150lb 24 elements	8.2	67	—	—	CHF01841 (4)	CHF01842 (3)	CHF01843 (2)	243	110
	8.3	100	—	—	CHF01844 (8)	—	CHF01845 (4)	277	126
	8.4	133	—	—	CHF01846 (8)	—	CHF01847 (4)	308	140
	8.5	167	—	—	CHF01848 (8)	—	CHF01849 (8)	346	157
	8.6	200	—	—	—	—	CHF01850 (8)	382	173
	8.7	233	—	—	—	—	CHF01851 (8)	420	191
	8.7	267	—	—	—	—	CHF01852 (8)	433	196
10"-150lb 27 elements	10.3	225	—	—	—	—	CHF01853 (9)	539	244
	10.5	262	—	—	—	—	CHF01854 (9)	615	279
12"-150lb 36 elements	12.3	300	—	—	—	—	CHF01855 (12)	694	315
	12.5	350	—	—	—	—	CHF01856 (12)	782	355
14"-150lb 45 elements	14.2	315	—	—	—	—	CHF01857 (15)	771	350
	14.3	375	—	—	—	—	CHF01858 (15)	827	375

(C) = Number of Branch Circuits per heater*

Product Inventory Available for Viewing and Selection @ www.tempco.com

Standard (Non-Stock) Circulation Heaters

Design Features

- *Brass Screw Plug and Steel 150-lb Flanged Heater Sizes*
- *NEMA 1 Terminal Housing*
- *Steel Tank*
- *Copper Sheath Heating Elements*
- *Watt Density of 60 watts/in² (9.3 watts/cm²)*

Typical Heating Applications: Clean Water

Nominal Pipe Size	Dimensions Reference Number	KW	Part Number 120V	240V-1Ph (C*)	240V-3Ph (C*)	480V-1Ph (C*)	480V-3Ph (C*)	Approximate Net Weight lbs	kgs
1¼" NPT 2 elements	1.1	3	CHF01859	CHF01860 (1)	—	—	—	14	6
	1.1	4	—	CHF01861 (1)	—	—	—	14	6
	1.2	5	—	CHF01862 (1)	—	—	—	17	8
	1.2	6	—	CHF01863 (1)	—	—	—	18	8
2½" NPT 3 elements	2.1	6	—	CHF01864 (1)	CHF01865 (1)	CHF01866 (1)	CHF01867 (1)	26	12
	2.1	7.5	—	CHF01868 (1)	CHF01869 (1)	CHF01870 (1)	CHF01871 (1)	26	12
	2.1	9	—	CHF01872 (1)	CHF01873 (1)	CHF01874 (1)	CHF01875 (1)	27	12
	2.2	12	—	—	CHF01877 (1)	CHF01878 (1)	CHF01879 (1)	34	15
	2.2	15	—	—	CHF01881 (1)	CHF01882 (1)	CHF01883 (1)	35	16
	2.3	18	—	—	CHF01885 (1)	CHF01886 (1)	CHF01887 (1)	43	20
3"-150lb 3 elements	3.1	6	—	CHF01888 (1)	CHF01889 (1)	CHF01890 (1)	CHF01891 (1)	52	24
	3.1	9	—	CHF01892 (1)	CHF01893 (1)	CHF01894 (1)	CHF01895 (1)	53	24
	3.2	12	—	—	CHF01896 (1)	CHF01897 (1)	CHF01898 (1)	61	28
	3.2	15	—	—	CHF01899 (1)	CHF01900 (1)	CHF01901 (1)	67	30
	3.3	18	—	—	CHF01902 (1)	CHF01903 (1)	CHF01904 (1)	74	34
4"-150lb 6 elements	4.1	12	—	CHF01905 (2)	CHF01906 (1)	CHF01907 (1)	CHF01908 (1)	77	35
	4.1	18	—	CHF01909 (2)	CHF01910 (1)	CHF01911 (1)	CHF01912 (1)	79	36
	4.2	24	—	CHF01913 (2)	CHF01914 (2)	CHF01915 (2)	CHF01916 (1)	92	42
	4.2	30	—	—	CHF01917 (2)	CHF01918 (2)	CHF01919 (1)	94	43
	4.3	36	—	—	CHF01920 (2)	CHF01921 (2)	CHF01922 (1)	117	53
	4.3	50	—	—	—	—	CHF01923 (2)	121	55
	4.4	60	—	—	—	—	CHF01924 (2)	145	66
5"-150lb 6 elements	5.1	24	—	CHF01925 (2)	CHF01926 (2)	CHF01927 (2)	CHF01928 (1)	115	52
	5.1	30	—	—	CHF01929 (2)	CHF01930 (2)	CHF01931 (1)	117	53
	5.2	36	—	—	CHF01932 (2)	CHF01933 (2)	CHF01934 (1)	128	58
	5.3	50	—	—	—	—	CHF01935 (2)	167	76
	5.4	60	—	—	—	—	CHF01936 (2)	196	89
5"-150lb 9 elements	5.1	36	—	—	CHF01937 (3)	CHF01938 (3)	CHF01939 (3)	120	54
	5.1	45	—	—	CHF01940 (3)	CHF01941 (3)	CHF01942 (3)	122	55
	5.2	54	—	—	CHF01943 (3)	CHF01944 (3)	CHF01945 (3)	134	61
	5.3	75	—	—	—	—	CHF01946 (3)	176	80
	5.4	90	—	—	—	—	CHF01947 (3)	197	89
6"-150lb 12 elements	6.1	24	—	CHF01948 (2)	CHF01949 (2)	CHF01950 (2)	CHF01951 (1)	125	57
	6.1	36	—	CHF01952 (3)	CHF01953 (2)	CHF01954 (2)	CHF01955 (1)	129	59
	6.2	48	—	—	CHF01956 (4)	CHF01957 (3)	CHF01958 (2)	153	69
	6.2	60	—	—	CHF01959 (4)	CHF01960 (3)	CHF01961 (2)	157	71
	6.3	72	—	—	CHF01962 (4)	—	CHF01963 (2)	196	89
	6.3	100	—	—	—	—	CHF01964 (2)	204	93
	6.4	120	—	—	—	—	CHF01965 (4)	246	112
6"-150lb 15 elements	6.1	30	—	CHF01966 (3)	CHF01967 (5)	CHF01968 (3)	CHF01969 (1)	128	58
	6.1	45	—	CHF01970 (5)	CHF01971 (5)	CHF01972 (3)	CHF01973 (5)	133	60
	6.2	60	—	—	CHF01974 (5)	CHF01975 (3)	CHF01976 (5)	158	72
	6.2	75	—	—	CHF01977 (5)	CHF01978 (5)	CHF01979 (5)	163	74
	6.3	90	—	—	CHF01980 (5)	—	CHF01981 (5)	202	92
	6.3	125	—	—	—	—	CHF01982 (5)	213	97
	6.4	150	—	—	—	—	CHF01983 (5)	257	117
8"-150lb 18 elements	8.1	50	—	—	CHF01984 (3)	CHF01985 (3)	CHF01986 (2)	210	95
	8.2	75	—	—	CHF01987 (6)	—	CHF01988 (2)	238	108
	8.3	100	—	—	CHF01989 (6)	—	CHF01990 (3)	266	121
	8.4	125	—	—	CHF01991 (6)	—	CHF01992 (6)	294	133
	8.5	150	—	—	—	—	CHF01993 (6)	326	148
	8.6	175	—	—	—	—	CHF01994 (6)	358	162
	8.7	200	—	—	—	—	CHF01995 (6)	391	177

(C*) = Number of Branch Circuits per heater

Ordering Information
See page 11-46

Standard (Non-Stock) Circulation Heaters

Design Features

- *316 Stainless Steel Screw Plug and 316 Stainless Steel 150-lb Flanged Heater Sizes*
- *NEMA 1 Terminal Housing*
- *316 Stainless Steel Sheath Heating Elements*
- *Watt Density of 60 watts/in² (9.3 watts/cm²)*
- *316 Stainless Steel Tank*

Typical Heating Application: Deionized Water

Nominal Pipe Size	Dimensions Reference Number	KW	Part Number 120V	240V-1Ph (C*)	240V-3Ph (C*)	480V-1Ph (C*)	480V-3Ph (C*)	Approximate Net Weight lbs	kgs
2½" NPT 3 elements	2.1	6	—	CHF01996 (1)	CHF01997 (1)	CHF01998 (1)	CHF01999 (1)	28	13
	2.1	7.5	—	CHF02000 (1)	CHF02001 (1)	CHF02002 (1)	CHF02003 (1)	28	13
	2.1	9	—	CHF02004 (1)	CHF02005 (1)	CHF02006 (1)	CHF02007 (1)	29	13
	2.2	12	—	—	CHF02009 (1)	CHF02010 (1)	CHF02011 (1)	36	16
	2.2	15	—	—	CHF02013 (1)	CHF02014 (1)	CHF02015 (1)	37	17
	2.3	18	—	—	CHF02017 (1)	CHF02018 (1)	CHF02019 (1)	38	17
4"-150lb 6 elements	4.1	12	—	CHF02020 (2)	CHF02021 (1)	CHF02022 (1)	CHF02023 (1)	77	35
	4.1	18	—	CHF02024 (2)	CHF02025 (1)	CHF02026 (1)	CHF02027 (1)	79	36
	4.2	24	—	CHF02028 (2)	CHF02029 (2)	CHF02030 (2)	CHF02031 (1)	92	42
	4.2	30	—	—	CHF02032 (2)	CHF02033 (2)	CHF02034 (1)	94	42
	4.3	36	—	—	CHF02035 (2)	CHF02036 (2)	CHF02037 (1)	117	53
	4.3	50	—	—	—	—	CHF02038 (2)	121	55
	4.4	60	—	—	—	—	CHF02039 (2)	145	66
6"-150lb 12 elements	6.1	24	—	CHF02040 (3)	CHF02041 (2)	CHF02042 (2)	CHF02043 (1)	126	57
	6.1	36	—	CHF02044 (3)	CHF02045 (2)	CHF02046 (2)	CHF02047 (1)	130	59
	6.2	48	—	—	CHF02048 (4)	CHF02049 (3)	CHF02050 (2)	153	69
	6.2	60	—	—	CHF02051 (4)	CHF02052 (3)	CHF02053 (2)	157	71
	6.3	72	—	—	CHF02054 (4)	—	CHF02055 (2)	196	89
	6.3	100	—	—	—	—	CHF02056 (4)	205	93
	6.4	120	—	—	—	—	CHF02057 (4)	246	112
6"-150lb 15 elements	6.1	30	—	CHF02058 (3)	CHF02059 (5)	CHF02060 (3)	CHF02061 (1)	128	58
	6.1	45	—	CHF02062 (5)	CHF02063 (5)	CHF02064 (3)	CHF02065 (5)	133	60
	6.2	60	—	—	CHF02066 (5)	CHF02067 (3)	CHF02068 (5)	158	72
	6.2	75	—	—	CHF02069 (5)	CHF02070 (5)	CHF02071 (5)	163	74
	6.3	90	—	—	CHF02072 (5)	—	CHF02073 (5)	202	92
	6.3	125	—	—	—	—	CHF02074 (5)	213	97
	6.4	150	—	—	—	—	CHF02075 (5)	257	117

(C*) = Number of Branch Circuits per heater

Ordering Information

Catalog Heaters

Order by Part Number for catalog heaters listed on pages 11-39 through 11-46.

Standard lead time is 4-5 weeks.

Custom Engineered/Manufactured Heaters

For sizes and ratings not listed, **TEMPCO** will design and manufacture a Circulation Heater to meet your requirements. ***Please Specify*** the following:

- ❑ Application, including operating temperature/pressure
- ❑ Wattage and Voltage and Phase
- ❑ Screw Plug or Flange Size and Material
- ❑ Element Sheath Material
- ❑ Element Watt Density
- ❑ Element Immersion Length
- ❑ Electrical Enclosure Type
- ❑ Thermostat— if required
- ❑ Vessel Material
- ❑ Additional Insulation
- ❑ Flow Control Baffles
- ❑ Other Optional Features

Power Control Panels for Process Heaters

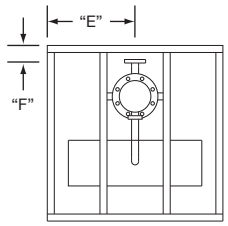
Note: **Power Control Panels** featuring mechanical or solid state controls with all other necessary components can be provided by TEMPCO for any size circulation heater. Refer to Section 13, pages 13-42 through 13-49 for complete details.

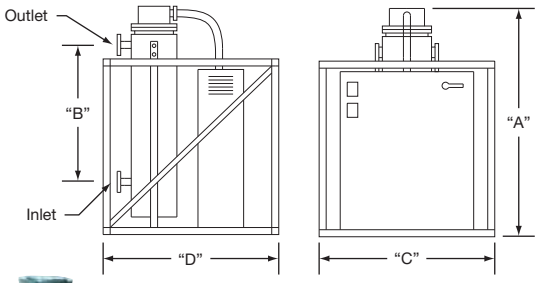
Product Inventory Available for Viewing and Selection @ www.tempco.com

Process Circulation Heating Systems

TEMPCO Circulation Systems include a circulation heater and power control panel skid mounted in a compact package to use minimal floor space. Heater vessel is carbon steel and can be vertically or horizontally mounted.

The pre-wired panel contains a process temperature control and a manual reset over-temperature control. The Zero Voltage Fired SCR power controller provides proportional power to the heater load for precise temperature control.





Horizontal Mount

Vertical Mount

Design Features

- 150-lb Flanged Heater Sizes
- Steel Sheath Heating Elements
- NEMA 1 Terminal Housing
- Watt Density of 15 watts/in^2 (2.3 watts/cm^2)

Standard (Non-Stock) Vertically Mounted Process Circulation Heating Systems

Typical Heating Applications: Medium Weight Oils • Heat Transfer Oils

KW	Heater Flange Size	In-Out Pipe Size	"A"		"B"		"C"		"D"		"E"		"F"		Part Number	
			in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	240V-3Ph	480V-3Ph
10	5"	2"	46	1168	25	635	39	991	13	330	8	203	43	1092	CHS02076	CHS02077
15	5"	2"	58	1473	37	940	39	991	13	330	8	203	57	1448	CHS02078	CHS02079
20	5"	2"	71	1803	50	1270	39	991	13	330	8	203	70	1778	CHS02080	CHS02081
25	5"	2"	83	2102	62	1575	39	991	13	330	8	203	82	2083	CHS02082	CHS02083
30	8"	2½"	52	1321	25	635	42	1067	14	356	13	330	45	1143	CHS02084	CHS02085
40	8"	2½"	65	1651	37	940	42	1067	14	356	13	330	59	1499	CHS02086	CHS02087
55	8"	2½"	77	1956	50	1270	42	1067	14	356	13	330	72	1829	CHS02088	CHS02089
70	8"	2½"	90	2286	62	1575	42	1067	14	356	13	330	84	2134	CHS02090	CHS02091
90	10"	4"	108	2743	75	1905	44	1118	19	483	14	356	102	2591	CHS02092	CHS02093
110	12"	5"	96	2438	62	1575	46	1168	19	483	15	381	89	2261	—	CHS02094
150	14"	6"	97	2464	62	1575	48	1219	19	483	16	406	89	2261	—	CHS02095
180	14"	6"	110	2794	75	1905	48	1219	19	483	16	406	102	2591	—	CHS02096

Ordering Information

Catalog Heaters

Order by Part Number for catalog heaters.

Standard lead time is 6-7 weeks.

Custom Engineered/Manufactured Heaters

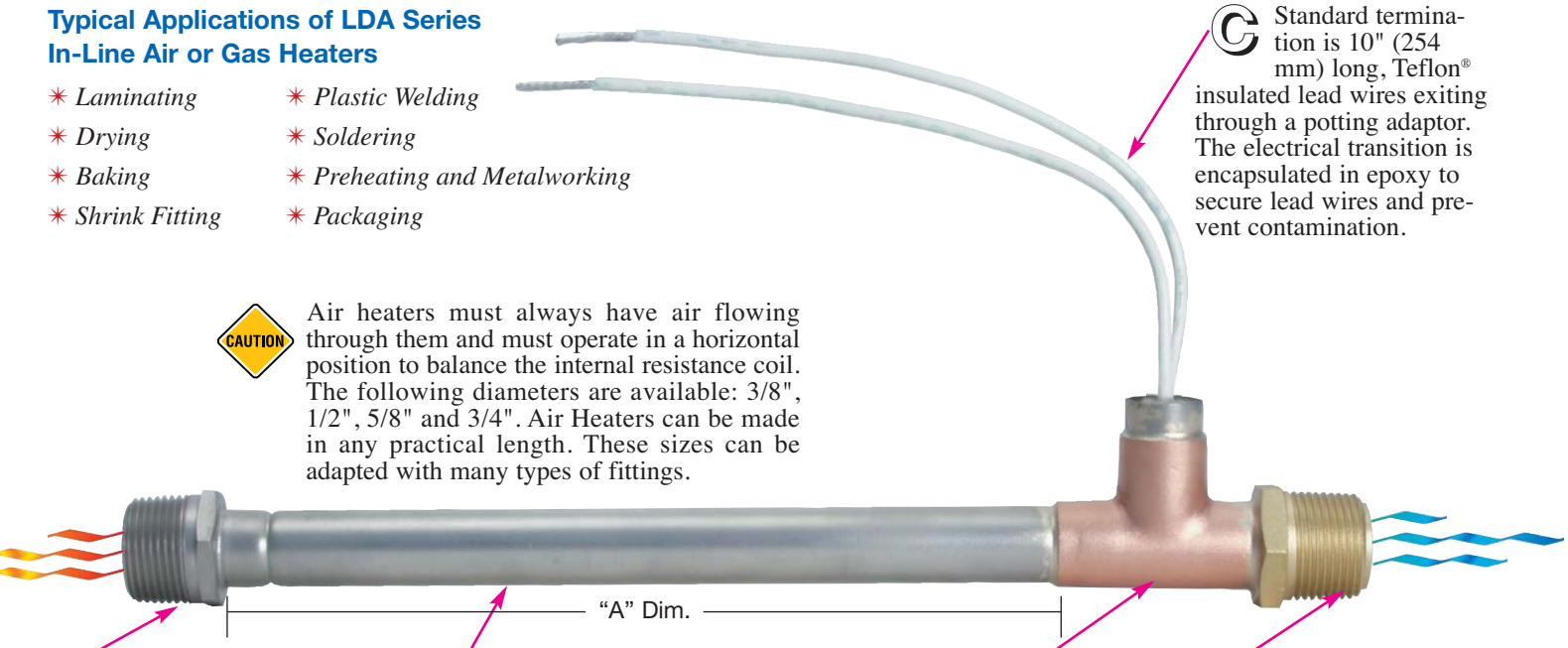
For sizes and ratings not listed, **TEMPCO** will design and manufacture a Circulation System to meet your requirements. ***Please Specify*** the following:

- ❑ Maximum temperature rise and operating pressure
- ❑ Inlet-Outlet size and type
- ❑ Vertical or horizontal mounting
- ❑ Element sheath material (Steel, Incoloy® or Copper)
- ❑ Vessel material (carbon steel or stainless steel)
- ❑ Element Watt density
- ❑ Wattage (up to 600KW), Voltage, Phase

LDA In-Line Forced Air Process Heaters

Typical Applications of LDA Series In-Line Air or Gas Heaters

- *Laminating*
- *Drying*
- *Baking*
- *Shrink Fitting*
- *Plastic Welding*
- *Soldering*
- *Preheating and Metalworking*
- *Packaging*



C Standard termination is 10" (254 mm) long, Teflon® insulated lead wires exiting through a potting adaptor. The electrical transition is encapsulated in epoxy to secure lead wires and prevent contamination.

CAUTION

Air heaters must always have air flowing through them and must operate in a horizontal position to balance the internal resistance coil. The following diameters are available: 3/8", 1/2", 5/8" and 3/4". Air Heaters can be made in any practical length. These sizes can be adapted with many types of fittings.

A Stainless Steel NPT fitting is heli-arc welded at the air outlet.

B Alloy 304 stainless steel tubing is used to provide high temperature strength and resistance to oxidation up to outlet temperature of 1000°F (538°C). Inlet air or gas temperature up to 250°F (121°C).

D Copper "T" fitting.

E NPT Brass fitting is silver-brazed at air inlet.

LDA In-Line Air Process Heater Specifications

Heater Diameter (in)	Maximum Amperage	Cross Sectional Flow Area (in^2)	Maximum CFM (ft^3)	Max. Wattage/Linear Inch Of Heated Length
3/8	6	.03	8	200
1/2	10	.04	10	250
5/8	15	.070	15	375
3/4	20	.120	20	500

Note: LDA In-Line Air Process Heaters can be made in any practical length within the standard diameters.

Heater Selection

To ensure maximum heater life, heater wattage must be calculated so that it is suitable for the desired air flow. To calculate wattage, determine the air flow and temperature rise required. The following relationship can be used to determine the wattage.

$$\text{Wattage} = \frac{\text{CFM} \times \text{Temperature rise (°F)}}{3}$$

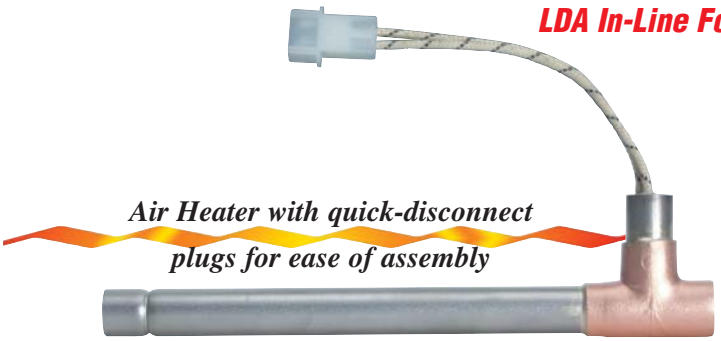
Table 1 Shows the relationship between cubic feet per minute versus maximum watts per linear inch of heated length on different heater diameters.

Maximum Watts per Linear Inch of Heated Length				
CFM	3/8" Dia.	1/2" Dia.	5/8" Dia.	3/4" Dia.
2	80	80	100	120
4	100	100	100	120
6	150	150	150	150
8	200	200	200	200
10	—	250	250	250
15	—	—	375	375
20	—	—	—	500

Note: It is recommended that the wattage not exceed the maximum watts per linear inch indicated in the above reference table.

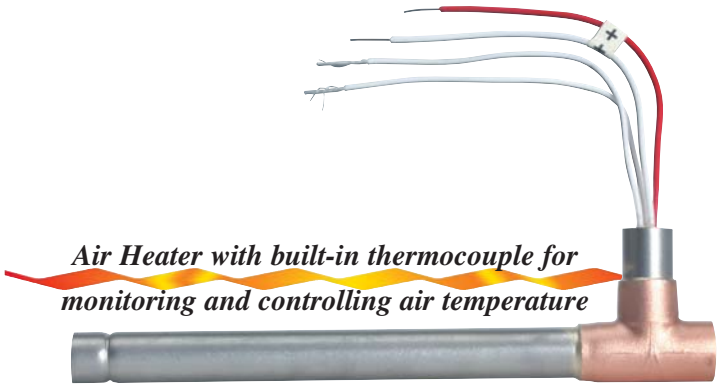
Product Inventory Available for Viewing and Selection @ www.tempco.com

LDA In-Line Forced Air and Gas Heating



Air Heater with quick-disconnect plugs for ease of assembly

Custom designed hot air igniter heater



Air Heater with built-in thermocouple for monitoring and controlling air temperature

Standard (Non-Stock) LDA In-Line Air Process Heaters

Diameter	Sheath (in)	Watts	Volts	Hot End Fitting	Cold End Fitting	Lead Length (in)	Notes	Part Number
3/8	4	400	120	No Fitting	No Fitting	18		LDA00022
3/8	4	200	120	No Fitting	No Fitting	10		LDA00032
1/2	7	500	120	No Fitting	No Fitting	10		LDA00012
1/2	5	400	240	No Fitting	No Fitting	10		LDA00018
1/2	6-1/2	400	120	No Fitting	No Fitting	10		LDA00019
1/2	5	400	120	No Fitting	No Fitting	10	w/Type J T/C	LDA00020
1/2	5	500	120	No Fitting	No Fitting	10	w/Type J T/C	LDA00023
1/2	5	400	120	No Fitting	1/8 NPT SS Female	36	w/Mate-N-Lock Amp Connector	LDA00027
1/2	4	200	120	No Fitting	No Fitting	12		LDA00031
1/2	5	400	120	1/8 NPT SS Female	1/8 NPT SS Female	36		LDA00035
1/2	7	1000	240	No Fitting	No Fitting	10		LDA00036
1/2	7	500	120	No Fitting	No Fitting	10		LDA00037
5/8	5	600	120	3/8 NPT SS Male	1/4 NPT SS Female	36		LDA00005
5/8	5	500	120	No Fitting	No Fitting	10		LDA00007
3/4	6	750	208	1/4 NPT SS Female	1/4 NPT SS Female	63	Distributed Watts	LDA00002
3/4	8	1000	240	3/4 NPT SS Male	3/4 NPT Brass Male	24 w/SS Braid		LDA00003
3/4	8	2000	240	3/4 NPT SS Male	3/4 NPT Brass Male	24 w/SS Braid	Distributed Watts	LDA00008
3/4	8	2000	240	3/4 NPT SS Male	3/4 NPT Brass Male	36 w/SS Braid	Distributed Watts	LDA00009
3/4	4-1/2	750	230	1/4 NPT SS Female	No Fitting	60	Hermetic Seal	LDA00025
3/4	4-1/2	800	115	1/4 NPT SS Female	No Fitting	18	Hermetic Seal	LDA00026
3/4	5	670	240	3/4 NPT SS Male	3/4 NPT Brass Male	36 w/SS Braid		LDA00030

Ordering Information

Catalog Heaters

Order by Part Number for catalog heaters.

Standard lead time is 2-3 weeks.

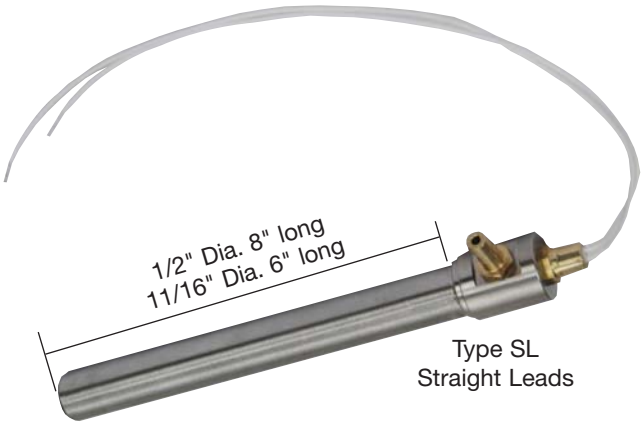
Custom Engineered/Manufactured Heaters

For sizes and ratings not listed, **TEMPCO** will design and manufacture an LDA In-Line heater to meet your requirements.

Please Specify the following:

- ❑ Diameter
- ❑ Inlet-Outlet size and type
- ❑ "A" Dimension
- ❑ Wattage and Voltage
- ❑ Optional Thermocouple
- ❑ Lead Lengths and Type
- ❑ Special Requirements

HAC In-Line Forced Air Process Heaters



Type SL
Straight Leads

Type SA
Straight Air Inlet

Type NT
90° Air Inlet

Design Features

- *Two standard sizes: 1/2" diameter × 8" long, 11/16" diameter × 6" long*
- *304 Stainless Steel sheath*
- *Exit air or gas temperature up to 1400°F (760°C)*
- *Inlet air or gas temperature up to 250°F (121°C)*
- *Ceramic coil support and insulator*
- *Three different terminations*
- *Customized termination, inlet, outlet, and wattage to customer specification available*

Daisy Wound Heating Element

This continuous wound heavy gage high temperature alloy wire is supported on custom designed ceramic insulator. This unique coil design rapidly and efficiently remove heat from the resistor wire to achieve higher air/gas temperatures than conventional coil wound designs.
The coil assembly is enclosed in stainless steel housings for safety and durability. Termination can be customized to suit your specific application. Consult Tempco with your requirements.

Standard (Non-Stock) 120V In-Line Air Process Heaters

Heaters have 12" Teflon® leads standard,
and the air inlet is a barbed fitting for a 1/4" ID tube.

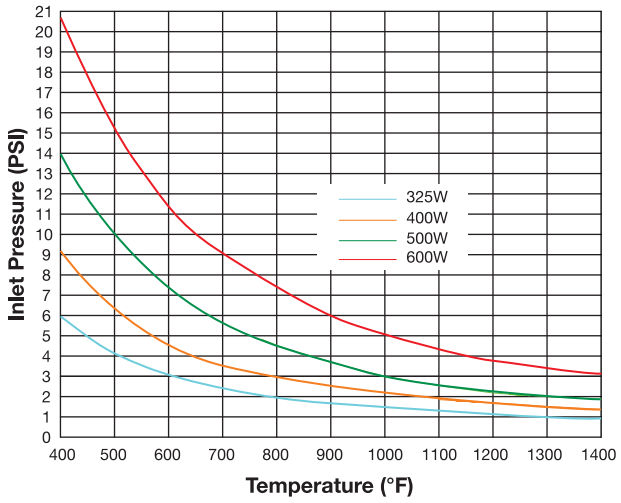
Termination Type	1/2" Diameter, 120V 8" Heater Length				11/16" Diameter, 120V 6" Heater Length	
	325W	400W	500W	600W	500W	600W
SA	HAC00001	HAC00004	HAC00007	HAC00010	HAC00013	HAC00016
SL	HAC00002	HAC00005	HAC00008	HAC00011	HAC00014	HAC00017
NT	HAC00003	HAC00006	HAC00009	HAC00012	HAC00015	HAC00018

CAUTION Air heaters must always have air flowing through them and should preferably be operated in a horizontal position. Use clean air.

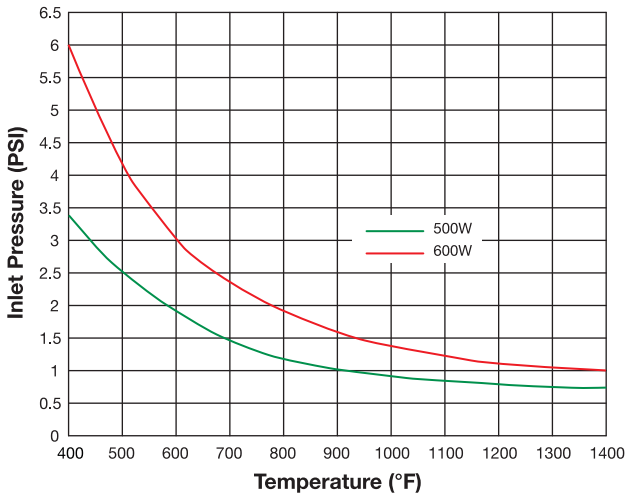
Product Inventory Available for Viewing and Selection @ www.tempco.com

HAC In-Line Air Process Heaters

Pressure vs. Temperature
(1/2" diameter heaters)



Pressure vs. Temperature
(11/16" diameter heaters)



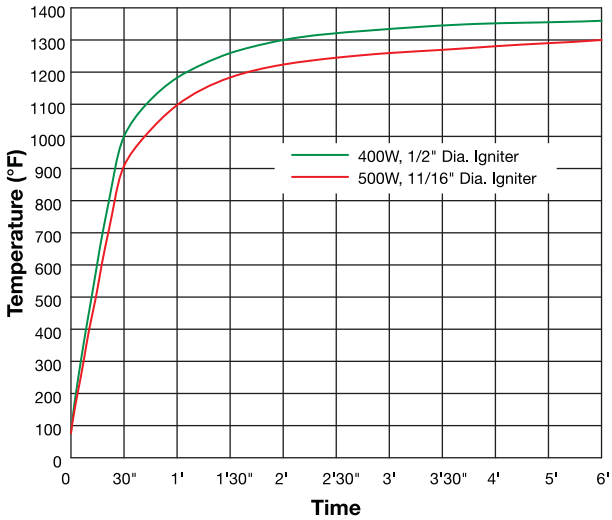
Exit air temperature depends on heater wattage and air flow rate. The above charts show exit air temperature at various inlet air pressures and wattages on a 1/2" and 11/16" OD heaters.

Linear Air Pumps for HAC In-Line Air Process Heaters

Design Features

- *High Efficiency*
- *Quiet Operation*
- *Low Vibration*
- *UL Component Recognition*

Temperature vs. Time
(1.1 CFM Pump)



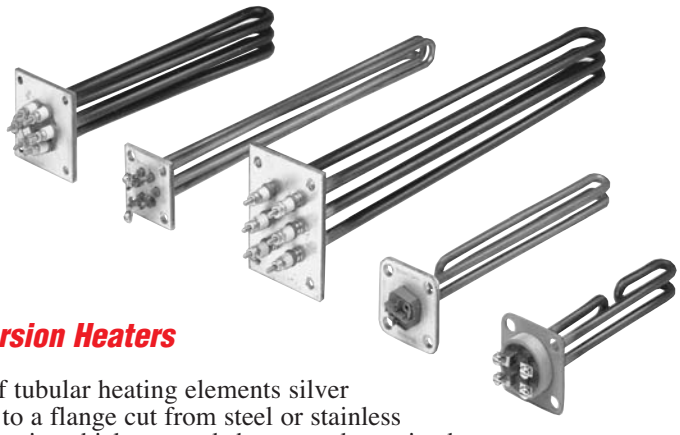
The above chart shows the time for the exit air temperature to reach steady state condition at 1.1 CFM using Tempco's air pump.

Pump Data

Head Configuration:		Pressure			
Pressure:		Flow @ 115V/60			
CFM@PSI	LPM@BAR				
PSI	bar	CFM	LPM	Amps	Watts
0	0	1.1	31.1	0.23	15
1	.1	0.62	10.5	0.23	12
2	.2	0.09		0.24	9
Max. Continuous Pressure:		2.0 PSI		0.14 bar	
Max. Intermittent Pressure:		2.32 PSI		0.16 bar	

HAC In-Line heaters can be connected to your air supply lines with an air pressure regulator. For self contained units Tempco air pumps can be directly connected to HAC In-Line process heaters. The pump comes with a 12" rubber hose for easy connection to the heater inlet.

Flanged Immersion Heaters With Custom Size And Shape Flanges



Typical Applications

- *Hot Air Dryers*
- *Dehumidifying Dryers*
- *Heat Exchange Systems*
- *Water and Water Solutions*
- *Steam Tables*
- *Air Heating*

Custom Immersion Heaters

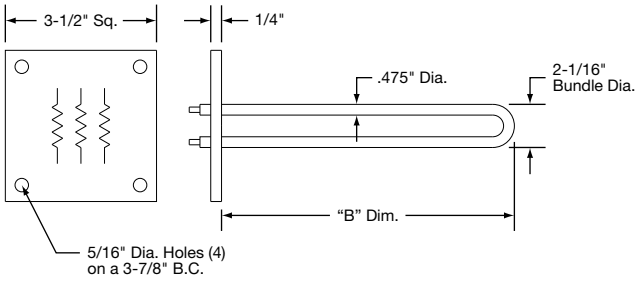
This design consists of tubular heating elements silver brazed or TIG welded to a flange cut from steel or stainless steel plate. Flange plate size, thickness and shape are determined by the application. A fiber gasket is supplied with each heater.

The various style heaters in the Stock Lists on pages 11-52 through 11-55 are direct replacements for heaters in many OEM applications.

This type construction also lends itself to be easily and economically engineered into new equipment.

OEM Replacement Flanged Heaters

3-1/2" Square Steel Flange • 3 Elements



Standard (Non-Stock) and Stock Flanged Heaters

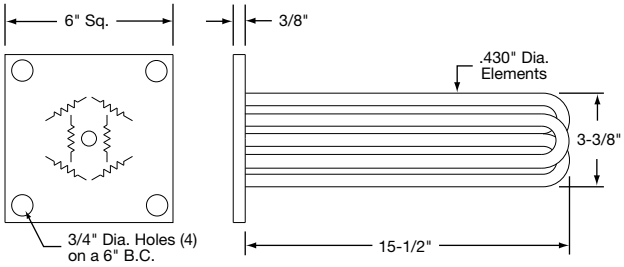
Element Sheath Material	KW	Watt Density W/in²	Watt Density W/cm²	"B" in	"B" mm	Part Number 240V-3Ph Y	Part Number 480V-3Ph Y	Part Number 575V-3Ph Y	Approximate Net Weight lbs	Approximate Net Weight kgs
Incoloy® 800	1.5	15	2.3	12 7/16	316	TPN01400	TPN01401	—	3	1.4
	2.5	24	3.7	12 7/16	316	*TPN01173	TPN01174	*TPN01402	3	1.4
	3	31	4.8	12 7/16	316	TPN01403	*TPN01404	*TPN01405	3	1.4
	3.5	24	3.7	17 7/8	454	*TPN01175	*TPN01201	*TPN01406	4	1.8
	4	27	4.2	17 7/8	454	TPN01407	*TPN01176	TPN01408	4	1.8
	5	34	5.3	17 7/8	454	*TPN01409	*TPN01410	TPN01411	4	1.8
Steel	2.5	24	3.7	12 7/16	316	TPN01351	TPN01373	—	3	1.4
	3.5	24	3.7	17 7/8	454	TPN01311	TPN01412	—	4	1.8

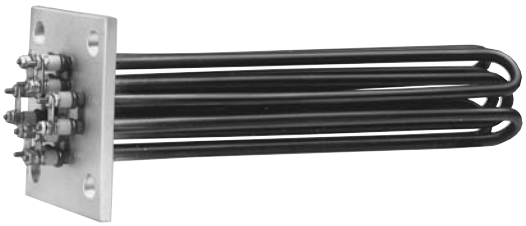
Standard lead time on non-stock items is 3 to 4 weeks.

An asterisk (*) next to the Part Number guarantees in-stock availability for same-day shipping when ORDERED BY 2 PM CST

OEM Replacement Flanged Heaters

6" Square Steel Flanged • 6 Incoloy® 800 Elements • 2 Circuits



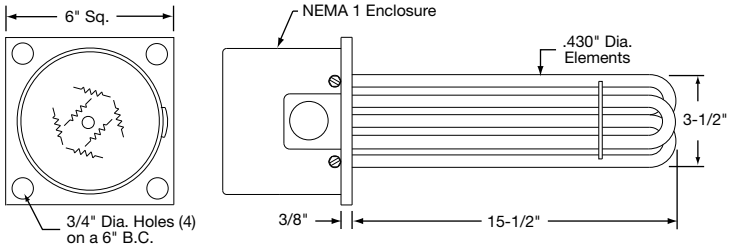


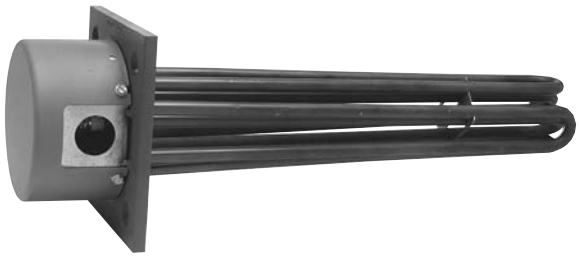
Standard (Non-Stock) and Stock Flanged Heaters

Element Sheath Material	KW	Watt Density W/in²	Watt Density W/cm²	Part Number 208V-3Ph	Part Number 230V-3Ph	Part Number 460V-3Ph	Part Number 575V-3Ph	Approximate Net Weight lbs	Approximate Net Weight kgs
Incoloy® 800	9	44	6.8	*TPN01168	*TPN01169	*TPN01170	TPN01424	8	3.6
	10.5	52	8.1	TPN01425	TPN01426	TPN01427	TPN01428	8	3.6
	12	60	9.3	*TPN01171	TPN01429	*TPN01172	TPN01430	8	3.6
	15	70	10.9	TPN01431	TPN01432	TPN01433	TPN01434	8	3.6

Standard lead time on non-stock items is 3 to 4 weeks.

6" Square Steel Flanged • 6 Incoloy® 800 Elements





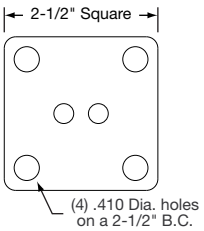
Standard (Non-Stock) and Stock Flanged Heaters

Standard lead time non-stock items is 3 to 4 weeks.

Element Sheath Material	KW	Watt Density W/in²	Watt Density W/cm²	Part Number 208V-3Ph	Part Number 240/480V-3Ph	Part Number 575V-3Ph	Approximate Net Weight lbs	Approximate Net Weight kgs
Incoloy® 800	4.5	20	3.1	TPN01413	TPN01414	—	9	4.1
	9	40	6.2	TPN01415	*TPN01416	TPN01417	9	4.1
	10.5	47	7.3	TPN01418	TPN01419	TPN01420	9	4.1
	12	54	8.4	*TPN01421	*TPN01422	TPN01423	9	4.1

Standard (Non-Stock) Hot Water Tank Heater • 2-1/2" Square Steel Flanged • 1 Incoloy® 800 Element

Immersed Length in	Immersed Length mm	KW	Part Number 120V	Part Number 240V
9¼	235	1.0	—	TPN01484
11	279	1.25	TPN01485	TPN01486
7⅜	187	1.5	TPN01487	TPN01488
9	279	2.0	TPN01489	TPN01490
10¾	273	2.5	—	TPN01491
12⅝	313	3.0	—	TPN01167
13¾	349	3.5	—	TPN01492
15¾	400	4.0	—	TPN01493
16¼	413	4.5	—	TPN01494
19	483	5.0	—	TPN01287



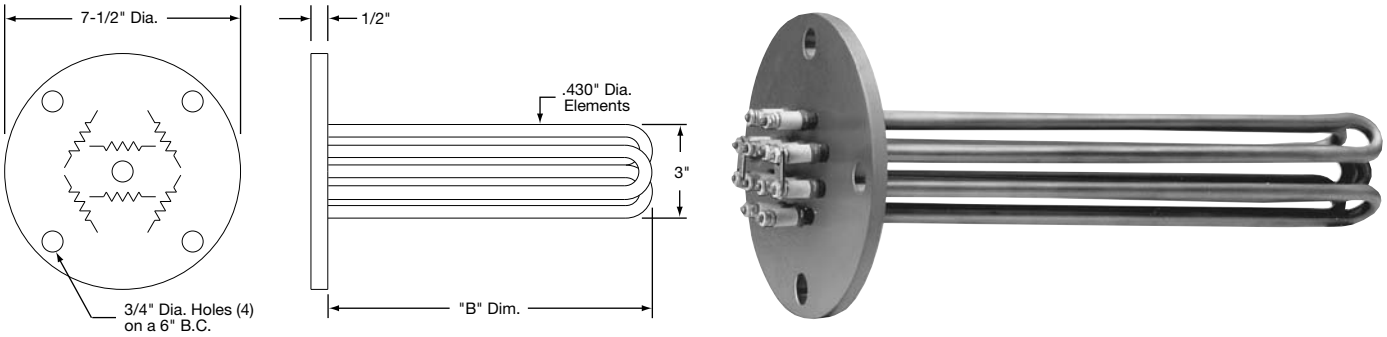
Design Features

- *2-1/2" Square Flange*
- *Incoloy® Element*
- *Gasket*
- *70 w/in²*

Standard lead time on non-stock items is 3 to 4 weeks.

OEM Replacement Flanged Heaters

7-1/2" Diameter Steel Flanged • 6 Elements

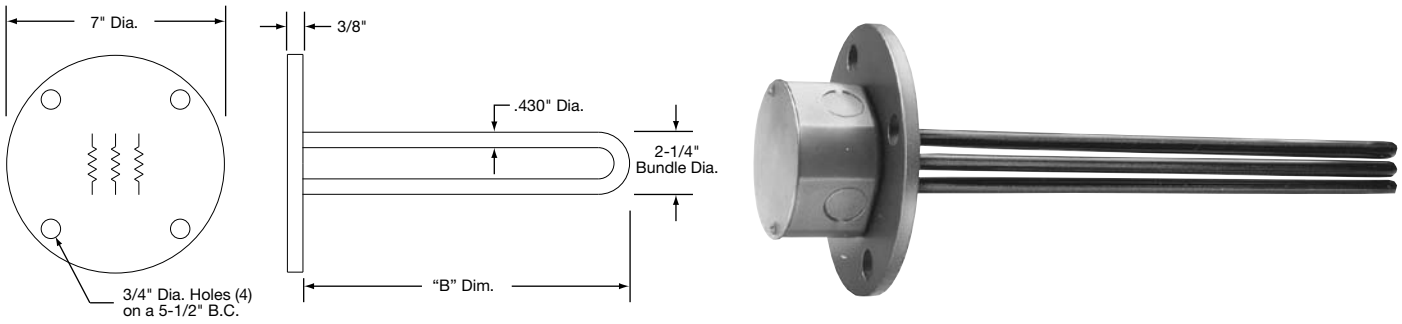


Standard (Non-Stock) and Stock Flanged Heaters

Element Sheath Material	KW	Watt Density W/in²	Watt Density W/cm²	"B" in	"B" mm	Part Number 208V-3Ph	Part Number 240V-3Ph Y	Part Number 480V-3Ph Y	Approximate Net Weight lbs	Approximate Net Weight kgs
Incoloy® 800	7.5	50	7.8	12	305	TPN01468	TPN01165	TPN01469	12	5.5
	9	42	8.1	15⅞	403	TPN01470	*TPN01350	*TPN01211	14	6.4
	10	50	7.8	15⅞	403	TPN01471	TPN01472	TPN01473	14	6.4
	12	53	8.2	15⅞	403	TPN01474	TPN01475	TPN01476	14	6.4
Copper	9	42	8.1	15⅞	403	TPN01477	TPN01478	TPN01479	14	6.4
	10	50	7.8	15⅞	403	TPN01480	TPN01481	TPN01260	14	6.4
	12	53	8.2	15⅞	403	TPN01482	TPN01483	TPN01299	14	6.4

Standard lead time on non-stock items is 3 to 4 weeks.

7" Diameter Steel Flange • 3 Incoloy® 800 Elements



Standard (Non-Stock) and Stock Flanged Heaters

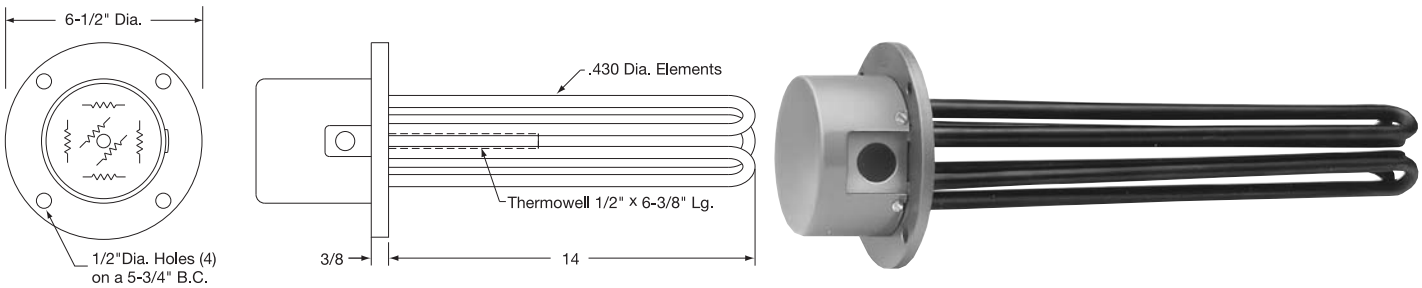
Element Sheath Material	KW	Watt Density W/in²	Watt Density W/cm²	"B" in	"B" mm	Part Number 240V-1Ph	Part Number 240V-3Ph	Part Number 480V-1Ph	Part Number 480V-3Ph	Approximate Net Weight lbs	Approximate Net Weight kgs
Incoloy® 800	3	24	3.7	17⅝	448	TPN01460	TPN01461	TPN01462	TPN01463	6	2.7
	4.5	50	7.8	12⅜	314	*TPN01347	TPN01339	TPN01464	TPN01465	5	2.3
	9	70	10.8	17⅞	454	TPN01348	TPN01198	TPN01349	TPN01223	6	2.7
	12	70	10.8	22⅞	581	—	TPN01304	TPN01466	TPN01467	6	2.7

Standard lead time on non-stock items is 3 to 4 weeks.

An asterisk (*) next to the Part Number guarantees in-stock availability for same-day shipping when ORDERED BY 2 PM CST

OEM Replacement Flanged Heaters

6-1/2" Diameter Steel Flange • 6 Incoloy® 800 Elements • 1 Circuit

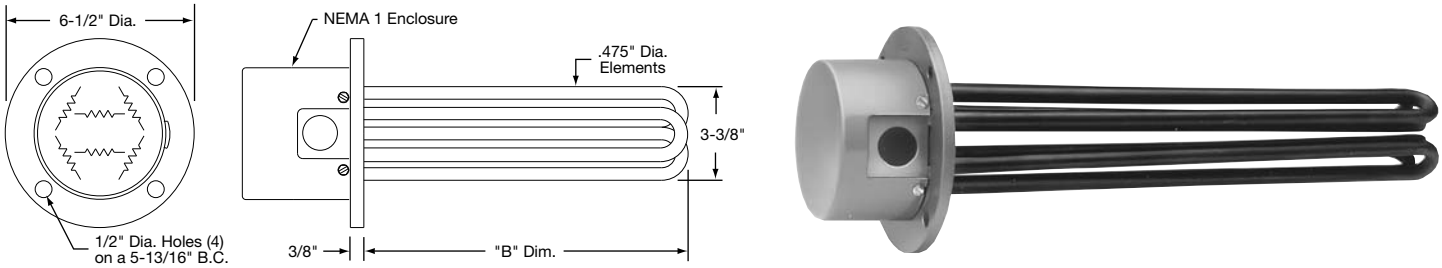


Standard (Non-Stock) and Stock Flanged Heaters

Element Sheath Material	KW	Watt Density W/in²	Watt Density W/cm²	Part Number 460V-3Ph	Approximate Net Weight lbs	Approximate Net Weight kgs
Incoloy® 800	9	46	7.1	*TPN01706	10	4.5
	12	62	9.6	TPN01707	10	4.5

Heaters can be factory rewired for 230V-3PH.

6-1/2" Diameter Steel Flange • 6 Elements • 2 Circuits



Standard (Non-Stock) and Stock Flanged Heaters

Element Sheath Material	KW	Watt Density W/in²	Watt Density W/cm²	B in	B mm	Part Number 208V-3Ph	230V-3Ph	460V-3Ph	575V-3Ph	Approximate Net Weight lbs	Approximate Net Weight kgs
Incoloy® 800	9	50	7.8	17	432	TPN01448	*TPN01177	*TPN01178	*TPN01449	10	4.5
	10.5	42	8.1	17	432	TPN01450	TPN01451	TPN01452	TPN01453	10	4.5
	12	50	7.8	17	432	TPN01454	TPN01204	*TPN01179	TPN01455	10	4.5
Copper	12	48	7.4	17	432	TPN01319	TPN01456	TPN01321	—	10	4.5
	15	70	10.9	28	711	TPN01457	TPN01458	TPN01459	—	12	5.4

Ordering Information

Catalog Heaters

Flanged Immersion Heaters whose Part Numbers are preceded by an asterisk (*) are Guaranteed In Stock for immediate delivery.

Part Numbers with no asterisk (*) are stocked as sub-assemblies for 2-3 week delivery.

Custom Engineered/Manufactured Heaters

Understanding that an electric heater can be very application specific, for sizes and ratings not listed, **TEMPCO** will design and manufacture a Flanged Immersion Heater to meet your requirements. ***Standard lead time is 3 to 4 weeks.***

Please Specify the following:

- ❑ Wattage, Voltage and Phase
- ❑ Flange Size and Material
- ❑ Element Sheath Material
- ❑ Element Watt Density
- ❑ Element Immersion Length
- ❑ Electrical Enclosure, if required
- ❑ Optional Features

Custom Process Tubular DUCT Forced Air Heaters

Process air duct heaters are used for tempering forced air in many industrial processes. Heater wattage is dependent on air outlet temperature (up to 1200°F [650°C]) and air velocity. Smaller duct heaters can be tandem mounted in place of one large unit to meet space limitations and simplify installation.

Heavy wall Incoloy® tubular heating elements (field replaceable) provide protection against corrosive air environments and resistance to vibration when compared to open coil elements.

Air duct heaters can be designed specifically for high pressure and/or hazardous locations. Turnkey systems including the duct heater, power and temperature control panel, and the temperature and over-temperature sensors can also be provided.

Our creative team of professionals can design and manufacture your next process forced air duct heating system.

Consult us with Your Requirements.

Typical Applications

- ✳ *Air Drying/Curing Operations*
- ✳ *Annealing*
- ✳ *Autoclaves*
- ✳ *Booster Air Heater*
- ✳ *Breaking Resistor*
- ✳ *Core Drying*
- ✳ *Dehumidification*
- ✳ *Forced Air Comfort Heating*
- ✳ *Heat Treating*
- ✳ *Make-Up Air Heating*
- ✳ *Re-Heating*
- ✳ *Resistor Load Banks*

High Temperature Application: The electrical housing is separated from the heater flange to lower the ambient temperature of the electrical wiring.

Electrical Housings: NEMA 4 (moisture resistant), NEMA 7 (explosion resistant) and NEMA 12 (dust resistant) are available.

Element Configuration: Elements can be U-bends, W-bends and foldback design depending on the requirements of the application.

Sealed Insulated Housing: An optional totally sealed insulated housing prevents contamination from entering the air stream. Shown is a stainless steel heater for a medical product manufacturing application.

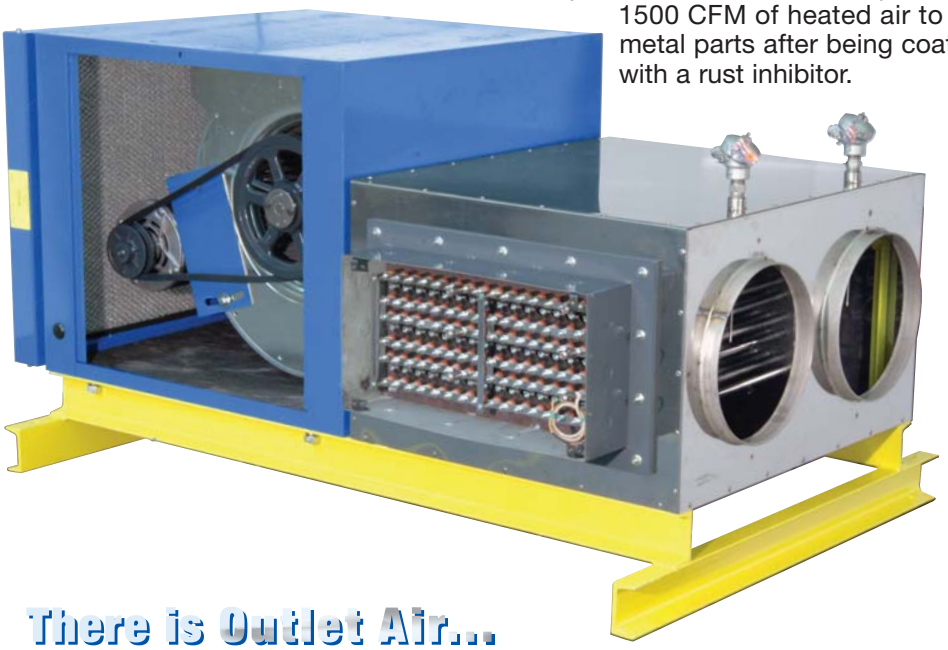
Selection and Sizing
See Page 11-59

Installation and Wiring
See Page 11-61

Standard Designs
See Page 11-62

Companies that integrate
TEMPCO's Forced Air Duct Heater Systems
have something in common.
One less thing to worry about.

Duct Heater System: Tempco can supply the heater and blower assembled, ready for connection to the application duct work. The pictured 48KW, 480V unit produces 1500 CFM of heated air to dry metal parts after being coating with a rust inhibitor.



Complete Your Thermal Loop System with a Tempco Power/Temperature Control Panel.
See pages 13-42 through 13-49.

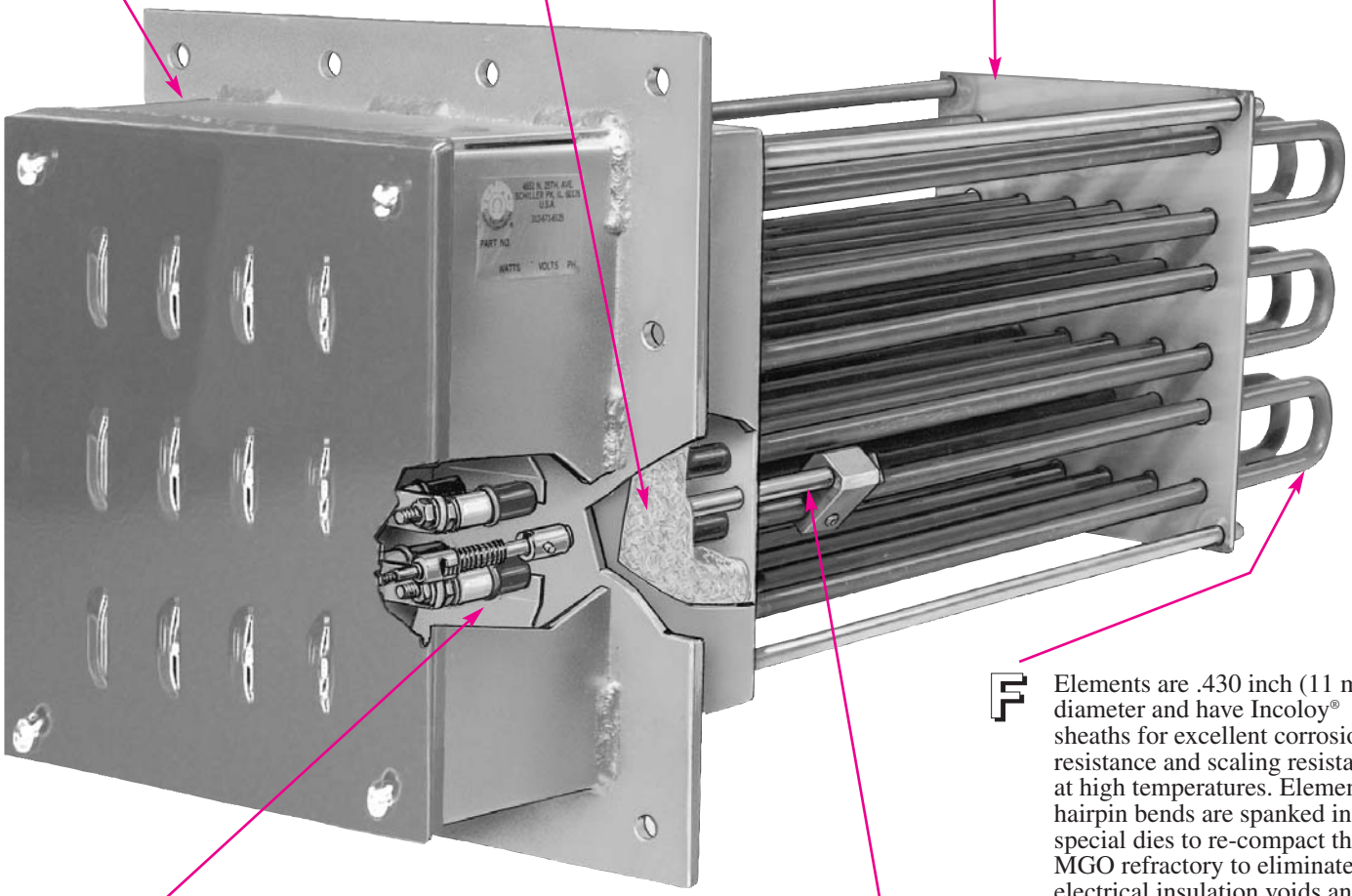
There is Outlet Air...
And then there is Tempco's Tempered Outlet Air for every Forced Air Heating Application.

Forced Air Duct Heaters

A NEMA 1 terminal box enclosure with vented cover to help keep wiring cooler. Optional enclosures: NEMA 4 (moisture resistant), NEMA 7 (explosion resistant) and NEMA 12 (dust resistant).

B 3-1/2 inches (89 mm) of mineral insulation in an aluminized steel enclosure minimizes heat losses while keeping the electrical wiring cooler.

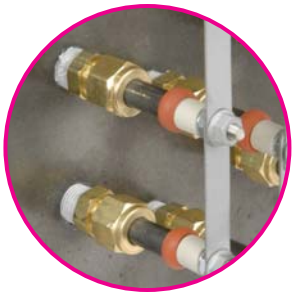
C The heavy duty frame is composed of a 1/4 inch (6 mm) thick steel mounting flange, stainless steel support plate and corner posts to securely hold the heating elements rigid in any mounting position.



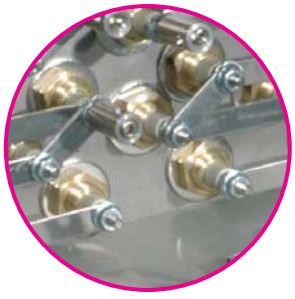
F Elements are .430 inch (11 mm) diameter and have Incoloy® sheaths for excellent corrosion resistance and scaling resistance at high temperatures. Element hairpin bends are spanked in special dies to re-compact the MGO refractory to eliminate any electrical insulation voids and hot spots.

D Field replaceable elements are held in place by a single screw quick release "V" clamp. Optional: Gastight design using compression or bulkhead fittings to attach elements to the flange prevents leakage of ducted gas into the terminal enclosure.

E 1/4 inch (6 mm) inside diameter thermowell accessed through a 1/8" NPT tapped hole in the flange allows installation of an optional Type J or K thermocouple for sensing the element temperature. An excellent safeguard for your system.



Compression Fittings



Bulkhead Fittings

Product Inventory Available for Viewing and Selection @ www.tempco.com

Duct Heater Selection and Sizing

Selecting the Proper Duct Heater

1. Establish the requirements of your process heating application. Select the heater assembly type, size, watt density, sheath material and electrical rating best suited for your application.
2. Match the heater watt density (w/in^2) to the medium being processed. If the watt density is too high for the application the heater will fail prematurely.
3. Match the sheath material and operating temperature to the medium being processed in order to avoid sheath corrosion.
4. Air flows must never be interrupted. Such events will cause overheating and/or premature heater burnout. Your installation should include high limit temperature controls.
5. Be sure that the heaters are securely mounted and protected from mechanical damage.
6. Select the terminal housing that provides the best terminal protection from the environment surrounding the application.
7. Thermostats are optional. Select the type and temperature rating required for the application. See Section 13.
8. If practical, heaters should be cleaned periodically in order to extend heater life.
9. If you should encounter any problems in selecting and/or installing a process heater, consult Tempco for assistance.

Sizing a Duct Heater

To properly match a duct heater to an application, the wattage, air velocity and element watt density must be determined.

Formulas and graphs on the following pages that will aid you in your design include:

- Wattage calculation formulas and table
- Element Watt Density vs. Sheath Temperature and Air Velocity Graph
- Pressure Drop vs. Air Velocity Graph

In most applications the following design limitations should be adhered to:

- Maximum watt density of 40 watts/in^2 (6.2 watts/cm^2)
- Maximum element sheath temperature of 1400°F (760°C)
- Minimum air velocity of 200 feet per minute (61 meters per minute)

KWH to Heat Air at Selected Flow Rates

Amt. of Air CFM	Temperature Rise (°F) 50	100	150	200	250	300	350	400	450	500	600
	Kilowatt Hours to Heat Air										
100	1.7	3.3	5	6.7	8.3	10	11.7	13.3	15	16.7	20
200	3.3	6.7	10	13.3	16.7	20	23.3	26.7	30	33.3	40
300	5.0	10.0	15	20.0	25.0	30	35.0	40.0	45	50.0	60
400	6.7	13.3	20	26.7	33.3	40	46.7	53.3	60	66.7	80
500	8.3	16.7	25	33.3	41.7	50	58.3	66.7	75	83.3	100
600	10.0	20.0	30	40.0	50.0	60	70.0	80.0	90	100.0	120
700	11.7	23.3	35	46.7	58.3	70	81.7	93.3	105	116.7	140
800	13.3	26.7	40	53.3	66.7	80	93.3	106.7	120	133.3	160
900	15.0	30.0	45	60.0	75.0	90	105.0	120.0	135	150.0	180
1000	16.7	33.3	50	66.7	83.3	100	116.7	133.3	150	166.7	200
1100	18.3	36.7	55	73.3	91.7	110	128.3	146.7	165	183.3	220
1200	20.0	40.0	60	80.0	100.0	120	140.0	160.0	180	200.0	240

Note: For additional information or help with your application please **CONSULT TEMPCO**.

Calculating Minimum Wattage Requirement

Table is for quick-estimation purposes and is based on air under standard conditions (70°F inlet air temperature at 14.7 PSIA).

Note: If air flow is given in CFM at operating temperature and pressure it can be converted to SCFM (Standard Cubic Feet per Minute) with the following formula; use the equations to the right for compressed air.

$$SCFM = CFM \times \frac{P}{14.7} \times \frac{530}{T + 460}$$

P = operating pressure (gauge pressure + 14.7)

T = operating temperature

Remember when calculating wattage to use the maximum anticipated air flow and to compensate for any heat losses.

For free air use equations:

$$KW = \frac{SCFM \times \text{Temperature rise (°F)}}{3000}$$

or

$$KW = \frac{SCMM \times \text{Temperature rise (°C)}}{47}$$

For compressed air use equations:

$$KW = \frac{CFM^* \times \text{Density}^* \text{ (lbs/cu. ft.)} \times \text{Temperature rise (°F)}}{228}$$

or

$$KW = \frac{CMM^* \times \text{Density}^* \text{ (kgs/cu. m)} \times \text{Temperature rise (°C)}}{57.5}$$

*At heater inlet temperature and pressure

Element Watt Density vs. Sheath Temperature and Air Velocity

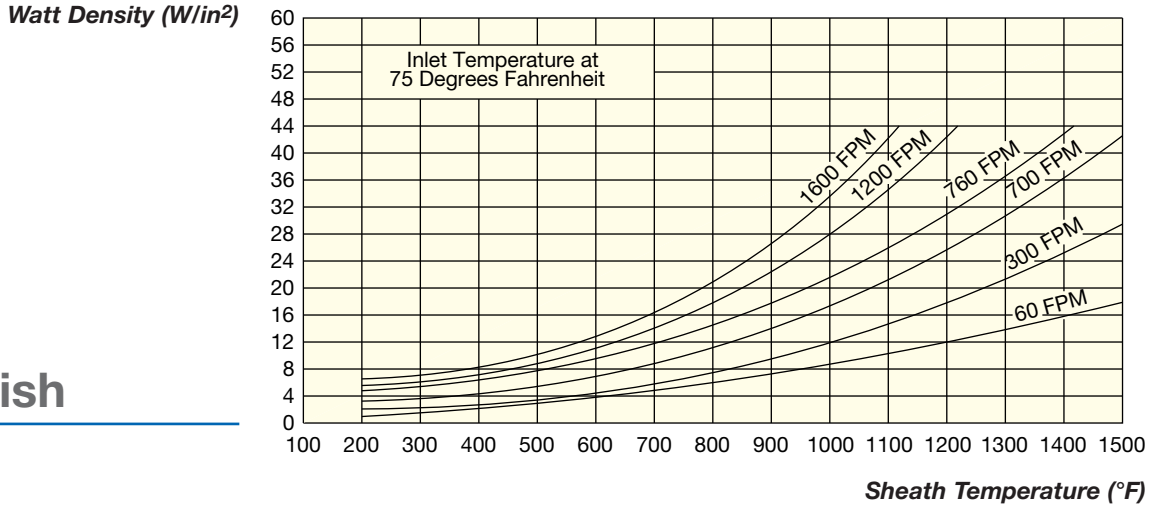
Use graph (English or Metric) to plot

Watt Density vs. **Air Velocity** to determine **Sheath Temperature**

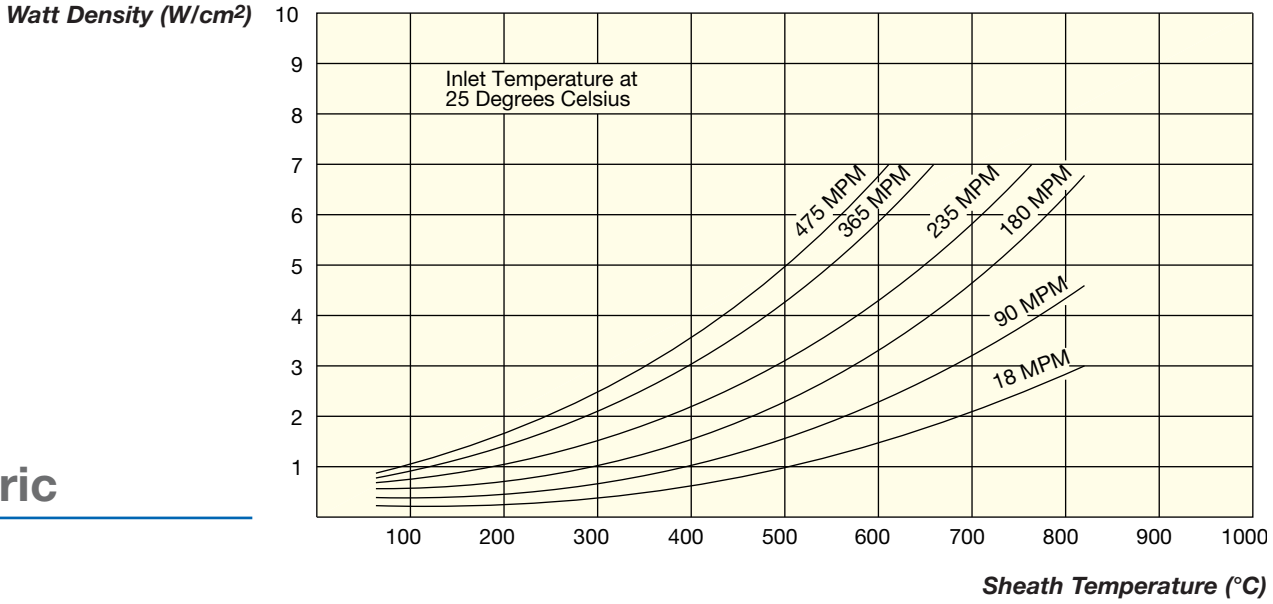
or

Watt Density vs. **Sheath Temperature** to determine the required **Air Velocity**

English



Metric



Product Inventory Available for Viewing and Selection @ www.tempco.com

Duct Heater Installation Recommendations

Installation Recommendations

1. Tempco Duct Heaters may be bolted to the ductwork through the side, bottom or top. Bottom and side mounting are preferred to minimize wiring/terminal enclosure temperatures.
2. Before mounting, consideration should be given to the strength of the ductwork required to support the weight of the heater. Add additional hangers or supports as required.
3. The inlet side of the unit should be at least 48 inches downstream from any change in duct size or duct direction.
4. To minimize pressure drop, mount in the duct with the narrow width of the heater perpendicular to the air flow.
5. Duct heaters may be mounted in tandem to increase the KW that can be installed.
6. Process temperature sensing should be located downstream from the duct heater.
7. All standard duct heaters have a thermowell attached to one element for installing a thermocouple to sense element temperature. Additional protection for the heater from low air flow can be achieved by installing an air flow switch or pressure switch on the inlet side.

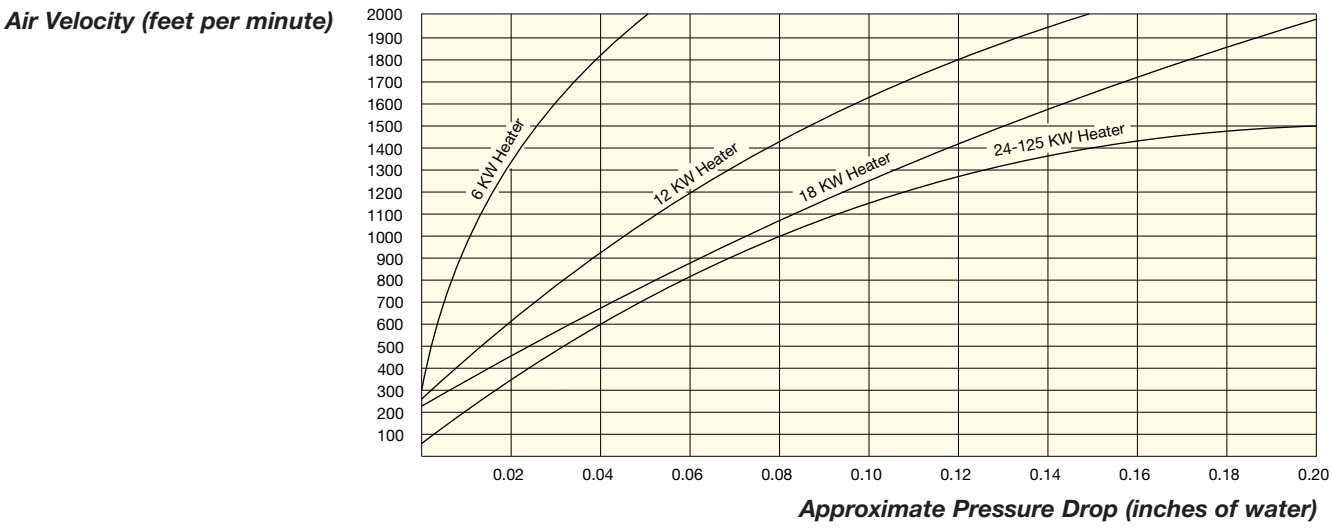
Wiring

1. Power supply conductors must have a minimum ampacity of 125% of the maximum heater load and be rated for the ambient temperature of the heater enclosure.
2. The air handler should run on a time delay after the heater is de-energized. This allows the elements to cool without overheating adjacent areas.
3. Duct heaters drawing more than 48 Amps are divided into smaller branch circuits; each drawing 48 Amps or less. Please note that the number of circuits can be changed to accommodate any wiring requirements you may have.

Note: Before you proceed to make any changes on factory prewired heaters check the heater wiring schematic or consult Tempco.

All electrical wiring must be done in accordance with national and local electrical codes.

Pressure Drop vs. Air Velocity



Calculating Air Velocity

$$\text{Velocity (feet/minute)} = \frac{\text{SCFM (CFM measured at standard conditions)}}{\text{Duct cross sectional area at heater in square feet}}$$

Maintenance Recommendations

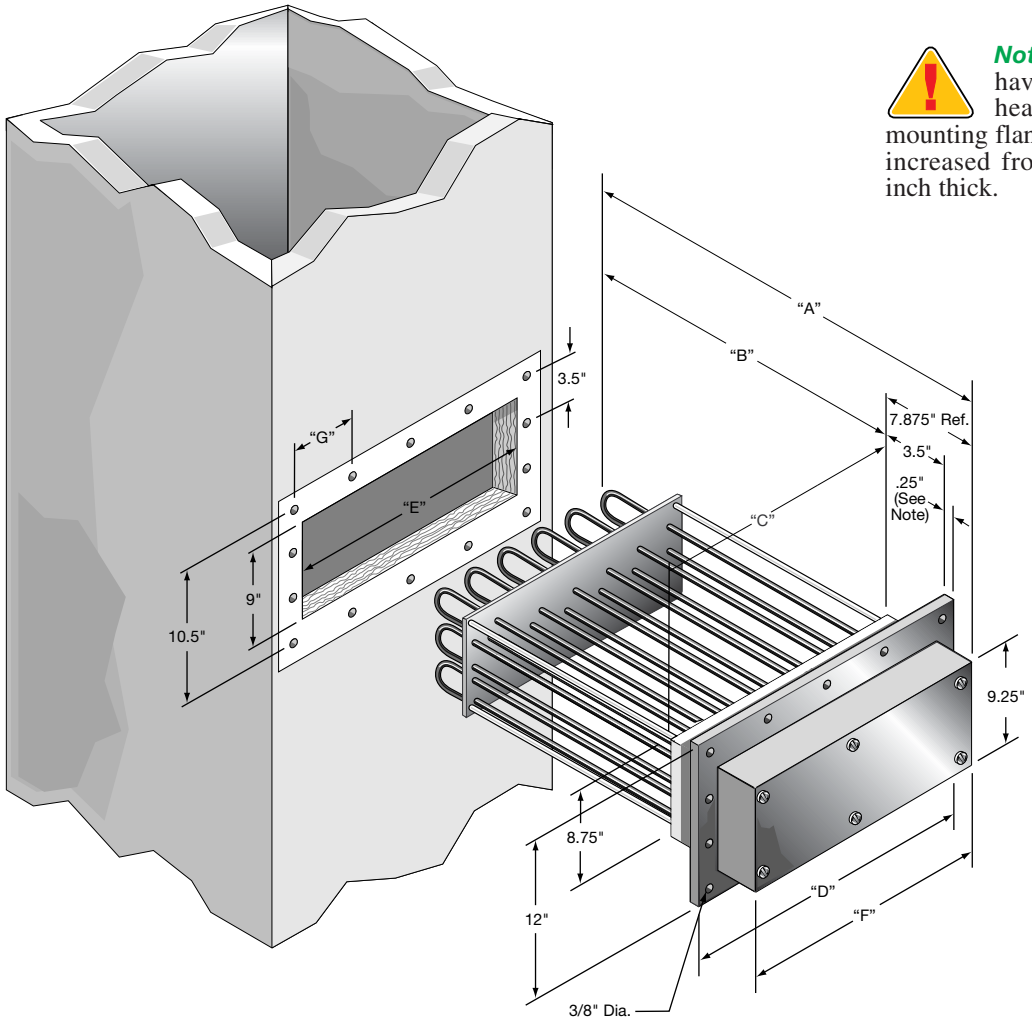
1. Never perform any type of service on duct heaters prior to disconnecting all power supply lines.
2. After long periods of idle use, clean elements prior to start-up.
3. Periodically clean the elements even during regular use so as not to allow dirt to build-up on the elements.
4. Periodically check that mounting screws or bolts have not become loose from blower vibration.
5. Periodically check that electrical connections are clean and tight.
6. Failed elements are field replaceable, minimizing downtime and saving the cost of a complete new heater.

Standard Duct Heater Features

Design Features

- *NEMA 1 General Purpose Ventilated Enclosure*
- *Painted Steel Mounting Flange*
- *Single and Three-Phase Wiring*
- *3-1/2 " (89 mm) Insulation*
- *Field Replaceable Incoloy® 840 Elements*
- *Element Bends Re-pressed*
- *1/4" (6 mm) Inside Diameter Thermowell*
- *Stainless Steel Support Plate and Corner Posts*

Typical Installation



Note: On Duct Heaters having more than 54 heating elements, the mounting flange thickness will be increased from 1/4 to 3/8 of an inch thick.

Standard (Non-Stock) Duct Heater Construction Specifications

Dimensions Reference Number	"A"		"B"		"C"		"D"		"E"		"F"		"G"		Number of Elements	Approximate Net Weight	
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm		lbs	kgs
1	27⅞	708	20	508	2¾	70	6½	165	3	76	3⅝	92	2½	64	6	22	10
2	27⅞	708	20	508	4¾	121	8½	216	5	127	5⅝	143	3½	89	12	31	14
3	27⅞	708	20	508	6¾	171	10½	267	7	178	7⅝	194	3	76	18	41	19
4	27⅞	708	20	508	8¾	222	12½	318	9	229	9⅝	244	2¾	70	24	51	23
5	27⅞	708	20	508	10¾	273	14½	368	11	279	11⅝	295	3¼	83	30	62	28
6	27⅞	708	20	508	12¾	324	16½	419	13	330	13⅝	346	3¾	95	36	73	33
7	27⅞	708	20	508	14¾	375	18½	470	15	381	15⅝	397	4¼	108	42	84	38
8	27⅞	708	20	508	16¾	425	20½	521	17	432	17⅝	448	4¾	121	48	95	43
9	27⅞	708	20	508	18¾	476	22½	572	19	483	19⅝	498	5¼	133	54	106	48
10	27⅞	708	20	508	20¾	527	24½	622	21	533	21⅝	549	5¾	146	60	117	53
11	32⅞	835	25	635	20¾	527	24½	622	21	533	21⅝	549	5¾	146	60	130	59
12	40⅜	1026	32½	826	20¾	527	24½	622	21	533	21⅝	549	5¾	146	60	155	70
13	49⅜	1254	41½	1054	20¾	527	24½	622	21	533	21⅝	549	5¾	146	60	180	82

Standard (Non–Stock) Duct Heaters

Watt Density W/in²	Watt Density W/cm²	KW	Dimensions Reference Number	Part Number 240V-1Ph	(C*)	240V-3Ph	(C*)	Replacement Elements	480V-1 Ph	(C*)	480V-3 Ph	(C*)	Replacement Elements
		6	1	TDH01002	(1)	TDH01003	(1)	THE03405	TDH01004	(1)	TDH01005	(1)	THE03819
		12	2	TDH01006	(1)	TDH01007	(1)	THE03405	TDH01008	(1)	TDH01009	(1)	THE03819
		18	3	TDH01010	(2)	TDH01011	(1)	THE03405	TDH01012	(1)	TDH01013	(1)	THE03819
		24	4	TDH01014	(2)	TDH01015	(2)	THE03405	TDH01016	(1)	TDH01017	(1)	THE03819
		30	5	—		TDH01018	(2)	THE03405	TDH01019	(2)	TDH01020	(1)	THE03819
		36	6	—		TDH01021	(2)	THE03405	TDH01022	(2)	TDH01023	(1)	THE03819
20	3.1	42	7	—		TDH01024	(2)	THE03405	TDH01025	(2)	TDH01026	(1)	THE03819
		48	8	—		TDH01027	(4)	THE03405	TDH01028	(2)	TDH01029	(2)	THE03819
		54	9	—		TDH01030	(3)	THE03405	TDH01031	(3)	TDH01032	(2)	THE03819
		60	10	—		TDH01033	(4)	THE03405	TDH01034	(4)	TDH01035	(2)	THE03819
		75	11	—		TDH01036	(4)	THE03845	TDH01037	(4)	TDH01038	(2)	THE03846
		100	12	—		—		—	—		TDH01039	(4)	THE03847
		125	13	—		—		—	—		TDH01040	(4)	THE03848
		9	1	TDH01072	(1)	TDH01073	(1)	THE03849	TDH01074	(1)	TDH01075	(1)	THE03851
		18	2	TDH01076	(2)	TDH01077	(1)	THE03849	TDH01078	(1)	TDH01079	(1)	THE03851
		27	3	TDH01080	(3)	TDH01081	(2)	THE03849	TDH01082	(2)	TDH01083	(1)	THE03851
		36	4	—		TDH01084	(2)	THE03849	TDH01085	(2)	TDH01086	(1)	THE03851
		45	5	—		TDH01087	(5)	THE03849	TDH01088	(2)	TDH01089	(2)	THE03851
		54	6	—		TDH01090	(3)	THE03849	TDH01091	(3)	TDH01092	(2)	THE03851
30	4.7	63	7	—		TDH01093	(7)	THE03849	TDH01094	(3)	TDH01095	(2)	THE03851
		72	8	—		TDH01096	(4)	THE03849	TDH01097	(4)	TDH01098	(2)	THE03851
		81	9	—		TDH01099	(6)	THE03849	TDH01100	(6)	TDH01101	(3)	THE03851
		90	10	—		TDH01102	(5)	THE03849	TDH01103	(4)	TDH01104	(4)	THE03851
		115	11	—		TDH01105	(10)	THE03850	TDH01106	(5)	TDH01107	(4)	THE03852
		150	12	—		—		—	—		TDH01108	(4)	THE03853
		190	13	—		—		—	—		TDH01109	(5)	THE03854

(C*) = Number of Branch Circuits per heater (48 amps each branch max). For different circuit wiring configurations consult Tempco.

Ordering Information

Catalog Heaters

Order by catalog number for catalog heaters.

Standard lead time is 3 to 4 weeks.

Note that Replacement Element Part Numbers for each heater are also listed.

Custom Engineered/Manufactured Heaters

For sizes and ratings not listed, **TEMPCO** will design and manufacture a Duct Heater to meet your requirements.

Please Specify the following:

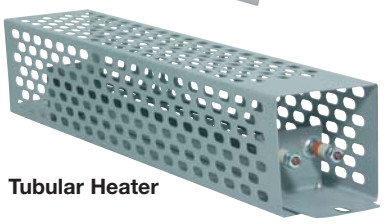
- ❑ Duct size
- ❑ Air flow velocity
- ❑ Inlet and outlet temperature
- ❑ Wattage, voltage and phase
- ❑ Number of circuits
- ❑ Element watt density
- ❑ Element sheath material
- ❑ Mounting flange material
- ❑ Insulation thickness
- ❑ Electrical enclosure type
- ❑ Over-temperature thermocouple, if required
- ❑ Any other modifications

Power Control Panels for Process Heaters

Note: **Power Control Panels** featuring mechanical or solid state controls with all other necessary components can be provided by TEMPCO for any size duct heater. Refer to Section 13, pages 13-42 through 13-49 for complete details.

Enclosure Heaters

Silicone Rubber Heater



Tubular Heater

Patent Pending

Ceramic Heater

Finned Strip Heater

Cabinet Enclosure Heaters

Tempco enclosure heaters are the answer to all your enclosure heater needs. Our heaters are designed to help electric, electronic, pneumatic, hydraulic and mechanical equipment perform at top capacity by protecting them against low temperatures, condensation and corrosion. Tempco offers many different styles of heaters that can be used in enclosure heating applications. Our most popular styles are displayed on the next few pages.

Typical Applications

- *Traffic Signal Control Boxes*
- *Automatic Teller Machines*
- *Outdoor Electrical Power Enclosures*
- *Control Panels*
- *Control Valve Housings*
- *Switch Gear*
- *Clothing Lockers*

Determining the Minimum Wattage for Your Application

- Determine the lowest temperature to which the enclosure is expected to be exposed.
- Determine the operating temperature to which you want the enclosure heated.
- Subtract the ambient temperature from the the enclosure temperature to get the temperature change required.
- Calculate the surface area of the enclosure. For a rectangular enclosure use the formula:

  2 [(Length × Width) + (Length × Height) + (Width × Height)]
- Select the correct table below depending upon whether your box is insulated or non-insulated. Read from the table the wattage required depending upon your calculated temperature change and surface area.
- Add an additional 50% of the determined wattage if the enclosure is to be located in windy conditions.

Selecting the Right Heater for Your Application

1. Determine the wattage of heater(s) that you need. See the instructions on this page to determine your wattage requirements.
2. Determine the type of heater that you need. Depending upon conditions, one heater type might be better than others. Items to take into consideration are space constraints inside the enclosure and wattages required.
3. Determine the number of heaters you need. You can combine multiple heaters to achieve your wattage requirements.
4. Determine how you will control the heaters. Will you use built-in thermostats to monitor the temperature? Or will you use a single temperature control to monitor and control the heaters? Tempco manufactures a wide range of temperature control devices and when multiple heaters are required, Tempco can supply you with the temperature controls that will meet your needs.

Insulated Enclosure Wattage Selection Table

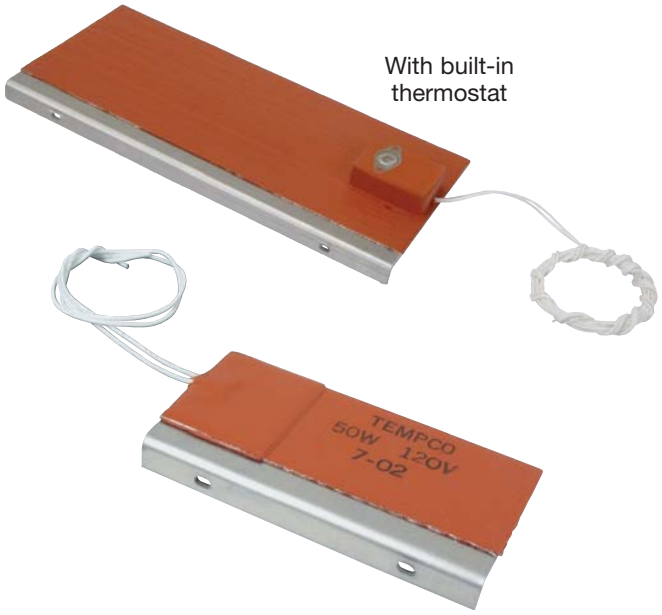
Δ Temperature	TOTAL SURFACE AREA ft² (m²)													
°F (°C)	2 (0.19)	3 (0.28)	4 (0.37)	5 (0.47)	6 (0.56)	7.5 (0.70)	9 (0.84)	10 (0.93)	15 (1.40)	20 (1.86)	25 (2.33)	30 (2.79)	40 (3.72)	50 (4.65)
20 (11)	10	10	15	20	20	25	30	35	50	65	80	100	130	160
40 (22)	15	20	30	35	40	50	60	65	100	130	160	195	260	320
60 (33)	20	30	45	50	60	75	90	100	145	195	240	290	385	480
80 (44)	30	40	55	65	80	100	115	130	195	260	320	320	515	640
100 (56)	35	50	65	80	100	125	145	160	240	320	400	400	640	800
120 (67)	40	60	80	100	115	150	175	195	290	385	480	480	770	960
140 (78)	45	70	90	115	135	175	205	225	340	450	560	560	900	1120

Uninsulated Enclosure Wattage Selection Table

Δ Temperature	TOTAL SURFACE AREA ft² (m²)													
°F (°C)	2 (0.19)	3 (0.28)	4 (0.37)	5 (0.47)	6 (0.56)	7.5 (0.70)	9 (0.84)	10 (0.93)	15 (1.40)	20 (1.86)	25 (2.33)	30 (2.79)	40 (3.72)	50 (4.65)
20 (11)	30	40	55	70	80	100	120	135	205	270	335	405	540	670
40 (22)	55	80	110	135	160	200	245	270	405	540	670	805	1075	1340
60 (33)	90	120	160	205	245	300	365	405	605	805	1005	1210	1610	2010
80 (44)	110	160	215	270	325	400	485	540	805	1075	1340	1610	2145	2680
100 (56)	135	200	270	335	405	500	605	670	1005	1340	1675	2010	2680	3350
120 (67)	165	240	320	405	485	600	725	805	1210	1610	2010	2415	3220	4020
140 (78)	190	280	375	470	565	700	845	940	1410	1880	2345	2815	3775	4690

Product Inventory Available for Viewing and Selection @ www.tempco.com

EHR - Silicone Rubber Enclosure Heater



Tempco's EHR series of silicone rubber enclosure heaters are designed for easy installation and safe operation. These rectangular-shaped wire-wound Silicone Rubber Heaters are vulcanized to an aluminum mounting plate with mounting holes. They provide superior protection for enclosures of all types against condensation, humidity and freezing.

It is recommended that the enclosure heater be used with a thermostat either built-in or mounted remotely to limit the maximum temperature reached and conserve energy. The suggested mounting method is at the bottom of the enclosure, mounted vertically. If a remote mounted thermostat is preferred, mount the heater on the bottom of the enclosure and the thermostat in the middle of the enclosure.

For a complete description and listing of available remote thermostats see page 11-6.

Standard (Non-Stock) Silicone Rubber Enclosure Heaters

Width	Length	Mounting Center	Watts	Volts	Lead Length	Thermostat (°F) Opens	Thermostat (°F) Closes	Part Number
2½	5	3	25	120	48	—	—	EHR00001
2½	5	3	25	120	48	60	40	EHR00002
2½	5	3	35	120	48	—	—	EHR00003
2½	5	3	50	120	48	—	—	EHR00004
2½	5	3	50	120	48	60	40	EHR00005
2½	6	4	60	120	48	—	—	EHR00006
2½	6	4	60	120	48	60	40	EHR00007
2½	6	4	60	120	48	140	110	EHR00008
2½	6	4	60	120	48	180	150	EHR00009
2½	10	7	70	120	48	—	—	EHR00010
2½	10	7	100	120	48	—	—	EHR00011
2½	10	7	100	120	48	60	40	EHR00012
2½	12	9	120	120	48	—	—	EHR00013
2½	12	9	120	120	48	60	40	EHR00014
2½	12	9	120	120	48	140	110	EHR00015
2½	12	9	120	120	48	180	150	EHR00016
4½	10	7	140	120	48	—	—	EHR00017
4½	10	7	250	120	48	—	—	EHR00018
4½	10	7	250	120	48	60	40	EHR00019

✻ Mounting slot size is 1/4" × 5/32".

Design Features

- *Choose either an integrated or remote thermostat*
- *Custom design and alternate thermostat settings available*
- *Heater vulcanized to an aluminum mounting plate for easy installation*
- *120V standard. Custom voltages available upon request.*
- *48" Teflon® leads standard*
- *Dimensions listed are for heater and bracket; actual heater width is 1/2" less*
- *Safe to operate, no exposed electrical connections*
- *Agency Approval:* c UL us

Ordering Information

EHR Silicone Rubber Enclosure Heater

Select a Silicone Rubber Enclosure Heater from the Standard Sizes and Ratings list above.

Standard heaters have a 3-week lead time.

Custom Engineered/Manufactured Enclosure Heaters

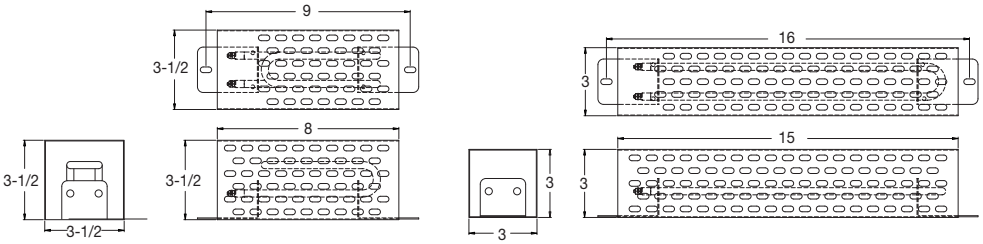
Understanding that an electric heater can be very application specific, for sizes and ratings not listed, **TEMPCO** can manufacture a EHR Enclosure Heater to meet your requirements. ***Standard lead time is 3 weeks.***

Please Specify the following:

- ❑ **Size:** Provide the length and width of the heater desired. An extra 1/2" is added for the aluminum bracket mounting flange.
- ❑ **Wattage:** Up to 5w/in² (0.8w/cm²)
- ❑ **Voltage:** All standard voltages are available

Enclosure Heaters

EHT — Tubular Enclosure Heaters



Design Features

- *SS tubular heating element*
- *Up to 15 w/in²*
- *10-32 terminals standard*

Stock Series EHT Heaters

Wattage	3-1/2" Square by 8" Enclosure				3" Square by 15" Enclosure			
	Enclosure Heater		Replacement Heater Only		Enclosure Heater		Replacement Heater Only	
	120V	240V	120V	240V	120V	240V	120V	240V
100	EHT00006	—	THE08345	—	EHT00017	—	THE08334	—
250	EHT00008	EHT00009	THE08347	THE08348	EHT00019	EHT00020	THE08336	THE08337
350	EHT00010	EHT00011	THE08349	THE08350	EHT00021	EHT00022	THE08338	THE08339
375	EHT00012	EHT00013	THE08351	THE08352	EHT00023	EHT00024	THE08340	THE08341
500	EHT00014	EHT00015	THE08353	THE08354	EHT00025	EHT00026	THE08342	THE08343

Ordering Information

Select a **Tubular Enclosure Heater** from the Standard Sizes and Ratings list above.

Custom Engineered/Manufactured Heaters

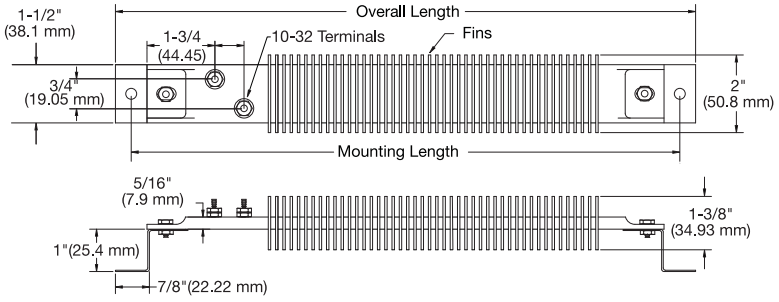
Standard lead time is 3 weeks. Please Specify the following:

- ❑ **Size:** Provide the length and width of the perforated box desired.
- ❑ **Wattage:** Tubular heater wattages up to 15 w/in²
- ❑ **Termination:** Various terminations are available. Consult Tempco.
- ❑ **Voltage:** All standard voltages are available

EHF — Finned Channel Strip Enclosure Heaters

Design Features

- *10-32 offset screw terminals (T4 style) standard, other terminations available*
- *UL recognized component*
- *Stainless steel sheath and fins*
- *Easy installation with special enclosure mounting brackets*



Stock and Standard (Non-Stock) Series EHF Heaters

Overall Length	Mounting Dimension	Watts	Part Number 120V	Part Number 240V
12.125	11.375	200	✻EHF00001	EHF00002
15.625	14.875	350	✻EHF00003	EHF00004
19.5	18.75	450	✻EHF00005	EHF00006
25.375	24.625	700	EHF00007	EHF00008

An ✻ next to the part number indicates a stock item.

Ordering Information

Select a **Finned Channel Strip Enclosure Heater** from the Standard Sizes and Ratings list above.

Custom Engineered/Manufactured Heaters

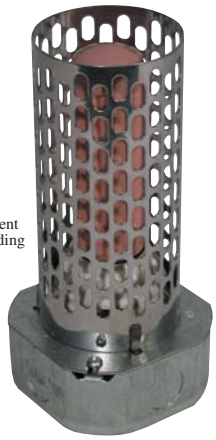
Standard lead time is 3 weeks. Please Specify the following:

- ❑ **Length**
- ❑ **Termination Type**
- ❑ **Secondary Bushings** *(see page 8-13)*
- ❑ **Wattage**
- ❑ **Voltage**
- ❑ **Igloo™ Terminal Covers**

EHC Ceramic E-Mitter® Enclosure Heaters

Series EHC — Cabinet Enclosure Heater

Tempco's Edison Screw-In Bulb Style E-Mitter® is a hollow tube-shaped ceramic heater. The heater's unique 360° radiating pattern makes it ideal for use as an enclosure heater. The unique thin wall construction and geometrical shape of the EHC style heater facilitates very fast heating and cooling rates.



NEMA 1 Housing

NEMA 4 Housing

Ordering Information

Select a **Ceramic E-Mitter® Enclosure Heater** from the Standard Sizes and Ratings list below.

Standard lead time is 3 weeks.

Please Specify the following:

- ❑ **Housing Type:** NEMA 1 or NEMA 4
- ❑ **Wattage:** Up to 35w/in² (5.4w/cm²)
- ❑ **Voltage:** 120V or 240V

Complete Screw-In Bulb E-Mitter Information can be found in Section 7 on page 7-42

EHC NEMA 1 Enclosure Heaters with Metamorphing Rose Bulb

Watts	Volts	Part Number	Replacement Heater Bulb
50	120	EHC10100	CRT10100
75	120	EHC10101	CRT10101
	240	EHC10106	CRT10106
100	120	EHC10102	CRT10102
	240	EHC10107	CRT10107
150	120	EHC10103	CRT10103
	240	EHC10108	CRT10108
200	120	EHC10104	CRT10104
	240	EHC10109	CRT10109
250	120	EHC10105	CRT10105
	240	EHC10110	CRT10110

Replacement housing p/n is CRK00037

EHC NEMA 4 Enclosure Heaters with Metamorphing Yellow Bulb

Watts	Volts	Part Number	Replacement Heater Bulb
75	120	EHC40101	CRT20112
	240	EHC40106	CRT20118
100	120	EHC40102	CRT20113
	240	EHC40107	CRT20119
150	120	EHC40103	CRT20114
	240	EHC40108	CRT20120
200	120	EHC40104	CRT20115
	240	EHC40109	CRT20121
250	120	EHC40105	CRT20116
	240	EHC40110	CRT20122

Replacement housing p/n is CRK00038

EHA — Remote Thermostats for Enclosure Heaters

Design Features

- ✶ *Standard lead length 48"*
- ✶ *Can easily be located anywhere in the enclosure using the pressure sensitive adhesive.*
- ✶ *Any standard thermostat can be used (see Section 13, page 13-65 for available ranges)*
- ✶ *Silicone rubber base and enclosure*
- ✶ *Ratings: 10A/250 Vac, 15A/120 Vac*

Ordering Information

Select a **Remote Thermostat** from the list at right.

Custom Engineered/Manufactured Remote Thermostats

Standard lead time is 3 weeks. Please Specify the following:

- ❑ **Range:** Select from the list of thermostats on page 13-65
- ❑ **Lead Length:** Specify any special lead length you require.

Stock EHA Remote Thermostats

Opens °F	Closes °F	Part Number
60±5	40±7	EHA00001
140±5	110±10	EHA00002
180±5	150±10	EHA00003

Electrically Heated Hose Assemblies

Tempco's Electrically Heated Hose Assemblies are designed for optimum transfer of non-explosive liquids or gases. Tempco's HEH Transfer Hoses are Teflon® lined stainless steel braid heated flexible assemblies. Style R (regular pressure) or Style H (high pressure) transfer hoses are used in a wide range of applications such as water (freeze protection), steam, wax, plastics and many others. Heated transfer hoses improve fluid transfer for many applications.

Design Features

- *Base Hose has a smooth bore Teflon® core with Stainless Steel overbraid*
- *Self-vulcanizing Silicone TGL bedding tape at 50% overlap*
- *Kapton® insulation wrapped stranded nichrome alloy heater element*
- *2 layers of 1/8" Nomex® felt insulation*
- *Layer of 2" wide black tape for final wrap*
- *Heavy duty abrasive resistant outer covering, polyester braid; optional water resistant jacket is available upon request.*
- *Heat shrink tube end caps*
- *Male NPT or 37° JIC female swivel fittings are standard; options include Tri-Clamp or Tubing/Pipe for compression fittings. Choice of Stainless Steel or plated carbon steel.*
- *Temperature range to 450°F/232°C*
- *Overall length up to 600 inches*
- *Temperature sensors such as thermocouples or RTDs can be built-in to the assembly.*
- *Snap action thermostats can be built in to the assembly to limit the maximum temperature.*
- *6 ft. power leads standard; length can vary upon request.*
- *Hose assemblies available in 120 and 240 Vac*
- *Ground connection to the Stainless Steel overbraid*

Typical Applications

- *Hot Melt Systems*
- *Petroleum Products*
- *Food Products*
- *Hot Oil Lines*
- *Chemical Transfer*
- *Gas Analyzer Systems*
- *Steam Transfer*
- *Water & Waste Disposal*
- *Bulk Transfer*
- *Paint Systems*
- *Tar & Asphalt*
- *Waxes – Candle Making*
- *Adhesives*

Tempco's Control Consoles

Ideal for controlling process temperatures on heated hose assemblies. Complete information can be found on page 13-40.

Construction Characteristics

Tempco's Heated Transfer Hoses are built to the most stringent standards. Each hose is hand assembled to exact physical and electrical specifications. The heated hose assembly starts with the highest quality Teflon® smooth bore core with Stainless Steel overbraid style hose. Over this is wrapped a layer of self-vulcanizing silicone TGL bedding tape at 50% overlap as a base for the resistance wire. The stranded resistance wire is pre-wrapped with Kapton® insulation before winding around the growing assembly in the precise pattern required for uniform heating. Next is wound two layers of Nomex® felt insulation, to maintain consistent heat and a safe cool-to-the-touch design, followed by a layer of 2" wide black tape. The standard hose outer cover is an abrasion resistant polyester braid for normally dry environments. An optional outer cover can be provided for water resistant protection.

The hose assembly is then finished with heat shrink end caps, specified hydraulic fittings and electrical connectors. Hoses are also manufactured with optional built-in sensors including RTDs or thermocouples.

Specifications for Heated Hose Assemblies

Hose Size	Style R – Regular Pressure Core ID in. / mm	Style R – Regular Pressure Hose Assembly OD in. / mm	Style H – High Pressure Core ID in. / mm	Style H – High Pressure Hose Assembly OD in. / mm	Max. Rec. Watt Density (w/ft.) R Style	Max. Rec. Watt Density (w/ft.) H Style	Max. Working Pressure (PSI) R Style	Max. Working Pressure (PSI) H Style	Minimum Bend Radius in. / mm	Male NPT Fitting Size SS	JIC Fitting Size, SS
#4	.187 / 4.75	1.40 / 35.6	.222 / 5.64	1.40 / 35.6	23	30	2250	4000	4 / 102	¼-18	7/16-20
#6	.312 / 7.92	1.50 / 38.1	.308 / 7.82	1.50 / 38.1	25	40	1875	4000	8 / 203	3/8-18	9/16-18
#8	.406 / 10.31	1.59 / 40.4	.401 / 10.19	1.59 / 40.4	30	50	1500	4000	10 / 254	½-14	¾-16
#10	.500 / 12.70	1.69 / 42.9	.495 / 12.57	1.69 / 42.9	35	55	1312	4000	13 / 330	½-14	⅞-14
#12	.625 / 15.87	1.79 / 45.5	.617 / 15.67	1.79 / 45.5	40	65	1125	4000	15 / 381	¾-14	1 1/16-12
#16	.875 / 22.22	2.10 / 53.3	.867 / 22.02	2.30 / 58.4	50	85	750	4000	18 / 457	1-11½	1 5/16-12
#20	1.12 / 28.57	2.60 / 66.0	1.118 / 28.40	2.70 / 68.6	65	95	500	4000	24 / 610	1¼-11½	1⅝-12

Note: Operating pressures are for non-impulsive applications only.

Ordering Code:

HEH – 1 2 3 4 5 6 7 8 9 10 11

Hose Style *BOX 1*
R = Regular Pressure, Teflon®
H = High Pressure, Teflon®
X = Other

Length *BOX 2*
In 6" increments
From **006** to **600** inches

Trade Size *BOX 3*
04, 06, 08, 10, 12, 16, 20,
XX = Other

Wattage *BOX 4*
Insert Required Wattage
Example: **0120** = 120 Watts

Note: Larger wattages are limited to 240V due to overall amperage requirements.

Voltage *BOX 5*
1 = 120 Vac
2 = 240 Vac
X = Other

Electrical Connectors *BOX 6*
A = Hubbel® #4720C, 15A, 120 Vac, locking plug (NEMA 5-15)
B = Hubbel® #4570C, 15A, 240 Vac, locking plug (NEMA 6-15)
C = Industry common, 9-pin Amp® connector
D = No connector, flying leads
X = Other
Note: If a temperature sensor is specified with a locking plug, a mini type plug will be supplied.

Temperature Sensor/Thermostat *BOX 7*
A = RTD, 100 ohm platinum
B = Thermocouple, Type J
C = Thermocouple, Type K
N = None
X = Other

Note: It is strongly recommended that a sensor and separate temperature control or a thermostat be used to control the temperature of Tempco's Heated Hose Assemblies. It is very difficult to limit the overall temperature by using a lower wattage and have a reasonable rise time.

Hydraulic Fitting — Near Electrical Connection *BOX 8*
J = JIC 37° Female Swivel
N = JIC 37° Female Swivel and Male NPT adapter
Optional
T = Tri-Clamp
P = Tubing / Pipe (for compression fitting)
X = Other

Hydraulic Fitting — Opposite End *BOX 9*
J = JIC 37° Female Swivel
N = JIC 37° Female Swivel and Male NPT adapter
Optional
T = Tri-Clamp
P = Tubing / Pipe (for compression fitting)
X = Other

Hydraulic Fitting Material *BOX 10*
S = Stainless Steel
X = Other

External Covering *BOX 11*
P = Heavy duty polyester braid
Optional
N = Water resistant jacket (Available for limited sizes; consult Tempco)
X = Other

Ordering Information

Heated Hose Assemblies are offered with the features listed above. 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.

Consult Tempco for your special requirements.

Standard lead time is 2 to 3 weeks.

Accessory Item (Optional)
9-pin mating connector

Type	Part Number	Included
Cable Mount	EHDR-1115	shell, insert, sockets, cable clamp and 12" of pre-crimped leads
Panel Mount	EHDR-1116	shell/flange, insert, sockets, and 12" of pre-crimped leads

Metal Jacketed Drum Heaters

Speed Flow of Solid and Semi-Solid Viscous Materials with Tempco Electric Drum and Pail Heaters

Typical Drum Heater with Infinite/Variable Control

Optional Drip Guard
Prevents contamination of the heater from drum materials. Available for 55 gallon drums only.
Part Number: DHM00070

Design Features

- *Rapid heat-up of drum*
- *Easy installation and removal*
- *Durable metal design*
- *Infinite switch or thermostat*
- *3-heat control*
- *Indicator lamps: green for power, red for heater*
- *6 ft. power cord*
- *Variety of diameters (all 5" wide) and ratings*
- *Stock to 2 week lead time!*
- *UL listed and CSA certified*

Thermostat Control models sense temperature in an area remote from the heating element and will automatically cycle heater to maintain set temperature. Three-heat switch allows three wattage ratings per thermostat setting and voltage rating.

Infinite/Variable Control models cycle the current ON and OFF. The ratio of ON time will increase as the the control is advanced. Three-heat switch allows the operator to control the heater output within a given 3 settings of high, medium, or low.

Stock and Standard (Non-Stock) Drum Heaters

Drum Size	Temp Control	Watts	Volts	Part Number
55 GAL. 22.5" Diameter	Infinite/Variable Heat Control	1750	120	*DHM00010
	60°-250°F Thermostat	1920	120	*DHM00020†
	200°-400°F Thermostat	1920	120	DHM00030†
	Infinite/Variable Heat Control	3000	240	DHM00040††
	60°-250°F Thermostat	3000	240	*DHM00050††
	200°-400°F Thermostat	3000	240	*DHM00060††
30 GAL. 18.5" Diameter	Infinite/Variable Heat Control	1750	120	DHM00080
	60°-250°F Thermostat	1920	120	DHM00090†
	200°-400°F Thermostat	1920	120	DHM00100†
16 GAL. 14.5" Diameter	Infinite/Variable Heat Control	1500	120	DHM00110
	60°-250°F Thermostat	1500	120	DHM00120
	200°-400°F Thermostat	1500	120	DHM00130
5 GAL. 11.25" Diameter	Infinite/Variable Heat Control	1500	120	DHM00140
	60°-250°F Thermostat	1500	120	DHM00150
	200°-400°F Thermostat	1500	120	DHM00160

† The 1920 Watt/120V model is equipped with a special high amperage plug. If required the matching receptacle is:
EHD-103-108 Hubbel® #5361 20A 125V

†† The 3000 Watt/240V is equipped with a standard 15A/240V straight blade type plug.

Typical Applications

Industries	Applications
Mining & Oil Companies	Heat diesel fuel, grease, etc. in cold weather
Candle Makers	Heat wax to make candles
Food Processors	Heat food additives
Aircraft Mechanics	Heat aircraft grease during cold weather
Farm Supply Distributors	Heat tallow to 140°F to mix with feed ration
Auto Mechanics/ Undercoaters	Accelerate flow of undercoating material
Beekeepers	Reliquefy honey after crystallizing
Roofers	Heat roofing material during cold weather
Chemical Manufacturers	Heat chemical components
Chemical Users	During the manufacturing process
Furniture Manufacturers	Heat adhesives

Heated Drum Dolly for Metal Drums

Holds up to 900 lbs.

Chain Link Reinforced Power Cord

Infinite Variable Heat Control

Heat your 55 gallon drum while keeping it portable. Just place the drum on the dolly's 3/4" thick × 15-1/4" square heated platen.
The overall diameter is 28-1/2" with an inside diameter of 24". The dolly comes equipped with 3" diameter phenolic casters and a 6 foot long cord and plug.

Part Number: ***DHM01001** 1750 Watts, 120VAC
Part Number: ***DHM01002** 1920 Watts, 240VAC

An asterisk (*) next to the Part Number guarantees in-stock availability for same-day shipping when ORDERED BY 2 PM CST

Standard lead time is Stock to 2 weeks.

Product Inventory Available for Viewing and Selection @ www.tempco.com

Silicone Rubber Drum and Pail Heaters

Specifications

- Maximum operating temperature of 425°F (218°C).
- Power cord is 6-foot long, SJO Type 16/3 complete with three-prong plug for 120 VAC models. Plugs are not included on 240 VAC models but are available (see page 15-13).
- Surface grounded electrically with internal metal screen.
- 1250 volts dielectric tested.
- Vulcanized silicone rubber construction resistant to moisture, ozone, fungus, and radiation.

B2 series thermostat, see page 13-64 for specifications.

Built tough

Resistant to chemicals

Ratings for Metal and Plastic Drums and Pails

Easy to clean

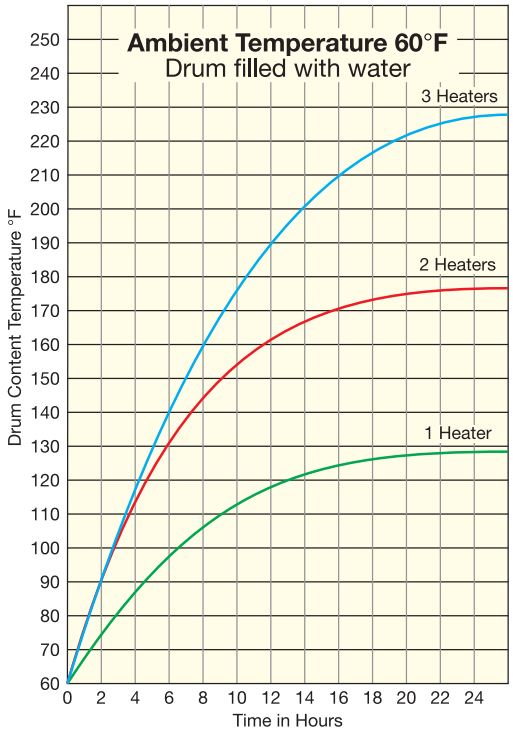
Stock to 2 week lead time

UL and CSA Approval
See page 9-2 for details

Tempco flexible drum heaters can save time by heating stored viscous fluid to a pourable temperature.

The heater is built to be tough, long lasting, and resistant to chemicals. Because few materials stick to its silicone rubber with fiberglass reinforced construction, it is easy to clean. The heater comes with a 6-foot cord and plug (120V only). When not in use, it rolls for convenient storage.

The total wattage (number of heaters) and the material being heated inside of the drum must be considered when determining the actual temperature to which that specific material can be heated.



Stock Drum Heaters for Metal Drums

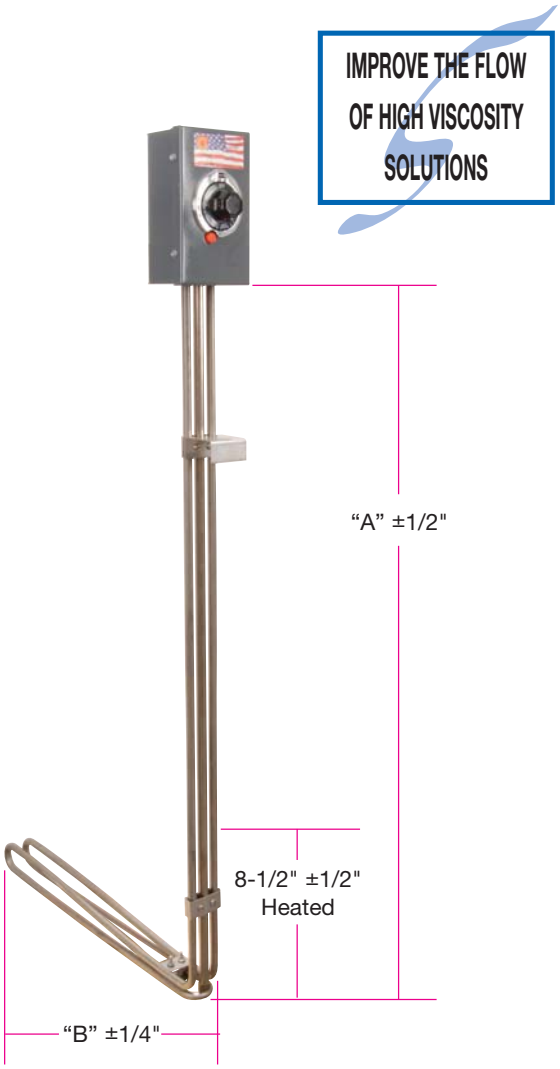
Drum size	Drum Dia.	Heater Width	Heater Length	Watts	Part Number 120V	Part Number 240V	Thermostat
5 Gal.	11.5	3"	31"	300	DHR00150	DHR01010	50-425°F
15 Gal.	13.5	3"	38"	500	DHR00110	DHR00130	50-425°F
30 Gal.	18	3"	52"	750	DHR00070	DHR00090	50-425°F
55 Gal.	22.5	3"	64"	1000	*DHR00020	*DHR00040	50-425°F
5 Gal.	11.5	3"	31"	300	DHR00140	DHR01041	No
15 Gal.	13.5	3"	38"	500	DHR00100	DHR00120	No
30 Gal.	18	3"	52"	750	DHR00060	DHR00080	No
55 Gal.	22.5	3"	64"	1000	*DHR00010	*DHR00030	No
5 Gal.	11.5	4"	31"	550	DHR01014	DHR01018	50-425°F
15 Gal.	13.5	4"	38"	700	DHR01013	DHR01017	50-425°F
30 Gal.	18	4"	52"	1000	DHR01012	DHR01016	50-425°F
55 Gal.	22.5	4"	64"	1500	*DHR00050	*DHR00055	50-425°F
5 Gal.	11.5	9.5"	31"	1000	DHR01023	DHR01047	70-190°F
15 Gal.	13.5	9.5"	38"	1000	DHR01024	DHR01046	70-190°F
55 Gal.	22.5	9.5"	64"	1500	*DHR01025	DHR01045	70-190°F

Stock Drum Heaters for Plastic Pails

Drum size	Drum Dia.	Heater Width	Heater Length	Watts	Part Number 120V	Part Number 240V	Thermostat
5 Gal.	11.5	4"	31"	150	DHR01034	DHR01044	50-160°F
15 Gal.	13.5	4"	38"	200	DHR01035	DHR01036	50-160°F
30 Gal.	18	4"	52"	250	DHR01037	DHR01038	50-160°F
55 Gal.	22.5	4"	64"	300	*DHR01033	*DHR01039	50-160°F
5 Gal.	11.5	9.5"	31"	300	DHR01027	DHR01043	70-140°F
55 Gal.	22.5	9.5"	64"	750	*DHR01026	DHR01042	70-140°F

Standard lead time is Stock to 2 weeks.

Drum Immersion Heaters



Design Features

- ***Fits through the standard 2" bung opening in 55 gallon drums***
- *Ideal for improving the flow of lard, tar, oils and other high viscosity solutions*
- *Double Pole 60-250°F thermostat with over temperature cutout and pilot lamp to indicate heater on/off status*
- *Only 6" of vertical riser is heated, allowing liquid level to fluctuate without damaging the heater.*
- *Adjustable stainless steel mounting bracket*

Optional Features

- *Passivation, electropolished, or bright annealed surface treatments available for Stainless Steel or Incoloy sheath designs.*
- *NEMA 4 (moisture resistant) and/or NEMA 7 (explosion resistant) terminal enclosures*
- *External Power wiring options include flexible cord/plug, armored cable, wire braided or plain leadwire.*
- *Process or Hi-Limit thermocouple in thermowell in place of the thermostat*

Installation, Operation & Maintenance Instructions

1. Ensure the vertical heated portion, which extends 6" up riser from bottom of element, is always fully immersed.
2. Use in metal drums, containers or heat resistant tanks only.
3. All wiring should be in accordance with NEC/NFPA and local codes.
4. Use techniques safe for the heater and surrounding environment.
5. Use mounting brackets to position heater away from tank wall and above sludge buildup at bottom of tank.
6. Periodically remove the heater to clean residues and inspect for damage.

CAUTION **Hazard of electric shock. Heater installation must be grounded. Heater must be disconnected from power input before servicing or removal.**

Standard (Non-Stock) 55 Drum Heaters

Sheath	Watt Density w/in²	Watt Density w/cm²	Watts	Volts	"A" Dim. in	"B" Dim. in	Part Number
Copper	8	1.2	1000	120	36	19	TAT30003
	32	5.0	4000	240	36	19	TAT30004
Stainless Steel	8	1.2	1000	120	36	19	TAT30002
	32	5.0	4000	240	36	19	TAT30001
Steel	8	1.2	1000	120	36	19	TAT30005
	32	5.0	4000	240	36	19	TAT30006

NOTE: This style heater can be manufactured with "A" and "B" dimensions suitable for other applications. Consult Tempco with your requirements.

Ordering Information

Catalog Heaters

Order by Part Number for catalog heaters listed on pages 11-72 and 11-73.

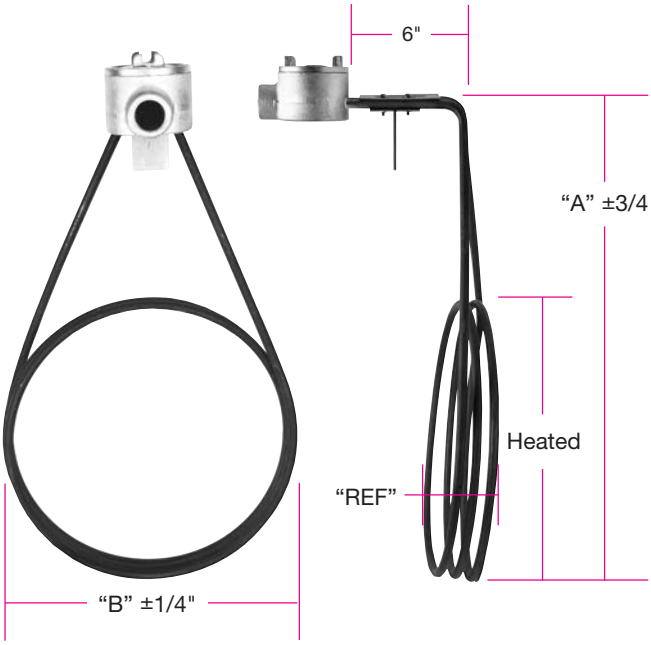
Custom Engineered/Manufactured Heaters

Understanding that an electric heater can be very application specific, for ratings not listed, **TEMPCO** will design and manufacture an Immersion Heater to meet your requirements. ***Standard lead time is 3 weeks.***

Please Specify the following:

- ❑ Application
- ❑ Wattage, Voltage
- ❑ Element Sheath Material
- ❑ Element Watt Density
- ❑ "A" and "B" Dimensions
- ❑ Unheated Section
- ❑ Optional Features
- ❑ Quantity

Vertical Loop – Low Profile Immersion Heaters



Design Features

- *Used on open top tanks for heating water, water based solutions, citrus juices, plating tanks, oil tempering, salt baths and other mild corrosive solutions*
- *NEMA 4 (moisture resistant) housing with integral grounding terminal is standard. Other NEMA ratings available.*
- *Low profile design with adjustable SS mounting bracket*
- *Optional Passivated, Electropolished, or Bright Annealed surface treatments available for Stainless Steel or Incoloy sheath designs*
- *External power wiring options including flexible cord/plug, armor cable, braided or plain lead wire.*
- *Optional Hi-limit MI thermocouple on heater sheath*

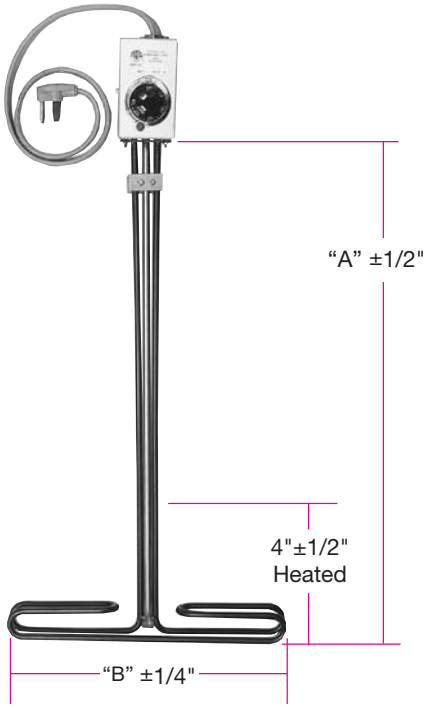
Standard (Non-Stock) and Stock Vertical Loop Heaters

Sheath	Watt Density w/in²	Watts	Volts	Dimensions (in) "A"	"B"	"REF"	Part Number
Copper	25	5000	240	26	15	2	TAT50011
	40	7500	240	26	15	2	TAT50012
Stainless Steel	25	5000	240	26	15	2¾	*TAT50013
	40	7500	240	26	15	2¾	TAT50014
Steel	25	5000	240	26	15	2	TAT50015
	40	7500	240	26	15	2	TAT50016

Standard lead time is Stock to 3 weeks.

An asterisk (*) next to the Part Number guarantees in-stock availability for same-day shipping when ORDERED BY 2 PM CST

Sanitizing Sink Immersion Heaters



Design Features

- *Used for sterilization of water tanks in restaurants, taverns and laboratories*
- *Double Pole 60-250°F thermostat with over-temperature cutout. Optional pilot lamp to indicate heater on/off status available.*
- *Standard 4 ft. (optional 6 ft.) cord set with grounding plug (NEMA 5-15P for 120V and 6-30P for 240V)*
- *Adjustable Stainless Steel mounting bracket*
- *Consult Tempco for custom designs*

Standard (Non-Stock) Sink Immersion Heaters

Sheath	Watt Density w/in²	Watts	Volts	"A" Dim. in	"B" Dim. in	Part Number
316 Stainless Steel (Electropolished)	65	6000	240	26	17	TAT40001
	56	4000	240	26	13	TAT40002
	16	1500	120	26	17	TAT40003
	14	1000	120	26	13	TAT40004
316 Stainless Steel (Bright Annealed)	65	6000	240	26	17	TAT40005
	56	4000	240	26	13	TAT40006
	16	1500	120	26	17	TAT40007
	14	1000	120	26	13	TAT40008

Standard lead time is Stock to 3 weeks.

Ordering Information
See page 11-72

Over-the-Side Immersion Heaters

Application

Tempco Over-the-Side Immersion Heaters are specifically designed for heating fluids in tanks. Depending on the tank shape, size, accessibility and working area inside the tank, choose a round or L shaped heater.

Standard sheath materials are Incoloy® 800 and steel with all wetted parts made with compatible alloys.

Construction

Tubular heating elements are welded into a liquid-tight junction box. Power leads for the elements travel up through the riser pipe and are connected to a terminal block in a NEMA 4 Housing. Unless otherwise specified, heaters are wired for three-phase from the factory but can easily be converted to single-phase.

A thermowell for a 3/8" diameter bulb is standard to accommodate an optional thermostat. A thermostat can be field installed to mounting lugs located in the electrical enclosure.

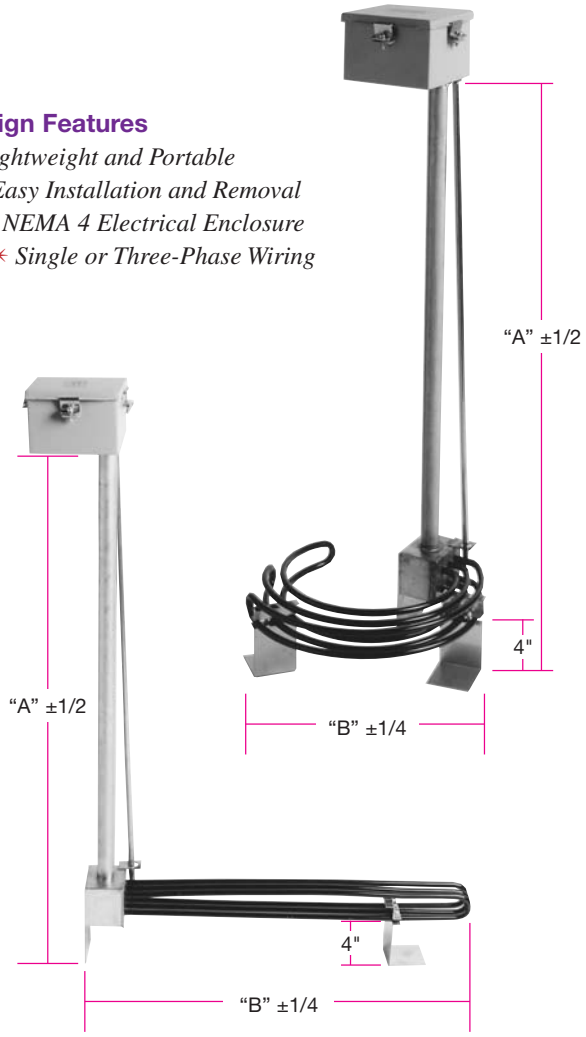
4" (102 mm) sludge legs keep the elements off the bottom of the tank and above any deposits that may accumulate there.

Optional Features

- *304 or 316 Stainless Steel construction for all wetted parts*
- *Passivation of all wetted parts. Electropolished or bright annealed surface treatments for Stainless Steel or Incoloy designs (heating elements only)*
- *NEMA 1 or NEMA 4/7 (explosion resistant) terminal housings*
- *Flange, fixed or adjustable bracket on riser for mounting*
- *Mounting flange for terminal housing*
- *External power wiring options include flexible cord/plug, armored cable, wire braided or plain lead wire*
- *Double or Single pole thermostat (see page 11-6 for available ranges)*
- *Process or Hi-limit thermocouple in thermowell in place of the thermostat*
- *Hi-limit MI thermocouple on sheath*
- *Special riser and/or sludge leg heights*
- *Up to 12 elements per heater assembly*
- *Right-angle riser design*

Design Features

- *Lightweight and Portable*
- *Easy Installation and Removal*
- *NEMA 4 Electrical Enclosure*
- *Single or Three-Phase Wiring*



Standard (Non-Stock) and Stock Over-the-Side Immersion Heaters

Typical Heating Applications: Lightweight Oils • Degreasing Solutions • Mineral Oil

Element Shape	"A" in	"A" mm	"B" in	"B" mm	KW	Part Number 240V-3Ph	Part Number 480V-3Ph	Approximate Net Weight lbs	Approximate Net Weight kg
Round	39 5/16	999	13 1/2	343	3	TAT20001	TAT20002	17	8
	51 5/16	1303	18 1/2	470	6	TAT20003	TAT20004	20	9
	51 5/16	1303	23 1/2	597	9	TAT20005	TAT20006	22	10
Straight	39 5/16	999	22 5/8	575	3	*TAT10001	TAT10002	15	7
	51 5/16	1303	37 5/8	956	6	*TAT10003	*TAT10004	18	8
	51 5/16	1303	52 5/8	1337	9	*TAT10005	*TAT10006	20	9

Standard lead time is Stock to 3 weeks.

Design Features

- *Steel Sheath Heating Elements*
- *NEMA 4 Terminal Housing*
- *Watt Density of 23 watts/in² (3.6 watts/cm²)*

An asterisk (*) next to the Part Number guarantees in-stock availability for same-day shipping when ORDERED BY 2 PM CST

Product Inventory Available for Viewing and Selection @ www.tempco.com

Standard (Non-Stock) and Stock Over-the-Side Immersion Heaters

Design Features

- *Incoloy® Sheath Heating Elements*
- *NEMA 4 Terminal Housing*
- *Watt Density of 23 watts/in² (3.6 watts/cm²)*

***Typical Heating Applications:* Citric and Phosphoric Acid Solutions • Water-Based Chemical Solutions**

Element Shape	"A" in	"A" mm	"B" in	"B" mm	KW	Part Number 240V-3Ph	Part Number 480V-3Ph	Approximate Net Weight lbs	Approximate Net Weight kg
Round	39 5/16	999	13 1/2	343	3	TAT20007	TAT20008	17	8
	51 5/16	1303	18 1/2	470	6	TAT20009	TAT20010	20	9
	51 5/16	1303	23 1/2	597	9	TAT20011	TAT20012	22	10
Straight	39 5/16	999	22 5/8	575	3	*TAT10007	TAT10008	15	7
	51 5/16	1303	37 5/8	956	6	*TAT10009	*TAT10010	18	8
	51 5/16	1303	52 5/8	1337	9	*TAT10011	*TAT10012	20	9

Design Features

- *Incoloy® Sheath Heating Elements*
- *NEMA 4 Terminal Housing*
- *Watt Density of 42 watts/in² (7.4 watts/cm²)*

***Typical Heating Applications:* Process Water • Mild Caustic Solutions (2% max.) • Clean Water**

Element Shape	"A" in	"A" mm	"B" in	"B" mm	KW	Part Number 240V-3Ph	Part Number 480V-3Ph	Approximate Net Weight lbs	Approximate Net Weight kg
Round	39 5/16	999	10 3/4	273	3	TAT20013	TAT20014	16	7
	39 5/16	999	13 1/2	343	6	TAT20015	TAT20016	17	8
	39 5/16	999	16	406	9	TAT20017	TAT20018	18	8
	51 5/16	1303	18 1/2	470	12	TAT20019	TAT20020	20	9
	51 5/16	1303	21 1/4	540	15	TAT20021	TAT20022	21	10
	51 5/16	1303	23 1/2	597	18	TAT20023	TAT20024	22	10
Straight	39 5/16	999	14 3/8	371	3	*TAT10013	*TAT10014	14	6
	39 5/16	999	22 5/8	575	6	TAT10015	TAT10016	15	7
	39 5/16	999	30 1/8	765	9	*TAT10017	*TAT10018	16	7
	51 5/16	1303	37 5/8	956	12	*TAT10019	TAT10020	18	8
	51 5/16	1303	45 1/8	1146	15	TAT10021	TAT10022	19	9
	51 5/16	1303	52 5/8	1337	18	*TAT10023	*TAT10024	20	9

An asterisk (*) next to the Part Number guarantees in-stock availability for same-day shipping when ORDERED BY 2 PM CST

Ordering Information

Catalog Heaters

Over-the-Side Immersion Heaters whose Part Numbers are preceded by an asterisk (*) are Guaranteed In Stock for immediate delivery.

Part Numbers with no asterisk (*) are stocked as sub-assemblies for 2-3 week delivery.

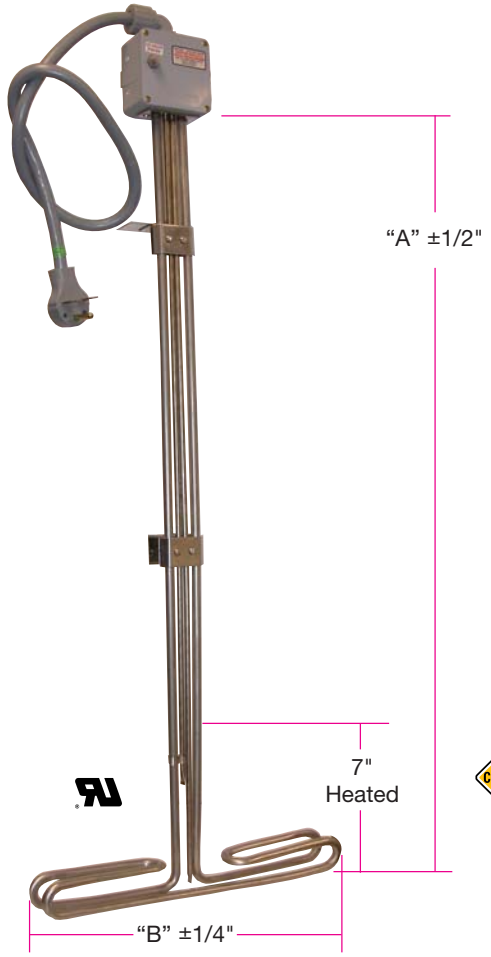
Custom Engineered/Manufactured Heaters

Understanding that an electric heater can be very application specific, for sizes and ratings not listed, **TEMPCO** will design and manufacture an Over-the-Side Immersion Heater to meet your requirements.
Standard lead time is Stock to 3 weeks.

Please Specify the following:

- ❑ Application
- ❑ Wattage, Voltage and Phase
- ❑ Element Sheath Material
- ❑ Number of Elements
- ❑ Element Watt Density
- ❑ "A" and "B" dimensions
- ❑ Optional Features
- ❑ Quantity

General Purpose Tank or Reservoir Water Immersion Heater



Design Features

- Immersion section of heater made of 316 Stainless Steel
- Cold riser extends to the top of container where control housing is located
- Cord set with 3-wire grounding plug is included for easy installation and wiring.
- Adjustable vapor-proof thermostat control with temperature range of 55°F to 115°F (+/-3°)
- Hi-limit cut switch set to 125°F (+/-4°)
- Stainless Steel mounting bracket also supplied for easy mounting
- Pilot light and on-off switch provided

Hi-Limit:

If the thermostat should fail and its contacts stick in a closed position, the heating element will continue to heat to about 125°F. At this temperature the Hi-Limit will open and turn the heating element off. After repairing or replacing the thermostat the Hi-Limit can be manually reset.

CAUTION

Hazard of electric shock. Installation must be grounded to earth and heater connected to line input through properly sized GFCI circuit breaker.

Disconnect power to heater before servicing. There should be no body contact with the water while the heater is in the water.

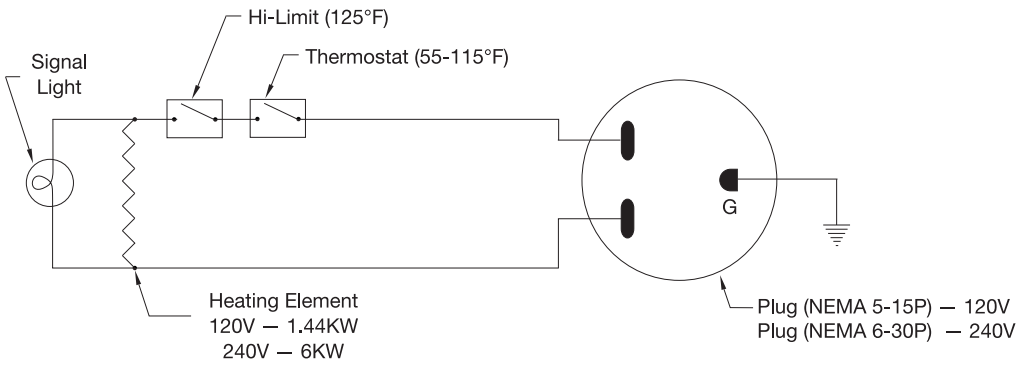
Under NO circumstances should this heater be turned on unless the system is full of water.

An asterisk (✻) next to the Part Number guarantees in-stock availability for same-day shipping when ORDERED BY 2 PM CST

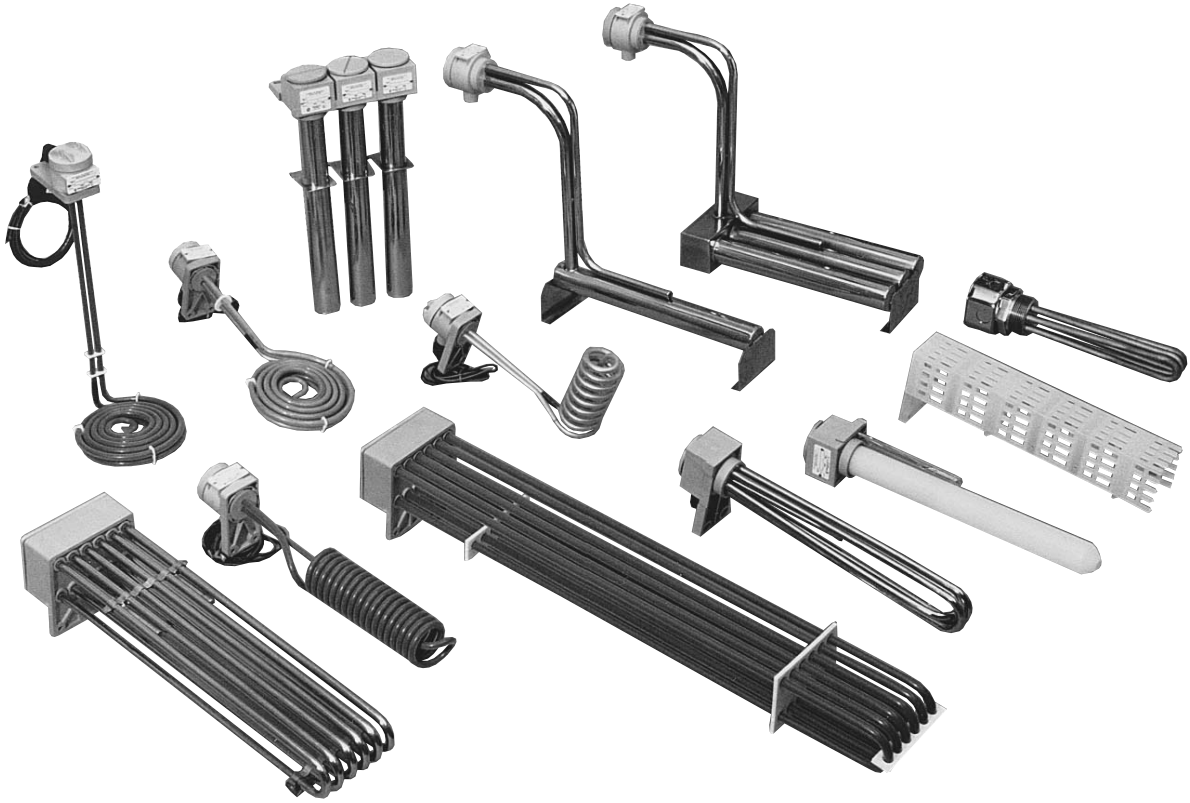
General Purpose Tank or Reservoir Heater

Sheath	Watt Density w/in²	Watts	Volts	"A" Dim. in	"B" Dim. in	Part Number 4 ft. cord	Part Number 6 ft. cord
316 Stainless Steel	51	6000	240	39-3/4	17-1/2	✻TAT40012	TAT40017
(Bright Annealed)	13	1440	120	39-3/4	17-1/2	TAT40016	✻TAT40013

Wiring Diagram — Internal Electrical Connections



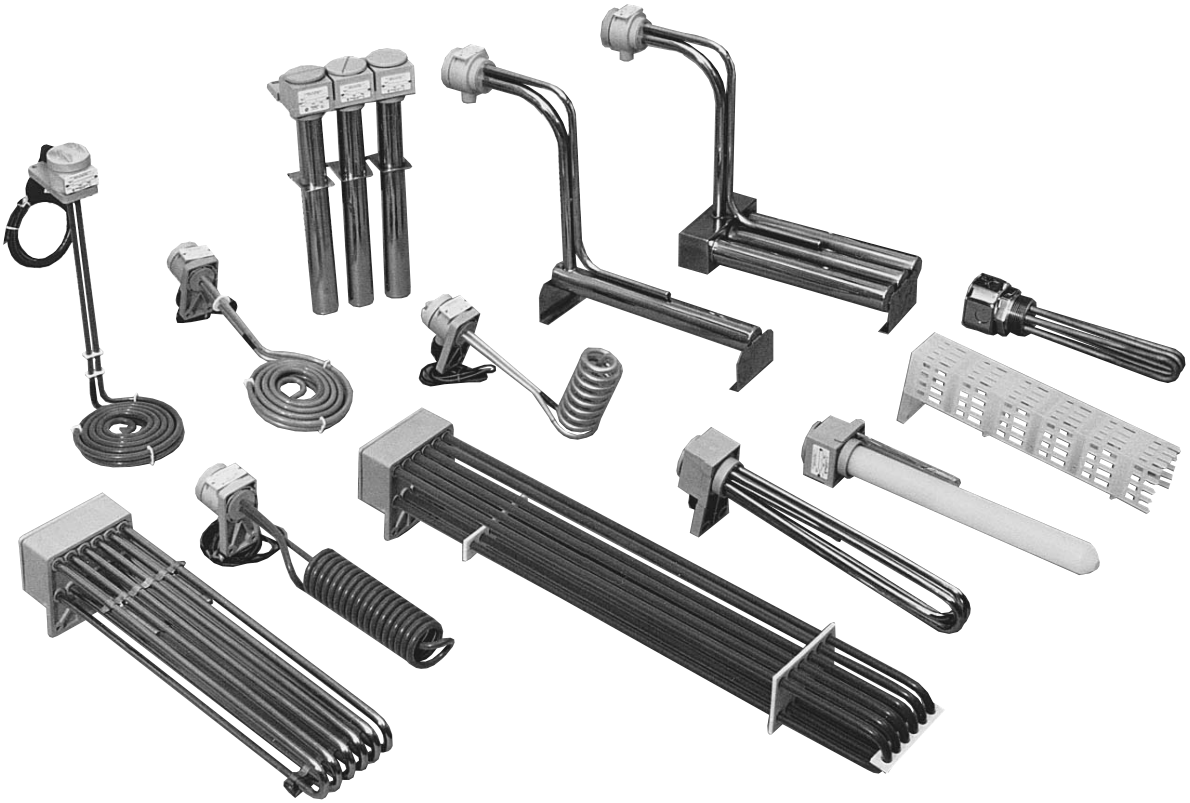
Over-the-Side Chemical Bath Immersion Heaters



The Over-the-Side Chemical Bath Immersion Heaters on the following pages (11-77 through 11-100) of this CD do not appear in the print version of the Tempco catalog.

Information for Chemical Bath Immersion Heaters can also be found on www.tempco.com

Over-the-Side Chemical Bath Immersion Heaters



TEMPCO Over-the-Side Chemical Bath Immersion Heaters offer a wide variety of sheath materials and heater configurations to cover the widest possible spectrum of chemical heating applications. From plain steel to Teflon® covered, Tempco is sure to have the correct heater for even the most difficult solution. Built-in thermal overload protection prevents premature heater burnout in low liquid level conditions. This thermal protection also guards against a potentially hazardous situation should the heater be in close proximity to combustibles such as a plastic tank, or the medium being heated.

Design Features

- *Heavy duty, long lasting construction*
- *Standard thermal protection*
  - *T1 replaceable, standard*
  - *T2 resettable, optional*
- *Fully grounded for safety*
- *Vapor-tight polypropylene terminal enclosure*
- *Standard 3 ft. flexible PVC liquid-tight conduits and leads*
- *Agency Approvals:*

Tempco Over-the-Side Immersion Heaters are UL listed (except plain steel) under Classification KQGV, File Number E176527.

All catalog heaters are CSA certified under File Number LR 701748.

OVER THE SIDE

Typical Applications

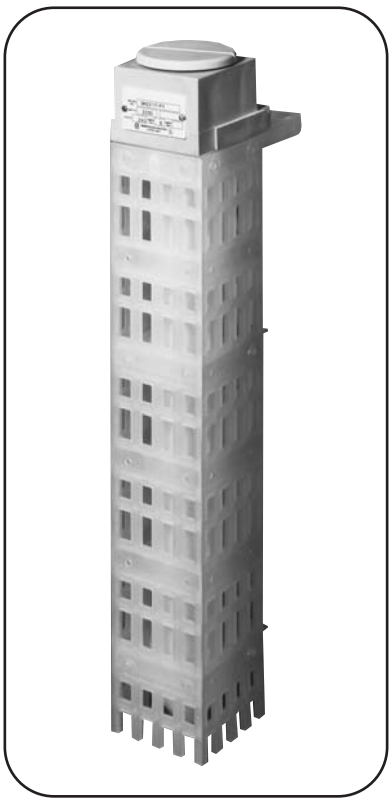
- *Aqueous and semi-aqueous cleaning*
- *Evaporation tanks*
- *Chemical etching*
- *Chemical mixing*
- *Phosphatizing*
- *Rinse tanks*
- *Anodizing*
- *Pickling*
- *Plating*
- *Dyeing*

3 Construction Styles to select from...

OVER THE SIDE MODELS

Teflon®

- Low watt density for long service life
- Non-contaminating .030 Teflon® covered stainless steel element
- Lightweight, non-floating construction
- Polypropylene guards (optional Teflon® guards for chromic acids or solutions exceeding 180°F)



Quartz

- Replaceable element and quartz tube
- Standard heater with polypropylene guard (optional Teflon® guards for chromic acids or solutions exceeding 180°F)

Metal Tube

- Variety of materials including steel, SS 304, SS 316, and titanium for chemical compatibility
- Rugged long lasting construction

Thermal Over-Temperature Protection

CAUTION

The realities of any plating, cleaning, anodizing, etching or pickling operation are that something could go wrong such as:

- An undetected tank leak
- Undetected evaporation losses
- Failure to refill the system

Any of these conditions creates a situation where the potential for fire or other hazard is increased.

Standard Setup — All Tempco Over-the-Side Teflon®, quartz and metal tube heaters come equipped with a replaceable thermal fuse placed in a thermowell and positioned at the top of the heater's hot zone. When wired into the heater circuit, it will instantly cut power to the heater when the preset temperature is reached. If the heater is over 15 amp, the thermal fuse would be wired into the control relay circuit. Also available is the T2 bi-metal switch which would be wired into the control relay circuit and used with additional components to form a resettable system.

We highly recommended the use of liquid level switches tied into control circuitry to provide a failsafe backup to the thermal fuse.

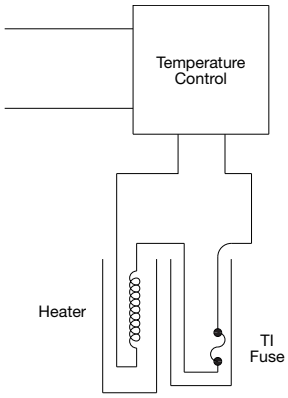
Application Guide for Thermal Over-Temperature Devices

T1 Thermal Fuse Devices

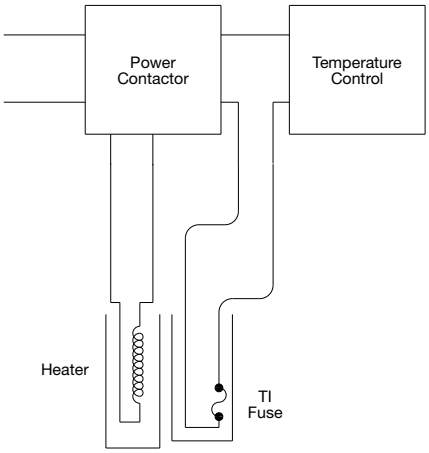
The T1 Over-Temperature Device is a eutectic switch with a pre-specified melt temperature. The "one shot" characteristic is useful in alerting operators to identify and remedy the cause of the over-temperature condition in the course of T1 fuse replacement.

UL/CSA listed rating of 15 Amps up to 277 Vac

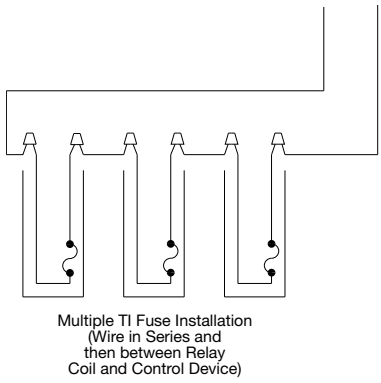
Single-Phase



Power Contactor



Multi-Phase



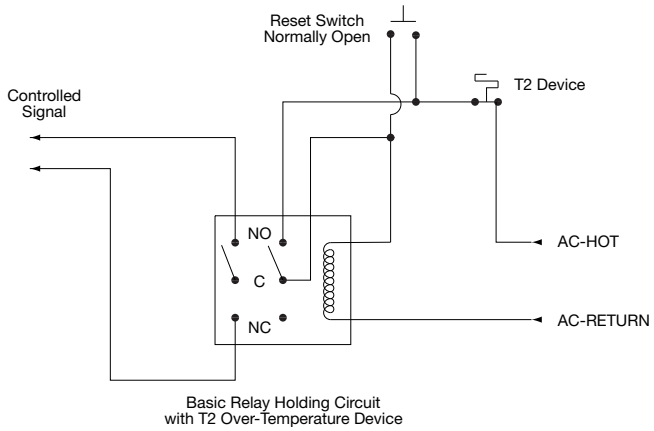
T2 Bi-Metal Switch

The T2 Over-Temperature Device is a slow make/slow break bimetallic thermostat with a pre-specified calibration temperature. The slow break characteristic coupled with the pushbutton reset feature is extremely useful when a low liquid level occurs.

The T2 Over-Temperature Device is electrically installed with a holding circuit in conjunction with a power contactor to energize the heater. ***The T2 device must never be used to directly switch heater power.***

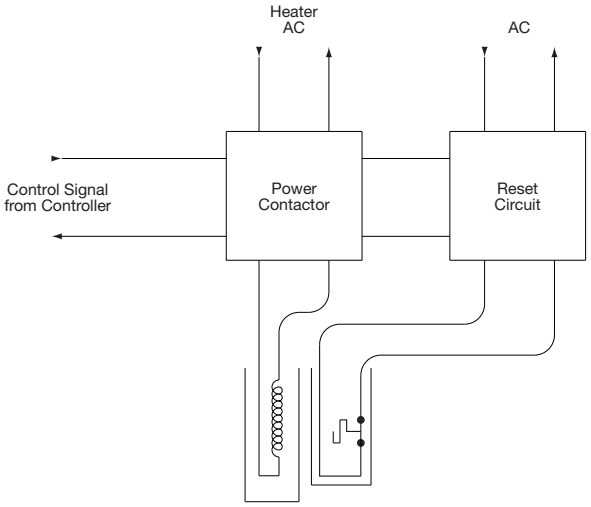
UL/CSA listed rating of 6 Amps @ 120 Vac or 4 Amps @ 240 Vac

Basic Relay Holding Circuit



Basic Relay Holding Circuit
with T2 Over-Temperature Device

Typical Installation



Note: 1. Multiple heaters are hooked up according to standard electrical practices.
2. Multiple T2 devices are hooked up in series on one reset circuit.

Replacement Thermal Protection Accessories

Various construction methods are used in the manufacture of Teflon®, Quartz and Metal Tube Over-the-Side Immersion Heaters.

The T1 or T2 Thermal Protection Devices are matched to the item they protect for lead length and mounting style.

T1 Thermal Fuse Devices

Description	Catalog Number
T1 Thermal Fuse for **Teflon®** Over-the-Side Heaters (rated to 190°F)	TMC90001
T1 Thermal Fuse for **Quartz** Over-the-Side Heaters (w/SS Braid Sleeving)	
• Low Temperature Range	TMC90002
• Medium Temperature Range	TMC90003
T1 Thermal Fuse for **Straight Metal** Over-the-Side Heaters	
• Low Temperature Range	TMC90005
• Medium Temperature Range	TMC90006
• High Temperature Range	TMC90007
T1 Thermal Fuse for **L-Shaped Metal** Over-the-Side Heaters	
• Low Temperature Range	TMC90008
• Medium Temperature Range	TMC90009
• High Temperature Range	TMC90010

T2 Bi-Metal Switch

Description	Catalog Number
T2 Bi-Metal Switch for **Teflon®** Over-the-Side Heaters (rated to 190°F)	TMC90101
T2 Bi-Metal Switch for **Quartz** Over-the-Side Heaters (w/SS Braid Sleeving)	
• Low Temperature Range	TMC90102
• Medium Temperature Range	TMC90103
• High Temperature Range	TMC90104
T2 Bi-Metal Switch for **Straight Metal** Over-the-Side Heaters	
• Low Temperature Range	TMC90105
• Medium Temperature Range	TMC90106
• High Temperature Range	TMC90107
T2 Bi-Metal Switch for **L-Shaped Metal** Over-the-Side Heaters	
• Low Temperature Range	TMC90108
• Medium Temperature Range	TMC90109
• High Temperature Range	TMC90110

High Temperature Range— Solutions from 220°F to 300°F (104.4°C to 149.0°C)

Medium Temperature Range— Solutions from 180°F to 220°F (82.2°C to 104.4°C)

Low Temperature Range— Solutions up to 180°F (82.2°C)

Chemical Bath Temperature Control Systems

Single-Phase Non-Indicating Thermostat 25 Amp Output

Design Features

- *FEP sleeved bulb and capillary for chemical resistance; 5 or 12 ft. available*
- *Double pole, 120 or 240 Volt operation*
- *Enclosure: 3.75" x 5.87" x 3.375" deep*
  Mounting centers: 2.62" x 6.25"

Standard (Non-Stock) Sizes and Ratings

Part Number	Volts	Amps	Temperature Range °F	Capillary Length ft (mm)	Shipping Weight Lbs (kg)
TMC11001	120/240	25	30° to 220°F	5 (1525)	3 (1.5)
TMC11002	120/240	25	30° to 220°F	12 (3660)	3 (1.5)
TMC11003	120/240	25	200° to 550°F	5 (1525)	3 (1.5)

Standard lead time is 2 to 3 weeks.

1- or 3-Phase Non-Indicating Thermostat Control Systems: 30 - 150 Amps

Design Features

- *FEP sleeved bulb and capillary for chemical resistance; 5 ft. standard or 12 ft. available*
- *Gasketed plastic enclosure for corrosion resistance*
- *240 or 480 Volt operation*
- *3-pole contactor for single or three-phase operation*
- *30 - 150 Amp capability*

Standard (Non-Stock) Sizes and Ratings

(Standard lead time is 2 to 3 weeks.)

Part Number Temperature Range 30 to 220°F	200 to 550°F	Volts	Amps	Shipping Weight Lbs (kg)
TMC11004	TMC11016	240	30	15 (7)
TMC11005	TMC11017	480	30	15 (7)
TMC11006	TMC11018	240	50	16 (7.5)
TMC11007	TMC11019	480	50	16 (7.5)
TMC11008	TMC11020	240	75	22 (10)
TMC11009	TMC11021	480	75	22 (10)
TMC11010	TMC11022	240	90	24 (11)
TMC11011	TMC11023	480	90	24 (11)
TMC11012	TMC11024	240	120	26 (12)
TMC11013	TMC11025	480	120	26 (12)
TMC11014	TMC11026	240	150	32 (14.5)
TMC11015	TMC11027	480	150	32 (14.5)

Note: The control systems listed above have a 5 ft. bulb and capillary, 3-pole mechanical relay, step-down control transformer.

User is responsible for fuses or circuit breaker for main power.

Enclosure Dimensions (in)

	A	B	C	D	E
30 - 50A	14.37	9.5	6.25	13.62	6
75 - 120A	14.37	9.5	6.25	13.62	6
150A	17.5	15.75	8.37	16.75	12

Product Inventory Available for Viewing and Selection @ www.tempco.com

Chemical Bath Temperature Control Systems

Single-Phase Non-Indicating Electronic Thermostat 20 Amp Output

Design Features

- *1000 ohm RTD included, 10 ft. FEP sleeved for chemical resistance*
- *Accuracy (sensor): +/- 2°F (1°C)*
- *Sensor short and break protection*
- *Enclosure: NEMA 1, 3.75" x 5.87" x 3.375" deep*
  Mounting centers: 2.62" x 6.25"

Standard (Non-Stock) Sizes and Ratings

Part Number	Volts	Amps	Temperature Range °F (°C)	Sensor Length ft (mm)	Ship Wgt Lbs (kg)
TMC12001	120	20	50° to 250°F (10° to 120°C)	10 (3)	3 (1.5)
TMC12002	120	20	150° to 550°F (66° to 288°C)	10 (3)	3 (1.5)

Note: Field selectable for 120 or 240 Volt operation

Standard lead time is 2 to 3 weeks.

1- or 3-Phase Non-Indicating Electronic Thermostat Control Systems: 30 – 150 Amps

User is responsible for fuses or circuit breaker for main power.

Design Features

- *1000 ohm RTD included, 10 ft. FEP sleeved for chemical resistance*
- *Accuracy (sensor): +/- 2°F (1°C)*
- *Sensor short and break protection*
- *Gasketed plastic enclosure for corrosion resistance*
- *240 or 480 Volt operation*
- *3-pole contactor for single or three-phase operation*
- *30 - 150 Amp capability*

Standard (Non-Stock) Sizes and Ratings

(Standard lead time is 2 to 3 weeks.)

Part Number Temperature Range 50 to 250°F	150 to 550°F	Volts	Amps	Shipping Weight Lbs (kg)
TMC12003	TMC12015	240	30	15 (7)
TMC12004	TMC12016	480	30	15 (7)
TMC12005	TMC12017	240	50	16 (7.5)
TMC12006	TMC12018	480	50	16 (7.5)
TMC12007	TMC12019	240	75	22 (10)
TMC12008	TMC12020	480	75	22 (10)
TMC12009	TMC12021	240	90	24 (11)
TMC12010	TMC12022	480	90	24 (11)
TMC12011	TMC12023	240	120	24 (11)
TMC12012	TMC12024	480	120	24 (11)
TMC12013	TMC12025	240	150	32 (14.5)
TMC12014	TMC12026	480	150	32 (14.5)

Note: The control systems listed above have a 10 ft. RTD, 3-pole mechanical relay, step down control transformer

Enclosure Dimensions (in)

	A	B	C	D	E
30 - 50A	14.37/365	9.5/365	6.25/159	13.62/346	6/152
75 - 120A	15.5/394	13.75/349	7.62/194	14.75/375	10/254
150A	17.5/445	15.75/400	8.37/213	16.75/425	12/305

Chemical Compatibility Guide

SOLUTION	TYPE OF HEATER
Acetic	Teflon® or Quartz
Acid Sulfate	Teflon® or Quartz
Actane 70, 80	Teflon®
Actane Salt	Teflon®
Alcorite	Teflon® or Quartz
Alkaline Cleaners (Electrified)	304 Stainless Steel
Alkaline Soaking Cleaners	304 Stainless Steel
Alodine	316 Stainless Steel
Alstan	304 Stainless Steel
Aluminum Anodizing	Teflon® or Quartz
Aluminum Bright Dip	Teflon® or Quartz
Aluminum Chloride	Teflon® or Quartz
Aluminum Cleaners	304 Stainless Steel*
Aluminum Sulfate	304 Stainless Steel
Ammonia	304 Stainless Steel
Ammonia Persulfate	Teflon® or Quartz
Ammonium Bi Fluoride	Teflon®
Ammonium Chloride	Titanium
Ammonium Nitrate	316 Stainless Steel
Anodizing	Teflon® or Quartz
ARP 28, 80 Blackening Salts	Teflon® or Quartz
Arsenic	304 Stainless Steel
Barium Chloride	Titanium
Benzoic Acid	Titanium
Black Nickel	Teflon® or Quartz
Black Oxide (High-Temp)	304 Stainless Steel*
Black Oxide (Low-Temp)	Titanium
Bonderizing	316 Stainless Steel*
Boric Acid	Titanium
Brass Cyanide	304 Stainless Steel
Bright Copper-Cyanide	304 Stainless Steel
Bright Nickel	Teflon®, Quartz or Titanium
Bronze	304 Stainless Steel
Brown Oxide	Titanium
Burnite	Teflon® or Quartz
Butyric Acid	Titanium
Cadmium (Alkaline)	304 Stainless Steel
Cadmium Black	Teflon® or Quartz
Cadmium Fluoborate	Teflon®
Calcium Chloride	Titanium
Calcium Hypochlorite	Titanium
Carbonic Acid	Titanium
Caustic Etch	Steel*
Caustics	Steel
Caustics (highly concentrated 20% & over)	Steel*
Chloride	Teflon® or Quartz
Chlorine/Wet	Teflon® or Quartz
Chlorosulfuric Acid	Titanium
Chromic Acetate	Teflon® or Quartz
Chromic Anodizing	Teflon® or Quartz
Chromic Nickel	Teflon® or Quartz
Chromium (Fluoride)	Teflon®
Chromium (No Fluorides)	Teflon®, Quartz or Titanium
Citric Acid	Titanium
Clear Chromate	Teflon® or Quartz
Cobalt Nickel	Teflon®, Quartz or Titanium
Cobalt Plating	304 Stainless Steel
Cobra Etch	Teflon®
Copper Acid	Teflon® or Quartz
Copper Bright Acid	Teflon® or Quartz
Copper Cyanide	304 Stainless Steel
Copper Fluoborate	Teflon®
Copper Pyrophosphate	304 Stainless Steel
Copper Strike	304 Stainless Steel
Copper Sulfate	Teflon® or Quartz
Cyanide	304 Stainless Steel
Deionized Water	316 Stainless Steel
Deoxidizer (Etching)	Quartz
Deoxidizer Non-Chromated	316 Stainless Steel
Dichromic Seal	Steel
Diethylene Glycol	304 Stainless Steel
Diversey, 511, 514	Teflon®
Dow Therm	316 Stainless Steel*
Dye Solutions	304 Stainless Steel
Ebonal C	Titanium
Electro Cleaner	304 Stainless Steel
Electro Polishing	Teflon® or Quartz
Electroless Copper	Teflon®
Electroless Nickel	Teflon® or Titanium*
Electroless Tin (Acid)	Teflon® or Quartz
Electroless Tin (Alkaline)	316 Stainless Steel
Enthone 80 Acid	Teflon®
Ethylene Glycol	Steel*
Ferric Ammonium Oxide	316 Stainless Steel
Ferric Chloride	Teflon®, Quartz or Titanium
Ferric Nitrate	304 Stainless Steel
Ferric Sulfate	304 Stainless Steel
Fluoborate	Teflon®
Formic Acid	316 Stainless Steel
Glycerol	304 Stainless Steel*
Gold-Acid	Teflon®, Quartz or Titanium
Gold Cyanide	304 Stainless Steel
Gold-Immersion	304 Stainless Steel
Grey Nickel	Teflon®, Quartz or Titanium
Hot Seal Dichromate	316 Stainless Steel
Hydrochloric Acid	Teflon® or Quartz
Hydrofluoric Acid	Teflon®
Hydrogen Peroxide	Teflon® or Quartz*
Indium	Teflon® or Quartz
Iridite (1, 2, 3, 4-C, 7, 8, 15)	Teflon® or Quartz

Teflon® is a registered trademark of DuPont.

* Should use heater watt densities of 18 watts/sq.in.

Product Inventory Available for Viewing and Selection @ www.tempco.com

Chemical Compatibility Guide

SOLUTION	TYPE OF HEATER
Iridite (4-75, 4-73, 14, 14-2, 14-9)	316 Stainless Steel
Iron Fluoborate	Teflon®
Iron Phosphate	316 Stainless Steel*
Isoprep (186, 187, 188)	316 Stainless Steel
Isoprep Acid Salts	Teflon®
Jetal	304 Stainless Steel
Lead Acetate	304 Stainless Steel
Lime Saturated Water (Alkaline)	316 Stainless Steel*
Linseed Oil	304 Stainless Steel
Magnesium Hydroxide	304 Stainless Steel*
Magnesium Nitrate	Teflon® or Quartz
Manganese Phosphate	316 Stainless Steel*
McDermid 629	Teflon®
Mercuric Chloride	Titanium
Muriatic Acid	Teflon® or Quartz
Nickel (Plating Solution)(Watts)	Teflon®, Quartz or Titanium
Nickel Acetate Seal	316 Stainless Steel
Nickel Chloride	Titanium
Nitric Acid	Teflon® or Quartz
Nitric Hydrochloric Acids	Teflon® or Quartz
Nitric Phosphoric	Quartz*
Oil	Steel*
Oleic Acid	Teflon® or Quartz
Paint Stripper (Alkaline)	304 Stainless Steel*
Perchlorethylene	316 Stainless Steel*
Phosphate	316 Stainless Steel*
Phosphate Cleaner	304 Stainless Steel*
Phosphoric Acid (No Fluoride)	Teflon® or Quartz*
Potassium Acid Sulfate	Teflon® or Quartz
Potassium Cyanide	304 Stainless Steel
Potassium Hydrochloric	Teflon® or Quartz
Potassium Hydroxide	304 Stainless Steel
Potassium Permanganate	Teflon® or Titanium*
Rhodium	Teflon® or Quartz
Rochelle Salt Cyanide	304 Stainless Steel
Ruthenium	Teflon® or Quartz
Salt (Actine)	Teflon®
Sea Water	Titanium
Silver Bromide	316 Stainless Steel
Silver Cyanide	304 Stainless Steel
Silver Lume	304 Stainless Steel
Silver Nitrate	316 Stainless Steel
Sodium Bisulfate	Teflon® or Quartz
Sodium Carbonate	Titanium
Sodium Chlorate	Titanium
Sodium Chloride	Titanium
Sodium Cyanide	304 Stainless Steel
Sodium Dichromate (Hot Seal)	316 Stainless Steel
Sodium Hydroxide	Steel
Sodium Hypochlorite	Teflon®
Sodium Persulfate	Teflon® or Quartz
Stannate	Steel
Stanostar	Teflon® or Quartz
Stearic Acid	Quartz
Sulfamate Nickel	Teflon®, Quartz or Titanium
Sulfur	Teflon® or Quartz
Sulfur Peroxide	Teflon® or Quartz
Sulfuric Acid	Teflon® or Quartz
Sulphamic Acid	Teflon® or Quartz
Tannic Acid	Titanium
Tin Nickel	Teflon®
Tin Plating (Acid) (Fluoborate)	Teflon®
Tin Plating (Acid)(Stanus/Sulphate)	Teflon® or Quartz
Tin Plating (Alkaline)	304 Stainless Steel
Trichlorethylene	316 Stainless Steel*
Trioxide (Pickle)	Teflon® or Quartz
Turco (4181, 4338)	316 Stainless Steel*
Unichrome	Teflon® or Quartz
Water	316 Stainless Steel or Quartz
Wood's Nickel Strike	Teflon® or Quartz
Yellow Dichromate	Teflon® or Quartz
Zinc Acid	Teflon® or Titanium
Zinc Ammonium Chloride	Quartz or Titanium
Zinc Cyanide	304 Stainless Steel
Zinc Phosphate	316 Stainless Steel*
Zincate	304 Stainless Steel

* Should use heater watt densities of 18 watts/sq.in.maximum

Note: The data listed is provided as a reference and is offered as a guide only. It is not intended to be used as the sole basis of design or to establish specification limits. **Tempco Electric Heater Corporation** assumes no obligation or liability for any advice furnished by it or for results obtained from its use. Due to the complexities of solutions and applications, it is the customer's responsibility to contact their chemical supplier for heater material compatibility and recommendations. Ultimate responsibility lies with the user.

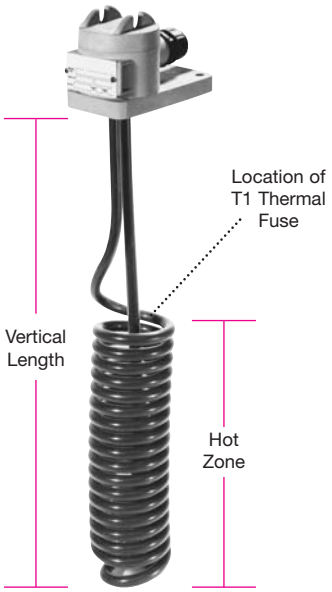
Do not use electric immersion heaters to heat flammable solutions!

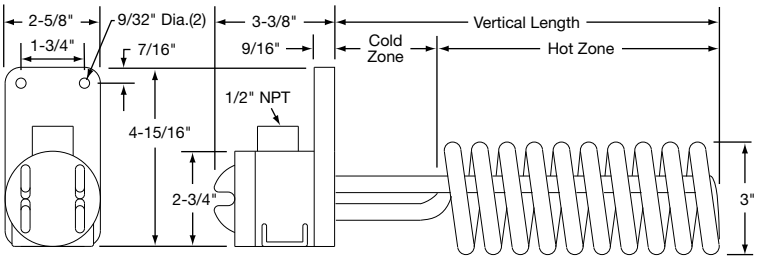
CAUTION

Please insure applicability of heater before installation since we cannot guarantee heaters against premature failure due to corrosion or chemical destruction caused by unusual conditions over which we have no control such as:

- Excessively high solution temperatures
- The concentration of the solution
- The presence of inhibitors
- The presence of other acids causing a secondary reaction
- Stray electrical currents
- Flux floating on the surface
- The presence of dissolved gases
- Excessive sludge buildup
- Stagnant or turbulent flow of the solution
- Aeration
- Presence of oxygen or an oxidizing agent in the solution
- Erosion

Teflon® Single-Element Coil Heater





Typical Applications

Compatible with most plating tank solutions; inert to acids, anodizing and pickling solutions up to 190°F (88°C). Check recommendation guide on pages 11-84 and 11-85 and with chemical supplier for proper sheath material selection.

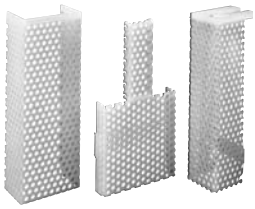
Replaces more expensive alumina or graphite heaters.

Design Features

- *10 watts/in² (1.6 watts/cm²) for long service life.*
- *Non-contaminating Teflon® covered stainless steel elements*
- *T1 thermal fuse protection standard; T2 bi-metal switch optional*
- *Grounded internal metal element for safety*
- *UL listed, CSA certified*
- *Lightweight, non-floating construction*
- *Vapor-tight polypropylene terminal enclosure with universal mounting flange*
- *Standard 3-ft. flexible PVC liquid-tight conduit*
- *Polypropylene guards (optional Teflon® guards recommended for chromic acid or solutions exceeding 180°F or 82.2°C)*
- *Single-Phase only*
- *120, 240, 480 volts standard as listed—other voltages available*
- *Longer and shorter vertical lengths available; Consult* **Tempco**.

Standard (Non-Stock) Sizes and Ratings

Watts	Part Number 120V	240V	480V	Hot Zone in	Hot Zone mm	Vertical Length in	Vertical Length mm
500	TMT01001	TMT01002	—	5	127	11	279
1000	TMT01003	TMT01004	—	7	178	11	279
2000	TMT01005	TMT01006	TMT01007	12	305	17	432
3000	—	TMT01008	TMT01009	16	406	23	584
4000	—	TMT01010	TMT01011	20	508	29	737
5000	—	TMT01012	TMT01013	25	635	35	889
6000	—	TMT01014	TMT01015	29	737	40	1016



Note: Guards are available and recommended for all Teflon® heaters. Standard guards are made of polypropylene; Teflon® guards are optional.

Ordering Information

Catalog Heaters

The part numbers given in the chart above are for the complete assembly including the heater, poly guard, and T1 thermal protector.

Other optional assemblies may be ordered; consult Tempco for the catalog number.

Custom Engineered/Manufactured Heaters

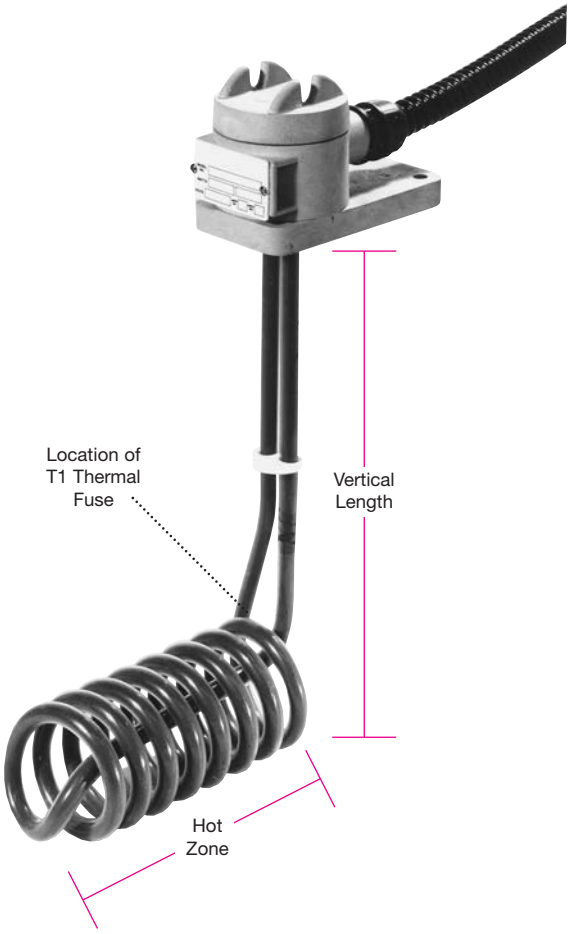
For sizes and ratings not listed, **TEMPCO** will design and manufacture a heater to meet your requirements. ***Standard lead time is 2 to 3 weeks.***

Please Specify the following:

- ❑ Hot Zone and Vertical Length per model
- ❑ Voltage and Wattage
- ❑ PVC liquid-tight conduit length (3 ft. standard)

Product Inventory Available for Viewing and Selection @ www.tempco.com

Teflon® Single-Element L-Shaped Coil Heater



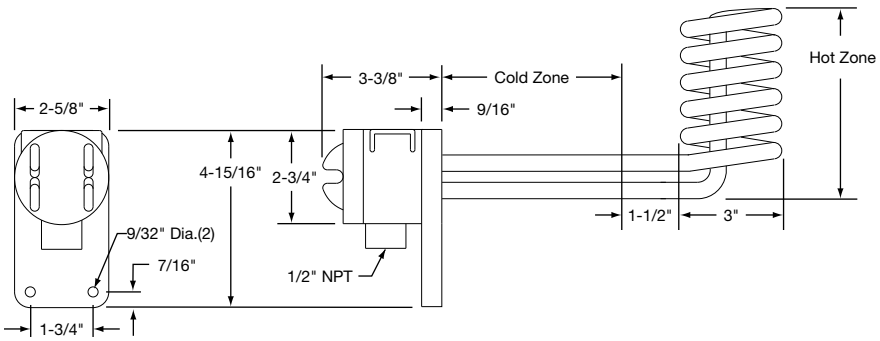
Typical Applications

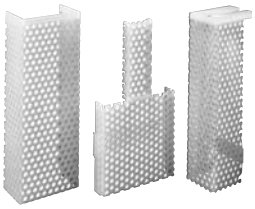
Compatible with most plating tank solutions; inert to acids, anodizing and pickling solutions up to 190°F (88°C). Check recommendation guide on pages 11-84 and 11-85 and with chemical supplier for proper sheath material selection.

Replaces more expensive alumina or graphite heaters.

Design Features

- *Bottom design for even heating and varying liquid levels*
- *10 watts/in² (1.6 watts/cm²) for long service life*
- *Non-contaminating Teflon® covered stainless steel elements*
- *T1 thermal fuse protection standard; T2 bi-metal switch optional*
- *Grounded internal metal element for safety*
- *UL listed, CSA certified*
- *Lightweight, non-floating construction*
- *Vapor-tight polypropylene terminal enclosure with universal mounting flange*
- *Standard 3-ft. flexible PVC liquid-tight conduit*
- *Polypropylene guards (optional Teflon® guards recommended for chromic acid or solutions exceeding 180°F or 82.2°C)*
- *Single-Phase only*
- *120, 240, 480 volts standard as listed—other voltages available*
- *Longer and shorter vertical lengths available; Consult* **Tempco**.





Note: Guards are available and recommended for all Teflon® heaters. Standard guards are made of polypropylene; Teflon® guards are optional.

Standard (Non-Stock) Sizes and Ratings

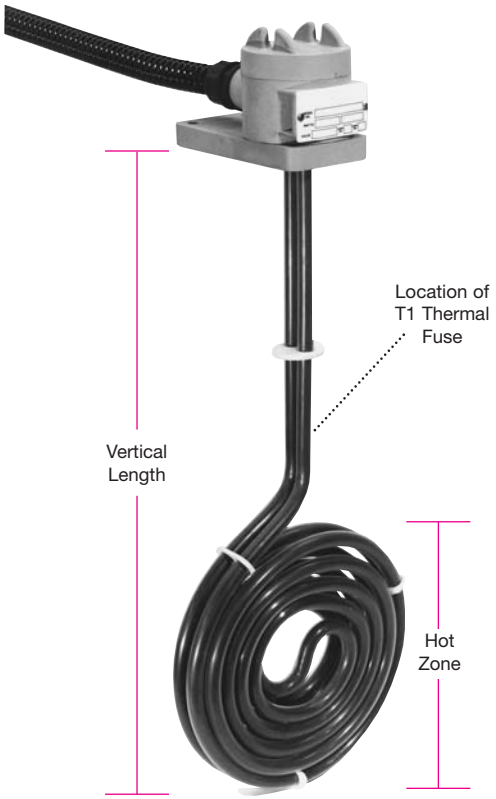
Watts	Part Number 120V	240V	480V	Hot Zone in	Hot Zone mm	Vertical Length in	Vertical Length mm
500	TMT02001	TMT02002	—	6	152	12	305
1000	TMT02003	TMT02004	—	8	203	12	305
2000	TMT02005	TMT02006	TMT02007	12	305	18	457
3000	—	TMT02008	TMT02009	17	432	18	457
4000	—	TMT02010	TMT02011	20	508	18	457
5000	—	TMT02012	TMT02013	24	610	18	457
6000	—	TMT02014	TMT02015	29	737	18	457

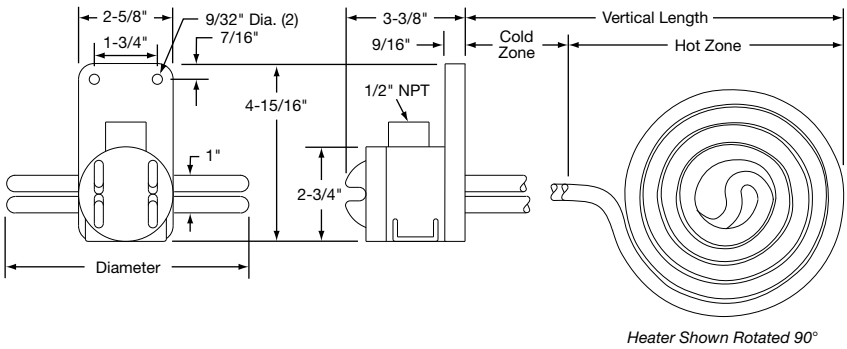
Standard lead time is 2 to 3 weeks.

Ordering Information

See page 11-86

Teflon® Single-Element Round Heater





Heater Shown Rotated 90°

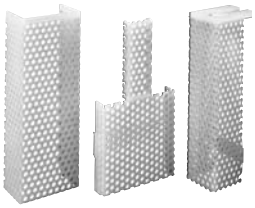
Typical Applications

Compatible with most plating tank solutions; inert to acids, anodizing and pickling solutions up to 190°F (88°C). Check recommendation guide on pages 11-84 and 11-85 and with chemical supplier for proper sheath material selection.

Replaces more expensive alumina or graphite heaters.

Design Features

- *Flat, low profile design*
- *10 watts/in² (1.6 watts/cm²) for long service life*
- *Non-contaminating Teflon® covered stainless steel elements*
- *T1 thermal fuse protection standard; T2 bi-metal switch optional*
- *Grounded internal metal element for safety.*
- *UL listed, CSA certified*
- *Lightweight, non-floating construction*
- *Vapor-tight polypropylene terminal enclosure with universal mounting flange*
- *Standard 3 ft. flexible PVC liquid-tight conduit.*
- *Polypropylene guards (optional Teflon® guards recommended for chromic acid or solutions exceeding 180°F or 82.2°C)*
- *Single-Phase only*
- *120, 240, 480 volts standard as listed—other voltages available*
- *Longer and shorter vertical lengths available; Consult* **Tempco**.



Note: Guards are available and recommended for all Teflon® heaters. Standard guards are made of polypropylene; Teflon® guards are optional.

Standard (Non-Stock) Sizes and Ratings

Watts	Part Number 120V	240V	480V	Hot Zone in	Hot Zone mm	Vertical Length in	Vertical Length mm	Diameter in	Diameter mm
500	TMT03001	TMT03002	—	6	152	14	356	5	127
1000	TMT03003	TMT03004	—	7	178	14	356	6	152
2000	TMT03005	TMT03006	TMT03007	9	229	17	432	8	203
3000	—	TMT03008	TMT03009	10	254	23	584	9	229
4000	—	TMT03010	TMT03011	12	305	29	737	11	279
5000	—	TMT03012	TMT03013	13	330	35	889	12	305
6000	—	TMT03014	TMT03015	14	356	40	1016	13	330

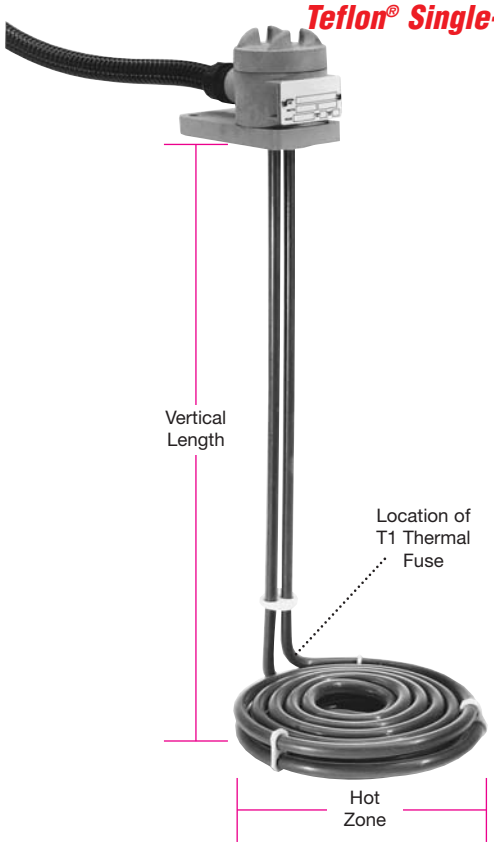
Standard lead time is 2 to 3 weeks.

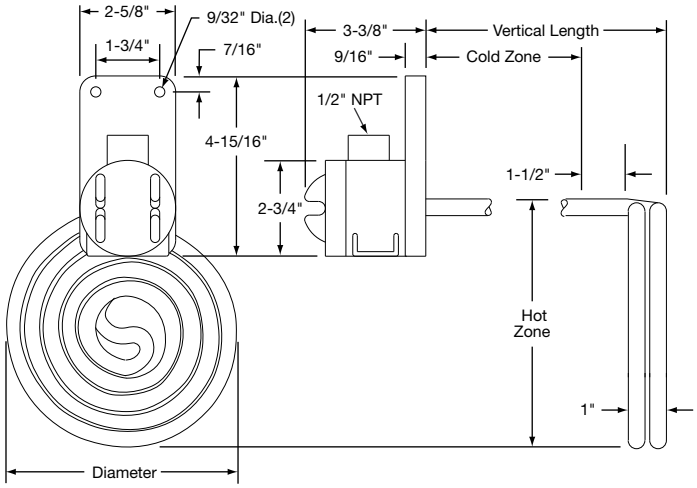
Ordering Information

See page 11-86

Product Inventory Available for Viewing and Selection @ www.tempco.com

Teflon® Single-Element L-Shaped Round Heater





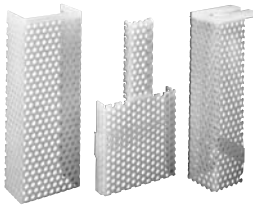
Typical Applications

Compatible with most plating tank solutions; inert to acids, anodizing and pickling solutions up to 190°F (88°C). Check recommendation guide on pages 11-84 and 11-85 and with chemical supplier for proper sheath material selection.

Replaces more expensive alumina or graphite heaters.

Design Features

- *Low profile bottom design for even heating and varying liquid levels*
- *10 watts/in² (1.6 watts/cm²) for long service life*
- *Non-contaminating Teflon® covered stainless steel elements*
- *T1 thermal fuse protection standard; T2 bi-metal switch optional*
- *Grounded internal metal element for safety*
- *UL listed, CSA certified*
- *Lightweight, non-floating construction*
- *Vapor-tight polypropylene terminal enclosure with universal mounting flange*
- *Standard 3-ft. flexible PVC liquid-tight conduit*
- *Polypropylene guards (optional Teflon® guards recommended for chromic acid or solutions exceeding 180°F or 82.2°C)*
- *Single-Phase only*
- *120, 240, 480 volts standard as listed—other voltages available*
- *Longer and shorter vertical lengths available; Consult* **Tempco**.



Note: Guards are available and recommended for all Teflon® heaters. Standard guards are made of polypropylene; Teflon® guards are optional.

Standard (Non-Stock) Sizes and Ratings

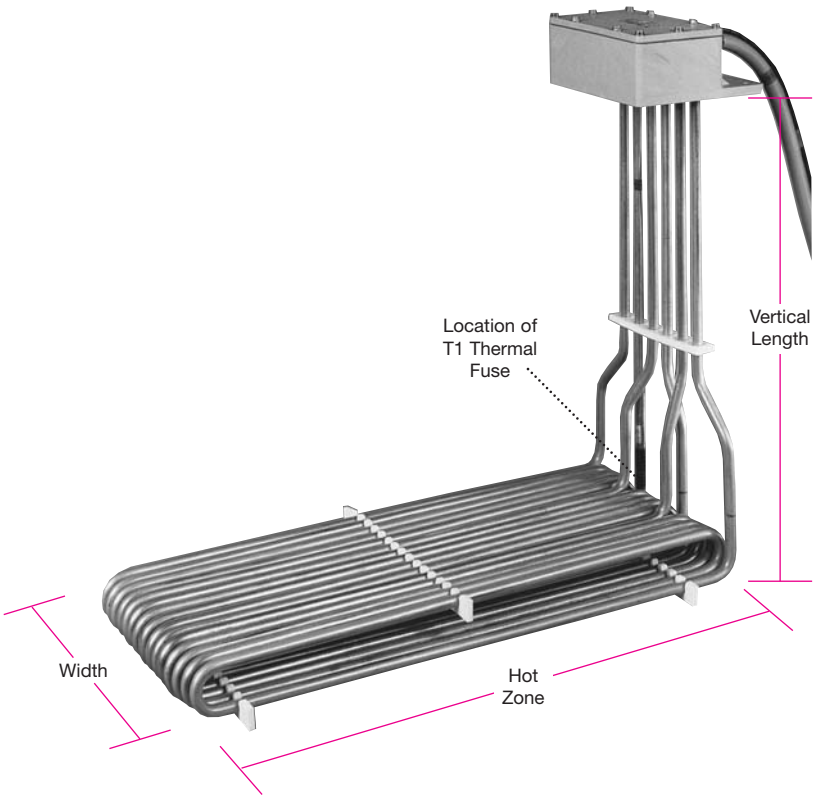
Watts	Part Number 120V	240V	480V	Hot Zone in	Hot Zone mm	Vertical Length in	Vertical Length mm	Diameter in	Diameter mm
500	TMT04001	TMT04002	—	5	127	12	305	5	127
1000	TMT04003	TMT04004	—	6	152	12	305	6	152
2000	TMT04005	TMT04006	TMT04007	8	203	18	457	8	203
3000	—	TMT04008	TMT04009	9	229	18	457	9	229
4000	—	TMT04010	TMT04011	11	279	18	457	11	279
5000	—	TMT04012	TMT04013	12	305	18	457	12	305
6000	—	TMT04014	TMT04015	13	330	18	457	13	330

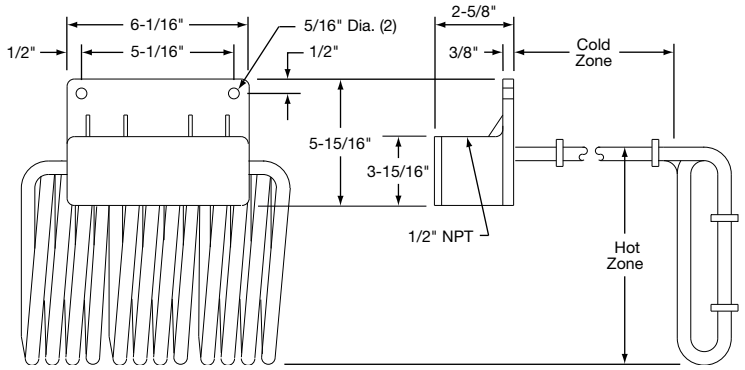
Standard lead time is 2 to 3 weeks.

Ordering Information

See page 11-86

Teflon® Three-Element L-Shaped Heater





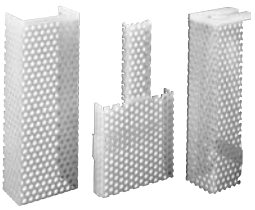
Typical Applications

Compatible with most plating tank solutions; inert to acids, anodizing and pickling solutions up to 190°F (88°C). Check recommendation guide on pages 11-84 and 11-85 and with chemical supplier for proper sheath material selection.

Replaces more expensive alumina or graphite heaters.

Design Features

- *Low profile bottom design for even heating and varying liquid levels*
- *10 watts/in² (1.6 watts/cm²) for long service life*
- *Non-contaminating Teflon® covered stainless steel elements*
- *T1 thermal fuse protection standard; T2 bi-metal switch optional*
- *Grounded internal metal element for safety*
- *UL listed, CSA certified*
- *Lightweight, non-floating construction*
- *Vapor-tight polypropylene terminal enclosure with universal mounting bracket*
- *Standard 3-ft. flexible PVC liquid-tight conduit*
- *Polypropylene guards (optional Teflon® guards recommended for chromic acid or solutions exceeding 180°F or 82.2°C)*
- *Standard three-phase wiring*
- *240, 480 volts standard as listed—other voltages available*
- *Longer and shorter vertical lengths available; Consult* **Tempco**.



Note: Guards are available and recommended for all Teflon® heaters. Standard guards are made of polypropylene; Teflon® guards are optional.

Standard (Non-Stock) Sizes and Ratings

Watts	Part Number 120V	240V	480V	Hot Zone in	Hot Zone mm	Vertical Length in	Vertical Length mm	Width in	Width mm
3000	—	TMT05001	TMT05002	13	330	18	457	7	178
6000	—	TMT05003	TMT05004	19	483	18	457	10	254
9000	—	TMT05005	TMT05006	23	584	18	457	10	254
12000	—	TMT05007	TMT05008	30	762	18	457	10	254
15000	—	TMT05009	TMT05010	36	914	18	457	10	254
18000	—	TMT05011	TMT05012	42	1067	18	457	10	254

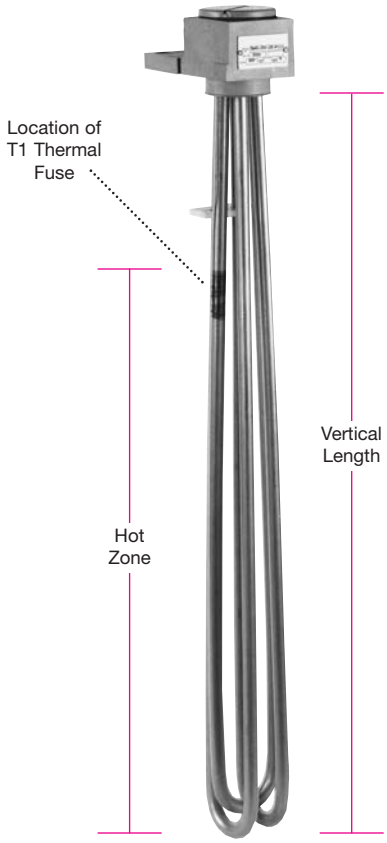
Standard lead time is 2 to 3 weeks.

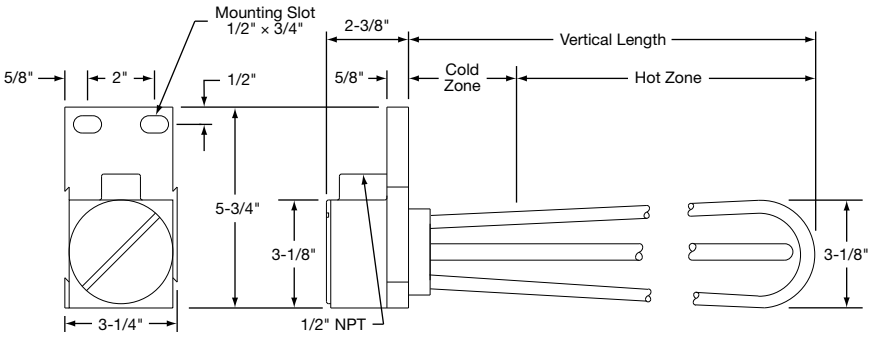
Ordering Information

See page 11-86

Product Inventory Available for Viewing and Selection @ www.tempco.com

Teflon® Three-Element Over-the-Side Heater





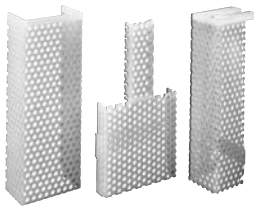
Typical Applications

Compatible with most plating tank solutions; inert to acids, anodizing and pickling solutions up to 190°F (88°C). Check recommendation guide on pages 11-84 and 11-85 and with chemical supplier for proper sheath material selection.

Replaces more expensive alumina or graphite heaters.

Design Features

- *10 watts/in² (1.6 watts/cm²) for long service life*
- *Non-contaminating Teflon® covered stainless steel elements*
- *T1 thermal fuse protection standard; T2 bi-metal switch optional*
- *Grounded internal metal element for safety*
- *UL listed, CSA certified*
- *Lightweight, non-floating construction*
- *Vapor-tight polypropylene terminal enclosure with universal mounting bracket*
- *Standard 3-ft. flexible PVC liquid-tight conduit*
- *Polypropylene guards (optional Teflon® guards recommended for chromic acid or solutions exceeding 180°F or 82.2°C)*
- *Single-Phase for 120V, three-phase for 240V or 480V standard*
- *120, 240, 480 volts standard as listed—other voltages available*
- *Longer lengths available; Consult* **Tempco.**



Note: Guards are available and recommended for all Teflon® heaters. Standard guards are made of polypropylene; Teflon® guards are optional.

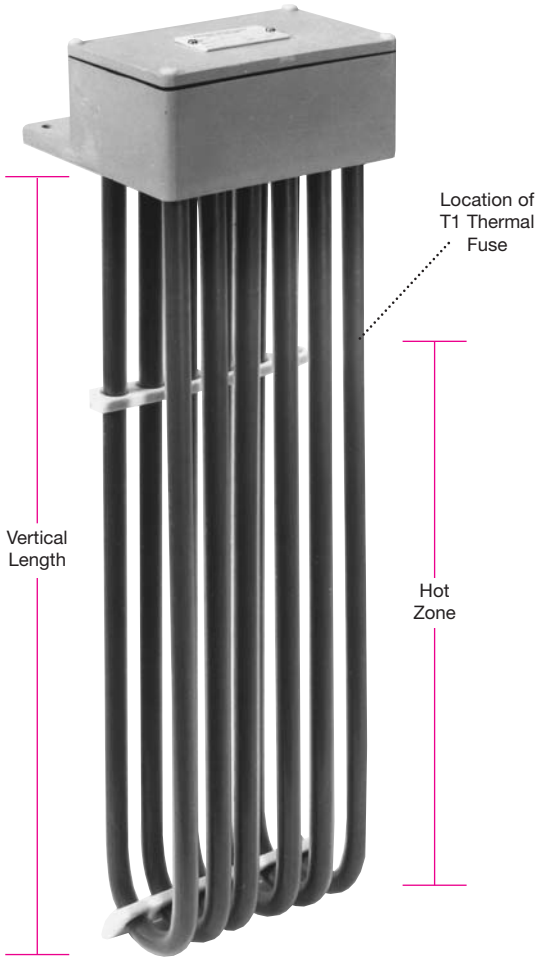
Standard (Non-Stock) Sizes and Ratings

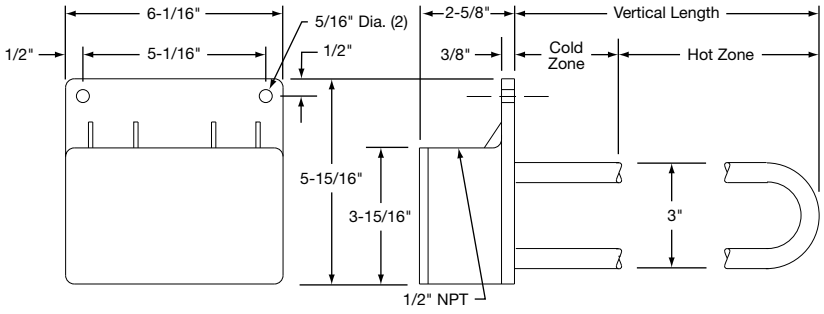
Watts	Part Number 120V	240V	480V	Hot Zone in	Hot Zone mm	Vertical Length in	Vertical Length mm
1000	TMT06001	TMT06002	—	9	229	17	432
1500	TMT06003	TMT06004	TMT06005	15	381	23	584
2000	TMT06006	TMT06007	TMT06008	21	533	29	737
3000	—	TMT06009	TMT06010	28	711	35	889
4000	—	TMT06011	TMT06012	38	965	47	1194
5000	—	TMT06013	TMT06014	47	1194	59	1499
6000	—	TMT06015	TMT06016	55	1397	68	1727

Standard lead time is 2 to 3 weeks.

Ordering Information
See page 11-86

Teflon® Six-Element Over-the-Side Heater





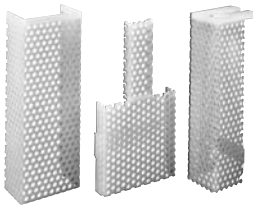
Typical Applications

Compatible with most plating tank solutions; inert to acids, anodizing and pickling solutions up to 190°F (88°C). Check recommendation guide on pages 11-84 and 11-85 and with chemical supplier for proper sheath material selection.

Replaces more expensive alumina or graphite heaters.

Design Features

- *10 watts/in² (1.6 watts/cm²) for long service life*
- *Non-contaminating Teflon® covered stainless steel elements*
- *T1 thermal fuse protection standard; T2 bi-metal switch optional*
- *Grounded internal metal element for safety*
- *UL listed, CSA certified*
- *Lightweight, non-floating construction*
- *Vapor-tight polypropylene terminal enclosure with universal mounting bracket*
- *Standard 3-ft. flexible PVC liquid-tight conduit*
- *Polypropylene guards (optional Teflon® guards recommended for chromic acid or solutions exceeding 180°F or 82.2°C)*
- *Single-phase for 120V, three-phase for 240V or 480V standard*
- *120, 240, 480 volts standard as listed—other voltages available*
- *Longer lengths available; Consult* **Tempco.**



Note: Guards are available and recommended for all Teflon® heaters. Standard guards are made of polypropylene; Teflon® guards are optional.

Standard (Non-Stock) Sizes and Ratings

Watts	Part Number 120V	240V	480V	Hot Zone in	Hot Zone mm	Vertical Length in	Vertical Length mm
2000	TMT07001	TMT07002	TMT07003	9	229	17	432
3000	—	TMT07004	TMT07005	15	381	23	584
4000	—	TMT07006	TMT07007	21	533	29	737
6000	—	TMT07008	TMT07009	28	711	35	889
8000	—	TMT07010	TMT07011	38	965	47	1194
10000	—	TMT07012	TMT07013	47	1194	59	1499
12000	—	TMT07014	TMT07015	55	1397	68	1727

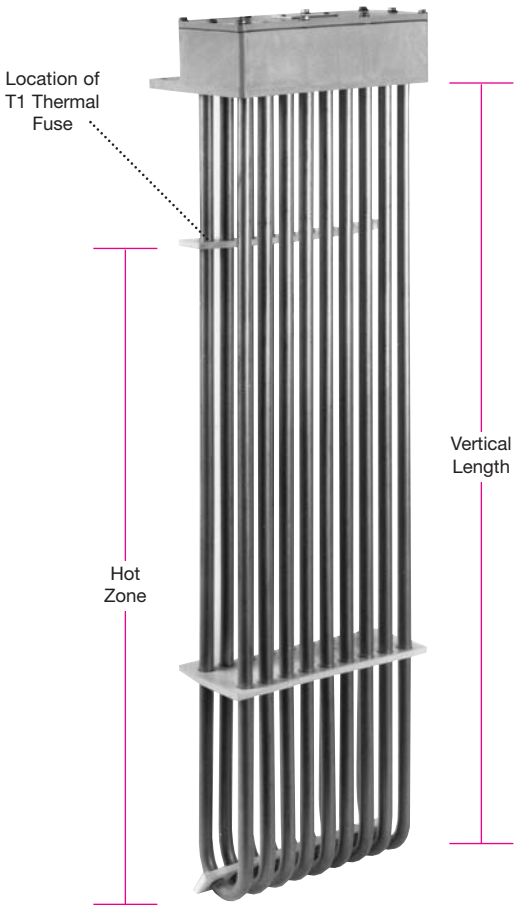
Standard lead time is 2 to 3 weeks.

Ordering Information

See page 11-86

Product Inventory Available for Viewing and Selection @ www.tempco.com

Teflon® Nine-Element Over-the-Side Heater



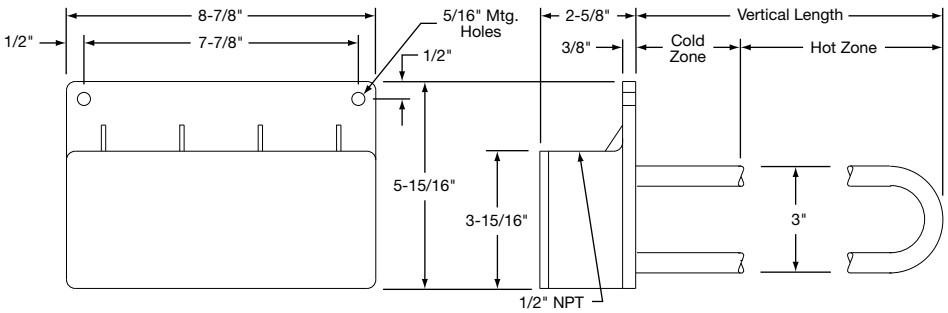
Typical Applications

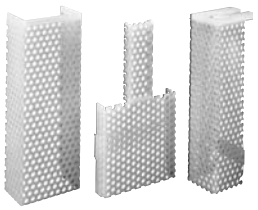
Compatible with most plating tank solutions; inert to acids, anodizing and pickling solutions up to 190°F (88°C). Check recommendation guide on pages 11-84 and 11-85 and with chemical supplier for proper sheath material selection.

Replaces more expensive alumina or graphite heaters.

Design Features

- *10 watts/in² (1.6 watts/cm²) for long service life*
- *Non-contaminating Teflon® covered stainless steel elements*
- *T1 thermal fuse protection standard; T2 bi-metal switch optional*
- *Grounded internal metal element for safety*
- *UL listed, CSA certified*
- *Lightweight, non-floating construction*
- *Vapor-tight polypropylene terminal enclosure with universal mounting bracket*
- *Standard 3 ft. flexible PVC liquid-tight conduit*
- *Polypropylene guards (optional Teflon® guards recommended for chromic acid or solutions exceeding 180°F or 82.2°C)*
- *Standard three-phase wiring*
- *240, 480 volts standard as listed—other voltages available*
- *Longer lengths available; Consult* **Tempco.**





Note: Guards are available and recommended for all Teflon® heaters. Standard guards are made of polypropylene; Teflon® guards are optional.

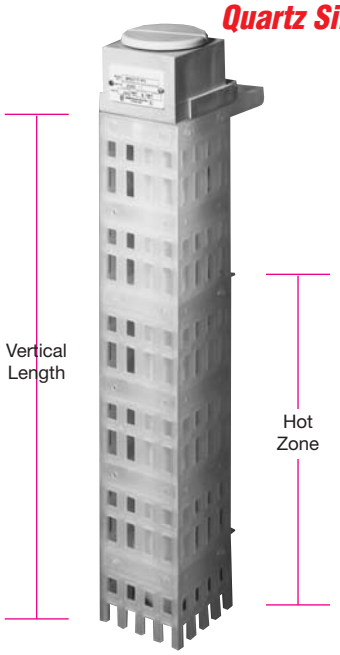
Standard (Non-Stock) Sizes and Ratings

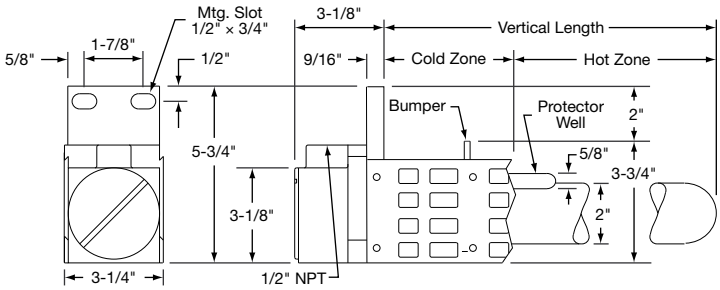
Watts	Part Number 120V	240V	480V	Hot Zone in	Hot Zone mm	Vertical Length in	Vertical Length mm
3000	—	TMT08001	TMT08002	9	229	17	432
4500	—	TMT08003	TMT08004	15	381	23	584
6000	—	TMT08005	TMT08006	21	533	29	737
9000	—	TMT08007	TMT08008	28	711	35	889
12000	—	TMT08009	TMT08010	38	965	47	1194
15000	—	TMT08011	TMT08012	47	1194	59	1499
18000	—	TMT08013	TMT08014	55	1397	68	1727

Standard lead time is 2 to 3 weeks.

Ordering Information
See page 11-86

Quartz Single-Tube Style Heater





Typical Applications

For plating tanks, pickling and other acidic aqueous solutions. Check recommendation guide on pages 11-84 and 11-85 and with chemical supplier for proper sheath material selection.

CAUTION Not for use in hydrofluoric acid or alkaline solutions.

Design Features

- *26 watts/in² (4.0 watts/cm²) for long service life*
- *Heavy duty, long lasting construction*
- *T1 thermal fuse protection standard; T2 bi-metal switch optional*
- *Replaceable element and quartz tube*
- *Grounded for safety*
- *UL listed, CSA certified*
- *Vapor-tight polypropylene terminal enclosure with universal mounting bracket*
- *Standard 3-ft. flexible PVC liquid-tight conduit*
- *Polypropylene guards (optional Teflon® guards recommended for chromic acid or solutions exceeding 200°F or 93.3°C.) The Teflon® guard is supplied with the high temperature complete assembly*
- *Single-Phase standard; three-phase available as an option*
- *120, 240, 480 volts standard as listed—other voltages available*
- *Longer lengths available; Consult* **Tempco.**

Ordering Code: K M H 1

Type: KMH1

Length (in.)

Hot Zone (in.)

Watts ÷ 100

Voltage
1 – 120
2 – 240
4 – 480

Phase: 1 or 3

Thermal Over-Temperature Protection

Thermal Fuse
1L – Solutions up to 180°F
1M – Solutions from 180°F to 220°F

Bi-Metal Switch
2L – Solutions up to 180°F
2M – Solutions from 180°F to 220°F

Conduit Length (in.)
36" standard

Style
C – Complete Assembly
H – Less Guard
E – Element Only
J – Tube Only

Ordering Information

KMH1 heaters are offered with the options listed in this 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.

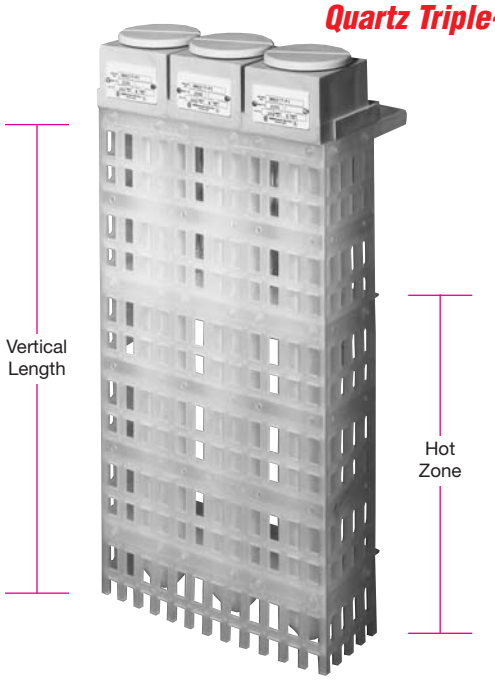
Standard Watts vs. Length and Hot Zone

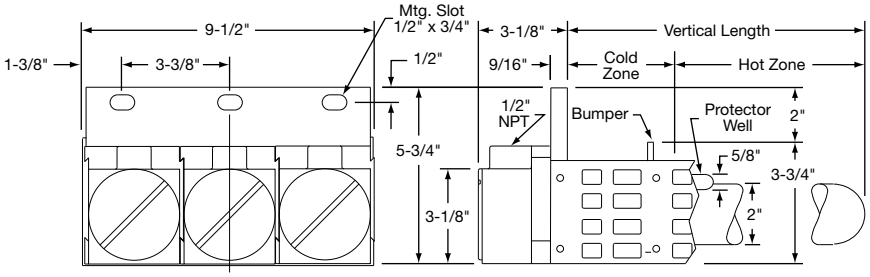
Watts	Hot Zone in	Hot Zone mm	Length in	Length mm
500	6	152	10	254
1000	7	178	11	279
1000	7	178	17	432
2000	12	305	17	432
2000	12	305	23	584
3000	18	457	23	584
3000	18	457	29	737
3500	21	533	29	737
4000	28	711	35	889
4000	28	711	41	1041
5000	33	838	41	1041
5000	33	838	47	1194
6000	39	991	47	1194
6000	39	991	52	1321
8000	49	1245	59	1499
10000	62	1575	71	1803

Standard lead time is 2 to 3 weeks.

Product Inventory Available for Viewing and Selection @ www.tempco.com

Quartz Triple-Tube Style Heater





Typical Applications

For plating tanks, pickling and other acidic aqueous solutions. Check recommendation guide on pages 11-84 and 11-85 and with chemical supplier for proper sheath material selection.

CAUTION Not for use in hydrofluoric acid or alkaline solutions.

Design Features

- *26 watts/in² (4.0 watts/cm²) for long service life*
- *Heavy duty, long lasting construction*
- *T1 thermal fuse protection standard; T2 bi-metal switch optional*
- *Replaceable element(s) and quartz tube(s)*
- *Grounded for safety*
- *UL listed, CSA certified*
- *Vapor-tight polypropylene terminal enclosure with universal mounting bracket*
- *Standard 3-ft. flexible PVC liquid-tight conduit*
- *Polypropylene guards (optional Teflon® guards recommended for chromic acid or solutions exceeding 200°F or 93.3°C.) The Teflon® guard is supplied with the high temperature complete assembly*
- *Standard design consists of three individual single-phase heaters, which can be wired delta in the field to achieve a three-phase balanced operating system. Individual elements are field replaceable*
- *120, 240, 480 volts standard as listed—other voltages available*
- *Longer lengths available; Consult* **Tempco.**

Ordering Code: K M H 3

Type: KMH3

Length (in.)

Hot Zone (in.)

Watts ÷ 100

Voltage
1 – 120
2 – 240
4 – 480

Phase: 1

Thermal Over-Temperature Protection

Thermal Fuse	Bi-Metal Switch
1L – Solutions up to 180°F	2L – Solutions up to 180°F
1M – Solutions from 180°F to 220°F	2M – Solutions from 180°F to 220°F

Conduit Length (in.)
36" standard

Style
C – Complete Assembly
H – Less Guard
E – Element Only
J – Tube Only

Standard Watts vs. Length and Hot Zone

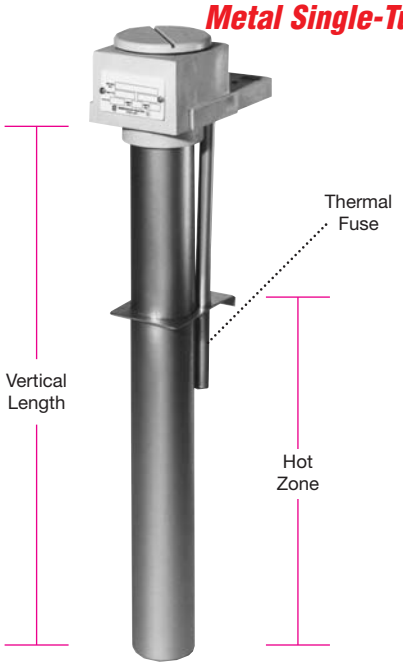
Watts	Hot Zone in	Hot Zone mm	Length in	Length mm
1500	6	152	10	254
3000	7	178	11	279
3000	7	178	17	432
6000	12	305	17	432
6000	12	305	23	584
9000	18	457	23	584
9000	18	457	29	737
10500	21	533	29	737
12000	28	711	35	889
12000	28	711	41	1041
15000	33	838	41	1041
15000	33	838	47	1194
18000	39	991	47	1194
18000	39	991	52	1321
24000	49	1245	59	1499
30000	62	1575	71	1803

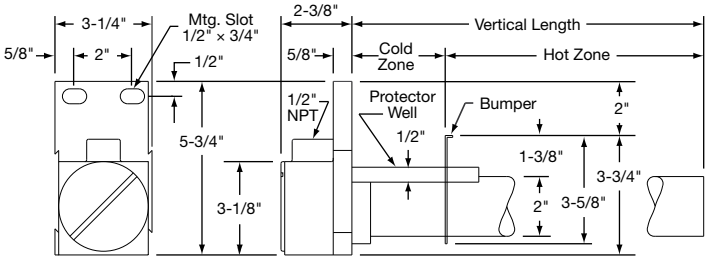
Standard lead time is 2 to 3 weeks.

Ordering Information

KMH3 heaters are offered with the options listed in this 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.

Metal Single-Tube Style Heater





Typical Applications

For plating tanks, rinse tanks and other acidic aqueous solutions. Check recommendation guide on pages 11-84 and 11-85 and with chemical supplier for proper sheath material selection.

Design Features

- *18 and 35 watts/in² (2.8 and 5.5 watts/cm²) for long service life*
- *Heavy duty, long lasting construction*
- *T1 thermal fuse protection standard; T2 bi-metal switch optional*
- *Grounded for safety*
- *UL listed except plain steel; all CSA certified*
- *Vapor-tight polypropylene terminal enclosure with universal mounting bracket*
- *Standard 3-ft. flexible PVC liquid-tight conduit*
- *Single-Phase standard; three-phase available as an option*
- *120, 240, 480 volts standard as listed—other voltages available*
- *Longer lengths available; Consult* **Tempco.**

Ordering Code: T M M 1

Type: TMM1

Length (in.)

Hot Zone (in.)

Material
A – Steel
B – 304 SS
C – 316 SS
T – Titanium

Watts ÷ 100

Voltage
1 – 120
2 – 240
4 – 480

Phase: 1 or 3

Thermal Over-Temperature Protection

Thermal Fuse
1L – Solutions up to 180°F
1M – Solutions from 180°F to 220°F
1H – Solutions from 220°F to 300°F

Bi-Metal Switch
2L – Solutions up to 180°F
2M – Solutions from 180°F to 220°F
2H – Solutions from 220°F to 300°F

Conduit Length (in.)
36" standard

Ordering Information

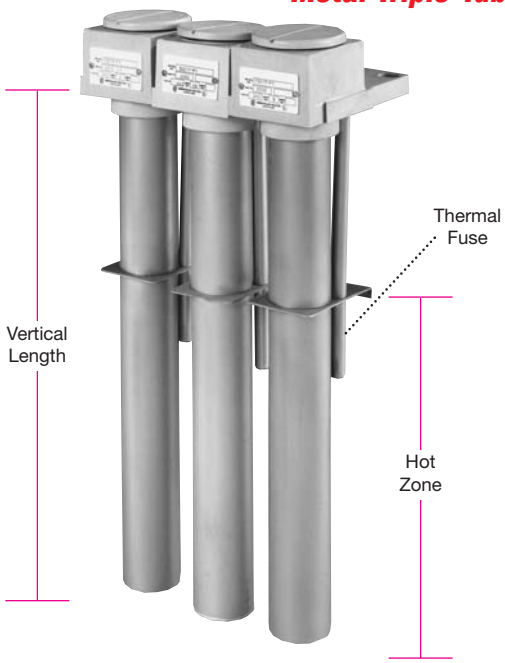
TMM1 heaters are offered with the options listed in this worksheet. Create an ordering code by filling in the boxes with the appropriate number and/or letter designation for your requirements, and a part number will be assigned.

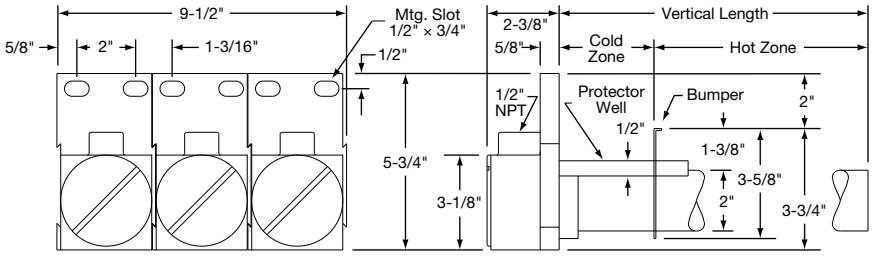
Standard Watts vs. Length and Hot Zone

Watts		Hot Zone		Length	
High	Low	in	mm	in	mm
1000	500	6	152	11	254
2000	1000	10	254	17	432
3000	1500	16	406	23	584
4000	2000	20	508	29	737
5000	2500	25	635	35	889
6000	3000	30	762	40	1016
8000	4000	37	940	47	1194
9000	4500	44	1118	54	1372
10000	5000	49	1245	59	1499
12000	6000	58	1473	68	1727

Standard lead time is 2 to 3 weeks.

Metal Triple-Tube Style Heater





Typical Applications

For plating tanks, phosphatizing and concentrated aqueous solutions. Check recommendation guide on pages 11-84 and 11-85 and with chemical supplier for proper sheath material selection.

Design Features

- *18 and 35 watts/in² (2.8 and 5.5 watts/cm²) for long service life*
- *Low watt density for extended service*
- *Heavy duty, long lasting construction*
- *T1 thermal fuse protection standard; T2 bi-metal switch optional*
- *Grounded for safety.*
- *UL listed except plain steel; all CSA certified*
- *Vapor-tight polypropylene terminal enclosure with universal mounting bracket*
- *Standard 3-ft. flexible PVC liquid-tight conduit*
- *Standard design consists of three individual single-phase heaters, which can be wired delta in the field to achieve a three-phase balanced operating system. Individual elements are field replaceable*
- *120, 240, 480 volts standard as listed—other voltages available*
- *Longer lengths available; Consult* **Tempco.**

Ordering Code: T M M 2

Type: TMM2

Length (in.)

Hot Zone (in.)

Material
A – Steel
B – 304 SS
C – 316 SS
T – Titanium

Watts ÷ 100

Voltage
1 – 120
2 – 240
4 – 480

Phase: 1

Thermal Over-Temperature Protection

Thermal Fuse
1L – Solutions up to 180°F
1M – Solutions from 180°F to 220°F
1H – Solutions from 220°F to 300°F

Bi-Metal Switch
2L – Solutions up to 180°F
2M – Solutions from 180°F to 220°F
2H – Solutions from 220°F to 300°F

Conduit Length (in.)
36" standard

Ordering Information

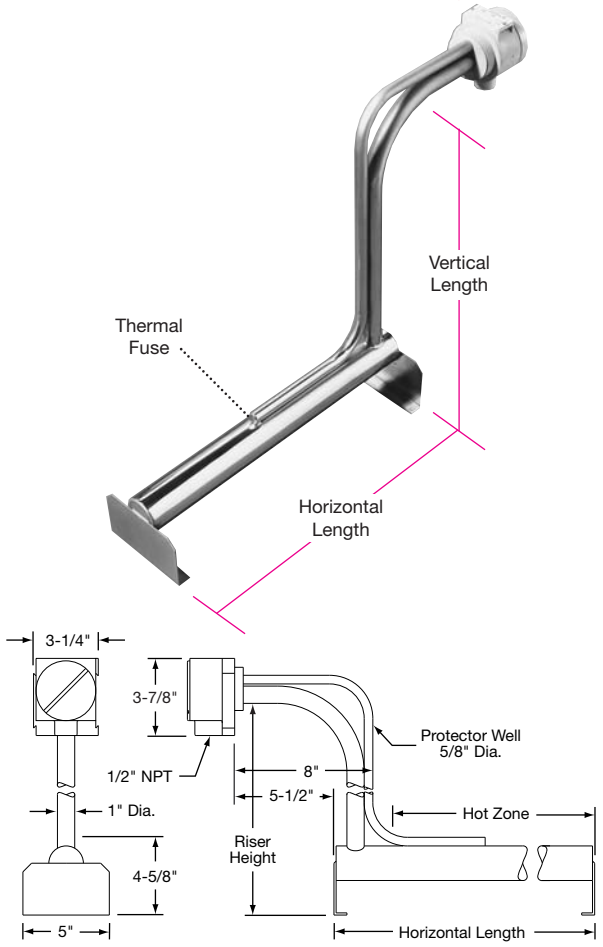
TMM2 heaters are offered with the options listed in this worksheet. Create an ordering code by filling in the boxes with the appropriate number and/or letter designation for your requirements, and a part number will be assigned.

Standard Watts vs. Length and Hot Zone

Watts		Hot Zone		Length	
High	Low	in	mm	in	mm
3000	1500	6	152	11	254
6000	3000	10	254	17	432
9000	4500	16	406	23	584
12000	6000	20	508	29	737
15000	7500	25	635	35	889
18000	9000	30	762	40	1016
24000	12000	37	940	47	1194
27000	13500	44	1118	54	1372
30000	15000	49	1245	59	1499
36000	18000	58	1473	68	1727

Standard lead time is 2 to 3 weeks.

Metal Single-Tube L-Shaped Heater



Typical Applications

For plating tanks, rinse tanks and other non-sludging aqueous solutions. Check recommendation guide on pages 11-84 and 11-85 and with chemical supplier for proper sheath material selection.

Design Features

- *35 watts/in² (5.5 watts/cm²) for long service life*
- *Bottom mount design for even heating and varying solution levels*
- *Standard 2" sludge legs (longer available)*
- *Heavy duty, long lasting construction*
- *T1 thermal fuse protection standard; T2 bi-metal switch optional*
- *Grounded for safety*
- *UL listed except Plain Steel; all CSA certified*
- *Vapor-tight polypropylene terminal enclosure*
- *Standard 3-ft. flexible PVC liquid-tight conduit*
- *Single-Phase standard; three-phase available as an option*
- *120, 240, 480 volts standard as listed—other voltages available*
- *Longer and shorter vertical lengths available; Consult* **Tempco**.

Ordering Code: T M M 3

Type: TMM3

Vertical Length (in.)

Hot Zone (in.) Horizontal

Material
A – Steel
B – 304 SS
C – 316 SS
T – Titanium

Watts ÷ 100

Voltage
1 – 120
2 – 240
4 – 480

Phase: 1 or 3

Thermal Over-Temperature Protection

Thermal Fuse
1L – Solutions up to 180°F
1M – Solutions from 180°F to 220°F
1H – Solutions from 220°F to 300°F

Bi-Metal Switch
2L – Solutions up to 180°F
2M – Solutions from 180°F to 220°F
2H – Solutions from 220°F to 300°F

Conduit Length (in.)
36" standard

Ordering Information

TMM3 heaters are offered with the options listed in this 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.

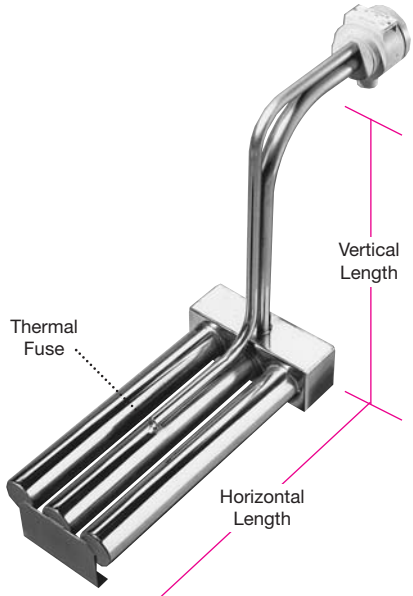
Standard Watts vs. Length

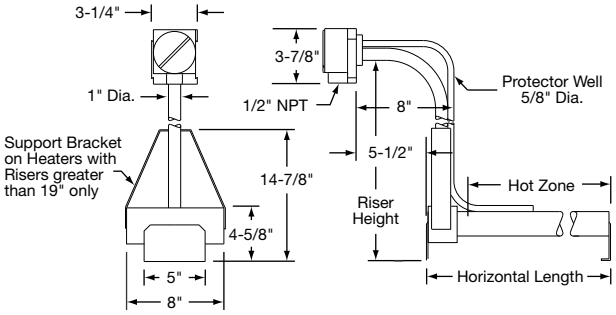
Watts	H. Length in	H. Length mm	V. Length in	V. Length mm
1000	13	330	15	381
2000	17	432	19	483
3000	22	559	25	635
4000	26	660	25	635
5000	31	787	37	940
6000	36	914	50	1270
8000	44	1118	50	1270
9000	50	1270	50	1270
10000	55	1397	50	1270
12000	64	1626	50	1270

Standard lead time is 2 to 3 weeks.

Product Inventory Available for Viewing and Selection @ www.tempco.com

Metal Triple-Tube L-Shaped Heater





Typical Applications

For plating tanks, rinse tanks and other non-sludging aqueous solutions. Check recommendation guide on pages 11-84 and 11-85 and with chemical supplier for proper sheath material selection.

Design Features

- *35 watts/in² (5.5 watts/cm²) for long service life*
- *Bottom mount design for even heating and varying solution levels*
- *Standard 2" sludge legs (longer available)*
- *Heavy duty, long lasting construction*
- *T1 thermal fuse protection standard; T2 bi-metal switch optional*
- *Grounded for safety*
- *UL listed except Plain Steel; all CSA certified*
- *Vapor-tight polypropylene terminal enclosure*
- *Standard 3-ft. flexible PVC liquid-tight conduit*
- *Three-phase standard; single-phase available as option*
- *240, 480 volts standard as listed—other voltages available*
- *Longer and shorter vertical lengths available; Consult* **Tempco**.

Ordering Code: T M M 4

Type: TMM4

Vertical Length (in.)

Hot Zone (in.) Horizontal

Material
A – Steel
B – 304 SS
C – 316 SS
T – Titanium

Watts ÷ 100

Voltage
1 – 120
2 – 240
4 – 480

Phase: 1 or 3

Thermal Over-Temperature Protection

Thermal Fuse
1L – Solutions up to 180°F
1M – Solutions from 180°F to 220°F
1H – Solutions from 220°F to 300°F

Bi-Metal Switch
2L – Solutions up to 180°F
2M – Solutions from 180°F to 220°F
2H – Solutions from 220°F to 300°F

Conduit Length (in.)
36" standard

Ordering Information

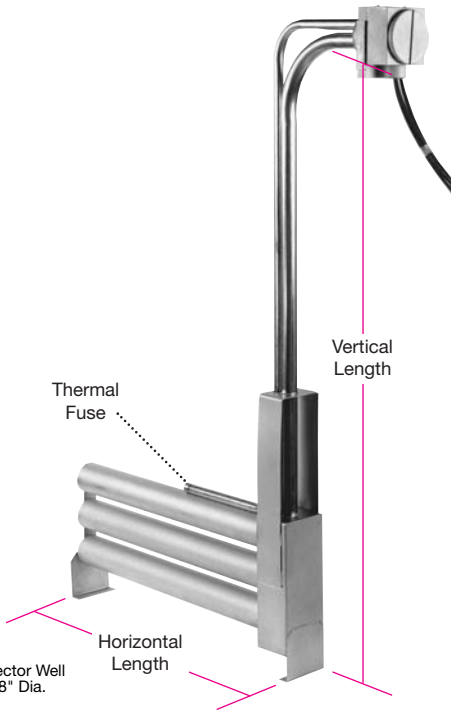
TMM4 heaters are offered with the options listed in this worksheet. Create an ordering code by filling in the boxes with the appropriate number and/or letter designation for your requirements, and a part number will be assigned.

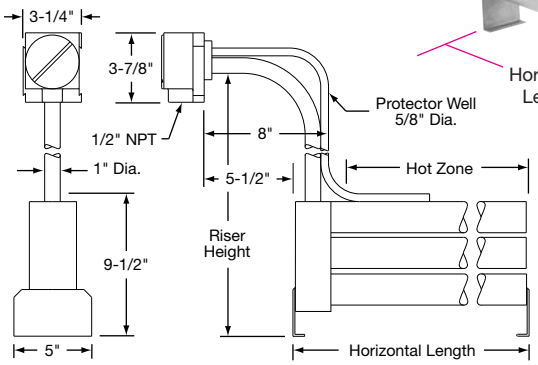
Standard Watts vs. Length

Watts	H. Length in	H. Length mm	V. Length in	V. Length mm
3000	13	330	15	381
6000	17	432	37	940
9000	22	559	37	940
12000	26	660	37	940
15000	31	787	37	940
18000	36	914	50	1270
24000	44	1118	50	1270
27000	50	1270	50	1270
30000	55	1397	50	1270
36000	64	1626	50	1270

Standard lead time is 2 to 3 weeks.

Triple-Tube Vertical Stack L-Shape Heater





Typical Applications

For plating tanks, rinse tanks and other non-sludging aqueous solutions. Check recommendation guide on pages 11-84 and 11-85 and with chemical supplier for proper sheath material selection.

Design Features

- *35 watts/in² (5.5 watts/cm²) for long service life*
- *Space-saving vertical configuration*
- *Bottom mount design for even heating and varying solution levels*
- *Standard 2" sludge legs (longer available)*
- *Heavy duty, long lasting construction*
- *T1 thermal fuse protection standard; T2 bi-metal switch optional*
- *Grounded for safety*
- *Vapor-tight polypropylene terminal enclosure*
- *Standard 3-ft. flexible PVC liquid-tight conduit*
- *Three-Phase standard; single-phase available as option*
- *240, 480 volts standard as listed—other voltages available*
- *Longer and shorter vertical lengths available; Consult* **Tempco**.

Ordering Code: T M M 5

Type: TMM5

Vertical Length (in.)

Hot Zone (in.) Horizontal

Material
A – Steel
B – 304 SS
C – 316 SS
T – Titanium

Watts ÷ 100

Voltage
1 – 120
2 – 240
4 – 480

Phase: 1 or 3

Thermal Over-Temperature Protection

Thermal Fuse
1L – Solutions up to 180°F
1M – Solutions from 180°F to 220°F
1H – Solutions from 220°F to 300°F

Bi-Metal Switch
2L – Solutions up to 180°F
2M – Solutions from 180°F to 220°F
2H – Solutions from 220°F to 300°F

Conduit Length (in.)
36" standard

Ordering Information

TMM5 heaters are offered with the options listed in this 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.

Standard Watts vs. Length

Watts	Hot Zone in	Hot Zone mm	V. Length in	V. Length mm
3000	13	330	19	483
6000	17	432	37	940
9000	22	559	37	940
12000	26	660	37	940
15000	31	787	37	940
18000	36	914	50	1270
24000	44	1118	50	1270
27000	50	1270	50	1270
30000	55	1397	50	1270
36000	64	1626	50	1270

Standard lead time is 2 to 3 weeks.

Product Inventory Available for Viewing and Selection @ www.tempco.com