



Tank Immersion Heaters

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 PTFE 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.

3 Construction Styles to select from...



Teflon®

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



Quartz

- Replaceable element and quartz tube
- Standard heater with polypropylene guard (optional PTFE 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

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
Approval

Tempco TMT, TMM (except plain steel) and KMH (up to 4KW/assembly) are UL listed in the US and for Canada under UL File Number E176527.

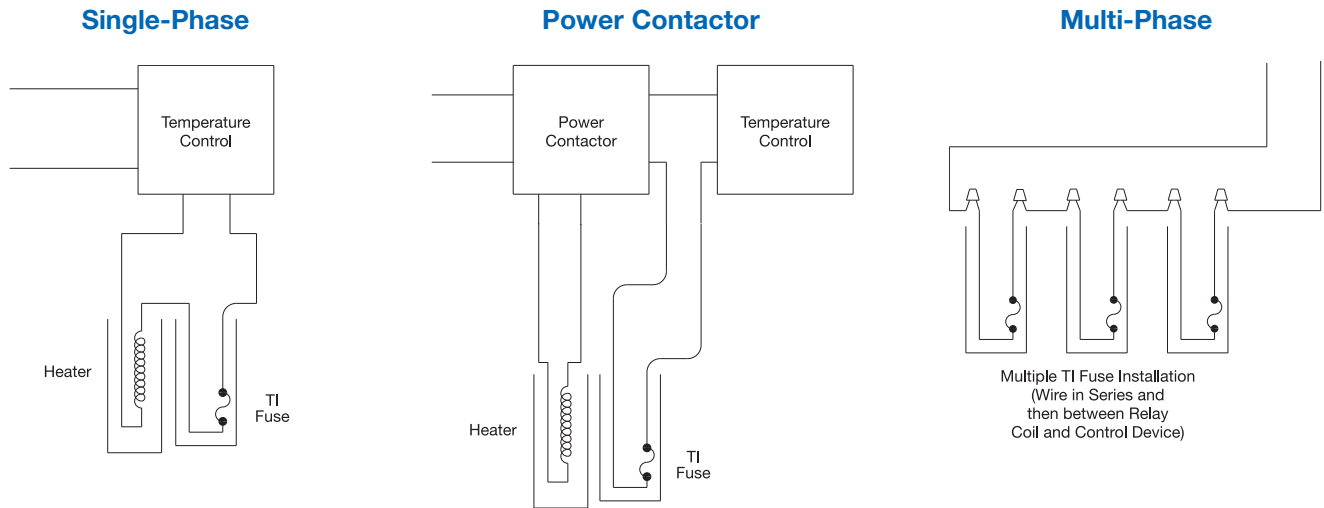


Application Guide for Thermal Over-Temperature Devices

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 listed rating of 15 Amps up to 277 Vac

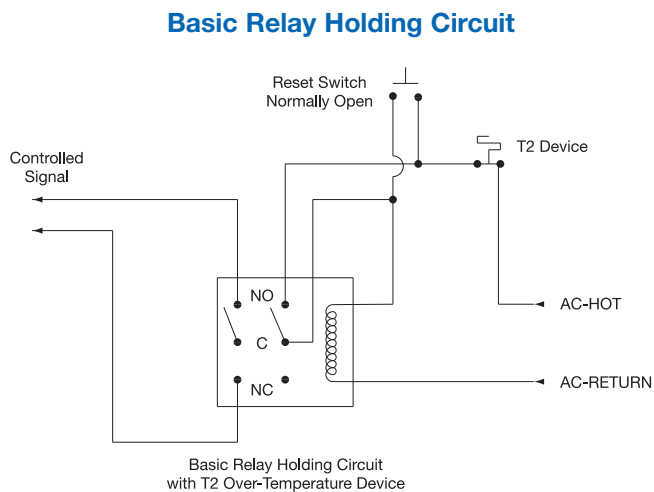


T2 Bi-Metal Switch

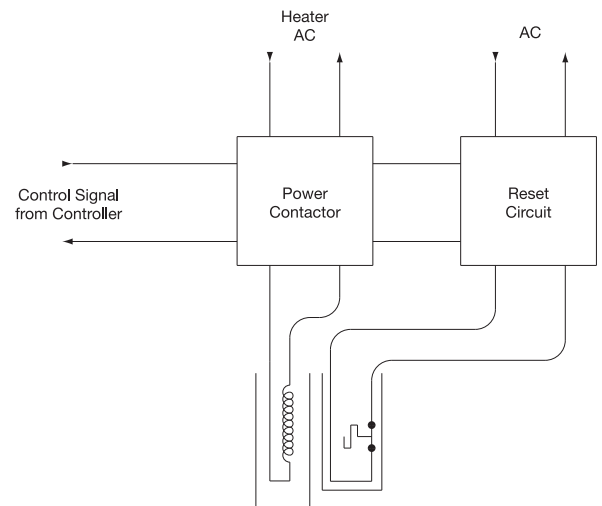
The T2 Over-Temperature Device is a slow make/slow break bimetallic thermostat with a pre-specified calibration temperature. The slow break characteristic coupled with the pushbutton reset feature is extremely useful when a low liquid level occurs.

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 control heater power.**

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



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.



Tank Immersion Heaters

Replacement Thermal Protection Accessories

Various construction methods are used in the manufacture of PTFE, 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 PTFE Over-the-Side Heaters (to 190°F)	TMC90001
T1 Thermal Fuse for PTFE L-Shaped Over-the-Side Heaters (to 190°F)	TMC90004
T1 Thermal Fuse for Quartz Over-the-Side Heaters (w/SS Braid Sleeving)	
• Low Temperature Range (to 180°F)	TMC90002
• Medium Temperature Range (to 220°F)	TMC90003
T1 Thermal Fuse for Straight Metal Over-the-Side Heaters	
• Low Temperature Range (to 180°F)	TMC90005
• Medium Temperature Range (to 220°F)	TMC90006
• High Temperature Range (to 300°F)	TMC90007
T1 Thermal Fuse for L-Shaped Metal Over-the-Side Heaters	
• Low Temperature Range (to 180°F)	TMC90008
• Medium Temperature Range (to 220°F)	TMC90009
• High Temperature Range (to 300°F)	TMC90010

T2 Bi-Metal Switch

Description	Catalog Number
T2 Bi-Metal Switch for PTFE Over-the-Side Heaters (rated to 190°F)	TMC90101
T2 Bi-Metal Switch for PTFE L-Shaped Over-the-Side Heaters (to 190°F)	TMC90111
T2 Bi-Metal Switch for Quartz Over-the-Side Heaters (w/SS Braid Sleeving)	
• Low Temperature Range (to 180°F)	TMC90102
• Medium Temperature Range (to 220°F)	TMC90103
T2 Bi-Metal Switch for Straight Metal Over-the-Side Heaters	
• Low Temperature Range (to 180°F)	TMC90105
• Medium Temperature Range (to 220°F)	TMC90106
• High Temperature Range (to 300°F)	TMC90107
T2 Bi-Metal Switch for L-Shaped Metal Over-the-Side Heaters	
• Low Temperature Range (to 180°F)	TMC90108
• Medium Temperature Range (to 220°F)	TMC90109
• High Temperature Range (to 300°F)	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)

Thermal Over-Temperature Protection



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.



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 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

Part Number		Volts	Amps	Shipping Weight Lbs (kg)
30 to 220°F	200 to 550°F			
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)

Standard lead is 2 to 3 weeks.

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

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



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



Chemical Compatibility Guide

SOLUTION	TYPE OF HEATER
Acetic	PTFE or Quartz
Acid Sulfate	PTFE or Quartz
Actane 70, 80	PTFE
Actane Salt	PTFE
Alcorite	PTFE or Quartz
Alkaline Cleaners (Electrified)	304 Stainless Steel
Alkaline Soaking Cleaners	304 Stainless Steel
Alodine (most formulas)	316 Stainless Steel
Alstan	304 Stainless Steel
Aluminum Anodizing	PTFE or Quartz
Aluminum Bright Dip	PTFE or Quartz
Aluminum Chloride	PTFE or Quartz
Aluminum Cleaners	304 Stainless Steel
Aluminum Sulfate	304 Stainless Steel
Ammonia	304 Stainless Steel
Ammonia Persulfate	PTFE or Quartz
Ammonium Bi Fluoride	PTFE
Ammonium Chloride	Titanium
Ammonium Nitrate	316 Stainless Steel
Anodizing	PTFE or Quartz
ARP 28, 80 Blackening Salts	PTFE or Quartz
Arsenic	304 Stainless Steel
Barium Chloride	Titanium
Benzoic Acid	Titanium
Black Nickel	PTFE 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	PTFE, Quartz or Titanium
Bronze	304 Stainless Steel
Brown Oxide	Titanium
Burnite	PTFE or Quartz
Butyric Acid	Titanium
Cadmium (Alkaline)	304 Stainless Steel
Cadmium Black	PTFE or Quartz
Cadmium Fluoborate	PTFE
Calcium Chloride	Titanium
Calcium Hypochlorite	Titanium
Carbonic Acid	Titanium
Caustic Etch	Steel
Caustics	Steel
Caustics (highly concentrated 20% & over)	Steel
Chloride	PTFE, Quartz or Titanium
Chlorine/Wet	PTFE or Quartz
Chlorosulfuric Acid	Titanium
Chromic Acetate	PTFE or Quartz
Chromic Anodizing	PTFE or Quartz
Chromic Nickel	PTFE or Quartz
Chromium (Fluoride)	PTFE

SOLUTION	TYPE OF HEATER
Chromium (No Fluorides)	PTFE, Quartz or Titanium
Citric Acid	Titanium
Clear Chromate	PTFE or Quartz
Cobalt Nickel	PTFE, Quartz or Titanium
Cobalt Plating	304 Stainless Steel
Cobra Etch	PTFE
Copper Acid	PTFE or Quartz
Copper Bright Acid	PTFE or Quartz
Copper Cyanide	304 Stainless Steel
Copper Fluoborate	PTFE
Copper Pyrophosphate	304 Stainless Steel
Copper Strike	304 Stainless Steel
Copper Sulfate	PTFE or Quartz
Cyanide	304 Stainless Steel
Deionized Water	316 Stainless Steel
Deoxidizer (Etching)	PTFE or Quartz
Deoxidizer Non-Chromated	316 Stainless Steel
Dichromic Seal	Steel
Diethylene Glycol	304 Stainless Steel
Diversey, 511, 514	PTFE
Dow Therm	316 Stainless Steel
Dye Solutions	304 Stainless Steel
Ebonal C	Titanium
Electro Cleaner	304 Stainless Steel
Electro Polishing	PTFE or Quartz
Electroless Copper	PTFE
Electroless Nickel	PTFE or Titanium
Electroless Tin (Acid)	PTFE or Quartz
Electroless Tin (Alkaline)	316 Stainless Steel
Enthone 80 Acid	PTFE
Ethylene Glycol	Steel
Ferric Ammonium Oxide	316 Stainless Steel
Ferric Chloride	PTFE, Quartz or Titanium
Ferric Nitrate	304 Stainless Steel
Ferric Sulfate	304 Stainless Steel
Fluoborate	PTFE
Formic Acid	316 Stainless Steel
Glycerol	304 Stainless Steel
Gold-Acid	PTFE, Quartz or Titanium
Gold Cyanide	304 Stainless Steel
Gold-Immersion	304 Stainless Steel
Grey Nickel	PTFE, Quartz or Titanium
Hot Seal Dichromate	316 Stainless Steel
Hydrochloric Acid	PTFE or Quartz
Hydrofluoric Acid	PTFE
Hydrogen Peroxide	PTFE or Quartz
Indium	PTFE or Quartz
Iridite (1, 2, 3, 4-C, 7, 8, 15)	PTFE or Quartz
Iridite (4-75, 4-73, 14, 14-2, 14-9)	316 Stainless Steel
Iron Fluoborate	PTFE
Iron Phosphate	316 Stainless Steel
Isoprep (186, 187, 188)	316 Stainless Steel



Chemical Compatibility Guide

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

Solutions requiring derated heaters are indicated in red type.

PTFE is the abbreviation for PolyTetraFluoroEthylene.



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!



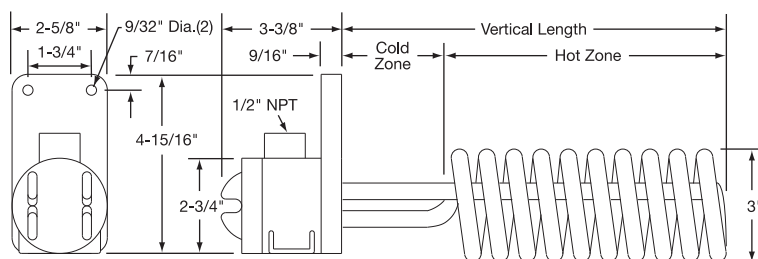
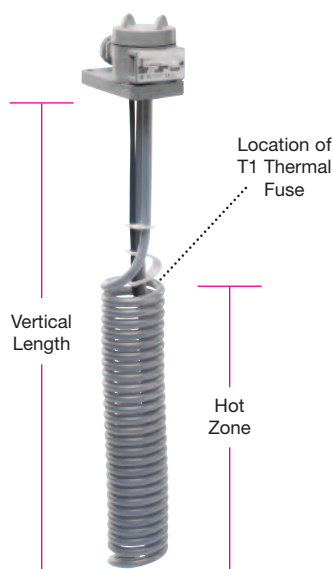
Please insure applicability of heater before installation since we cannot guarantee heaters against premature failure due to corrosion or chemical destruction caused by unusual conditions over which we have no control such as:

- 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
- Aeration
- Stagnant or turbulent flow of the solution
- Presence of oxygen or an oxidizing agent in the solution
- Erosion
- High Pressures or Vacuum Conditions



Tank Immersion Heaters

Fluoropolymer (PTFE) 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 compatibility guide on pages 11-88 and 11-89 and with chemical supplier for proper sheath material selection.

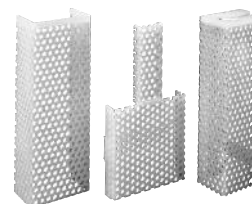
Replaces more expensive alumina or graphite heaters.

Design Features

- * 10 watts/in² (1.6 watts/cm²) for long service life
- * Non-contaminating Fluoropolymer (PTFE) covered stainless steel elements
- * T1 thermal fuse protection standard; T2 bi-metal switch optional
- * Grounded internal metal element for safety
- * UL listed for US and Canada
- * Lightweight, non-floating construction
- * Vapor-tight polypropylene terminal enclosure with universal mounting flange
- * Standard 3-ft. flexible PVC liquid-tight conduit
- * 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 with Polypropylene Guard

Watts	Part Number			Hot Zone		Vertical Length	
	120V	240V	480V	in	mm	in	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 recommended for all fluoropolymer heaters. Standard guards are made of polypropylene. Fluoropolymer (PTFE) guards are available for chromic acid and temperatures above 180°F (82°C).

Ordering Information

Catalog Heaters

The part numbers given 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

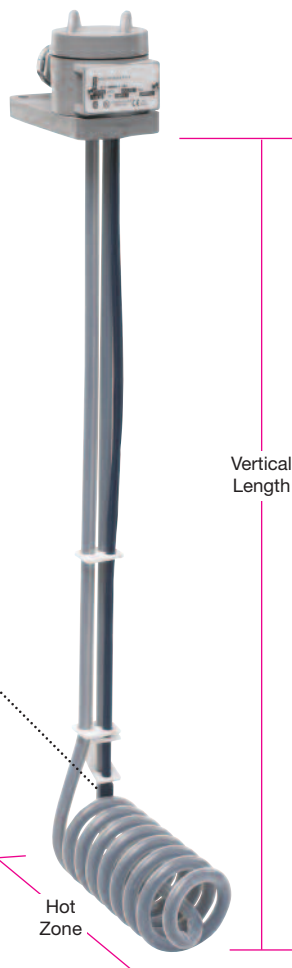
For sizes and ratings not listed, **TEMPCO** will design and manufacture a heater to meet your requirements. **Standard lead time is 2 to 3 weeks.**

Please Specify the following:

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



Fluoropolymer (PTFE) Single-Element L-Shaped Coil Heater



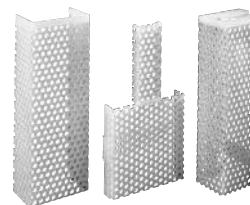
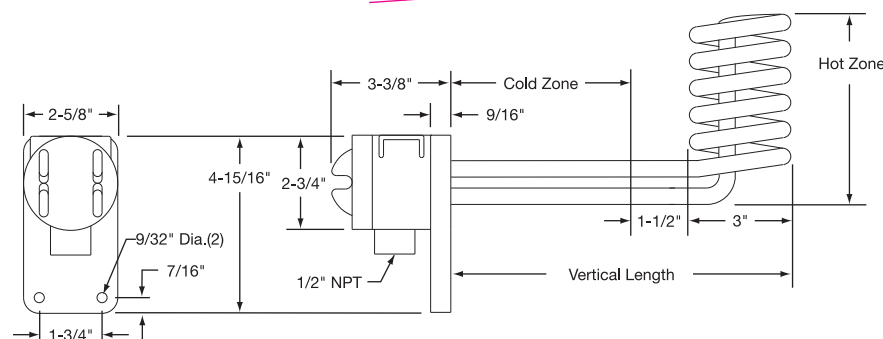
Typical Applications

Compatible with most plating tank solutions; inert to acids, anodizing and pickling solutions up to 190°F (88°C). Check compatibility guide on pages 11-88 and 11-89 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 Fluoropolymer (PTFE) covered stainless steel elements
- * T1 thermal fuse protection standard; T2 bi-metal switch optional
- * Grounded internal metal element for safety
- * UL listed for US and Canada
- * Lightweight, non-floating construction
- * Vapor-tight polypropylene terminal enclosure with universal mounting flange
- * Standard 3-ft. flexible PVC liquid-tight conduit
- * Single-Phase only
- * 120, 240, 480 volts standard as listed — other voltages available
- * Longer and shorter vertical lengths available; consult Tempco.



Note: Guards are recommended for all fluoropolymer heaters. Standard guards are made of polypropylene. Fluoropolymer (PTFE) guards are available for chromic acid and temperatures above 180°F (82°C).

Ordering Information

See page 11-90

Standard (Non-Stock) Sizes and Ratings with Polypropylene Guard

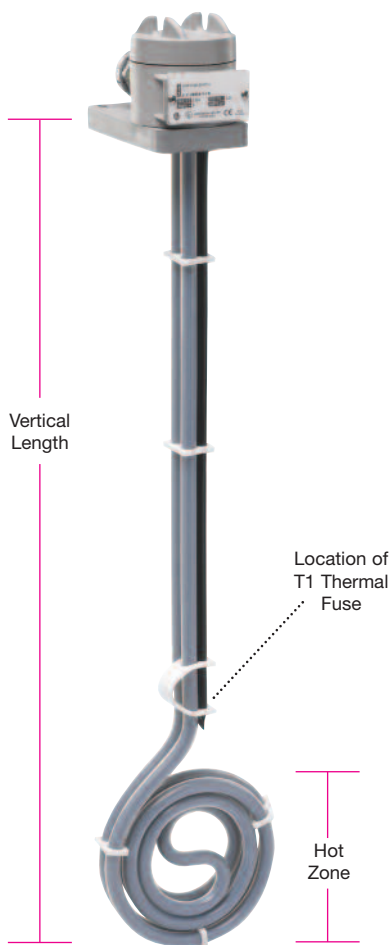
Watts	Part Number			Hot Zone		Vertical Length	
	120V	240V	480V	in	mm	in	mm
500	TMT02001	TMT02002	—	6	152	12	305
1000	TMT02003	TMT02004	—	8	203	12	305
2000	TMT02005	TMT02006	TMT02007	12	305	18	457
3000	—	TMT02008	TMT02009	17	432	18	457
4000	—	TMT02010	TMT02011	20	508	18	457
5000	—	TMT02012	TMT02013	24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

Standard lead time is 2 to 3 weeks.



Tank Immersion Heaters

Fluoropolymer (PTFE) Single-Element Round Heater



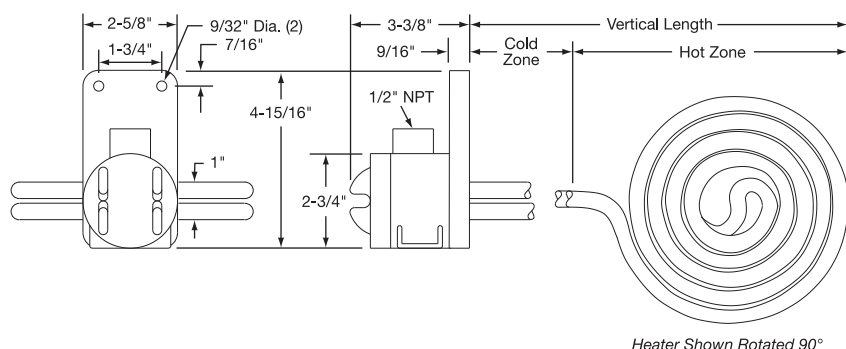
Typical Applications

Compatible with most plating tank solutions; inert to acids, anodizing and pickling solutions up to 190°F (88°C). Check compatibility guide on pages 11-88 and 11-89 and with chemical supplier for proper sheath material selection.

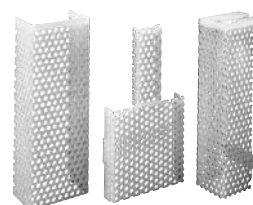
Replaces more expensive alumina or graphite heaters.

Design Features

- * Flat, low profile design
- * 10 watts/in² (1.6 watts/cm²) for long service life
- * Non-contaminating Fluoropolymer (PTFE) covered stainless steel elements
- * T1 thermal fuse protection standard; T2 bi-metal switch optional
- * Grounded internal metal element for safety.
- * UL listed for US and Canada
- * Lightweight, non-floating construction
- * Vapor-tight polypropylene terminal enclosure with universal mounting flange
- * Standard 3-ft. flexible PVC liquid-tight conduit.
- * Single-Phase only
- * 120, 240, 480 volts standard as listed — other voltages available
- * Longer and shorter vertical lengths available; consult Tempco



Heater Shown Rotated 90°



Note: Guards are recommended for all fluoropolymer heaters. Standard guards are made of polypropylene. Fluoropolymer (PTFE) guards are available for chromic acid and temperatures above 180°F (82°C).

Ordering Information

See page 11-90

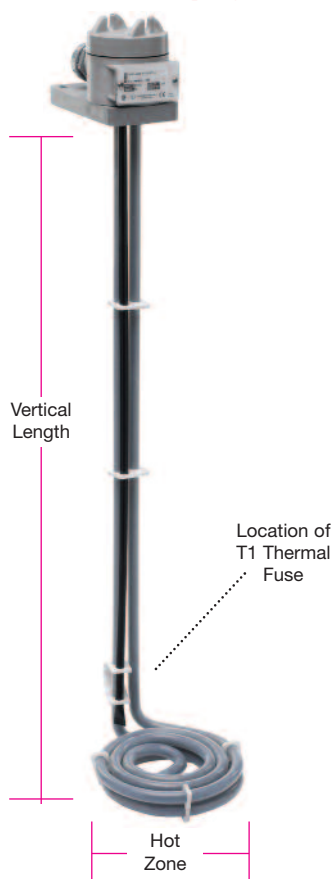
Standard (Non-Stock) Sizes and Ratings with Polypropylene Guard

Watts	Part Number			Hot Zone		Vertical Length		Diameter	
	120V	240V	480V	in	mm	in	mm	in	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.



Fluoropolymer (PTFE) Single-Element L-Shaped Round Heater



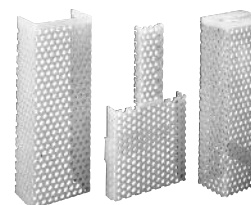
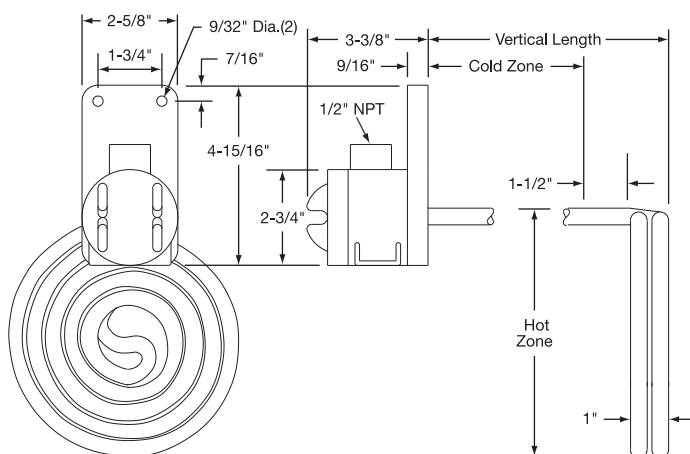
Typical Applications

Compatible with most plating tank solutions; inert to acids, anodizing and pickling solutions up to 190°F (88°C). Check compatibility guide on pages 11-88 and 11-89 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 Fluoropolymer (PTFE) covered stainless steel elements
- * T1 thermal fuse protection standard; T2 bi-metal switch optional
- * Grounded internal metal element for safety
- * UL listed for US and Canada
- * Lightweight, non-floating construction
- * Vapor-tight polypropylene terminal enclosure with universal mounting flange
- * Standard 3-ft. flexible PVC liquid-tight conduit
- * Single-Phase only
- * 120, 240, 480 volts standard as listed — other voltages available
- * Longer and shorter vertical lengths available; consult Tempco



Note: Guards are recommended for all fluoropolymer heaters. Standard guards are made of polypropylene. Fluoropolymer (PTFE) guards are available for chromic acid and temperatures above 180°F (82°C).

Standard (Non-Stock) Sizes and Ratings with Polypropylene Guard

Watts	Part Number			Hot Zone		Vertical Length		Diameter	
	120V	240V	480V	in	mm	in	mm	in	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.

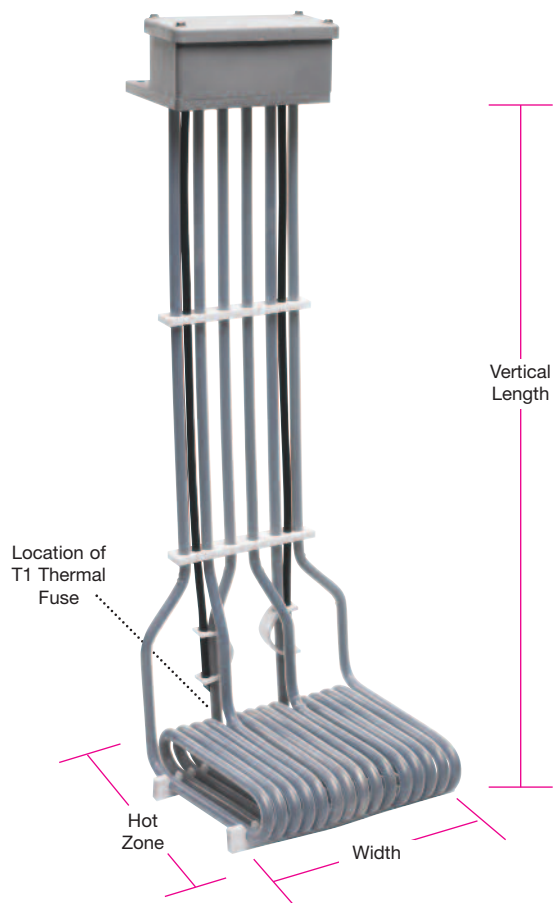
Ordering Information

See page 11-90



Tank Immersion Heaters

Fluoropolymer (PTFE) Three-Element L-Shaped Heater



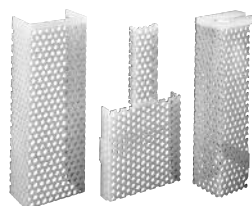
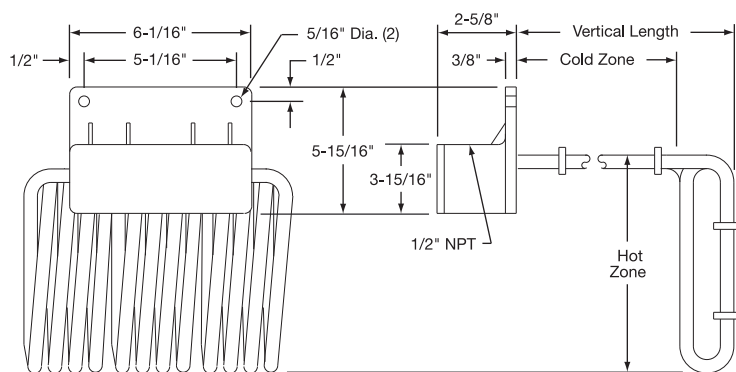
Typical Applications

Compatible with most plating tank solutions; inert to acids, anodizing and pickling solutions up to 190°F (88°C). Check compatibility guide on pages 11-88 and 11-89 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 Fluoropolymer (PTFE) covered stainless steel elements
- * T1 thermal fuse protection standard; T2 bi-metal switch optional
- * Grounded internal metal element for safety
- * UL listed for US and Canada
- * Lightweight, non-floating construction
- * Vapor-tight polypropylene terminal enclosure with universal mounting bracket
- * Standard 3-ft. flexible PVC liquid-tight conduit
- * Standard three-phase wiring
- * 240, 480 volts standard as listed — other voltages available
- * Longer and shorter vertical lengths available; consult Tempco



Note: Guards are recommended for all fluoropolymer heaters. Standard guards are made of polypropylene. Fluoropolymer (PTFE) guards are available for chromic acid and temperatures above 180°F (82°C).

Ordering Information

See page 11-90

Standard (Non-Stock) Sizes and Ratings with Polypropylene Guard

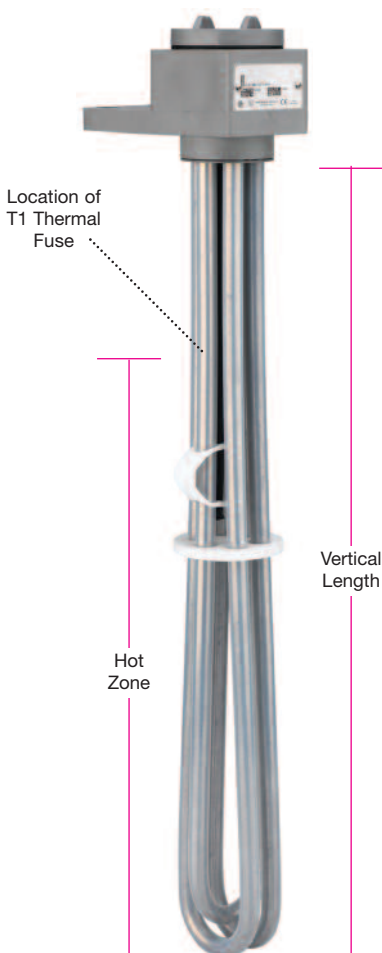
Watts	Part Number			Hot Zone		Vertical Length		Width	
	120V	240V	480V	in	mm	in	mm	in	mm
3000	—	TMT05001	TMT05002	13	330	18	457	7	178
6000	—	TMT05003	TMT05004	19	483	18	457	10	254
9000	—	TMT05005	TMT05006	23	584	18	457	10	254
12000	—	TMT05007	TMT05008	30	762	18	457	10	254
15000	—	TMT05009	TMT05010	36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

Standard lead time is 2 to 3 weeks.

View Product Inventory @ www.tempco.com



Fluoropolymer (PTFE) Three-Element Over-the-Side Heater



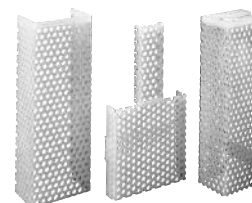
Typical Applications

Compatible with most plating tank solutions; inert to acids, anodizing and pickling solutions up to 190°F (88°C). Check compatibility guide on pages 11-88 and 11-89 and with chemical supplier for proper sheath material selection.

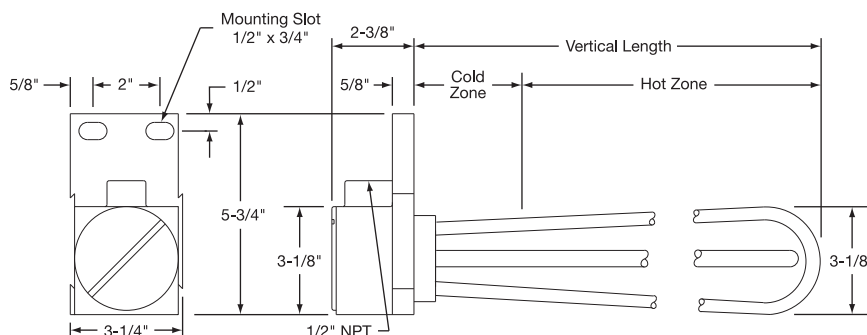
Replaces more expensive alumina or graphite heaters.

Design Features

- * 10 watts/in² (1.6 watts/cm²) for long service life
- * Non-contaminating Fluoropolymer (PTFE) covered stainless steel elements
- * T1 thermal fuse protection standard; T2 bi-metal switch optional
- * Grounded internal metal element for safety
- * UL listed for US and Canada
- * Lightweight, non-floating construction
- * Vapor-tight polypropylene terminal enclosure with universal mounting bracket
- * Standard 3-ft. flexible PVC liquid-tight conduit
- * 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 recommended for all fluoropolymer heaters. Standard guards are made of polypropylene. Fluoropolymer (PTFE) guards are available for chromic acid and temperatures above 180°F (82°C).



Ordering Information

See page 11-90

Standard (Non-Stock) Sizes and Ratings with Polypropylene Guard

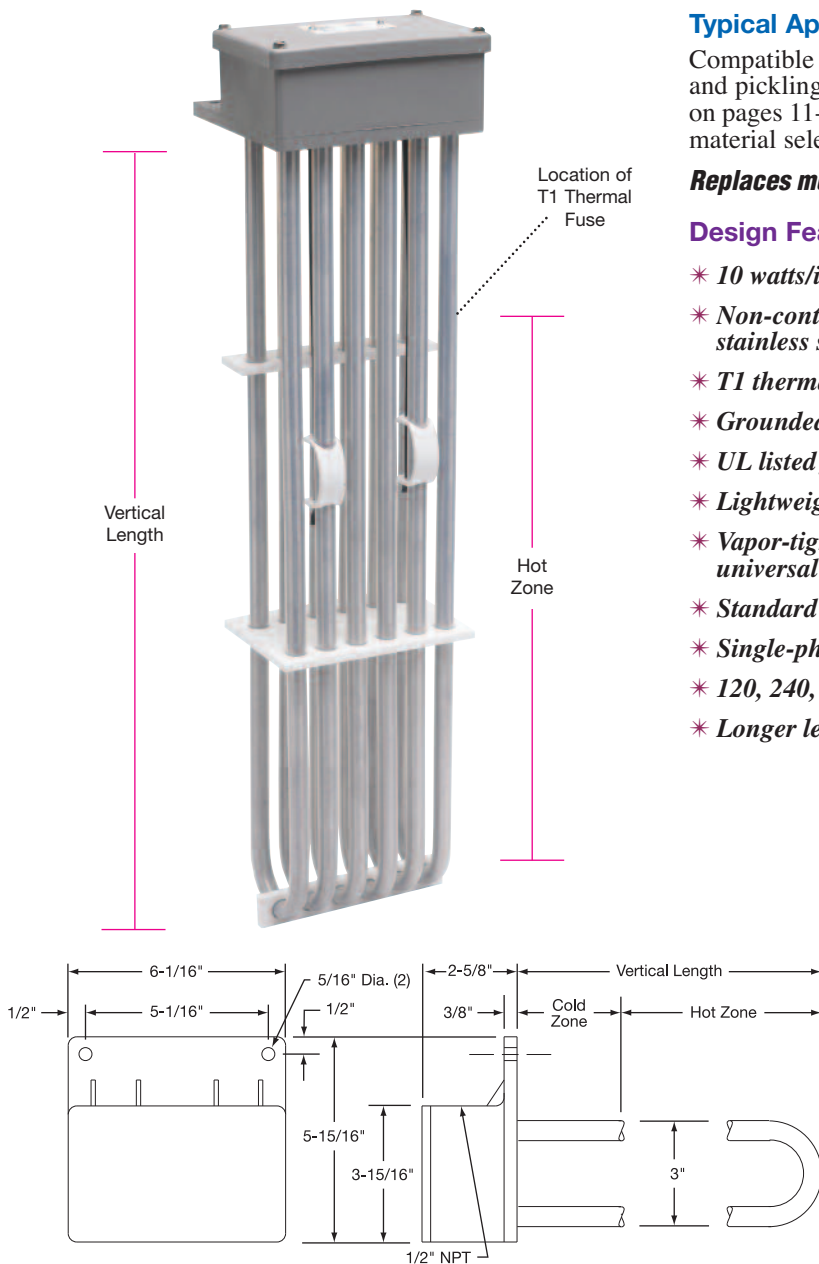
Watts	Part Number			Hot Zone		Vertical Length	
	120V	240V	480V	in	mm	in	mm
1000	TMT06001	TMT06002	—	9	229	17	432
1500	TMT06003	TMT06004	TMT06005	15	381	23	584
2000	—	TMT06007	TMT06008	21	533	29	737
3000	—	TMT06009	TMT06010	28	711	35	889
4000	—	TMT06011	TMT06012	38	965	47	1194
5000	—	TMT06013	TMT06014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

Standard lead time is 2 to 3 weeks.



Tank Immersion Heaters

Fluoropolymer (PTFE) Six-Element Over-the-Side Heater



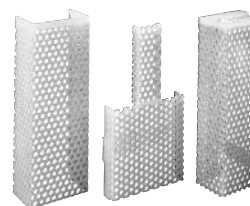
Typical Applications

Compatible with most plating tank solutions; inert to acids, anodizing and pickling solutions up to 190°F (88°C). Check compatibility guide on pages 11-88 and 11-89 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 Fluoropolymer (PTFE) covered stainless steel elements
- * T1 thermal fuse protection standard; T2 bi-metal switch optional
- * Grounded internal metal element for safety
- * UL listed for US and Canada
- * Lightweight, non-floating construction
- * Vapor-tight polypropylene terminal enclosure with universal mounting bracket
- * Standard 3-ft. flexible PVC liquid-tight conduit
- * 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 recommended for all fluoropolymer heaters. Standard guards are made of polypropylene. Fluoropolymer (PTFE) guards are available for chromic acid and temperatures above 180°F (82°C).

Ordering Information

See page 11-90

Standard (Non-Stock) Sizes and Ratings with Polypropylene Guard

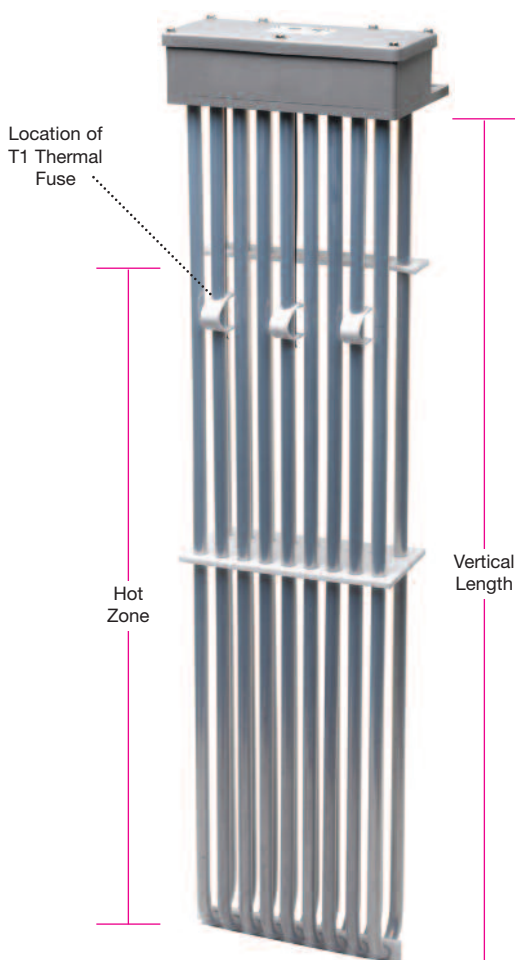
Watts	Part Number			Hot Zone		Vertical Length	
	120V	240V	480V	in	mm	in	mm
2000	TMT07001	TMT07002	TMT07003	9	229	17	432
3000	—	TMT07004	TMT07005	15	381	23	584
4000	—	TMT07006	TMT07007	21	533	29	737
6000	—	TMT07008	TMT07009	28	711	35	889
8000	—	TMT07010	TMT07011	38	965	47	1194
10000	—	TMT07012	TMT07013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

Standard lead time is 2 to 3 weeks.

View Product Inventory @ www.tempco.com



Fluoropolymer (PTFE) Nine-Element Over-the-Side Heater



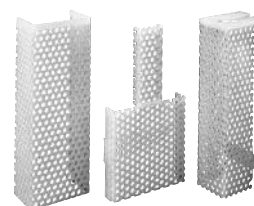
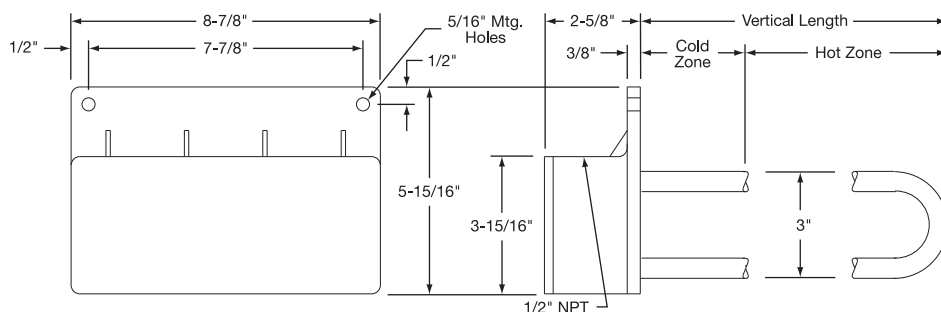
Typical Applications

Compatible with most plating tank solutions; inert to acids, anodizing and pickling solutions up to 190°F (88°C). Check compatibility guide on pages 11-88 and 11-89 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 Fluoropolymer (PTFE) covered stainless steel elements
- * T1 thermal fuse protection standard; T2 bi-metal switch optional
- * Grounded internal metal element for safety
- * UL listed for US and Canada
- * Lightweight, non-floating construction
- * Vapor-tight polypropylene terminal enclosure with universal mounting bracket
- * Standard 3-ft. flexible PVC liquid-tight conduit
- * Standard three-phase wiring
- * 240, 480 volts standard as listed — other voltages available
- * Longer lengths available; consult Tempco



Note: Guards are recommended for all fluoropolymer heaters. Standard guards are made of polypropylene. Fluoropolymer (PTFE) guards are available for chromic acid and temperatures above 180°F (82°C).

Standard (Non-Stock) Sizes and Ratings with Polypropylene Guard

Watts	Part Number			Hot Zone		Vertical Length	
	120V	240V	480V	in	mm	in	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

Ordering Information

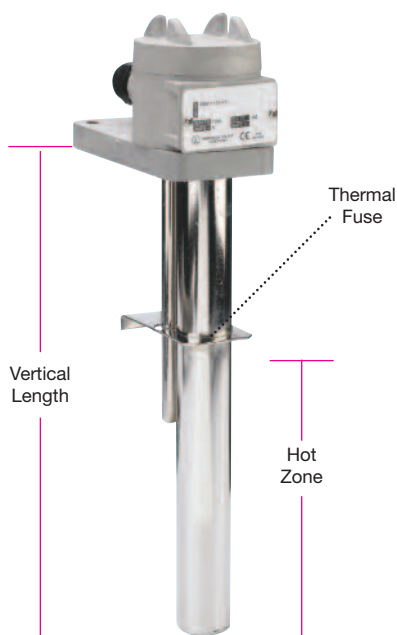
See page 11-90

Standard lead time is 2 to 3 weeks.



Tank Immersion Heaters

Metal Single-Tube Style Heater

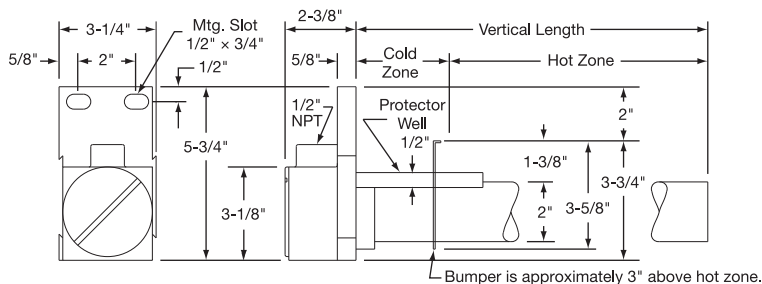


Typical Applications

For plating tanks, rinse tanks and other acidic aqueous solutions. Check compatibility guide on pages 11-88 and 11-89 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; for US and Canada
- * 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

Voltage
1 – 120
2 – 240
4 – 480

Watts ÷ 100

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

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

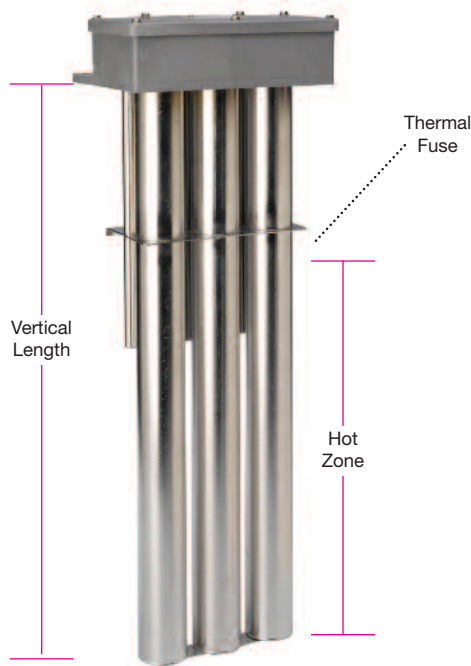
Standard lead time is 2 to 3 weeks.

Ordering Information

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



Metal Triple-Tube Style Heater

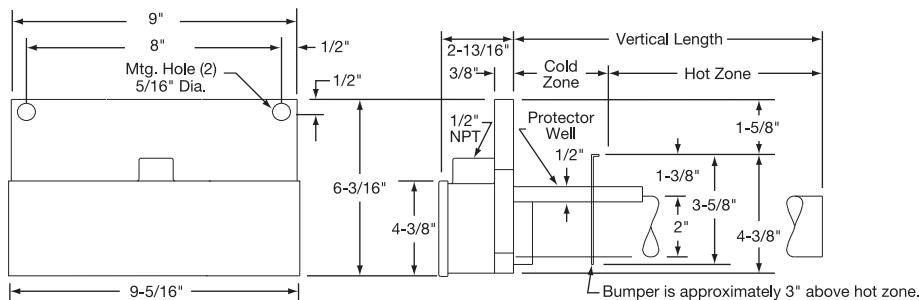


Typical Applications

For plating tanks, phosphatizing and concentrated aqueous solutions. Check compatibility guide on pages 11-88 and 11-89 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; for US and Canada
- * Vapor-tight polypropylene terminal enclosure with universal mounting bracket
- * Standard 3-ft. flexible PVC liquid-tight conduit
- * Standard design includes a common wiring terminal enclosure with a single conduit hub for external connections; power wiring from the three tubes can be configured single- or three-phase.
- * 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.)

Watts ÷ 100

Phase: 1

Material

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

Voltage

1 – 120
2 – 240
4 – 480

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

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.

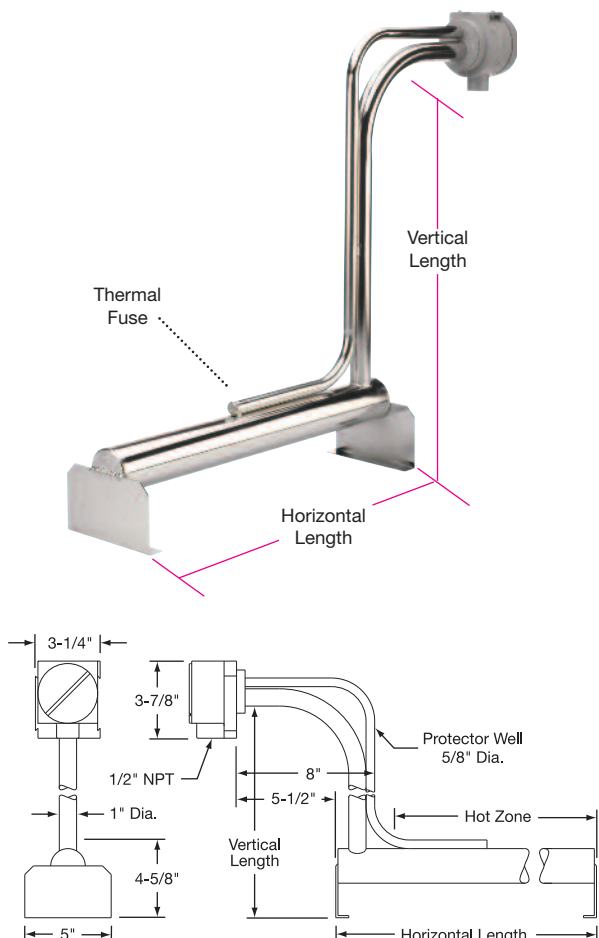
Ordering Information

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



Tank Immersion Heaters

Metal Single-Tube L-Shaped Heater



Typical Applications

For plating tanks, rinse tanks and other non-sludging aqueous solutions. Check compatibility guide on pages 11-88 and 11-89 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; for US and Canada
- * 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

Watts ÷ 100

Phase: 1 or 3

Voltage

1 – 120
2 – 240
4 – 480

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

Standard Watts vs. Length

Watts	H. Length		V. Length	
	in	mm	in	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

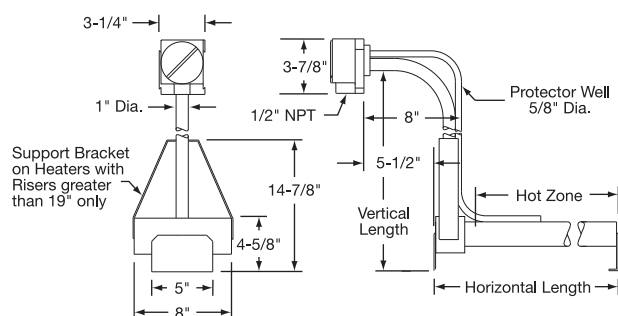
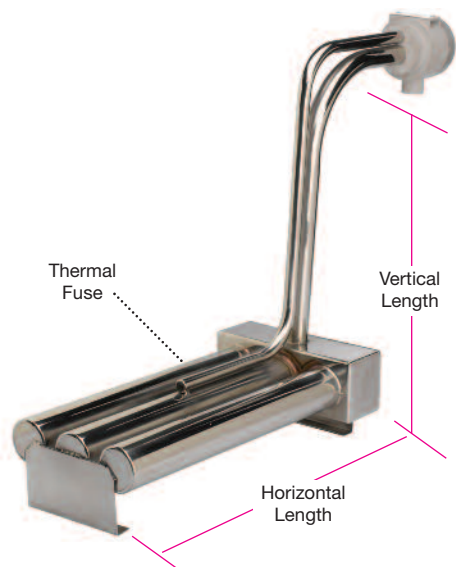
Standard lead time is 2 to 3 weeks.

Ordering Information

TMM3 heaters are offered with the options listed in this worksheet. Create an ordering code by filling in the blanks with the appropriate number and/or letter designation for your requirements, and a part number will be assigned.



Metal Triple-Tube L-Shaped Heater



Typical Applications

For plating tanks, rinse tanks and other non-sludging aqueous solutions. Check compatibility guide on pages 11-88 and 11-89 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; for US and Canada
- * 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

Watts ÷ 100

Material

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

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

Standard Watts vs. Length

Watts	H. Length		V. Length	
	in	mm	in	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.

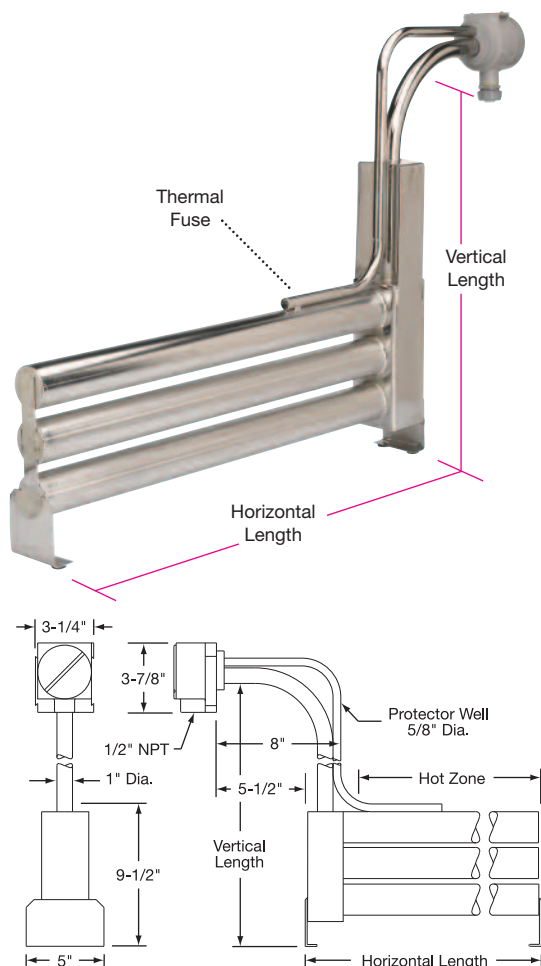
Ordering Information

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



Tank Immersion Heaters

Triple-Tube Vertical Stack L-Shape Heater



Typical Applications

For plating tanks, rinse tanks and other non-sludging aqueous solutions. Check compatibility guide on pages 11-88 and 11-89 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
- * UL listed except Plain Steel; for US and Canada
- * 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

Watts ÷ 100

Phase: 1 or 3

Voltage

1 – 120
2 – 240
4 – 480

Material

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

Ordering Information

TMM5 heaters are offered with the options listed in this worksheet. Create an ordering code by filling in the blanks with the appropriate number and/or letter designation for your requirements, and a part number will be assigned.

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

Standard Watts vs. Length

Watts	Hot Zone		V. Length	
	in	mm	in	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.

