

TA SERIES

THERMOSTATIC STEAM TRAPS

Pressures To 650 PSIG (44.8 barg)
 Temperatures to 750°F (400°C)

Sealed Stainless Steel Body - Lightweight, compact and corrosion resistant. No bolts or gaskets. Eliminates body leaks.

Self Centering Valve - Leak tight shutoff. Improved energy savings. Assembly of actuator and valve to impingement plate allows valve to self-align with center of valve seat orifice. Provides long lasting valve and seat.

Temperature Sensitive Actuators - One moving part. Stainless Steel, fail open or fail closed, welded actuator for maximum corrosion, thermal and hydraulic shock resistance.

For Superheated Steam Applications - Because the trap closes at saturated steam temperature, superheated steam cannot reach trap.

Thermal and Hydraulic Shock Resistant - Impingement plate plus welded construction prevent damage to actuator.

Hardened Stainless Steel Valve and Seat - Long life. Lapped as a matched set for water tight seal.

Inexpensive - Low initial cost.

Maintenance Free - Sealed unit. Replacement traps cost less than repair of more expensive in-line repairable traps.

Freeze Proof - Self draining when installed vertically.

Directional Discharge - Pipe thread erosion prevented by directing discharge to center of pipe.

Air Vent - Efficient steam service air vent when equipped with ISO Bellows and installed in air vent location.



THERMOSTATIC
STEAM TRAPS

Applications

- Unit Heaters
- Air Vents
- Steam Tracing
- Drip Legs
- Platen Presses
- Plating Tanks
- Sterilizers
- Tire Presses
- Cooking Equipment
- Laundry Equipment
- Other Process Equipment

Options

- ISO - ISO Filled Actuator
- SLR - SLR Orifice
- SW - Socketweld

Canadian Registration # OE0591.9

MODELS*

- **TA502**—Reduced capacity
- **TA503**—Standard capacity
- **TA504**—High capacity

*Add (-FC) for fail closed or (-FO) for fail open to end of model number

Operation

Thermal actuator is filled at it's free length with a liquid having a lower boiling point than water. As assembled, valve is normally open. When very hot condensate enters trap, thermal actuator fill vaporizes to a pressure higher than line pressure. This forces valve into seat orifice to prevent any further flow. As condensate collects, it takes heat from the actuator, lowering internal pressure.

Line pressure will then compress thermal actuator to open valve and discharge condensate. Valve opening automatically adjusts to load conditions from minimum on very light loads to full lift at maximum load. Restricted orifice in TA502 (small opening at bottom of valve seat) prevents trap from discharging continuously on light loads such as are encountered on tracer lines.

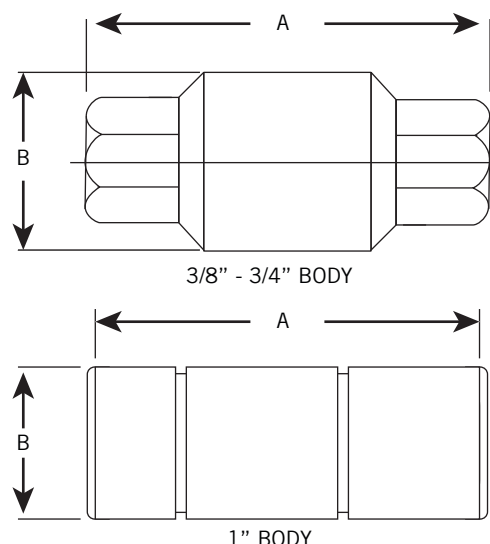
TA SERIES

THERMOSTATIC STEAM TRAPS

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SPECIFICATION

Steam trap shall be of balanced pressure design with stainless steel welded actuator capable of discharging condensate within 10°F of saturated temperature. Where greater sensitivity is required or protection from flash steam locking, a SLR orifice shall be available to allow condensate and flash steam evacuation at or near saturated temperatures. Where subcooling of condensate is desired alternate thermostatic actuator will be available to allow condensate evacuation at or near 40°F below saturated temperatures. Thermostatic actuator shall employ a conical valve lapped in matched sets with the seat ring assuring tight shut off. A minimum of three orifice sizes shall be available allowing for custom capacity sizing. Trap shall be stainless steel bodied suitable for pressures to 650 psig and available in 3/8" through 1" NPT or socketweld.



Connections: 3/8" - 1" NPT or socketweld

Maximum operating conditions

Standard Traps

PMO: Max. Operating Pressure 500 psig (34.5 barg)

TMO: Max. Operating Temperature 600°F (316°C)

ISO Option Traps

PMO: Max. Operating Pressure 650 psig (44.8 barg)

TMO: Max. Operating Temperature 650°F (343°C)

All Traps

PMA: Max. Allowable Pressure 650 psig (44.8 barg)

TMA: Max. Allowable Temperature 750°F (400°C)

Materials of construction

Body & Cover ASTM A276

For 1" - 316SS, ASME SA479

Actuator Welded Stainless Steel

Valve & Seat Hardened 416 Stainless Steel

Dimensions			
NPT or Socket weld	Inches (mm)		Weight Lbs. (kg)
	A	B	
3/8", 1/2"	3 3/4 (95)	1 3/4 (44)	1.1 (0.5)
3/4"	3 15/16 (100)	1 3/4 (44)	1.2 (0.54)
1"	4 3/8 (111)	1 3/4 (44)	1.6 (0.73)

Maximum Capacity - lbs/hr 10°F Below Saturation (Kg/hr 5°C Below Saturation)																		
Trap	Orifice Inch (mm)	Differential PSIG (barg)																
		5 (0.34)	10 (0.7)	20 (1.4)	50 (3.5)	100 (6.9)	125 (8.62)	150 (10.3)	200 (13.8)	250 (17.2)	300 (20.7)	350 (24.1)	400 (27.6)	450 (31.0)	500 (34.5)	550* (37.9)	600* (41.4)	650* (44.8)
TA502	1/8 (3)	216 (98)	265 (120)	375 (170)	592 (269)	778 (354)	838 (381)	890 (405)	980 (445)	1055 (480)	1121 (510)	1180 (536)	1235 (561)	1284 (584)	1331 (604)	1377 (625)	1425 (646)	1471 (667)
TA503	1/4 (6)	550 (249)	825 (374)	1210 (549)	1975 (896)	2825 (1281)	3140 (1424)	3425 (1554)	3650 (1656)	3960 (1796)	4100 (1860)	4230 (1919)	4420 (2005)	4600 (2086)	4760 (2161)	4910 (2232)	5060 (2297)	5190 (2359)
TA504	5/16 (8)	860 (390)	1220 (554)	1725 (783)	2725 (1237)	3575 (1623)	3850 (1748)	4090 (1857)	4505 (2045)	4850 (2202)	5155 (2340)	5425 (2463)	5675 (2576)	5900 (2679)	6110 (2774)	6310 (2868)	6480 (2945)	6625 (3011)

*Spence recommends ISO filled Actuator above 500 psi (34.5 bar) and for superheated steam.

May 2023

TA Series Thermostatic Steam Traps



Figure 1. TA Series Thermostatic Steam Traps

Features

- **Sealed Stainless Steel Body** – Lightweight, compact and corrosion resistant. No bolts or gaskets. Eliminates body leaks.
- **Self Centering Valve** – Leak tight shutoff. Improved energy savings. Assembly of actuator and valve to impingement plate allows valve to self-align with center of valve seat orifice. Provides long lasting valve and seat.
- **Temperature Sensitive Actuators** – One moving part. Stainless Steel, fail open or fail closed, welded actuator for maximum corrosion, thermal and hydraulic shock resistance.
- **For Superheated Steam Applications** – Because the trap closes at saturated steam temperature, superheated steam cannot reach trap.
- **Thermal and Hydraulic Shock Resistant** – Impingement plate plus welded construction prevent damage to actuator.
- **Hardened Stainless Steel Valve and Seat** – Long life. Lapped as a matched set for water tight seal.
- **Inexpensive** – Low initial cost.
- **Maintenance Free** – Sealed unit. Replacement traps cost less than repair of more expensive in-line repairable traps.
- **Freeze Proof** – Self draining when installed vertically.
- **Directional Discharge** – Pipe thread erosion prevented by directing discharge to center of pipe.
- **Air Vent** – Efficient steam service air vent when equipped with ISO Bellows and installed in air vent location.

Introduction

A steam trap is an automatic valve which discharges condensate, undesirable air and non-condensibles from a system while trapping, or holding in steam. Thermostatic steam traps operate in direct response to the temperature within the trap.

The TA Series is a balanced pressure design with stainless steel welded actuator capable of discharging condensate within 10°F / -12°C of saturated pressure.



TA Series

Specifications

This section lists the specifications for the TA Series. Factory specifications are stamped on the nameplate fastened on the steam trap at the factory.

Available Configuration⁽¹⁾

Type TA502: Reduced capacity

Type TA503: Standard capacity

Type TA504: High capacity

Body Size

NPS 3/8, 1/2, 3/4 and 1 / DN 10, 15, 20 and 25

End Connection

NPT and Socket Weld

Maximum Operating Pressure⁽²⁾

Standard Traps: 500 psig / 34.5 bar g

ISO Option Traps: 650 psig / 44.8 bar g

Maximum Allowable Pressure⁽²⁾

650 psig / 44.8 barg

Maximum Operating Temperature⁽²⁾

Standard Traps: 600°F / 316°C

ISO Option Traps: 650°F / 343°C

Maximum Allowable Temperature⁽²⁾

750°F / 399°C

Capacity Information

See Table 2

Materials of Construction

Body and Cover: Stainless steel

Actuator: Welded Stainless Steel

Valve and Seat: Hardened 416 Stainless Steel

Applications

Unit Heaters

Air Vents

Steam Tracing

Drip Legs

Platen Presses

Plating Tanks

Sterilizers

Tire Presses

Cooking Equipment

Laundry Equipment

Other Process Equipment

Options

ISO: ISO Filled Actuator

SW: Socket weld

SLR: SLR Orifice

Approximate Weight

Table 1

1. Add (-FC) for fail closed or (-FO) for fail open to end of Type number.

2. The pressure/temperature limits in this Bulletin and any applicable standard or code limitation should not be exceeded.

For greater sensitivity or protection from flash steam locking, SLR orifice is available to allow condensate and flash steam evacuation at or near saturated temperatures. If subcooling of condensate is desired, alternate thermostatic actuator is available to allow condensate evacuation at or near 40°F / 4.4°C below saturated temperatures.

Thermostatic actuator has a conical valve lapped in matched sets with the seat ring assuring tight shut off. A minimum of three orifice sizes is available allowing for custom capacity sizing. Trap is stainless steel-bodied suitable for pressures up to 650 psig / 44.8 bar and available in NPS 3/8 to 1 / DN 10 to 25 in NPT or socket weld end connection.

Principle of Operation

Thermal actuator is filled at its free length with a liquid having a lower boiling point than water. As assembled, valve is normally open. When very hot condensate enters trap, thermal actuator fill vaporizes to a pressure higher than line pressure. This forces valve into seat orifice to prevent any further flow. As condensate collects, it takes heat from the actuator, lowering internal pressure. Line pressure will then compress thermal actuator to open valve and discharge condensate. Valve opening automatically adjusts to load conditions from minimum on very light loads to full lift at maximum load. Restricted orifice in Type TA502 (small opening at bottom of valve seat) prevents trap from discharging continuously on light loads such as are encountered on tracer lines..

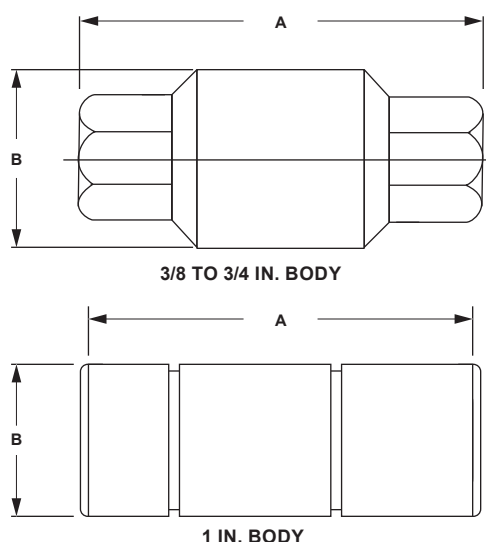


Figure 2. TA Series Dimensions

Table 1. TA Series Dimensions and Weight

NPT OR SOCKET WELD		IN. / mm		WEIGHT, LBS / kg
NPS	DN	A	B	
3/8, 1/2	10, 15	3-3/4 / 95	1-3/4 / 44	1.1 / 0.5
3/4	20	3-15/16 / 100	1-3/4 / 44	1.2 / 0.54
1	25	4-3/8 / 111	1-3/4 / 44	1.6 / 0.73

Table 2. Maximum Capacity - Lbs/hr 10°F Below Saturation / Kg/hr 5°C Below Saturation

TYPE	ORIFICE, IN. / mm	DIFFERENTIAL PRESSURE, psig / barg																
		5 / 0.34	10 / 0.7	20 / 1.4	50 / 3.5	100 / 6.9	125 / 8.62	150 / 10.3	200 / 13.8	250 / 17.2	300 / 20.7	350 / 24.1	400 / 27.6	450 / 31.0	500 / 34.5	550(1 / 37.9	600(1 / 41.4	650(1 / 44.8
		lbs/hr / kg/hr																
TA502	1/8 / 3	216 / 98	265 / 120	375 / 170	592 / 269	778 / 354	838 / 381	890 / 405	980 / 445	1055 / 480	1121 / 510	1180 / 536	1235 / 561	1284 / 584	1331 / 604	1377 / 625	1425 / 646	1471 / 667
TA503	1/4 6	550 / 249	825 / 374	1210 / 549	1975 / 896	2825 / 1281	3140 / 1424	3425 / 1554	3650 / 1656	3960 / 1796	4100 / 1860	4230 / 1919	4420 / 2005	4600 / 2086	4760 / 2161	4910 / 2232	5060 / 2297	5190 / 2359
TA504	5/16 / 8	860 / 390	1220 / 554	1725 / 783	2725 / 1237	3575 / 1623	3850 / 1748	4090 / 1857	4505 / 2045	4850 / 2202	5155 / 2340	5425 / 2463	5675 / 2576	5900 / 2679	6110 / 2774	6310 / 2868	6480 / 2945	6625 / 3011

1. Emerson recommends ISO filled Actuator above 500 psi / 34.5 bar and for superheated steam.

Installation

- Before installing trap, blow all dirt and scale from apparatus and piping.
- Install trap with arrow on body in flow line as close as possible to apparatus with strainer and valve upstream of trap.
- Pitch all drain lines toward trap.

Note

Approved practice is to install separate traps on each piece of apparatus to be drained. Steam supplied to inlets of several units may be of uniform pressure, but invariably there is a

differential at the outlets. Although this differential may be small, unit discharging highest pressure will control the action of trap, while other units become air-bound and water logged. Piping upstream and downstream of trap should be at least equal to or one size larger than trap connection.

- Record the location of the trap for maintenance accessibility.

Capacity Information

Capacity information for every Type of TA Series is shown in Table 2.

TA Series

Ordering Information

When ordering, complete the ordering guide on this page. Refer to the Specifications section on page 2.

Review the description to the right of each specification and the information in each referenced table or figure. Specify your choice whenever a selection is offered.

Ordering Guide

Type (Select One)

- ☐ Type TA502-FO
- ☐ Type TA502-FC
- ☐ Type TA503-FO
- ☐ Type TA503-FC
- ☐ Type TA504-FO
- ☐ Type TA504-FC

Body Size (Select One)

- ☐ NPS 3/8 / DN 10
- ☐ NPS 1/2 / DN 15
- ☐ NPS 3/4 / DN 20
- ☐ NPS 1 / DN 25

End Connection (Select One)

- ☐ NPT
- ☐ Socket Weld

Options

- ☐ ISO - ISO Filled Actuator
- ☐ SW - Socket Weld
- ☐ SLR - SLR Orifice

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