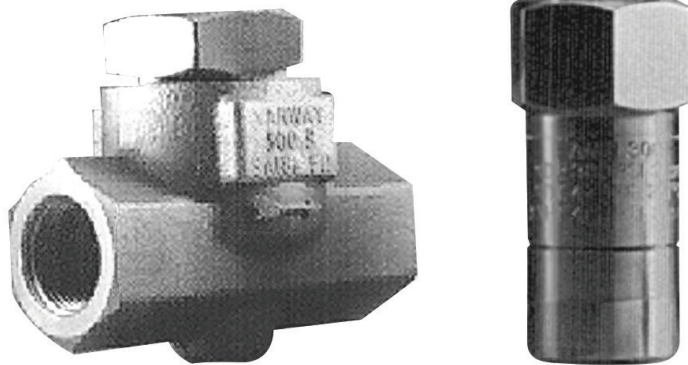




YARWAY PROCESS THERMOSTATIC STEAM TRAPS

SERIES 151 AND AV5

A wide range of process thermostatic steam traps is available to match almost any application need



FEATURES

- Simple construction
- Easy to maintain as installed
- Excellent air handling capability
- Pressure assisted fail-open design
- Hardened stainless steel valve and seat
- Withstands superheat
- Efficient air and noncondensable removal
- Shuts tight on steam
- Compact and lightweight

GENERAL APPLICATIONS

Ideally suited for use on tubes, coils or heat exchangers, tanks or vats for heating liquids in either batch or continuous operation.

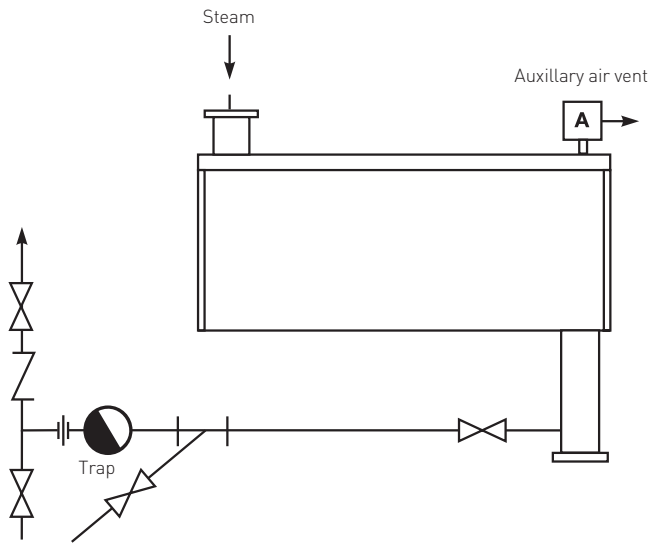
TECHNICAL DATA

Size range: NPS 1/2, 3/4 and 1
(DN 15, 20 and 25)
Temperature: Up to 650°F (343°C)
Pressure: Up to 600psi (41bar)
Materials: Chrome moly steel, 416
Stainless steel
End connections: NPT, socket weld, flanged

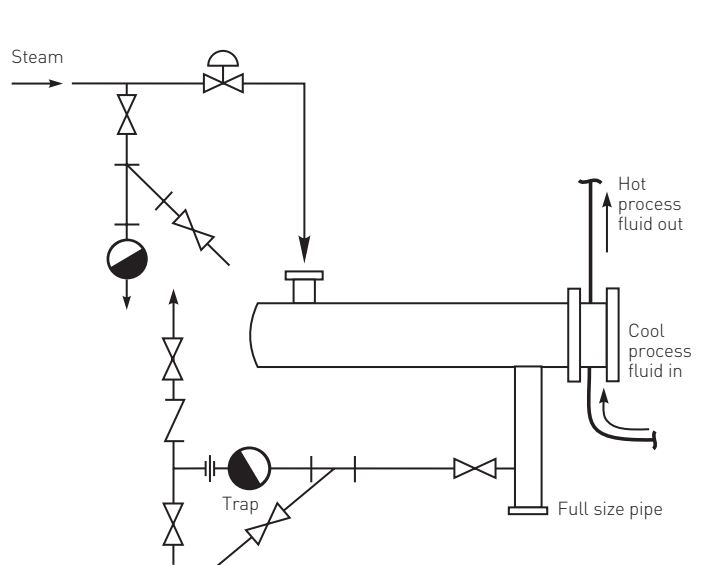
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AUTOCLAVE



SHELL AND TUBE HEATER



GUIDELINES FOR TYPICAL PROCESS APPLICATIONS

Depending on the application, a process steam trap will probably have to handle heavy startup loads, often followed by smaller running loads. The trap's function is to drain the process equipment and thus ensure that effective heat transfer is achieved (through latent heat). A few guidelines for optimum results include:

- Provide an adequate size process connection from equipment.
- Locate trap below the equipment (water runs downhill).
- Use good piping practice to ensure that clean condensate is presented to the trap.
- Include air vents and vacuum breakers as necessary for effective equipment operation.

Why choose a thermostatic steam trap?

Thermostatic traps react to changes in temperature and therefore discriminate very well between steam and cooler noncondensable gases. They can rapidly purge air from a system, especially on cold startups. These traps can be installed in various positions to match piping. Most commonly, actuation is by means of a bellows-like capsule filled with a vaporizing liquid. Thermostatic traps respond more slowly to changing conditions due to the heat energy of the condensate inside the trap which is slow to dissipate, thus causing some time delay. Insulating thermostatic traps aggravate this situation.

To improve responsiveness, these traps should be mounted at the end of a cooling leg in an area where air can circulate freely and a distance from the collection pocket to match condensate load.

Profile of a process application: Gravity drainage, shell and tube heat exchanger

Tubes, coils or jackets are used with heat exchangers, tanks or vats for heating liquids in either batch or continuous operation, typical of shell and tube heaters. Equipment is generally protected from the weather and typically features a single coil.

Heavy startup loads, followed by smaller running loads are to be expected, but without the extreme swings of weather-exposed equipment.

Adequate air venting is most important as the equipment is often run on daily or weekly schedules. Tendency is for total shut-down of equipment following completion of run or batch. Lack of proper venting can cause condensate to be drawn back into the heat exchanger coils.

Air in a heating system significantly reduces its efficiency. Air is a very poor conductor of heat and air filming on pipes and heat exchanger tubes reduces the heat transfer rate through their metal walls. Also, steam mixed with air contains fewer BTUs at a given pressure than steam alone. It is the function of a steam trap to aid in venting air from a steam system, but auxiliary thermostatic air vents are often required. Open to cooler air and closed to hotter steam, they greatly speed up the air purging process. When frequent startups and shutdowns are the rule, rapid air purging is a significant factor. Thermostatic traps are often favored for their good air handling characteristics on startup.

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PILOT OPERATED TRAPS

As the name implies, these traps are actuated by a thermostatic pilot valve which drives the main valve. The pilot, which is bellows actuated, is in essence a working mechanism similar to that used in bellows traps. Therefore the operating characteristics of pilot operated traps are basically the same as those of the pilot. Pilot operated traps are process traps that offer a dual capacity range. Small condensate loads are handled by the pilot and when the load exceeds its capacity, the main valve opens. An additional advantage of these traps is that they are relatively small in size and light-weight, yet can handle large quantities of condensate. They are a practical alternative to large heavy mechanical traps.

Yarway pilot operated traps offer the following advantages:

- Simple construction
- Small size and weight
- Easy to maintain as installed
- Excellent air handling capability
- Energy efficient

BELLOWS TECHNOLOGY

Yarway offers two bellows technology products for process applications utilizing the FTE (Filled Thermal Element):

- Series 151 Dual Range Steam Trap
- Series AV-5 Thermostatic Air Vent

With the Series 151 trap, the FTE acts as the pilot. This means that by opening or closing its

internal valve - as the condensate temperature changes - the pilot determines whether the main valve is open or closed. If the condensate load is very low, then the total flow is passed through the pilot only.

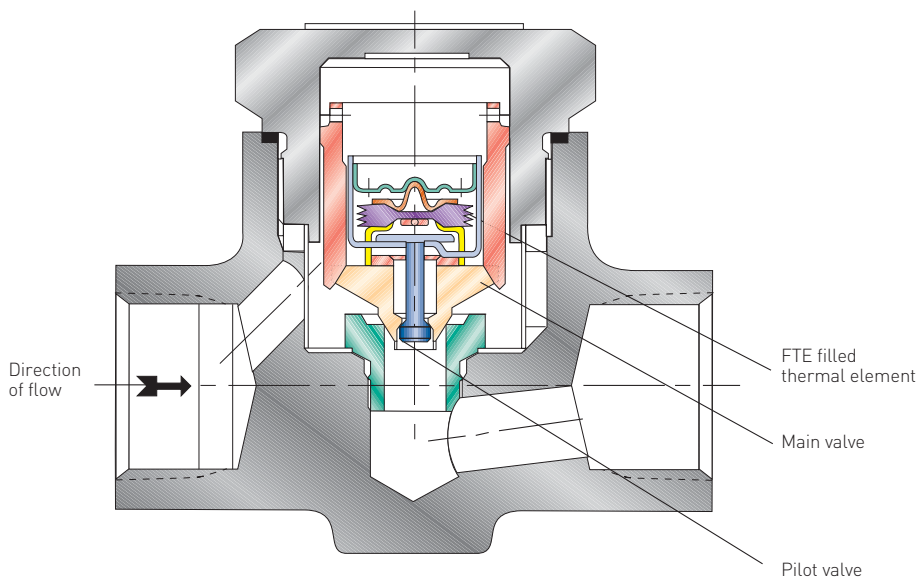
With the AV-5 Air Vent, the FTE thermostatic bellows opens and closes in response to temperature changes. Steam is prevented from discharging through the vent and only air and subcooled noncondensable or cool condensate can therefore be discharged.

All Yarway bellows traps deliver consistent features such as:

- Three-year warranty
- Pressure assisted fail-open design
- Hardened stainless steel valve and seat
- Withstands superheat
- Efficient air and noncondensable removal
- Shuts tight on steam
- Compact and lightweight

HOW IT WORKS

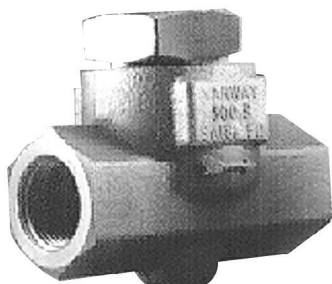
When condensate reaches a Series 151 trap, the FTE opens a pilot valve to allow limited flow. The main valve stays closed until the condensate load exceeds the capacity of the pilot valve; then the pilot valve opens the main valve, and both discharge at full capacity. At startup, both the pilot valve and the main valve are open for high-capacity discharge of air and condensate. And in normal operation, the pilot valve may drain condensate continuously, closing only in the absence of condensate.



YARWAY PROCESS THERMOSTATIC STEAM TRAPS

SERIES 151 AND AV5

SERIES 151 DUAL RANGE PROCESS TRAPS (OR HIGH CAPACITY AIR VENT)



The Series 151 Dual Range Steam Trap is designed for use on both batch and continuous applications such as batch stills, autoclaves, reboilers, storage tanks, shell and tube heat exchangers and tank coils. The Dual Range Steam Traps are capable of handling high startup and running loads, and provide maximum air venting capability. There are two body styles and two internals available, the 151 angle and 151 in-line. There is a standard capacity internal and an "H" high capacity internal available. Both internals are interchangeable in both bodies.

APPLICABLE CODES AND STANDARDS

Pressure ratings per ASME/FCI-69-1.
Performance testing per ASME PTC-39-1. End connections per ASME B1.20.1 for threaded ends, per ASME B16.11 for socketwelding ends.

HOW TO SIZE

Required trap flow rate = Maximum expected condensate load (lb/hr) x Safety load factor. A safety load factor of 2-4 is usually recommended. Then select a trap from the flow rate chart. Do not size trap based on end connections.

HOW TO ORDER

Typical specification

Traps shall be Dual Range type with a combination of welded stainless steel FTE thermostatic pilot valve and fluid-dynamic main valve. Construction shall be forged steel body and stainless steel bonnet with factory calibrated, stainless steel internals, self-adjusting for all pressures to 300 psi (21 bar). Specify angle or in-line body.

Ordering

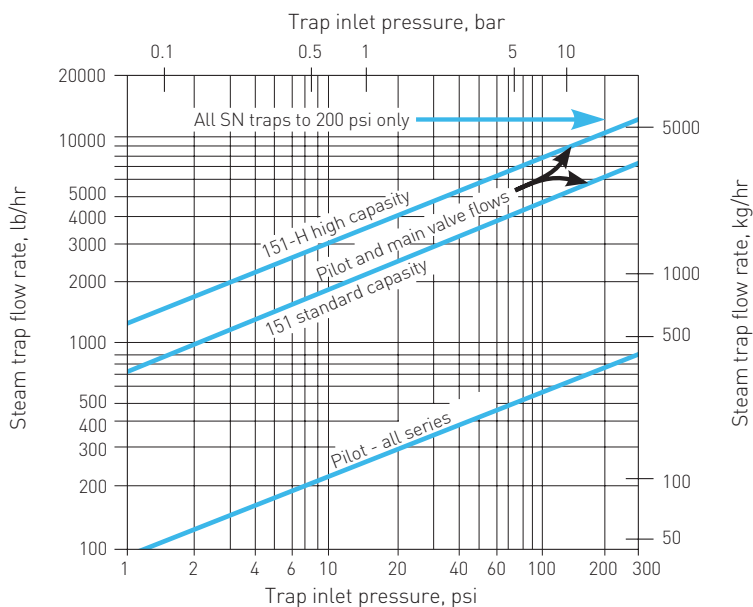
Specify trap size and series. Threaded end connections (socketwelded optional). Repair kits are interchangeable and are supplied as sets of matched parts (seat, seat gasket, screen and preassembled cage assembly).

PRESSURE AND TEMPERATURE RATINGS

(All pressures are gage)

- ASME Class 300
- Max. Design Temp.: 750°F (400°C)
- Operating Pressure: 1-300 psi (0.07-21 bar)
- Max. Operating Temp.: 500°F (260°C)

Condensate Capacity Near Steam Temperature (for steam trap sizing)

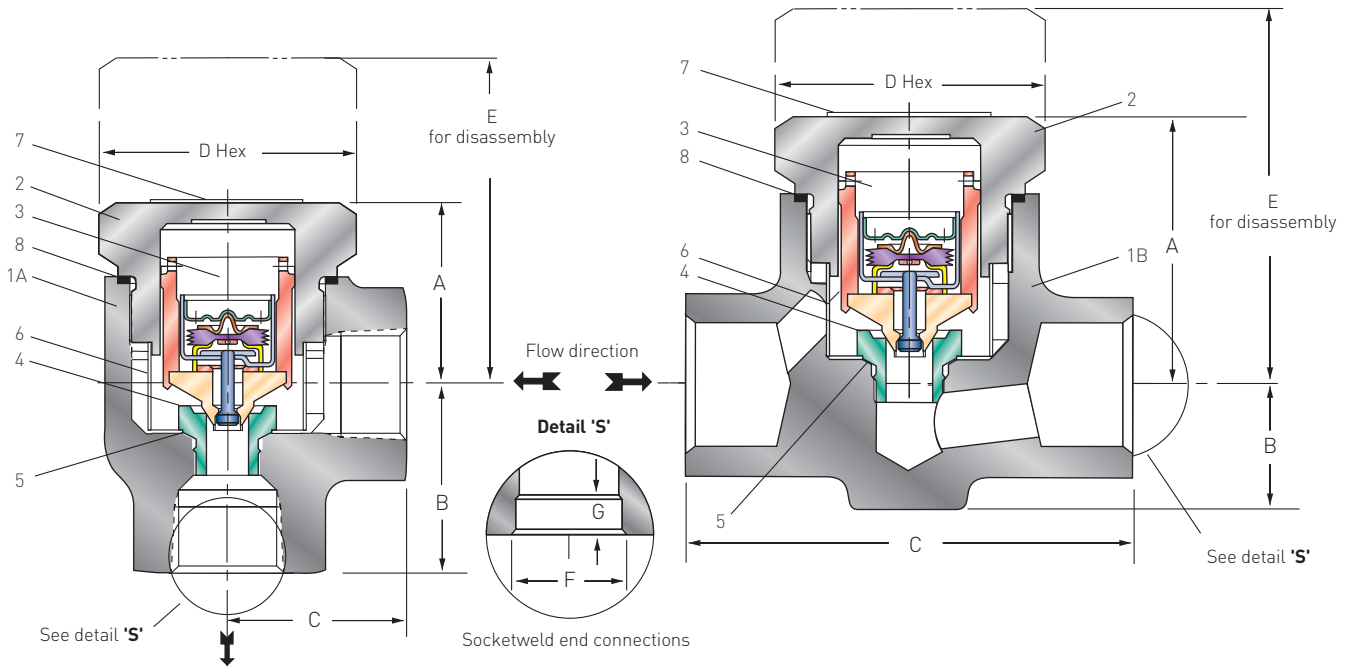


Note: 151-H High Capacity Trap - use 1" pipe, valves and fittings.

YARWAY PROCESS THERMOSTATIC STEAM TRAPS

SERIES 151 AND AV5

SERIES 151 DUAL RANGE PROCESS TRAPS (OR HIGH CAPACITY AIR VENT)



PARTS AND MATERIALS

Item	Part	Material
1A	Body 151 angle	ASME SA-105, Carbon steel
	Body 151S/SN angle	ASME SA182 316L Stainless steel
1B	Body 151 In-line	ASME SA 182 F11, Cr. Mo. 0.15% Maximum Carbon
1B	Body 151S/SN In-line	ASME SA182 316L Stainless steel
2	Bonnet	ASTM A-582 416 Stainless steel
3 ⁽¹⁾	Cage assembly	Stainless steel
4 ⁽¹⁾	Seat	Stainless steel
5 ⁽¹⁾	Gasket, seat	Monel [®]
6 ⁽¹⁾	Screen	18-8 Stainless steel
7	Nameplate	302 Stainless steel
8 ⁽¹⁾	Gasket, bonnet	Monel [®] Teflon [®] coated

NOTES

1. Denotes available repair kit.

DIMENSIONS, in. (mm)

Fig. No.	Size NPS (DN)	A	B	C	D	E	F	G	Weight lb. (kg)
151*	¾ (20)	1 7/8 (48)	1 7/8 (48)	1 3/4 (44)	2 1/4 (57)	3 (76)	1.070 (28)	½ (13)	4 ½ (2.0)
151**	¾ (20)	2 5/8 (67)	1 3/16 (30)	4 5/16 (110)	2 1/4 (57)	4 (102)	1.070 (28)	½ (13)	4 ½ (2.0)
151**	1 (25)	2 5/8 (67)	1 5/16 (33)	4 5/8 (118)	2 1/4 (57)	4 (102)	1.335 (34)	½ (13)	5 (2.3)

* Angle

** In-Line

YARWAY PROCESS THERMOSTATIC STEAM TRAPS

SERIES 151 AND AV5

SERIES AV-5 THERMOSTATIC AIR VENT



The Yarway Series AV-5 Thermostatic air vent has been designed to remove air and noncondensable gases from steam systems which otherwise would reduce efficiency of heat transfer during startup of normal operation. The AV-5 uses the HP version of the Filled Thermal Element (FTE) as the actuating mechanism.

CAPACITIES

Assuming that a minimum inlet pressure of 15 psig to atmosphere, the air handling capacity of the AV-5 is 1.25 actual cubic ft/min. This capacity is regardless of pressure or temperature changes because sonic velocity has been reached.

APPLICABLE CODES AND STANDARDS

Pressure ratings per ASME/FCI-69-1.
Performance testing per ASME PTC-39.1.
End connections per ASME B1.20.1 for threaded ends.

HOW TO ORDER

Typical specifications

The Air Vent shall be a thermostatic type with a Filled Thermal Element (FTE) actuator with opening action of plug in a downstream direction, away from the seat, to provide a pressure-assisted fail-open operation. The body and internals shall be of stainless steel.

Ordering

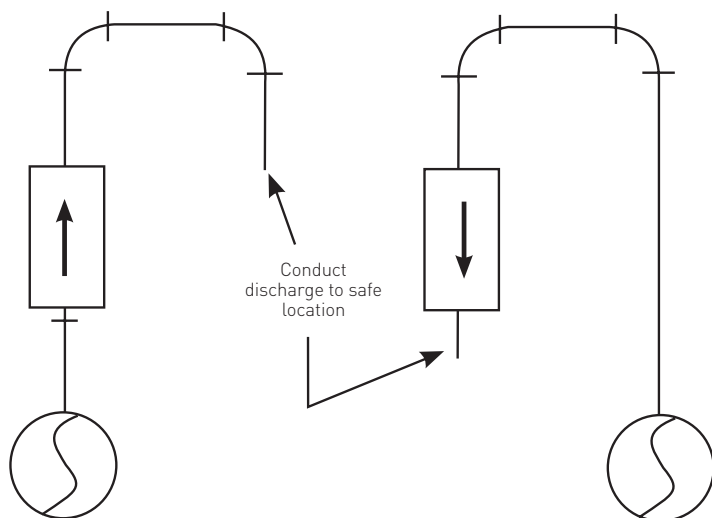
Specify Air Vent size 1/2", 3/4", Series AV-5.

Pressure and temperature ratings

(All pressures in gage)

- Shell: ASME Class 600 (PN 100) B16.34
- Max. Operating Pressure: 600 psi (41 bar)
- Max. Operating Temp.: 650°F (343°C)
- Max. Test Pressure: 800 psi (55 bar)

TYPICAL INSTALLATION



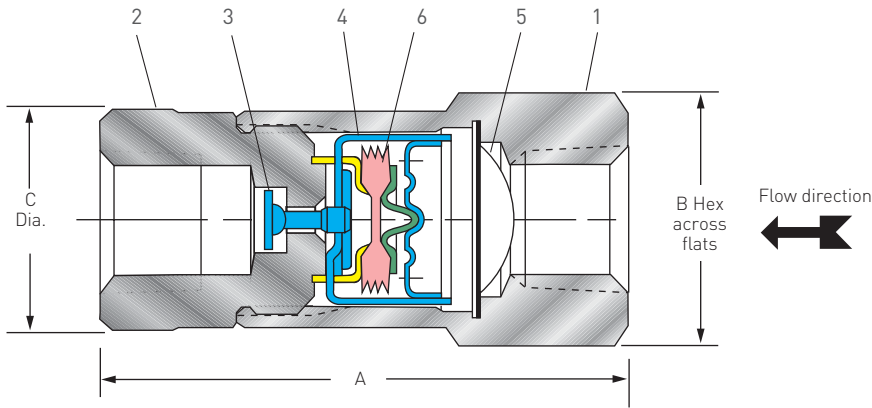
PREFERRED INSTALLATION
Generally more sensitive to presence of air

ACCEPTABLE ALTERNATIVE
Vent may cycle on some condensate

YARWAY PROCESS THERMOSTATIC STEAM TRAPS

SERIES 151 AND AV5

SERIES AV-5 THERMOSTATIC AIR VENT



PARTS AND MATERIALS

Item	Part	Materials
1	Body	ASTM A582 416 Stainless steel
2	Outlet fitting	ASTM A582 416 Stainless steel
3	Valve plug	AISI 17-4PH Stainless steel
4	Cage assembly	AISI 304 Stainless steel
5	Screen	AISI 304 Stainless steel
6	Filled thermal element	Stainless steel

DIMENSIONS, in. (mm)

Size in. (DN)	Dimensions, in.(mm)			Weight lb. (kg)
	A	B	C	
1/2 (15)	3 (76)	1 1/4 (32)	1 1/4 (32)	3/4 (0.3)
3/4 (20)	3 3/8 (81)	1 1/2 (38)	1 3/8 (35)	1 (0.5)

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