



**A wide range of process thermostatic steam traps are available to match almost any application need.**

**The Right Trap For The Right Application**

Whenever you're faced with a process application, it's not enough to just select any steam trap to solve your problem. Instead, remember to match your application with the correct steam trap technology. With Yarway process thermostatic traps, you'll find a range of solutions available to match almost any application you face. But that solution is only as valuable as your understanding of the problem you are trying to solve. Variables such as steam pressure, condensate load, ambient conditions, air venting, water hammer, dirt, and corrosion must be carefully considered when choosing the right trap for the right application. Even upstream and downstream piping design plays a very important role in your final selection. With Yarway, you're not alone in making these tough decisions. You are supported every step of the way with valuable programs like Yarway's Complete Steam Trap Sizing and Selection software.



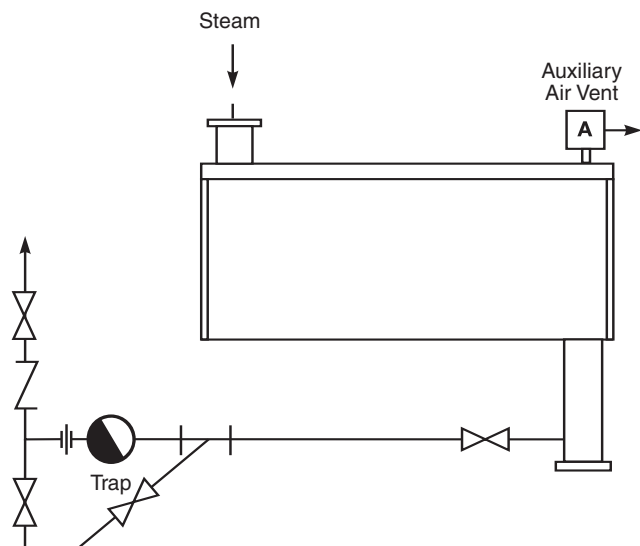
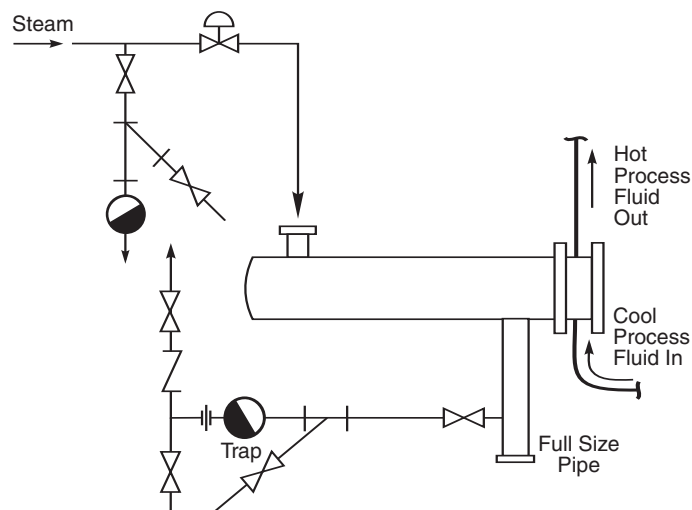
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**Autoclave****Shell and Tube Heater**

**Auxiliary Air Vents are often helpful in purging air from large steam spaces at startup.**

### 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 bimetallic element or 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 aggravates 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 shutdown 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.

### Pilot Operated Traps

As the name implies, these traps are actuated by a thermostatic pilot valve which drives the main valve. The pilot, which can either be bimetallic or bellows actuated, is in essence a working mechanism similar to that used in bimetallic or bellows traps respectively. 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

### Bimetallic

Yarway offers two bimetallic thermostatic steam traps for process applications:

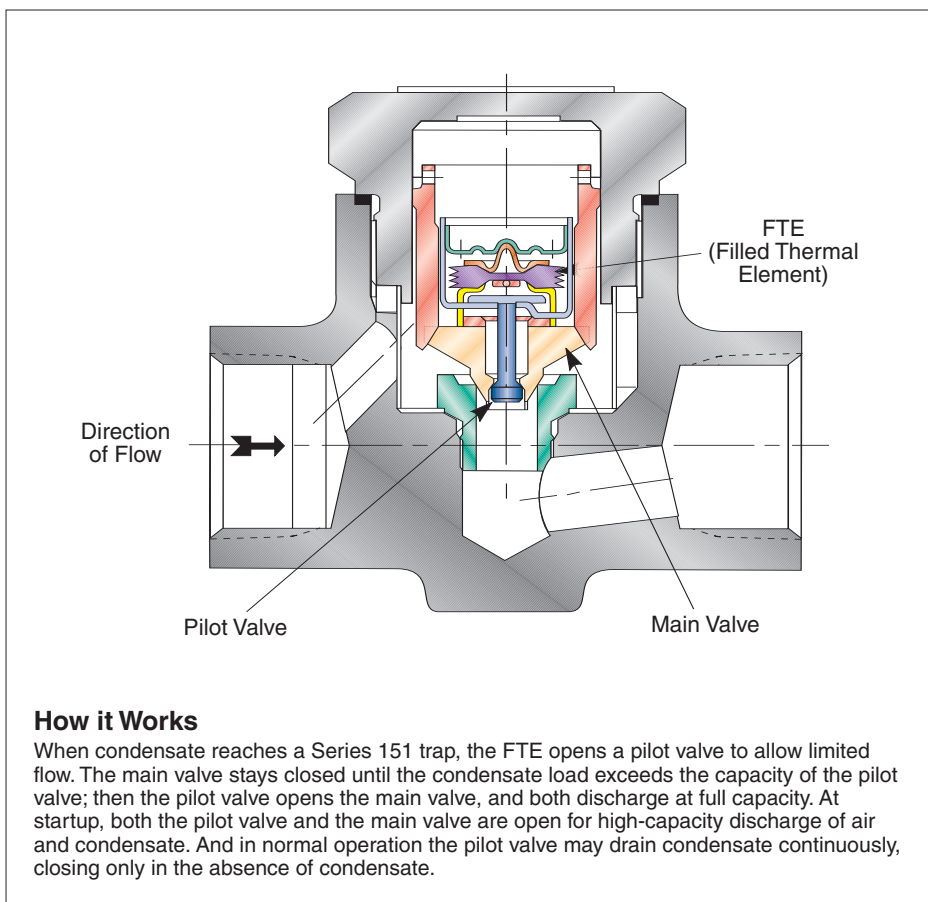
- Series SP
- Series ABL

Bimetallic traps utilize the sensible heat in the condensate in conjunction with line pressure to open and close a valve mechanism. The bimetallic elements are usually in the form of small discs which

are arranged to produce an increasing closing force with increasing temperature. This closing force is opposed by line pressure. Since the line pressure is a major force balancing component, this balance is also affected by back pressure. Back pressure in a closed return system provides an additional closing force which, since it opposes the supply pressure, produces a lower opening temperature than the same trap discharging to atmosphere.

Bimetallic steam traps offer the following advantages:

- Ruggedly designed to withstand water hammer
- Energy efficient
- Self-draining
- Resistant to freeze damage
- Capable of temperature adjustment
- Can be mounted in any position
- Primary fail mode is open



### 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.

## 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 ANSI/FCI-69-1. Performance testing per ANSI/ASME PTC-39-1, ISO 7841 and 7842. End connections per ANSI B1.20.1 for threaded ends, per ANSI B16.11 for socketwelding ends.

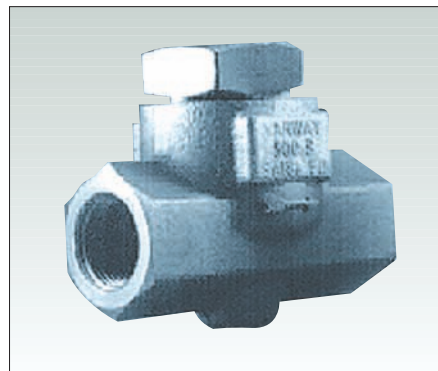
### How to Size

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 or 316L stainless 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).

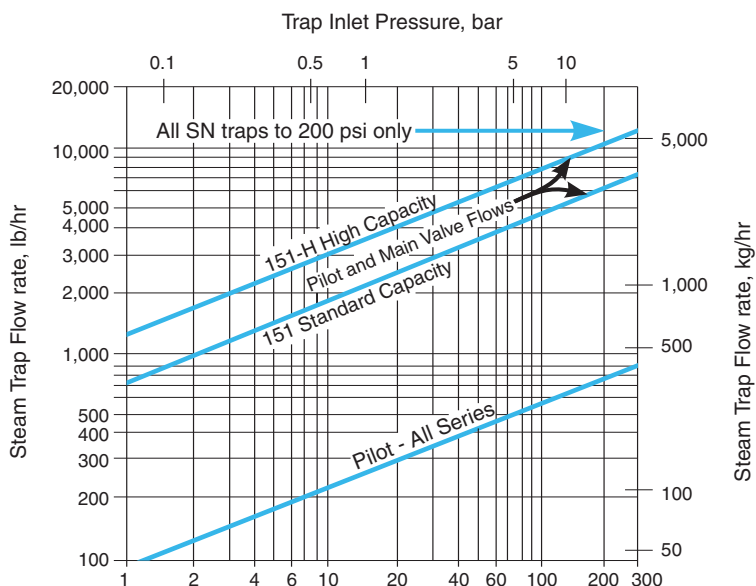


### Pressure-Temperature Ratings

(All pressures are gage)

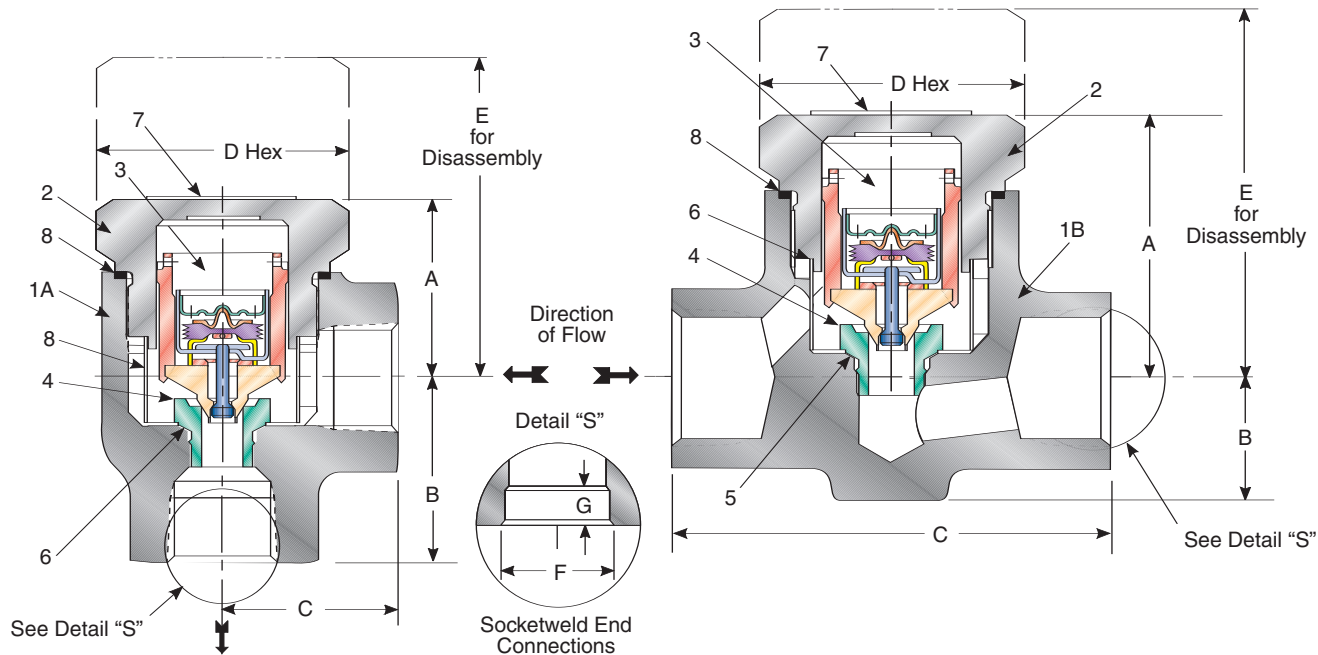
- ANSI Class 300
- Max. Design Temperature: 750°F [400°C]
- Operating Pressure: 1-300 psi [0.07-21 bar]
- Max. Operating Temperature: 500°F [260°C]

## Condensate Capacity Near Steam Temperature (for steam trap sizing)



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

Series 151 Dual Range Process Traps (or High Capacity Air Vent)



Parts and Materials

Item	Part	Materials
1A	Body 151 Angle Body 151S/SN Angle	ASME SA-105, Carbon Steel 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'	Cage Assembly	Stainless Steel
4'	Seat	Stainless Steel
5'	Gasket, Seat	Monel®
6'	Screen	18-8 Stainless Steel
7	Nameplate	302 Stainless Steel
8'	Gasket, Bonnet	Monel® Teflon® Coated

Notes

1. Denotes available repair kit.
2. Monel is a registered trademark of Special Metals Corporation.
3. Teflon is a registered trademark of E.I. du Pont de Nemours Company

Dimensions/Weights

Fig. No.	Size in. [DN]	Dimensions, in. [mm]									Weight lb. (kg)
		A	B	B1*	C	C1*	D	E	F	G	
151 Angle	¾ [20]	1 7/8 [48]	1 7/8 [48]	2 9/16 [65]	1 ¾ [44]	2 ¾ [60]	2 ¼ [57]	3 [76]	1.070 [28]	½ [13]	4 ½ (2)
151 In-Line	¾ [20]	2 5/8 [67]	1 ¾ [30]	1 ¾ [30]	4 5/16 [110]	5 9/16 [141]	2 ¼ [57]	4 [102]	1.070 [28]	½ [13]	4 ½ (2)
151 In-line	1 [25]	2 5/8 [67]	1 5/16 [33]	1 ¾ [30]	4 5/8 [118]	5 9/16 [141]	2 ¼ [57]	4 [102]	1.335 [34]	½ [13]	5 (2.3)

Note

\* For 151S/SN

**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.

**Pressure-Temperature Ratings**

(All pressures in gage)

- Shell: ANSI Class 600 [PN100] B16.34
- Maximum Operating Pressure: 600 psi [41 bar]
- Maximum Operating Temperature: 650°F [343°C]
- Maximum Test Pressure: 800 psi [55 bar]

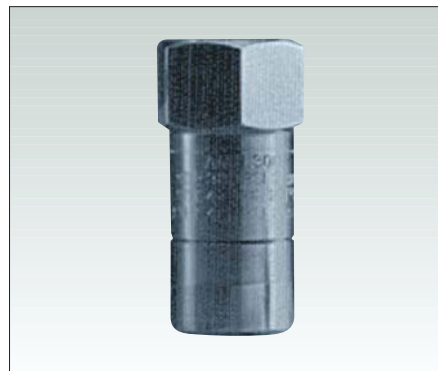
**Applicable Codes and Standards**

Pressure ratings per ANSI/FCI-69-1. Performance testing per ANSI/ASME PTC-39.1 and ISO 7841 and 7842. End connections per ANSI B1.20 for threaded ends.

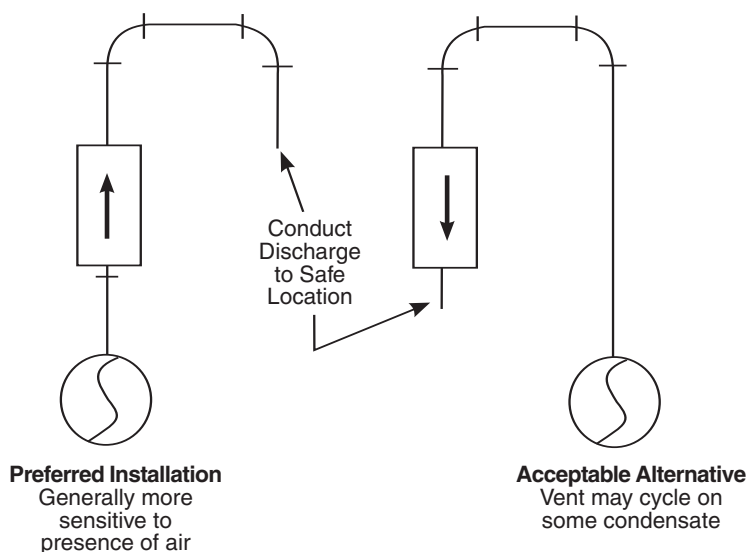
**How to Specify and Order**

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.

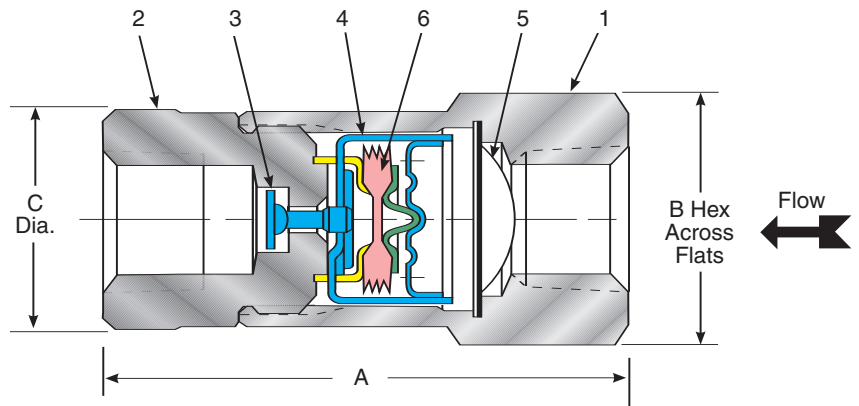
Ordering - Specify Air Vent size 1/2", 3/4", Series AV-5.



**Typical Installation**



**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/Weights**

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 3/16 [81]	1 1/2 [38]	1 3/8 [35]	1 (0.5)

## Series SP Bimetallic Steam Traps

Series SP bimetallic steam traps are designed to drain processing equipment that normally must discharge large volumes of condensate. Typical applications include large reboilers, heat exchangers, storage tanks, absorption units, and water heaters.

### Ratings

SP 80/100 Differential pressure to 300 psi [21 bar]; ANSI Class 300; Maximum Temperature 750°F.

### How to Order

When ordering a steam trap specify: pipe size; series; pressure rating of flanges; and minimum/maximum inlet pressure, back pressure and condensate flow rate. Unless otherwise specified, ANSI Class 300 RF flanges will be furnished.

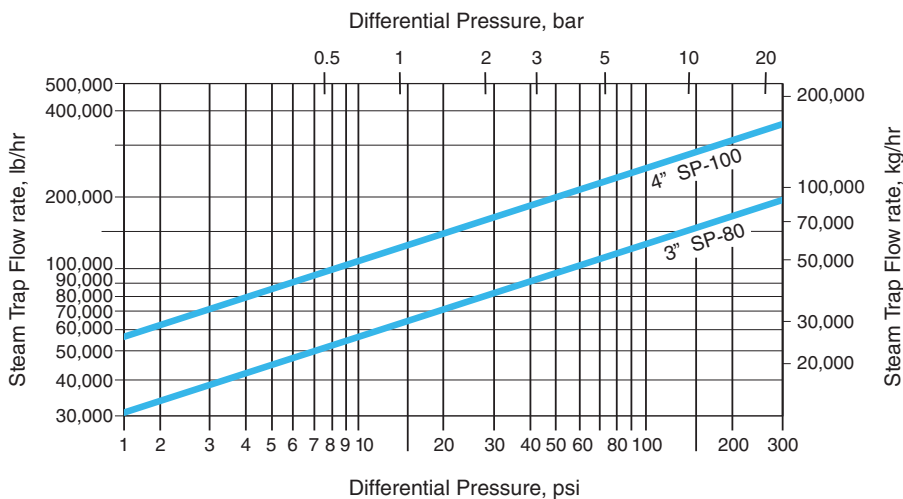
When ordering a renewal kit specify: steam trap part number; pipe size; series; and minimum/maximum inlet pressure, back pressure, and condensate flow rate.

### Applicable Codes and Standards

Pressure ratings per ANSI/FCI-69-1. Performance testing per ANSI/ASME PTC-39.1. Flanges per ANSI B16.5.



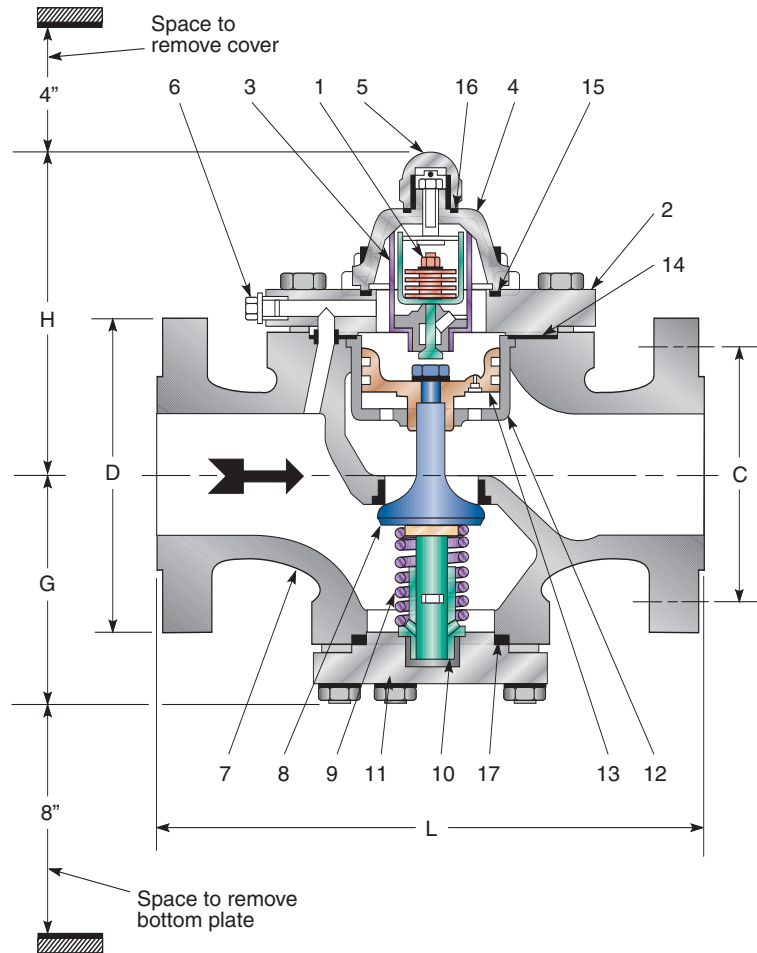
## Condensate Capacity (for steam trap sizing)



## Dimensions/Weights

Series	Flange Ratings ANSI	Pipe Size in. [DN]	Dimensions, in. [mm]				C	Weight lb. (kg)
			L	G	H	D		
SP 80	150	3 [80]	13 <sup>25</sup> / <sub>32</sub> [350]	5 <sup>7</sup> / <sub>16</sub> [138]	7 <sup>9</sup> / <sub>16</sub> [192]	7 <sup>15</sup> / <sub>32</sub> [190]	Four 3/4" holes, 6" bolt circle (4 x 19 x 152.5)	95 (43)
SP 100	150	4 [100]	15 <sup>3</sup> / <sub>4</sub> [400]	5 <sup>7</sup> / <sub>16</sub> [138]	7 <sup>9</sup> / <sub>16</sub> [192]	9 [229]	Eight 3/4" holes, 7 1/2" bolt circle (8 x 19 x 190.5)	115 (52)
SP 80	300	3 [80]	13 <sup>25</sup> / <sub>32</sub> [350]	5 <sup>7</sup> / <sub>16</sub> [138]	7 <sup>9</sup> / <sub>16</sub> [192]	8 <sup>9</sup> / <sub>32</sub> [210]	Eight 7/8" holes, 6 5/8" bolt circle (8 x 22 x 168.5)	106 (48)
SP 100	300	4 [100]	15 <sup>3</sup> / <sub>4</sub> [400]	5 <sup>7</sup> / <sub>16</sub> [138]	7 <sup>9</sup> / <sub>16</sub> [192]	10 [254]	Eight 7/8" holes, 7 7/8" bolt circle (8 x 22 x 200)	132 (60)

**Series SP Bimetallic Steam Traps**



**Parts and Materials**

Item	Part	Materials
1'	Bimetallic Device	Stainless Steel
2'	Cover	Carbon Steel ASTM A-105
3'	Strainer	Stainless Steel 304L
4'	Bonnet	Carbon Steel ASTM A-105
5'	Blind Nut	Carbon Steel ASTM A-105
6'	Seal Plug	Carbon Steel ASTM A-105
7	Body	Carbon Steel ASTM A-216
8	Main Valve	Stainless Steel 18-8
9	Valve Spring	Stainless Steel 18-8
10	Valve Internal Guide	Stainless Steel 18-8
11	Bottom Plate	Carbon Steel ASTM A-105
12	Cylinder	Stainless Steel
13	Piston	Stainless Steel
14'	Cover Gasket	Compressed Fiber
15'	Bonnet Gasket	Compressed Fiber
16'	Blind Nut Gasket	Compressed Fiber
17	Bottom Plate Gasket	Compressed Fiber

**Note**

1. Denotes available repair kit.

### Series ABL Bimetallic Steam Traps

Series ABL bimetallic steam traps are designed to drain various types of processing equipment in the CPI, such as reboilers, large storage tanks, and similar units that have variations in condensate loads. That heavier condensate draining ability also gives these traps broad application in large institutional laundries, and kitchens. Three models are available for different pressure ranges.

#### Ratings

ABL 414/514-Working pressure 1 1/2 to 200 psi [0.1 to 14 bar]. ANSI Class 600.

ABL 425/525-Working pressure 15 to 360 psi [1 to 25 bar]. ANSI Class 600.

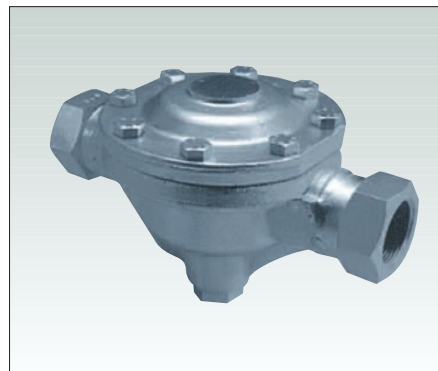
ABL 440-Working pressure 90 to 570 psi [6 to 40 bar]. ANSI Class 600.

#### How to Order

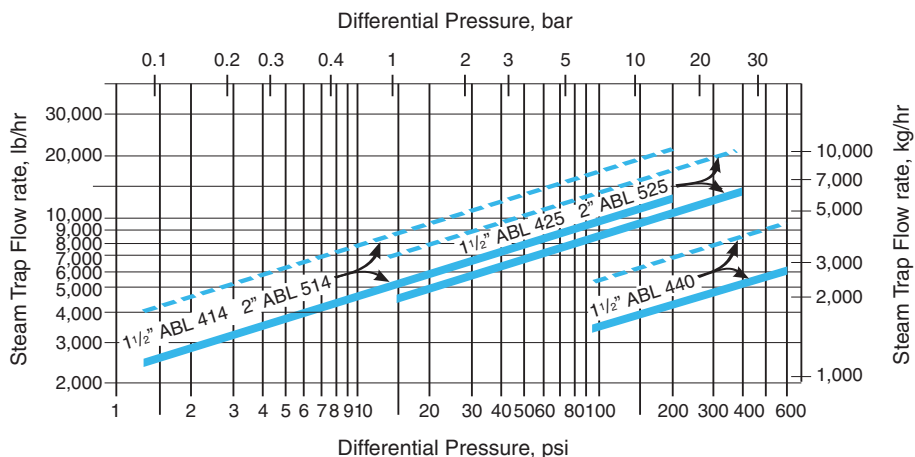
When ordering trap specify size of end connections and series. When ordering renewal kit specify pipe size and series. Examples: Trap renewal kit, Yarway Series ABL 414. Strainer renewal kit, 2" Yarway Series ABL 514.

#### Applicable Codes and Standards

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

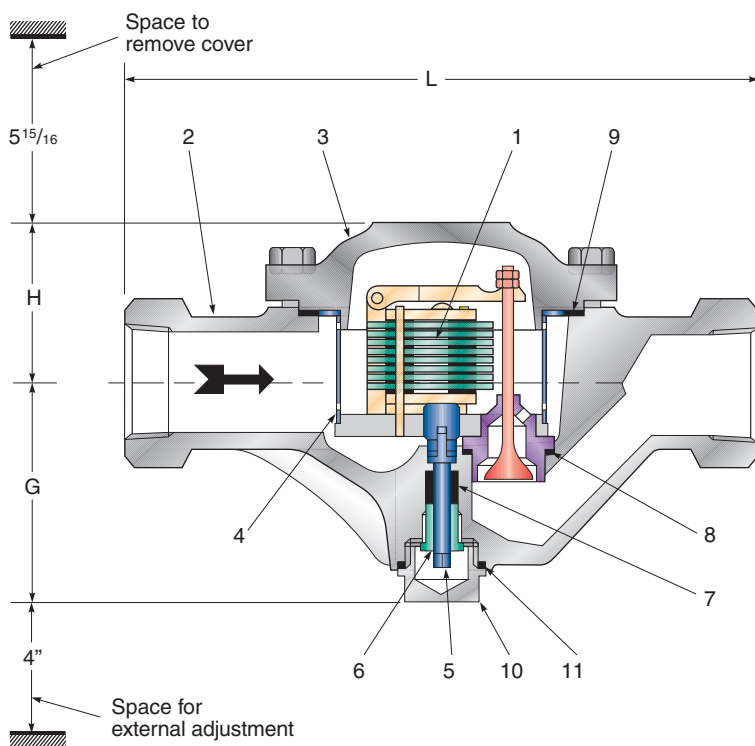


### Condensate Capacity (for steam trap sizing)



Solid line represents factory setting  
 Dashed line represents maximum field adjustments

## Series ABL Bimetallic Steam Traps



### Parts and Materials

Item	Part	Materials
1 <sup>1</sup>	Bimetallic Device	Stainless Steel
2	Body	Carbon Steel ASTM A-105
3	Cover	Carbon Steel ASTM A-105
4 <sup>1, 2</sup>	Strainer	Stainless Steel AISI-304L
5	Adjusting Screw	Stainless Steel 18-8
6	Packing Gland	Stainless Steel
7	Packing	Graphited Fiber
8 <sup>1</sup>	Valve Seat Gasket	Stainless Steel AISI-304L
9 <sup>1</sup>	Cover Gasket	Fiber
10	Plug	Carbon Steel ASTM A-105
11 <sup>2</sup>	Plug Gasket	Fiber

### Notes

1. Trap renewal kit includes bimetallic elements, valve assembly, seat, seat gasket, screen and cover gasket.
2. Strainer renewal kit includes screen and cover gasket.

### Dimensions/Weights

Series	Pipe Size in. [DN]	Dimensions, in. [mm]			Weight lb. (kg)
		L	G	H	
ABL 414	1 1/2 [40]	10 <sup>5</sup> / <sub>8</sub> [270]	3 <sup>15</sup> / <sub>16</sub> [100]	2 <sup>15</sup> / <sub>16</sub> [75]	27 (13)
ABL 514	2 [50]	10 <sup>5</sup> / <sub>8</sub> [270]	3 <sup>15</sup> / <sub>16</sub> [100]	2 <sup>15</sup> / <sub>16</sub> [75]	27 (13)
ABL 425	1 1/2 [40]	10 <sup>5</sup> / <sub>8</sub> [270]	3 <sup>15</sup> / <sub>16</sub> [100]	2 <sup>15</sup> / <sub>16</sub> [75]	27 (13)
ABL 525	2 [50]	10 <sup>5</sup> / <sub>8</sub> [270]	3 <sup>15</sup> / <sub>16</sub> [100]	2 <sup>15</sup> / <sub>16</sub> [75]	27 (13)
ABL 440	1 1/2 [40]	10 <sup>5</sup> / <sub>8</sub> [270]	3 <sup>15</sup> / <sub>16</sub> [100]	2 <sup>15</sup> / <sub>16</sub> [75]	27 (13)

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