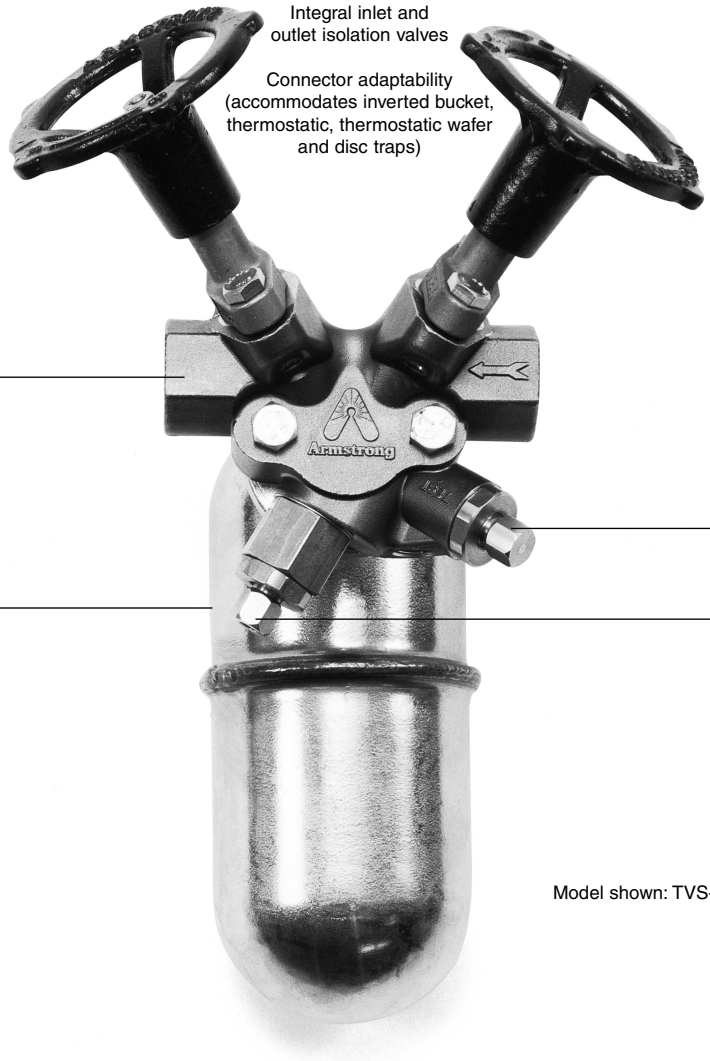
TVS-4000 Stainless Steel Trap Valve Station



Model shown: TVS-4000 with 2011

3-years guarantee

Trap Valve Station

- **Reduced costs**
  TVS saves on these fronts: energy, installation and maintenance.
- **Integration of trap, four valves and strainer**
  Inverted bucket long life and energy efficiency plus the savings and convenience of components merged into a single connector.
- **A full range of features**
  TVS has test and strainer blowdown valves. When installed with Model 2011 and 2022 steam traps, it will also accommodate the Armstrong pop drain as well as TrapAlert™ and SteamEye™ – remote steam trap monitoring and testing devices.
- **Reduced design time**
  Permits combining products with exact face-to-face dimensions.
- **Three-year guarantee**
  The TVS-4000 is guaranteed for three years when it's used with an Armstrong stainless steel inverted bucket trap.
- **Easy, in-line repairability**
- **Installation versatility**
  The connector design makes the TVS adaptable to any piping configuration.
- **Simplified trap testing**
  TVS enhances your capability to check trap operation and offers a built-in method to block and bleed traps.
- **Elimination of potential leak points**

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Armstrong 360° Universal Connector

Since Armstrong has designed the first Universal Connector in 1982, this one has become a standard everywhere in the world.

Features:

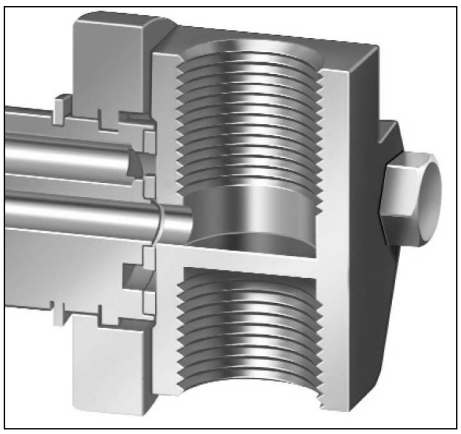
- Trap remains in the same position does not matter the pipe configuration
- Connectors remain in-line for easy trap replacement (2 bolts)
- Spiral-wound gasket
- 304 Stainless Steel corrosion resistant construction
- Lightweight
- Optional integrals strainer (IS-2)

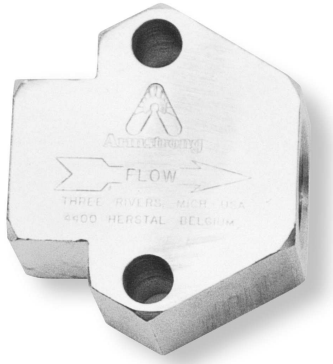
All existing trap types:

- Inverted Bucket (2000 Series)
- Bimetallic (AB-2000)
- Thermodynamic (CD-3300)
- Thermostatic wafer (WT-2000)
- Thermostatic bellows (TT-2000)
- Float & Thermostatic (F&T-2000)

Connections:

- Screwed NPT and BSPT
- Socketweld
- Flanged DIN and ANSI



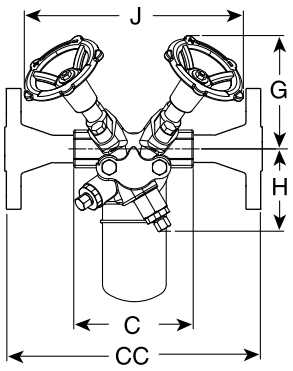


Available with Standard Connector
Material: 304 Stainless Steel

Available with IS-2 Integral Strainer Connector
(shown with optional blowdown valve)
Material: 316 Stainless Steel

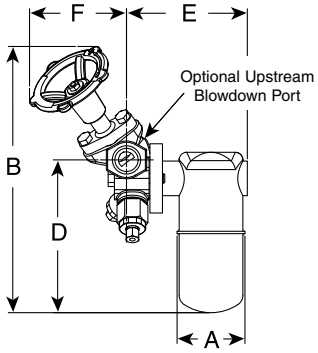
TVS-4000 Stainless Steel Trap Valve Station

Stainless Steel with 360° Connector
For Pressures to 45 bar...Capacities to 590 kg/h (Using 2000 Series Inverted Bucket Steam Traps)



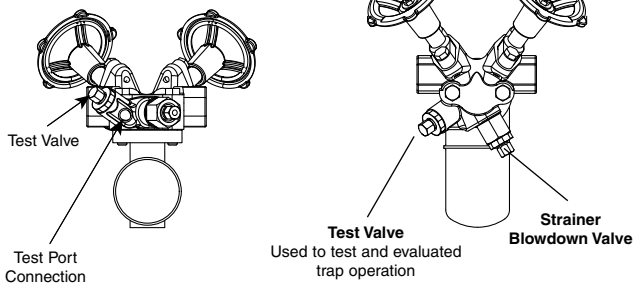
Model TVS-4000 with 2000 series SS Trap

Front View



Model TVS-4000 with 2000 series SS Trap

Side View



Model TVS-4000 with 2000 series SS Trap

Bottom View

Same principle. Different package with two piston-style isolation valves, test valve and integral stainless steel strainer with blowdown valve. Now the energy-saving performance and reliability of the inverted bucket steam trap are available in a versatile new package.

You'll still enjoy all the familiar benefits. And the same efficient condensate drainage from virtually every kind of steam-using equipment. What you'll find new are all the benefits of a piston valve integrated into the same space-saving package.

Materials – TVS-4000 Connector

Connector:	ASTM A351 Gr. CF8M
Strainer Screen:	Stainless steel
Screen Retainer:	Stainless steel
Gasket:	Stainless steel
Retainer Unit:	Stainless steel
Test Valve:	Stainless steel
Blowdown Valve:	Stainless steel

Connections

Screwed BSPT and NPT
Socketweld
Flanged DIN or ANSI (welded)

Isolation Valve Components

Handwheel:	Cast iron
Nut :	Stainless steel
Stem, Washers:	Stainless steel
Bonnet:	ASTM A351 Gr. CF8M
Bonnet, Bolts:	Stainless steel Gr. A2
Valve Plug:	Stainless steel
Disc Springs:	Stainless steel
Valve Sealing Rings:	Graphite and stainless steel
Lantern Bushing:	Stainless steel
Valve Washers:	Stainless steel

Materials – Series 2000 Traps

Body:	ASTM A240 Gr. 304L
Internals:	All stainless steel – 304
Valve and seat:	Hardened chrome steel – 440F (<38 bar) Titanium (>38 bar)

Table STE-190-1. TVS-4000 Series with 2000 Series Inverted Bucket Steam Trap (dimensions in mm)

Model No.	2010	2011	2022
Pipe Connections	15 – 20	15 – 20	15 – 20
"A" Trap Diameter	68	68	98
"B" Height Valve Open	203	268	318
"C" Face-to-Face (screwed & SW)	120	120	120
"CC" Face-to-Face (flanged PN40*)	384	384	384
"D" Connection ℄ to Bottom	120	154	203
"E" Connection ℄ to Outside of Trap	114	122	149
"F" Connection ℄ to Front of Handwheel (Valve Open)	89	98	98
"G" Connection ℄ to Top of Handwheel (Valve Open)	83	114	114
"H" Connection ℄ to Bottom of Connector	47	83	83
"J" Width Across Handwheels (Valve Open)	235	222	222
Weight in kg (screwed & SW)	4,1	4,3	5,4
Weight in kg (flanged PN40*)	5,8 – 6,4	6,0 – 6,6	7,1 – 7,7
Maximum Operating Pressure (Trap)	14 bar	28 bar	45 bar
Maximum Allowable Pressure (Trap)	28 bar @ 399°C	28 bar @ 399°C	45 bar @ 315°C

* Standard flanges are in carbon steel, stainless steel flanges are optional. Other flange sizes, ratings and face-to-face dimensions are available on request.
All models comply with the article 3.3 of the PED (97/23/EC).

All dimensions and weights are approximate. Use certified print for exact dimensions. Design and materials are subject to change without notice.

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TVS-4000 Stainless Steel Trap Valve Station

Stainless Steel with 360° Connector
For Pressures to 45 bar...Capacities to 590 kg/h (Using 2000 Series Inverted Bucket Steam Traps)

Table STE-191-1. Model 2010 Capacity

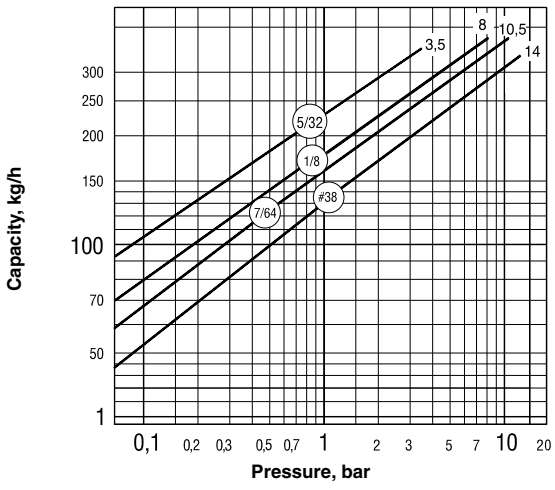


Table STE-191-2. Model 2011 Capacity

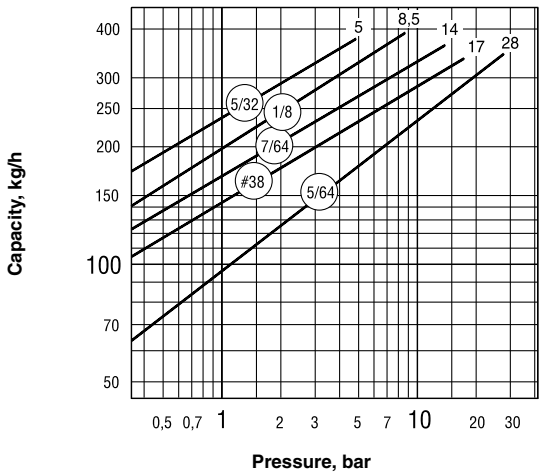
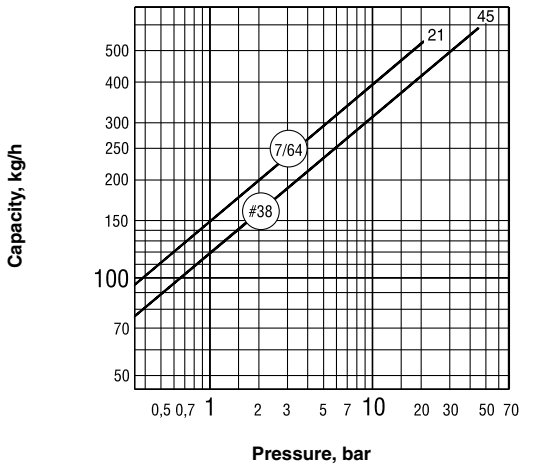


Table STE-191-4. How to Order

Model	Connection	Type of Connection Inlet/Outlet	Flow Direction	Trap Type
TVS-4000	15 20	NPT SW BSPT Flanged	R = Right to Left L = Left to Right	Inv. Bucket Disc Thermostatic Bimetallic F&T

Table STE-191-3. Model 2022 Capacity

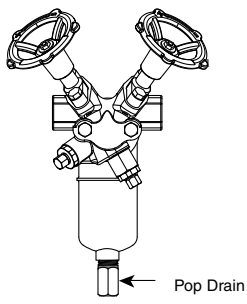


Options

Insu-Pak™
Now you can insulate the in-line traps in your plant without complicating regular trap maintenance. Insu-Pak, a simple reusable insulation package, cuts the time and cost of in-field installation because it goes on in a snap. And it comes off just as easily. The Insu-Pak can prevent trap freeze-up when used with a properly designed condensate manifold. Designed for use with Model 2010 and Model 2011 traps.

Pop Drain
Simple but effective against freeze-up. Properly installed and maintained at low points in your system, the simple, pressure-actuated pop drain opens for condensate drainage at 0,35 barg for Models 2011 and 2022.

Probe Connections are available for trap monitoring on Models 2011 and 2022.

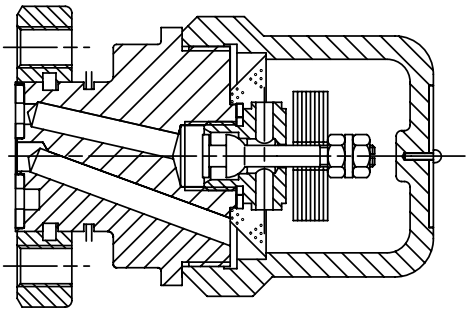


All dimensions and weights are approximate. Use certified print for exact dimensions. Design and materials are subject to change without notice.

AB-3000 Bimetallic Steam Trap

Stainless Steel

For Pressures to 22 bar…Capacities to 2 100 kg/h



Description

Armstrong's AB-3000 Bimetallic Steam Trap operates by the effect that rising temperature has on bimetallic elements. It adjusts itself to changing conditions, as the increasing pressure on the valve is compensated by the curving of the bimetallic elements caused by the increasing temperature. The valve of the AB-3000 is specially treated (boronization) in order to be more resistant to wiredrawing due to erosive condensate flashing.

Armstrong's AB-3000 has a sealed, stainless steel body that is lightweight, compact and highly resistant to corrosion. The AB-3000 is repairable (body and cap can be unscrewed). It is piped through the Armstrong 360° Universal Connector or Trap Valve Station (TVS). This makes it easy to install and replace, as the trap can be removed while the connector remains in-line. The result is savings in labor cost and increasing in flexibility, as other trap types (Inverted Bucket, Thermostatic and Thermodynamic) can be installed on the same connector.

Valve Boronized

The problem of wiredrawing of valve and seat materials is well known to users of steam traps and other types of valves. Wiredrawing is a particular problem to valves and seats of bimetallic traps, which rely on bimetallic elements to operate.

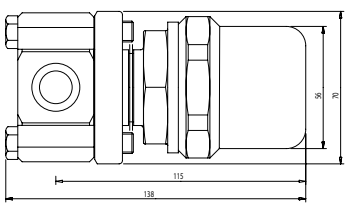
To solve the problem of wiredrawing, a new thermochemical surface treatment has been developed. The basic valve material is machinable hardened chrome steel. Atoms of highly resistant material are thermochemically diffused into the valve, giving a layer of protection and a hardness of 1700 HV to the basic material. Because of this new thermochemical treatment, the surface of the valve is highly resistant to the erosive action of flashing condensate. The failure rate of Armstrong bimetallic traps due to wearing out of valve and seat material is greatly reduced.

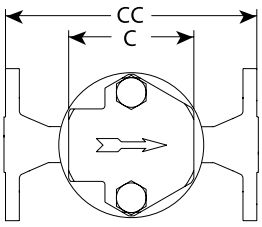
Table ST-192-1. Model AB-3000 Trap (dimensions in mm)

Pipe Connections	15 – 20 – 25
"C" Face-to-Face (screwed & SW)	60 – 60 – N/A
"CC" Face-to-Face (flanged PN40*)	150 – 150 – 160
Weight in kg (screwed & SW)	1,9
Weight in kg (flanged PN40*)	4,3 – 4,5 – 4,7

* Standard flanges are in carbon steel, stainless steel flanges are optional. Other flange sizes, ratings and face-to-face dimensions are available on request.

All sizes comply with the article 3.3 of the PED (97/23/EC).





Maximum operating conditions

Maximum allowable pressure (vessel design):	28 bar @ 343°C
Maximum operating pressure:	22 bar
Maximum back pressure:	99% of inlet pressure

Connections

Screwed BSPT and NPT
Socketweld
Flanged DIN or ANSI (welded)

Materials

Body:	ASTM - A240 304L
Standard connector:	Stainless steel – 304
Valve:	Chrome steel – 440F, Boronized
Seat:	303 Stainless steel
Elements:	Nickel plated
Strainer:	304 Stainless steel

Specification

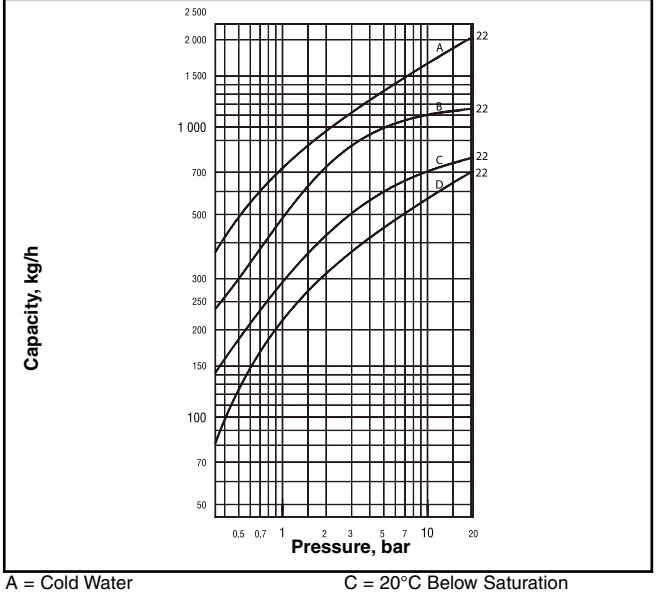
Bimetallic repairable steam trap with valve boronized, type AB-3000 in stainless steel, with integral strainer. Piped through 360° Universal Connector or Trap Valve Station (TVS). Maximum allowable back pressure 99% of inlet pressure.

How to order

Specify:

- Size and type of pipe connection.
- Maximum working pressure that will be encountered
- Maximum condensate load

Table ST-192-2. Model AB-3000 Capacity



A = Cold Water
B = 40°C Below Saturation
C = 20°C Below Saturation
D = 10°C Below Saturation

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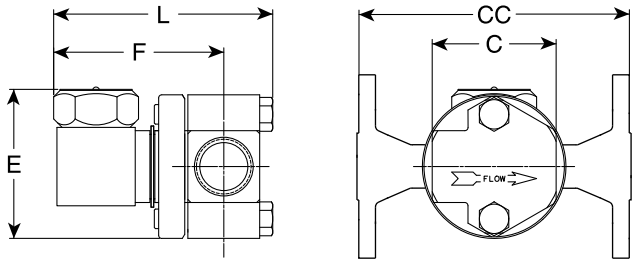
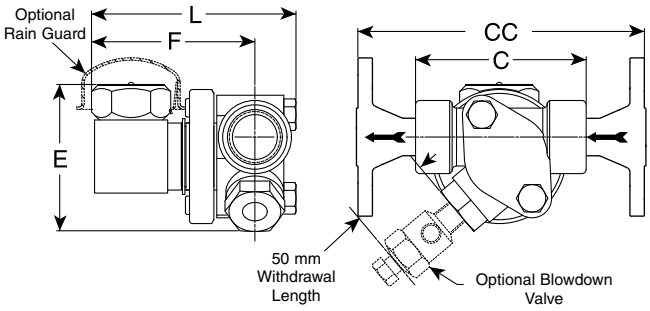
CD-3300 Disc Steam Trap

All Stainless with 360° Connector

For Pressures to 31 bar…Capacities to 360 kg/h



CD-3300 with Standard Connector



CD-3300 with IS-2 Connector with Integral Strainer

The Armstrong CD-3300 is a three discharge port design, which provides stable disc operation to extend operating life.

The CD-3300 is piped in-line by a 360° universal connector which allows you to install the trap in virtually any piping configuration. Armstrong's unique standard connector or its IS-2 connector with integral strainer makes the CD-3300 easy to install, easy to renew. You save on labor time and cost because the connector simplifies piping and remains in-line.

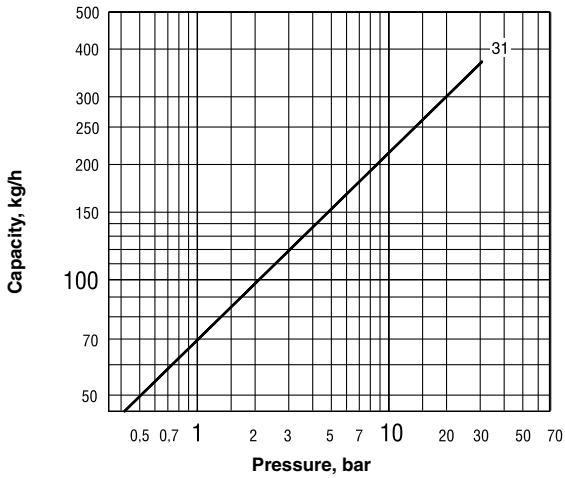
Materials

Trap and cap:	ASTM A743 CA40
Trap disc:	ASTM A276 Gr.420
Trap body:	ASTM A276 Gr.420
Standard connector:	Stainless steel – 304
IS-2 connector with integral strainer:	ASTM A351 Gr.CF8 20 x 20 mesh 304 SS Screen

Connections

Screwed BSPT and NPT
Socketweld
Flanged DIN or ANSI (welded)

Table STE-193-1. CD-3300 Series Capacity



Note: CD traps can operate with minimum of 0,15 bar inlet pressure and a maximum of 80% back pressure. However, for best results, inlet pressure should not drop below 0,70 bar and back pressure should not exceed 50% of inlet pressure.

Options

Rain guard insulating cap
Blowdown valve – IS-2 connector only
Plug for IS-2 strainer blowdown connection

Table STE-193-2. Model CD-3300 Trap (dimensions in mm)

Model No.	CD-3300		
	Standard Connector	IS-2 Connector w/Integral Strainer	
Pipe Connections	15 – 20 – 25	15 – 20	25
"C" Face-to-Face (screwed & SW)	60 – 60 – N/A	89	102
"CC" Face-to-Face (flanged PN40*)	150 – 150 – 160	150	160
"L" Overall Length	106	106	106
"H" Overall Height	76	76	89
"F" ℄ to Body End	86	86	86
Blowdown Connection Size	–	1/4" NPT	1/4" NPT
Weight in kg (screwed)	1,6	1,8	2,0
Weight in kg (flanged PN40*)	3,3 – 3,9 – 4,4	3,5 – 4,1	4,8
Maximum Allowable Pressure	50 bar @ 400°C		
Maximum Operating Pressure	31 bar @ 236°C		

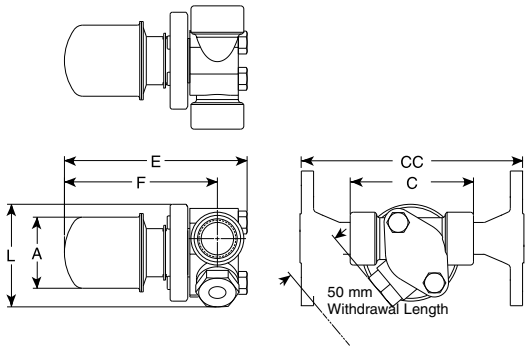
* Standard flanges are in carbon steel, stainless steel flanges are optional. Other flange sizes, ratings and face-to-face dimensions are available on request.
All sizes comply with the article 3.3 of the PED (97/23/EC).

All dimensions and weights are approximate. Use certified print for exact dimensions. Design and materials are subject to change without notice.

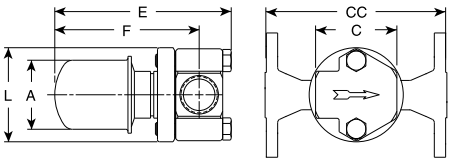
WT-2000 Thermostatic Wafer Steam Trap

Stainless Steel or Carbon Steel

For Pressures to 41 bar...Cold Water Start-Up Capacities to 730 kg/h



Model WT-2000 with IS-2 Connector with Integral Strainer



Model WT-2000 with Standard Connector

Description

The WT-2000 does not have an internal strainer, but is equipped with a special 360° connector to expand piping options and simplify installation. Choice of NPT or BSPT screwed connections, or socketweld connections. Also available with optional IS-2 stainless steel connector with integral strainer.

Note: Since the normal operation of all suppressed temperature-discharge (subcooling) steam traps is to back up condensate, they should not be used on drip legs for saturated steam service, heating or process equipment. Exercise care in the maintenance of any thermostatic wafer trap with a small discharge area susceptible to clogging.

Specification

Thermostatic wafer steam trap, type WT-2000 in stainless steel. Maximum allowable back pressure 99% of inlet pressure.

Table STE-194-1. WT-2000	
Design	Welded
Connections	Screwed BSPT and NPT – Socketweld – Flanged
Material	
Body	ASTM A240 – 304L
Cap	
Capsule wafer	Hastelloy
Capsule body	Stainless Steel – 303
Capsule cap	
Connector	
Standard	Stainless Steel – 304
IS-2 w/integral strainer	ASTM A351 Gr.CF8 w/20x20 mesh 304 SS screen
Maximum operating conditions	
Maximum allowable pressure (vessel design)	28 bar @ 343°C
Maximum operating pressure	22 bar
Options	
Blowdown Valve IS-2 Connector Only	
Plug for IS-2 Strainer Blowdown Connection	

Maximum back pressure: 99% of inlet pressure

How to Order

Specify:

- Model number
- Size and type of pipe connection, or connector style
- Any options required

Connectors

Besides the inverted bucket traps, the standard connectors or IS-2 connector with integral strainer can also be used on thermostatic, thermostatic wafer and controlled disc traps.

Table STE-194-2. WT-2000 Capacity			
Differential Pressure*	**Cold Water Start-Up 21°C**	**Hot Water Start-Up 100°C**	**Operating Condensate 10°C Below Saturation**
bar	kg/h	kg/h	kg/h**
0,35	54	45	4,5
0,7	68	77	5,9
1,4	145	113	8,2
2,0	177	136	9,1
3,0	191	159	10,9
3,5	222	181	11,8
5,0	259	218	13,6
7,0	295	263	15,9
10,5	318	318	18,1
14,0	408	363	20,9
17,0	454	431	22,7
21,0	476	465	25,4
24,0	522	544	28,6
28,0	590	567	31,8

* Capacities based on differential pressure with no back pressure.
** Capacities will vary with the degree of subcooling. When greater capacities are required, the trap will automatically adjust to the load, up to the maximum (cold water) capacity shown, by increasing the amount of subcooling.

Table STE-194-3. WT-2000 Trap (dimensions in mm)			
Model No.	**Standard Connector**	**IS-2 Connector with Integral Strainer**	
Pipe Connections	15 – 20 – 25	15 – 20	25
"A" Diameter	57	57	57
"C" Face-to-Face (screwed & SW)	60 – 60 – N/A	89	102
"CC" Face-to-Face (flanged PN40*)	150 – 150 – 160	150	160
"F" ℄ to Bottom End	108	111	111
"E" Overall Length	133	130	133
"L" Overall Height	72	72	72
Blowdown Connection	–	1/4"	1/4"
Weight in kg (screwed & SW)	1,4	1,5	1,5
Weight in kg (flanged PN40*)	3,8 – 4,0 – 4,2	3,2 – 3,8	4,3

* Standard flanges are in carbon steel, stainless steel flanges are optional. Other flange sizes, ratings and face-to-face dimensions are available on request.
All sizes comply with the article 3.3 of the PED (97/23/EC).

All dimensions and weights are approximate. Use certified print for exact dimensions. Design and materials are subject to change without notice.

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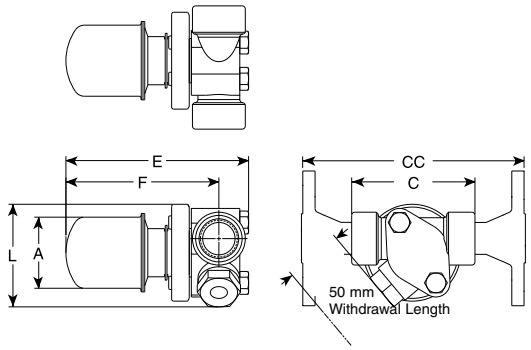
TT-2000 Thermostatic Bellows Steam Trap

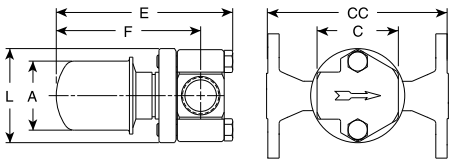
All Stainless Steel

For Pressures to 20 bar...Capacities to 1 570 kg/h



Model TT-2000 with IS-2 Connector with Integral Strainer

Model TT-2000 with Standard Connector



Model TT-2000 with Standard Connector

Description

The balanced pressure bellows thermostatic steam trap has a sealed, stainless-steel body that is lightweight, compact and highly resistant to corrosion. The cage, bellows, valve and seat are all assembled into a precisely calibrated operating unit that ensures positive opening and closing action at slightly below steam temperature. The unique, stainless-steel construction is smaller and much lighter than comparable cast iron, brass or steel traps. TT-2000 with the 360° universal stainless steel connector comes with either a standard connector or the IS-2 connector with integral strainer.

Note: Can also be used as a thermostatic air vent (Reference TTF Series Thermostatic Air Vents page AV-406).

Specification

Thermostatic steam trap, type TT-2000 in stainless steel. Maximum allowable back pressure 99% of inlet pressure.

How to Order

Specify:

- Model number
- Size and type of pipe connection
- Connector type

Connections

Screwed BSPT and NPT
Socketweld
Flanged DIN or ANSI (welded)

Table STE-195-2. TT-2000 Trap (dimensions in mm)

Model No.	Standard Connector	IS-2 Connector with Integral Strainer	
Pipe Connections	15 – 20 – 25	15 – 20	25
"A" Diameter	57	57	57
"C" Face-to-Face (screwed & SW)	60 – 60 – N/A	89	102
"CC" Face-to-Face (flanged PN40*)	150 – 150 – 160	150	160
"E" Overall Length	133	130	133
"F" ℄ to Body End	108	111	111
"L" Overall Height	72	72	72
Weight in kg (screwed & SW)	1,4	1,5	1,5
Weight in kg (flanged PN40*)	3,8 – 4,0 – 4,2	3,2 – 3,8	4,3

* Standard flanges are in carbon steel, stainless steel flanges are optional. Other flange sizes, ratings and face-to-face dimensions are available on request.
All sizes comply with the article 3.3 of the PED (97/23/EC).

Table STE-195-1. TT-2000

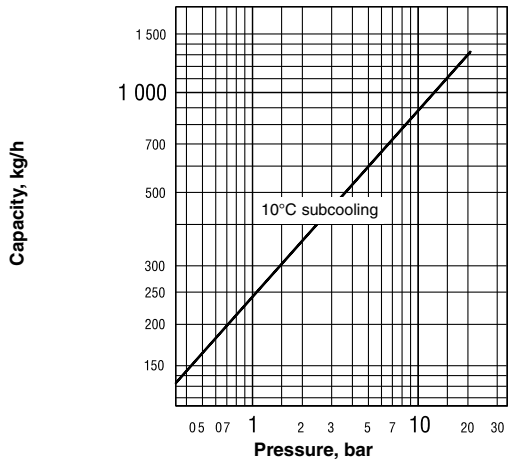
Design	Welded
Connections	Screwed BSPT and NPT – Socketweld – Flanged
Material	
Body	ASTM A240 – 304L
Valve	Bronze
Seat	Stainless Steel
Thermostatic air vent	Standard Stainless steel & bronze w/phosphor bronze bellows caged in stainless steel
Optional: All stainless steel thermostatic air vent	
Connector	
Standard	Stainless steel – 304
IS-2 w/integral strainer	ASTM A351 Gr.CF8 w/20x20 mesh 304 SS screen
Maximum Operating Conditions	
Max. allowable pressure (vessel design)	20 bar @ 232°C
Max. operating pressure	20 bar
Max. operating temperature bellows	190°C

Maximum back pressure: 99% of inlet pressure

Materials

Body: 304L Stainless steel
Connector: 304 Stainless steel
Bellows: Stainless steel and bronze with phosphor-bronze bellows, caged in stainless steel

Table STE-195-3. Model TT-2000 Capacity



All dimensions and weights are approximate. Use certified print for exact dimensions. Design and materials are subject to change without notice.

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