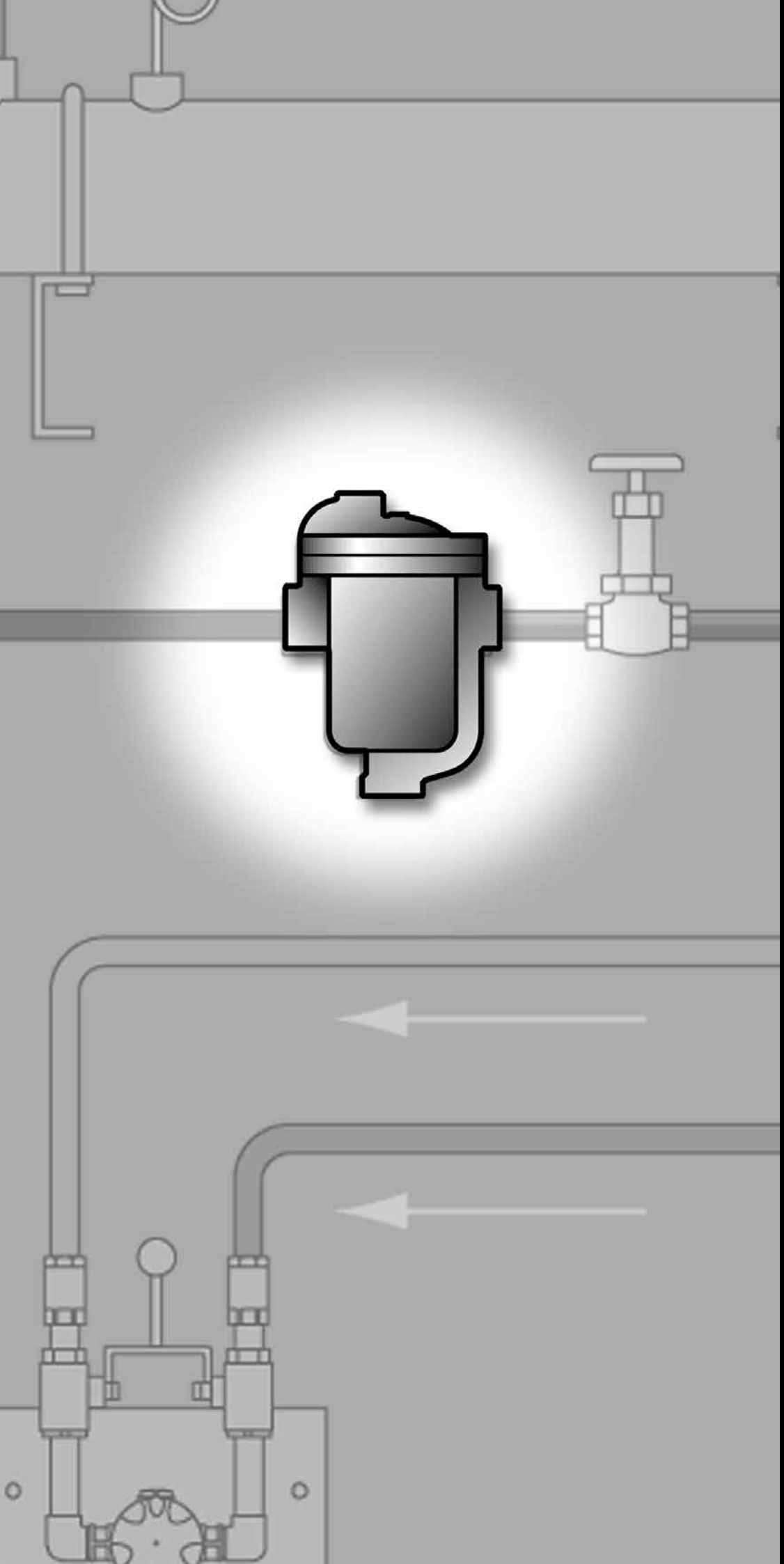
Steam Trapping and Steam Tracing Equipment



Armstrong®

Armstrong Steam Trapping and Steam Tracing Equipment

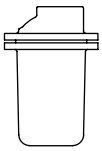
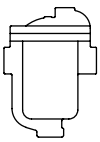
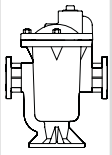
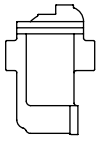
Pay less money for energy – and more attention to the environment.
It's pretty obvious, really. An efficient steam trap wastes less energy, which means you burn less fuel and reduce emissions. The results are energy savings and a cleaner, healthier environment. By helping companies manage energy, Armstrong steam traps are also helping protect the world we all share.

As a steam trap wears, it loses efficiency and begins to waste energy. But Armstrong inverted bucket traps last years longer than other traps. They operate more efficiently longer because the inverted bucket is the most reliable steam trap operating principle known.

Clearly, the longer an efficient trap lasts, the more it reduces energy wasted, fuel burned and pollutants released into the air. It's an all-around positive situation that lets the environment win, too. Bringing energy down to earth in your facility could begin with a renewed focus on your steam system, especially your steam traps. Said another way: Zeroing in your steam traps is an easy way to pay less money for energy – and more attention to the environment.

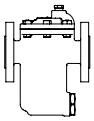
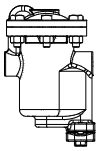
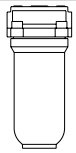
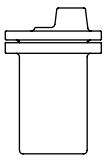
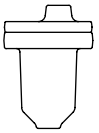
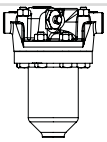
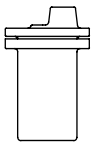
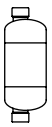
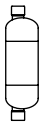
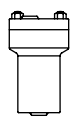
Companies around the world are beginning to realize that rather than being separate challenges, energy and the environment are and have always been a single mission. And that quality management in one area will surely impact the other.

Table 66-1. Armstrong Steam Trapping and Steam Tracing Equipment

Illustration	Type	Flow Direction	Connection Type	Max. Allow. Press. barg	TMA °C	Body Material	Model	Max. Oper. Press. barg	Connection Size							Located on Page
									1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	
	**Series 200** Inverted Bucket Capacities to 9 000 kg/h	↑	Screwed Flanged †	17	232	ASTM A48 Class 30 Cast Iron	**211** **212** **213** **214** **215** **216**	17 17 17 17 17 17	● ● ●	● ●	● ● ●	● ●	● ●	●		ST-78
	**Series 800** Inverted Bucket Capacities to 9 000 kg/h	→	Screwed Flanged †	17	232	ASTM A48 Class 30 Cast Iron	**800** **811** **812** **813** **814** **815** **816**	10,5 17 17 17 17 17 17	● ● ●	● ● ● ●	● ● ● ●	● ●	●	● ●	●	ST-80
	**Series 600F** Inverted Bucket Capacities to 9 072 kg/h	→	Flanged	17	232	ASTM A395 Gr. 60-40-18 Ductile Iron	**614F** **615F** **616F**	17 17 17			●	●	●	● ●	●	ST-84
	**Series 880** Inverted Bucket Capacities to 2 000 kg/h	→	Screwed Flanged †	17	232	ASTM A48 Class 30 Cast Iron	**880** **881** **882** **883**	10 17 17 17	● ● ●	● ● ● ●	●	●				ST-86

† Operating pressure and temperature may be limited depending on the class of flange selected.

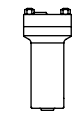
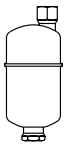
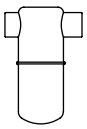
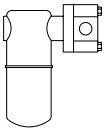
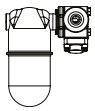
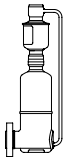
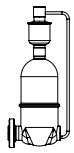
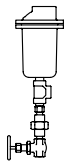
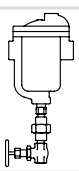
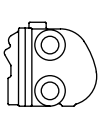
Table 67-1. Armstrong Steam Trapping and Steam Tracing Equipment

Illustration	Type	Flow Direction	Connection Type	Max. Allow. Press. barg	TMA °C	Body Material	Model	Max. Oper. Press. barg	Connection Size						Located on Page
									1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	
	**Series 680F** Inverted Bucket w/Strainer Capacities to 2 000 kg/h	→	Flanged	17	232	ASTM A395 Gr. 60-40-18 Ductile Iron	**681F** **682F** **683F**	17 17 17	● ●	● ● ●	● ● ●	 ●	 	 	ST-88
	**Series 970** Inverted Bucket Capacities to 2 000 kg/h	←	Screwed Socketweld Flanged †	41	343	ASTM A216 WCB Carbon Steel	**971** **973**	41 41	●	● ●	● ●	 	 	 	ST-90
	**Model EM** Inverted Bucket Capacities to 480 kg/h	→	Screwed Socketweld Flanged †	32	250	C 22.8	**EM**	32	●	●					ST-92
	**Series 300** Inverted Bucket Capacities to 9 000 kg/h	↑	Screwed Socketweld Flanged †	★★ 53 41 74 78 70 76	★★ 371	ASTM A105 Forged Steel	**310** **312** **313** **314** **315** **316**	27,5 41,5 45 45 45 45	● ● ●	● ● ●	 ● ● ●	 ● ●	 ● ●	 ●	ST-94
	**Model 411G** Inverted Bucket Capacities to 590 kg/h	↑	Screwed Socketweld Flanged †	★★ 69	★★ 371	ASTM A105 Forged Steel	**411G**	69	●	●					ST-96
	**Model 521** Inverted Bucket Capacities to 590 kg/h	→	Screwed Socketweld Flanged †	★★ 69	★★ 427	ASTM A105 Forged Steel	**521** **521-FW**	69	●	●					ST-98
	**Series 400** Inverted Bucket Capacities to 9 000 kg/h	↑	Screwed Socketweld Flanged †	★★ 83 76 117	★★ 427	ASTM A182 F22 Forged Steel	**413** **415** **416**	69 69 69	●	●	● ●	 ●	 ● ●	 ●	ST-100
	**Model 401-SH** Inverted Bucket Capacities to 350 kg/h	↑	Screwed Socketweld Flanged †	69	427	Carbon Steel ASTM A106 Gr. B	**401-SH**	69	●	●					ST-102
	**Model 501-SH** Inverted Bucket Capacities to 430 kg/h	↑	Screwed Socketweld Flanged †	106	454	316L Stainless Steel ASTM A312	**501-SH**	105	●	●					ST-102
	**Series 5000** Inverted Bucket Capacities to 2 340 kg/h	↑	Screwed Socketweld Flanged †	★★ 146 ★★ 174	★★ 427	ASTM A182 F22 Forged Steel	**5133G** **5155G**	103 124	●	● ●	● ●	 ●	 	 	ST-104

★★ See tables on pages ST-94, ST-96, ST-100 and ST-104 for complete temperature/pressure rating information.
† Operating pressure and temperature may be limited depending on the class of flange selected.

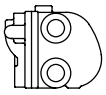
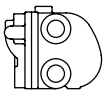
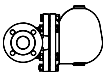
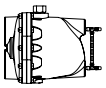
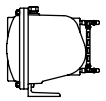
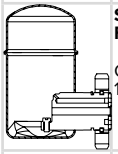
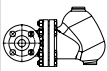
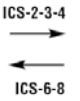
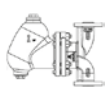
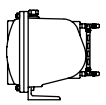
Steam Trapping and Steam Tracing Equipment ID Charts

Table 68-1. Armstrong Steam Trapping and Steam Tracing Equipment

Illustration	Type	Flow Direction	Connection Type	Max. Allow. Press. barg	TMA °C	Body Material	Model	Max. Oper. Press. barg	Connection Size							Located on Page
									3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	
	**Series 6000** Inverted Bucket Capacities to 2 950 kg/h		Socketweld Flanged †	★★ 241	★★ 454	ASTM A182 F22 Forged Steel	**6155G**	186				●	●			ST-106
	**Series 1000** Inverted Bucket Capacities to 2 000 kg/h		Screwed Socketweld Flanged †	28 28 45 31	427 427 316 427	304L Stainless Steel	**1010** **1011** **1022** **1013**	10,3 28 45 31		● ●	● ● ●	●				ST-110
	**Series 1800** Inverted Bucket Capacities to 1 090 kg/h		Screwed Socketweld Flanged †	28 45	427 315	304L Stainless Steel	**1810** **1811** **1822**	14 28 45	●	● ● ●	 ● ●	 ●				ST-112
	**Series 2000** Inverted Bucket Capacities to 590 kg/h		Screwed Socketweld Flanged †	28 45	427 315	304L Stainless Steel	**2010** **2011** **2022**	14 28 45		● ● ●	● ● ●	● ● ●				ST-114
	**Series 4000** Inverted Bucket Capacities to 540 kg/h		Screwed NPT Socketweld Flanged	28 45	427 315	ASTM-A 240 Grade 304L	**4011** **4022**	28 45		● ●	● ●	● ●				ST-116
	**Model FT-2000** Float & Thermostatic Capacities to 600 kg/h		Screwed Socketweld Flanged †	25	350	304L Stainless Steel	**FT-2000**	18		●	●	●				ST-118
	**Model FT-2022** Float & Thermostatic Capacities to 2126 kg/h		Screwed Socketweld Flanged †	25	350	304L Stainless Steel	**FT-2022**	18		●	●	●				ST-120
	**Series 20-DC** Automatic Differential Controllers Capacities to 9 000 kg/h		Screwed Flanged †	17	232	ASTM A48 Class 30 Cast Iron	**21-DC** **22-DC** **23-DC** **24-DC** **25-DC** **26-DC**	17 17 17 17 17 17		● 	 ● 	 ● 	 ● 	 ● 	 ●	ST-122
	**Series 80-DC** Automatic Differential Controllers Capacities to 9 000 kg/h		Screwed Flanged †	17	232	ASTM A48 Class 30 Cast Iron	**81-DC** **82-DC** **83-DC** **84-DC** **85-DC** **86-DC**	17 17 17 17 17 17		 	● ● 	 ● 	 ● 	 	 ● ●	ST-124
	**Series B & BI** Float & Thermostatic Capacities to 4 040 kg/h		Screwed	8,5 12	178 192	ASTM A48 Class 30 Cast Iron	**B-2, BI-2** **B-3, BI-3** **B-4, BI-4** **B-5** **B-6** **B-8**	2 2 2 2 2 2		●▲ 	●▲ 	 ●▲ 	 ● 	 ● 	 ●	ST-128

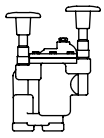
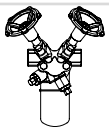
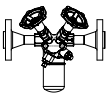
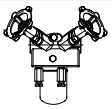
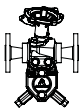
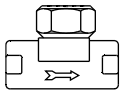
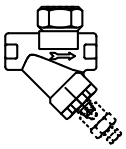
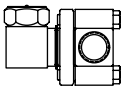
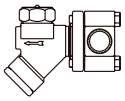
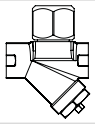
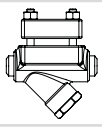
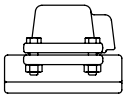
★★ See table on page ST-106 for complete temperature/pressure rating information.
† Operating pressure and temperature may be limited depending on the class of flange selected.
▲ Series AI and BI for in-line connection.

Table 69-1. Armstrong Steam Trapping and Steam Tracing Equipment

Illustration	Type	Flow Direction	Connection Type	Max. Allow. Press. barg	TMA °C	Body Material	Model	Max. Oper. Press. barg	Connection Size								Located on Page
									1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	
	**Series A & AI** Float & Thermostatic Capacities to 3 900 kg/h		Screwed	12	192	ASTM A48 Class 30 Cast Iron	**AI-2** **A-3, AI-3** **A-4, AI-4** **A-5** **A-6** **A-8**	12 12 12 12 12 12	▲	●▲	●▲	●	●	●			ST-130
	**AIC DN15-25** Float & Thermostatic Capacities to 1 024 kg/h		Screwed Flanged †	17	232	ASTM A395 Gr. 60-40-18 / EN-GJS-400-18U	**AIC**	1 2 5 8,5 14	● ● ● ● ●	● ● ● ● ●	● ● ● ● ●						ST-132
	**AIC DN40-50** Float & Thermostatic Capacities to 27 250 kg/h		Screwed Flanged †	40	300	ASTM A395 Gr. 60-40-18 / EN-GJS-400-18U	**AIC**	7 14 32					● ● ●	● ● ●			ST-134
	**Series JD & KD** Float & Thermostatic Capacities to 64 400 kg/h		Screwed Flanged †	21	343	ASTM A395 Ductile Iron	**15-JD** **20-JD** **30-JD** **75-JD** **125-JD** **175-JD** **250-JD** **300-JD** **30-KD** **50-KD** **300-KD**	1 1,4 2 5 8,5 12 17 21 2 3,5 21						● ● ● ● ● ● ● ● ● ● ●	● ●	● ●	ST-136
	**Series L & M** Float & Thermostatic Capacities to 94 350 kg/h		Screwed Flanged †	17	232	ASTM A48 Class 30 Cast Iron	**L-8** **L-10** **M-12**	17 17 17						●	●	●	ST-138
	**Series FT-4000** Capacities to 490 kg/h		Screwed Socketweld	33	315	ASTM A240 Grade 304L	**FT-4075** **FT-4150** **FT-4225** **FT-4300** **FT-4465**	5 10 16 21 31	● ● ● ● ●	● ● ● ● ●	● ● ● ● ●						ST-140
	**Series FF-4000** Capacities to 1 476 kg/h		Screwed Socketweld	41	427	ASTM A240 Grade 304L	**FF-4250** **FF-4450**	17 31	● ●	● ●							ST-142
	**ICS** Float & Thermostatic Capacities to 27 215 kg/h		Screwed Socketweld Flanged †	40	343	ASTM A352 Gr. LCB	**ICS**	32	●	●	●		●	●			ST-144
	**ICS-V** Float & Thermostatic Capacities to 27 215 kg/h		Screwed Socketweld Flanged †	40	343	ASTM A352 Gr. LCB	**ICS-V**	32	●	●	●		●	●			ST-146
	**Series LS & MS** Float & Thermostatic Capacities to 127 000 kg/h		Screwed Socketweld Flanged †	31	338	ASTM A216 WCB Carbon Steel	**LS-8** **LS-10** **MS-12**	31 31 31						●	●	●	ST-148

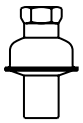
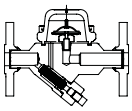
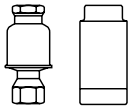
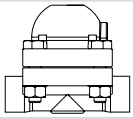
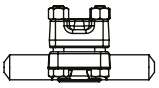
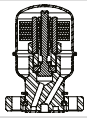
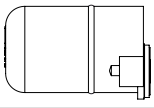
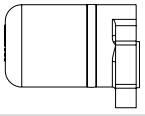
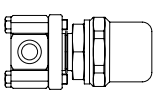
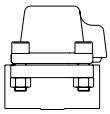
† Operating pressure and temperature may be limited depending on the class of flange selected.

Table 70-1. Armstrong Steam Trapping and Steam Tracing Equipment

Illustration	Type	Flow Direction	Connection Type	Max. Allow. Press. barg	TMA °C	Body Material	Model	Max. Oper. Press. barg	Connection Size				Located on Page
									3/8"	1/2"	3/4"	1"	
	**TVS-800** Trap Valve Station Capacities to 2 000 kg/h	→	Screwed Flanged +	17	232	ASTM A48 Class 30 Cast Iron	**TVS-811** **TVS-812** **TVS-813**	17 17 17		● ●	● ● ●	 ●	ST-152
	**TVS-4000** Trap Valve Station	✣	Screwed Socketweld Flanged +	45	315	ASTM A351 Gr. CF8M	**TVS-4000**	45		●	●		ST-154
	**TVS-4000F** Trap Valve Station	✣	Flanged +	45	315	ASTM A351 Gr. CF8M	**TVS-4000F**	45			●	●	ST-158
	**TVS-5000** Trap Valve Station	✣	Screwed Socketweld Flanged +	45	315	ASTM A350 LF2	**TVS-5000**	45		●	●		ST-160
	**TVS-6000UD** Double isolation connector	→ ←	Screwed Socketweld Buttweld Flanged +	45	315	ASTM A350 LF2	**TVS-6000UD**	45		●	●	●	ST-162
	**Series CD-33** Controlled Disc Capacities to 1 130 kg/h	✣	Screwed	63	400	ASTM A743 Gr. CA40	**CD-33** **CD-33L**	41		● ●	● ●	●	ST-170
	**Series CD-33S** Controlled Disc w/Integral Strainer Capacities to 1 130 kg/h						**CD-33S** **CD-33SL**			● ●	● ●	●	ST-170
	**Model CD-3300** Controlled Disc Capacities to 360 kg/h	✣	Screwed Socketweld Flanged +	50	400	Stainless Steel	**CD-3300**	31		●	●	●	ST-171
	**Model CD-3300S** Controlled Disc Capacities to 363 kg/h	✣	Screwed Socketweld Flanged +	50	400	Stainless Steel	**CD-3300S**	31		●	●		ST-172
	**CD72SR** Controlled Disc Capacities to 435 kg/h	✣	Screwed Socketweld Flanged +	69.6	399	ASTM A105N/ A350 LF2 Cl.1	**CD72SR**	41.4		●	●	●	ST-173
	**CD-80S** Controlled Disc Capacities to 362 kg/h	✣	Screwed Socketweld Flanged +	103.4	343	ASTM A182 F11 Class 2 ASTM A182 F22 Class 3	**CD-80S** **CD-82S**	68.9		●	●		ST-174
	**Series CD-40** Controlled Disc Capacities to 1 300 kg/h	✣	Screwed	41	260	Carbon Steel	**CD-41** **CD-42** **CD-43**	41 41 41	●	●	●	●	ST-177
	**Series CD-60** Controlled Disc Capacities to 1 300 kg/h	✣	Screwed Socketweld Flanged +	41	399	Forged Carbon Steel	**CD-61** **CD-62** **CD-63**	41 41 41	●	●	●	●	ST-177

Steam Trapping and Steam Tracing Equipment
ID Charts

Table 71-1. Armstrong Steam Trapping and Steam Tracing Equipment

Illustration	Type	Flow Direction	Conneciton Type	Max. Allow. Press. barg	TMA °C	Body Material	Model	Max. Oper. Press. barg	Connection Size				Located on Page
									3/8"	1/2"	3/4"	1"	
	**Series WMT** Thermostatic Wafer Cold Water Start-up Capacities to 450 kg/h		Screwed	17	204	304-L Stainless Steel	**WMT-1**	17	1 1/4" ● 3/8" ●	●			ST-178
	**TC-300** Thermostatic Cold Water Start-up Capacities to 454 kg/h		Screwed Socketweld Flanged †	32	350	ASTM-A-105	**TC-300**	17		●	●	●	ST-179
	**Series WT** Thermostatic Wafer Cold Water Start-up Capacities to 730 kg/h		Screwed	28	343	304-L Stainless Steel	**WT-1**	28		●	●		ST-180
			Screwed Socketweld	41	399	C1018 Carbon Steel	**WT-3**	41		●	●		
			Screwed Socketweld Flanged †	28	343	304-L Stainless Steel	**WT-2000**	28		●	●	●	
	**Model SH-300** Bimetallic Capacities to 1 800 kg/h		Screwed Socketweld Flanged †	40	350	Carbon Steel	**SH-300**	22		●	●	●	ST-182
	**Model SH-900** Bimetallic Capacities to 4 990 kg/h		Screwed Socketweld Flanged †	62	482	ASTM A351 Gr.CF8M	**SH-900**	L = 44* H = 62*		●	●	●	ST-183
	**Model SH-1500** Bimetallic Capacities to 3 180 kg/h		Screwed Socketweld Flanged †	124	565	ASTM 217 Cer. C12A	**SH-1500**	124			●	●	ST-184
	**Model SH-1600** Bimetallic Capacities to 2 950 kg/h		Socketweld Buttweld Flanged †	120.6	520	ASTM A-182 F22 Class 3	**SH-1600**	120.6			●	●	ST-185
	**Model SH-2000** Cold Water Start-Up Capacities to 2 175 kg/h		Screwed Socketweld	28	427	Stainless Steel	**SH-2000**	28		●	●	●	ST-186
	**Model SH-2500** Cold Water Start-Up Capacities to 2 722 kg/h		Screwed Socketweld	45	315	ASTM A351 Gr. CF8M	**SH-2500**	45		●	●	●	ST-187
	**Model SH-4000** Cold Water Start-Up Capacities to 2 722 kg/h		Screwed Socketweld Flanged †	86	482	Stainless Steel	**SH-4000**	86			●	●	ST-188
	**Model AB-3000** Bimetallic Capacities to 1 800 kg/h		Screwed Socketweld Flanged †	28	343	304L Stainless Steel	**AB-3000**	22		●	●	●	ST-190
	**Model AB-600** Bimetallic Capacities to 4 000 kg/h		Screwed Socketweld Flanged †	41	400	C 22.8	**AB-600**	41		●	●		ST-191

† Operating pressure and temperature may be limited depending on the class of flange selected.
All models comply with the Pressure Equipment Directive PED 2014/68/UE. For details, see specific product page or Armstrong PED Certificate.

Steam Trapping and Steam Tracing Equipment ID Charts

Table 72-1. Armstrong Steam Trapping and Steam Tracing Equipment

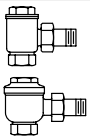
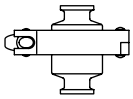
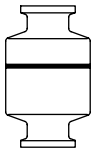
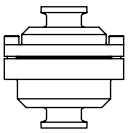
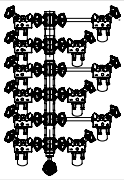
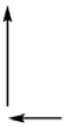
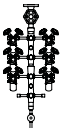
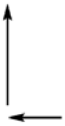
Illustration	Type	Flow	Direction Type	Max. Allow. Press. barg	TMA °C	Body Material	Model	Max. Oper. Press. barg	1/2"	3/4"	1"	Located on Page
	**Series TT** Thermostatic Bellows Capacities to 1 570 kg/h		Screwed	20	232	304L Stainless Steel	**TTF-1**	20	●	●		ST-192
			Screwed Socketweld				**TTF-1R**		●	●		
			Screwed Socketweld Flanged †				**TT-2000**		●	●	●	
	**Series TS** Thermostatic Bellows Capacities to 730 kg/h		Threaded	3,5	149	Bronze	**TS-2**	3,5	●	●		ST-194
				4,5	157		**TS-3**	4,5	●	●	●	
	**Model TC-C** Thermostatic Clean Steam Clamp Capacities to 1 570 kg/h		Sanitary End	8,3	177	Stainless Steel 316L	**TC-C**	7	●	●	●	ST-196
	**Model TC-S** Thermostatic Clean Steam Sealed Capacities to 1 700 kg/h		Sanitary End	10	186	Stainless Steel 316L	**TC-S**	8,3	●	●	●	ST-196
			Threaded						●	●		
			Tube End						●	●		
	**Model TC-R** Thermostatic Clean Steam Bolted Capacities to 1 570 kg/h		Sanitary End	8,3	177	Stainless Steel 316L	**TC-R**	7	●	●	●	ST-196
			Threaded						●	●		
			Tube End						●	●		

Table 73-1. Armstrong Steam Tracing Equipment

Illustration	Type	Flow Direction	Connection Type	Max. Allow. Press. barg	TMA °C	Body Material	Model	Max. Oper. Press. barg	Number of Tracers	Connection Size	Located on Page
	**TCMS** Piston Valve		Socketweld	50	288	ASTM A216	**TCMS**	50	—	1/2"	ST-201
	**MSD and SMSD** Manifolds for Steam Distribution		Socketweld Buttweld Flanged †	32	400	ASTM A105 Forged Steel	**MSD-04** **MSD-08** **MSD-12** **SMSD-04** **SMSD-08** **SMSD-12**	32	4 8 12 4 8 12	Inlet and Drain: 1 1/2" Tracers: 1/2" 3/4"	ST-202
	**MCC-160 with TVS-5111** Condensate Collection Assembly		Socketweld Buttweld Flanged †	28	399	ASTM A105 Forged Steel	**MCC-160-04** **MCC-160-08** **MCC-160-08**	28	4 8 12	Outlet and Drain: 1 1/2" Tracers: 1/2" 3/4"	ST-204
	**CCA-203** Condensate Collection Assembly		Socketweld Flanged †	42	427	ASTM A105/ 304-L Stainless Steel	**CCA-203-04** **CCA-203-06** **CCA-203-08** **CCA-203-10** **CCA-203-12**	42	4 6 8 10 12	Drain: 1/2" 3/4" Tracers: 1/2" 3/4"	ST-206

The Inverted Bucket Steam Trap

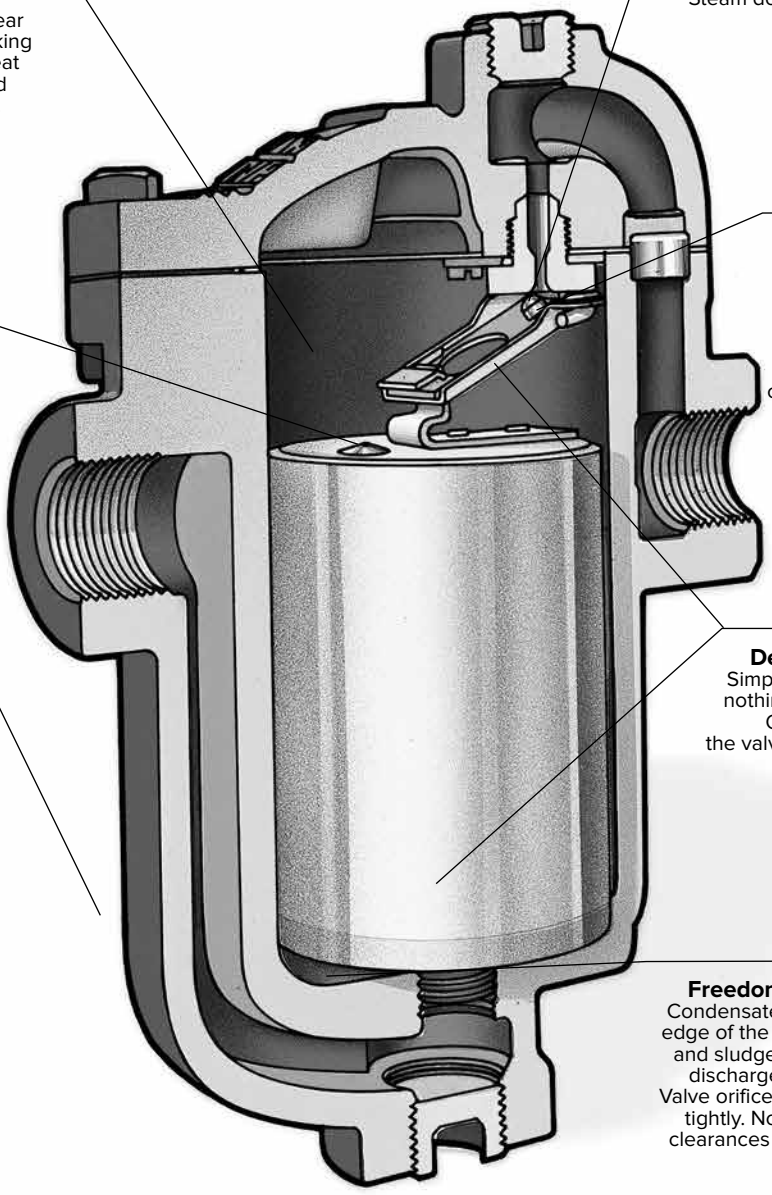
Energy Efficient Because It's So Reliable
The inverted bucket is the most reliable steam trap operating principle known. The heart of its simple design is a unique leverage system that multiplies the force provided by the bucket to open the valve against pressure. Since the bucket is open at the bottom, it resists damage from water hammer, and wear points are heavily reinforced for long life.

The inverted bucket has only two moving parts – the valve lever assembly and the bucket. That means no fixed points, no complicated linkages. Nothing to stick, bind or clog.

Wear and corrosion resistance
Free-floating guided lever valve mechanism is "frictionless," and all wear points are heavily reinforced. All working parts are stainless steel. Valve and seat are stainless steel, individually ground and lapped together in matched sets.

Continuous air and CO_2 venting
Vent in top of bucket provides continuous automatic air and CO_2 venting with no cooling lag or threat of air binding. Steam passing through vent is less than that required to compensate for radiation losses from the trap so it's not wasted.

Excellent operation against back pressure
Since trap operation is governed by the difference in density of steam and water, back pressure in the return line has no effect on the ability of the trap to open for condensate and close against steam.



Virtually no steam loss
Steam does not reach the water-sealed discharge valve.

Purging action
Snap opening of the valve creates a momentary pressure drop and turbulence in the unit drained. This breaks up films of condensate and air and speeds their flow to the trap.

Dependable operation
Simple, direct operation with nothing to stick, bind or clog. Only two moving parts – the valve lever and the bucket.

Freedom from dirt problems
Condensate flow under the bottom edge of the bucket keeps sediment and sludge in suspension until it is discharged with the condensate. Valve orifice opens wide and closes tightly. No buildup of dirt or close clearances to be affected by scale.

Resistance to damage from water hammer
Open bucket or float will not collapse as a result of water hammer.

Inverted Bucket Steam Trap

Conserves Energy Even in the Presence of Wear
Armstrong inverted bucket steam traps open and close based on the difference in density between condensate and steam – the inverted bucket principle. They open and close gently, minimizing wear. This simple fact means that inverted buckets are subject to less wear than some other types of traps.

In fact, as an Armstrong inverted bucket trap wears, its tight seal actually improves. The ball valve and seat of the Armstrong trap provide essentially line contact – resulting in a tight seal because the entire closing force is concentrated on one narrow seating ring.

An Armstrong inverted bucket trap continues to operate efficiently with use. Gradual wear slightly increases the diameter of the seat and alters the shape and diameter of the ball valve. But, as this occurs, a tight seal is still preserved – the ball merely seats itself deeper.

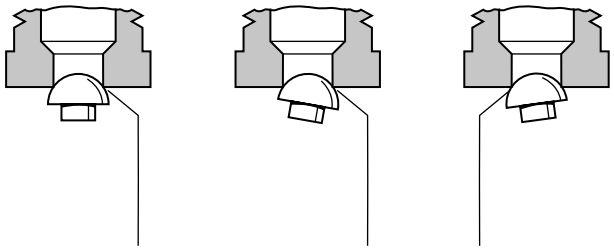
Corrosion-Resistant Parts
The stainless steel valve and seat of the Armstrong inverted bucket steam trap are individually ground and lapped together in matched sets. All other working parts are wear- and corrosion-resistant stainless steel.

Venting of Air and CO_2
The Armstrong inverted bucket provides continuous automatic air and CO_2 venting with no cooling lag or threat of air binding.

Operation Against Back Pressure
The Armstrong inverted bucket has excellent performance against back pressure. It has no adverse effect on inverted bucket operation other than to reduce its capacity by the low differential. The bucket simply requires less force to pull the valve open and cycle the trap.

Freedom From Dirt Problems
Armstrong designed its inverted bucket to be virtually free of dirt problems. The valve and seat are at the top of the trap, far away from the larger particles of dirt, which fall to the bottom. Here the up-and-down action of the bucket pulverizes them. Since the valve of an inverted bucket is either fully closed or open, dirt particles pass freely. And the swift flow of condensate from under the bucket's edge creates a unique self-scrubbing action that sweeps dirt out of the trap.

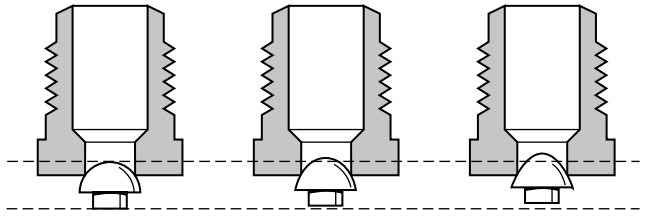
Armstrong IB Valve Seating/Ball Valve



Line Contact – Single Seat

Infinite Number of Center Lines and Seating Circumferences

IB Valve Wear Characteristics

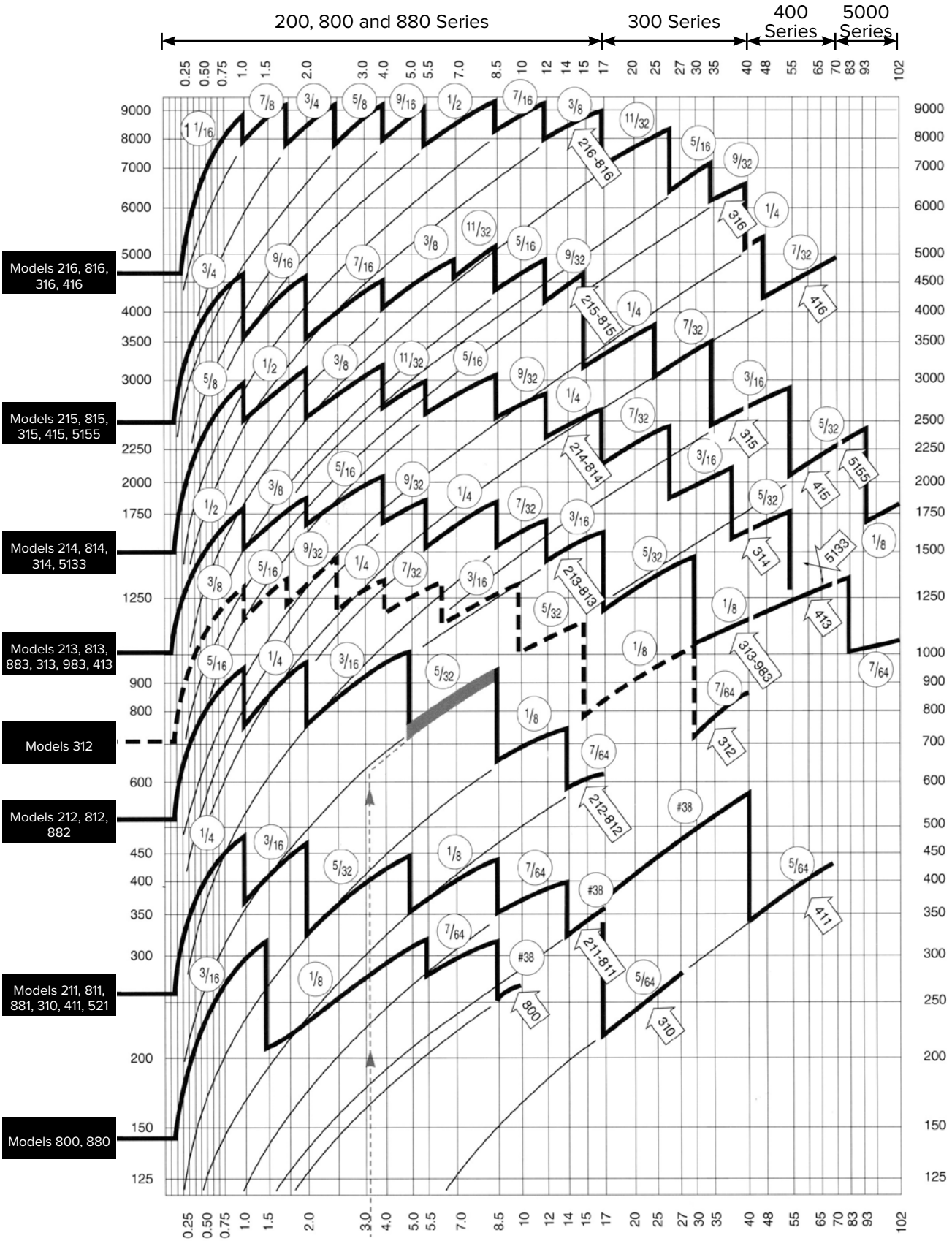


Armstrong IB ball valve continues to seat itself deeper, providing a tight seal even in the presence of wear.

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

IB Steam Trap Summary Capacity Chart

Pressure difference in bar between steam line and return line with trap valve closed
Note: Above capacity chart does not include all models available. Refer to specific page of trap required for capacities not covered above.



Pressure difference in bar between steam line and return line with trap valve closed
Note: Above capacity chart does not include all models available. Refer to specific page of trap required for capacities not covered above.

How to Use the IB Steam Trap Summary Capacity Chart

How the Capacity Chart was made
The Armstrong capacity chart shows continuous discharge capacities of Armstrong traps under actual operating conditions as determined by literally hundreds of tests. In these tests condensate at the steam temperature corresponding to the test pressure was used. The choking effect of flash steam through the orifice, as well as the back pressure created by flash steam, were automatically taken into account. Actual installation hookups were used so that pipe friction in both inlet and discharge lines also were reflected in the results.

Trap capacity ratings based on cold water tests which produce no flash steam would be much too high. Orifice tests also are too high because they ignore pipe friction. Theoretical calculations of trap capacities have never been conservative. You can rely on Armstrong capacity ratings because they show actual capacities of hot condensate.

Heavy "sawtooth" curves
show capacities for traps using maximum possible diameter orifices for the pressures shown.

Thin line curves
extending down to the left of the heavy curves show the capacities of Armstrong traps at pressures below their maximum ratings. For example: a model 216 trap with 1/2" orifice good for a maximum working pressure of 8,5 bar will have a continuous discharge capacity of a little less than 6 000 kg/h at 2,8 bar.

How to use the inverted bucket trap capacity chart
To select an inverted bucket steam trap using the Armstrong capacity chart, you must know the condensate load, safety factor and pressure differential. Remember, the objective is always to select a trap that can 1) operate at the maximum differential pressure and 2) handle the capacity at the minimum differential pressure. Consider the following typical problems:

Example 1:

Constant Pressure and Condensing Rate

Given:	
Maximum pressure differential:	5 bar
Operating differential:	4 bar
Condensate load:	133 kg/h
times 3:1 safety factor or:	400 kg/h

Enter chart at 4 bar and go up to 400 kg/h capacity. This is directly on the 5/32" orifice line as shown in Chart ST-77-1. The capacity of this 5/32" orifice at pressures less than 2 bar is indicated by the thin line. Follow the line to the right to the vertical drop at 5 bar. This means this orifice will operate to a maximum of 5 bar differential - the other requirement for this application. Follow the heavy line back to the left and note that it's attached to the arrow indicating that the 211, 811 or 881 traps (1811 and 1011 are other possibilities) with the 5/32" orifice will yield this capacity. This is the trap to use.

Example 2:

Constant Pressure and Condensing Rate but with Possible High Back Pressure

Assume for example:	
Maximum pressure differential:	6 bar
Operating differential minimum:	3 bar
Operating differential normally:	4 bar
Condensate load:	133 kg/h
times 3:1 safety factor or:	400 kg/h

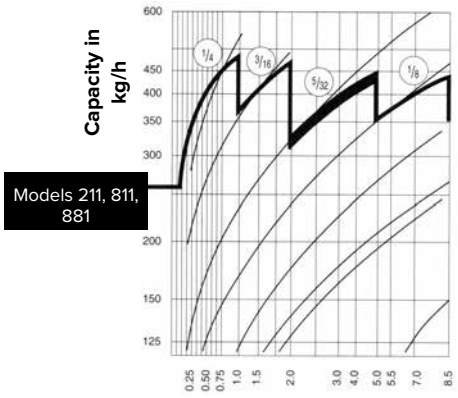
To solve the problem, refer to the sawtooth chart, page ST-76. Enter at the minimum differential pressure (3 bar) and move up until you intersect a line that is above 400 kg/h capacity, which is the first thin line above the heavy "sawtooth" for the 211, 811 and 881 traps.

Note that this is the continuation of the capacity line for the 5/32" orifice for the 212, 812 and 882 traps. Now follow the line to the right until the vertical drop at 8,5 bar differential. This is within our requirement of 6 bar. Therefore a 5/32" orifice can handle the 400 kg/h condensate load when fitted into a 212, 812 or 882 trap and that it will not lock shut at the 6 bar maximum differential. This is the trap to use since it will handle the load at both the minimum and maximum operating differentials, even though it has a maximum operating pressure differential of 8,5 bar.

Orifice sizes:

1 7/8"	= 47,0 mm	5/16"	= 7,9 mm
1 5/8"	= 41,0 mm	19/64"	= 7,5 mm
1 17/32"	= 39,0 mm	9/32"	= 7,1 mm
1 1/8"	= 28,0 mm	17/64"	= 6,7 mm
1 1/16"	= 27,0 mm	1/4"	= 6,4 mm
7/8"	= 22,2 mm	7/32"	= 5,6 mm
3/4"	= 19,0 mm	13/64"	= 5,1 mm
11/16"	= 17,5 mm	3/16"	= 4,8 mm
5/8"	= 15,9 mm	11/64"	= 4,4 mm
9/16"	= 14,3 mm	5/32"	= 4,0 mm
1/2"	= 12,7 mm	1/8"	= 3,2 mm
7/16"	= 11,2 mm	7/64"	= 2,8 mm
3/8"	= 9,5 mm	# 38	= 2,5 mm
11/32"	= 8,7 mm	5/64"	= 2,0 mm

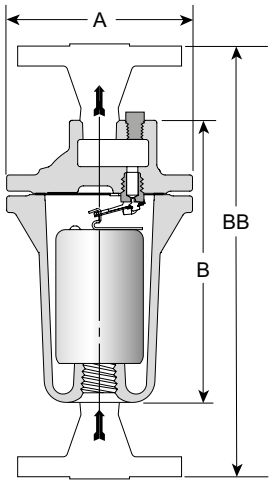
Chart ST-77-1: Selection Curve Example 1



200 Series Inverted Bucket Steam Traps

Cast Iron for Vertical Installation

For Pressures to 17 bar...Capacities to 9 000 kg/h



Model 211

Model 211

Description

The most reliable steam trap known – the inverted bucket – provides efficient condensate drainage of virtually all types of steam-using equipment. Put the inverted bucket to work in a tough cast iron package, and you have the best of both worlds. Because they operate efficiently for longer periods of time, Armstrong cast iron inverted buckets add solid energy savings to lower replacement/ labor costs.

A unique leverage system multiplies the force provided by the bucket to open the valve against system pressure. The mechanism is free-floating, and has no fixed pivots to create wear or friction.

Because the mechanism is located at the top of the trap, no dirt can collect on the orifice. Small particles of dirt are held in suspension until discharged by the full differential purging action when the bucket sinks, pulling the valve off the seat.

The discharge orifice is surrounded by a water seal, preventing live steam loss. Automatic air venting is provided by a small vent hole in the bucket, which provides continuous automatic air and CO_2 venting at steam temperature.

Inverted bucket traps drain continuously, although discharging intermittently, allowing no condensate backup. They are also resistant to water hammer.

Maximum Operating Conditions

Maximum allowable pressure (vessel design)ŧ:	17 bar @ 232°C
Maximum operating pressure:	17 bar
Maximum back pressure:	99% of inlet pressure

Connections

Screwed BSPT and NPT

Flanged EN1092-1 or ASME B16.5 (screw on)

Materials

Body:	ASTM A48 Class 30
Cap:	ASTM A48 Class 30
Internals:	All stainless steel – 304
Valve and seat:	Stainless Steel 17-4PH
Test plug:	Carbon steel

Options

- Stainless steel internal check valve
- Thermic vent bucket
- Scrub wire
- Large vent 17 bar maximum

Specification

Inverted bucket steam trap, type ... in cast iron, with continuous air venting at steam temperature, free floating stainless steel mechanism, and discharge orifice at the top of the trap. Maximum allowable back pressure 99% of inlet pressure.

How to Order

Specify:

- Model number
- Size and type of pipe connection
- Maximum working pressure that will be encountered or orifice size
- Any options required

Table ST-78-1. 200 Series, Bottom Inlet, Top Outlet Trap (dimensions in mm)

Add suffix "CV" to model number for internal check valve, "T" for thermic vent bucket; "LV" for the large vent.

Model No.	211	212	213	214	215	216
Pipe Connections	15	15 – 20	15 – 20 – 25	25 – 32	25 – 32 – 40	40 – 50
Test plug	1/8"	3/8"	1/2"	1/2"	3/4"	1"
"A" Flange Diameter	108	133	162	190	216	259
"B" Face-to-Face (screwed)	164	218	292	315	361	455
"BB" Face-to-Face (flanged PN40*)	284	338 - 347	412 - 421 - 412	435 - 439	481 - 485 - 491	585 - 593
Number of Bolts	6	8	6	8	8	12
Weight in kg (screwed)	2,7	5,2	9,2	15,0	20,3	35,2
Weight in kg (flanged EN1092-1*)	4,1	7,0 – 7,6	11 – 11,6 – 12	18,6 – 20,2	21 – 22,7 – 23	39,6 – 41,2

* Other flange sizes, ratings and face-to-face dimensions are available on request.

Shade indicates products that are CE Marked according to the PED (2014/68/UE). All the other models comply with the Article 4.3 of the same directive.

ŧ May be derated depending on flange rating and type.

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

200 Series Inverted Bucket Steam Traps

Cast Iron for Vertical Installation

For Pressures to 17 bar...Capacities to 9 000 kg/h

Table ST-79-1. Model 211 Capacity

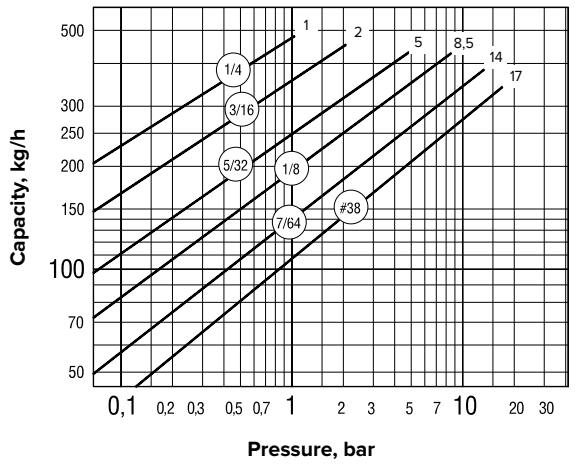


Table ST-79-2. Model 212 Capacity

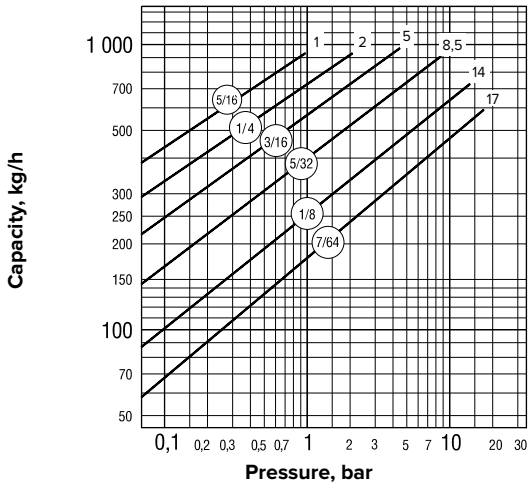


Table ST-79-3. Model 213 Capacity

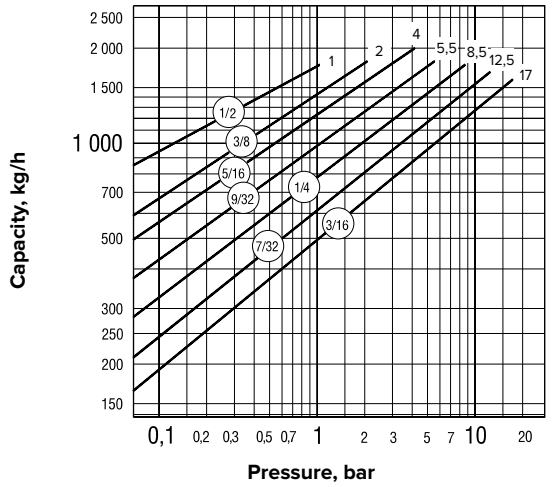


Table ST-79-4. Model 214 Capacity

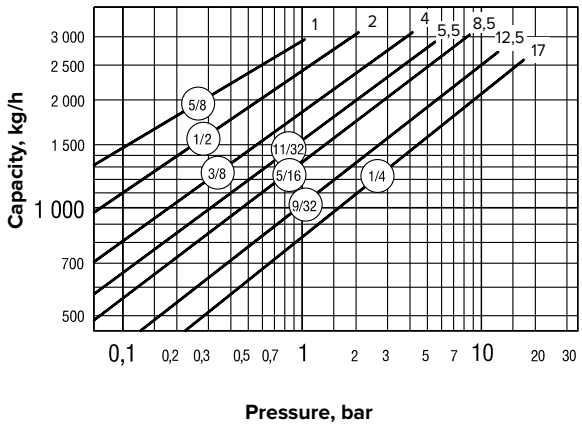


Table ST-79-5. Model 215 Capacity

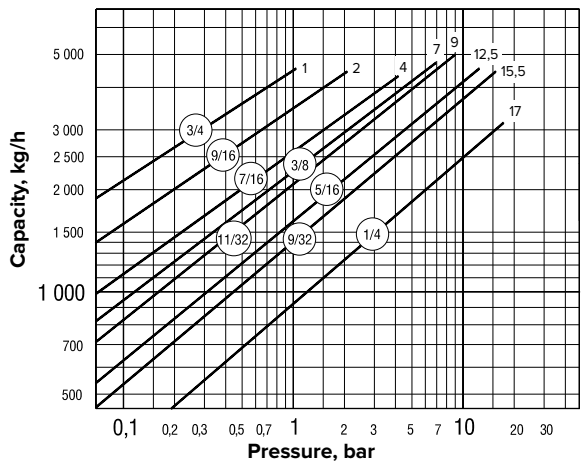
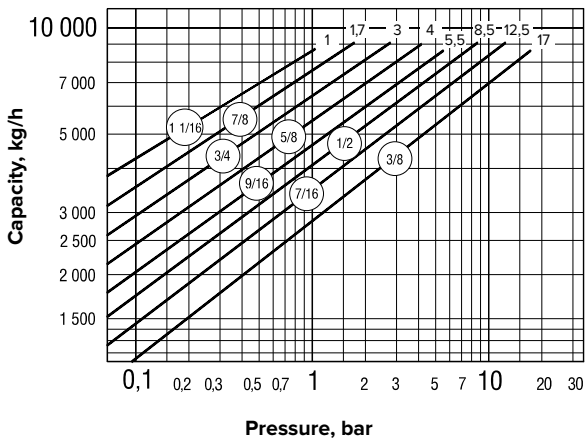


Table ST-79-6. Model 216 Capacity

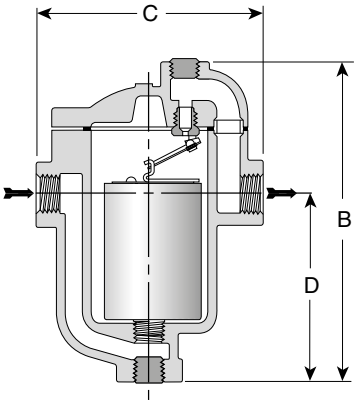


All dimensions and weights are approximate. Use certified print for exact dimensions. Design and materials are subject to change without notice.

800-813 Series Inverted Bucket Steam Traps

Cast Iron for Horizontal Installation

For Pressures to 17 bar...Capacities to 2 000 kg/h



Description

The most reliable steam trap known – the inverted bucket – provides efficient condensate drainage of virtually all types of steam-using equipment. Put the inverted bucket to work in a tough cast iron package, and you have the best of both worlds. Because they operate efficiently for longer periods of time, Armstrong cast iron inverted buckets add solid energy savings to lower replacement/ labor costs. All Armstrong cast iron inverted bucket steam traps are repairable for even bigger maintenance savings.

A unique leverage system multiplies the force provided by the bucket to open the valve against system pressure. The mechanism is free-floating, and has no fixed pivots to create wear or friction.

Because the mechanism is located at the top of the trap, no dirt can collect on the orifice. Small particles of dirt are held in suspension until discharged by the full differential purging action when the bucket sinks, pulling the valve off the seat.

The discharge orifice is surrounded by a water seal, preventing live steam loss. Automatic air venting is provided by a small vent hole in the bucket, which provides continuous automatic air and CO_2 venting at steam temperature.

Inverted bucket traps drain continuously, although discharging intermittently, allowing no condensate backup. They are also resistant to water hammer.

Maximum Operating Conditions

Maximum allowable pressure (vessel design)ŧ:	17 bar @ 232°C
Maximum operating pressure:	Model 800: 10 bar Model 811-813: 17 bar
Maximum back pressure:	99% of inlet pressure

Connections

Screwed BSPT and NPT
Flanges ASME B16.5 (screw on) available on request

Materials

Body:	ASTM A48 Class 30
Internals:	All stainless steel – 304
Valve and seat:	Stainless Steel 17-4PH
Test plug:	Carbon steel

Options

- Stainless steel internal check valve
- Thermic vent bucket
- Stainless steel pop drain
- Thermo drain
- Scrub wire
- Large vent 17 bar maximum

Specification

Inverted bucket steam trap, type ... in cast iron, with continuous air venting at steam temperature, free-floating stainless steel mechanism, and discharge orifice at the top of the trap. Maximum allowable back pressure 99% of inlet pressure.

How to Order

Specify:

- Model number
- Size and type of pipe connection
- Maximum working pressure or orifice size
- Any options required

Table 80-1. 800-813 Series Side Inlet, Side Outlet Trap (dimensions in mm)
Add suffix "CV" to model number for internal check valve, "T" for thermic vent bucket, "LV" for the large vent.

Model No.	800*	811	812	813
Pipe Connections	1/2" – 3/4"	1/2" – 3/4" – 1"	1/2" – 3/4"	3/4" – 1"
Test plug	1/4"	1/4"	1/2"	3/4"
«B» Height	138	175	230	298
«C» Face-to-Face (screwed)	127	127 – 127 – 133	165	197
«D» Bottom to ℄ Inlet	70	108	137	179
Number of Bolts	6			
Weight in kg	2,3	2,7	6,8	12,5

* Cannot be furnished with both thermic vent bucket and check valve.
All models comply with the Article 4.3 of the PED (2014/68/UE).
ŧ May be derated depending on flange rating and type.

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

800-813 Series Inverted Bucket Steam Traps

Cast Iron for Horizontal Installation

For Pressures to 17 bar...Capacities to 2 000 kg/h

Table 81-1. Model 800 Capacity

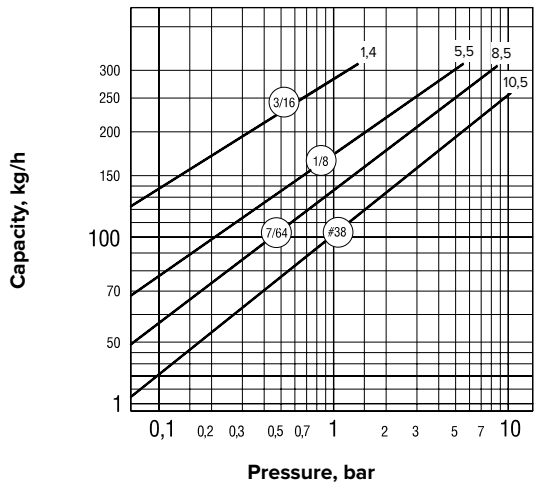


Table 81-2. Model 811 Capacity

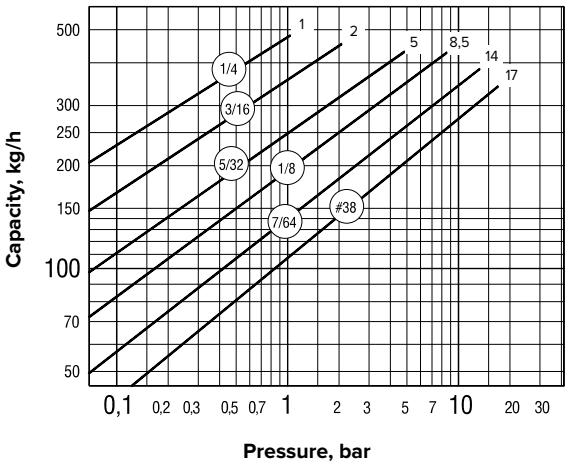


Table 81-3. Model 812 Capacity

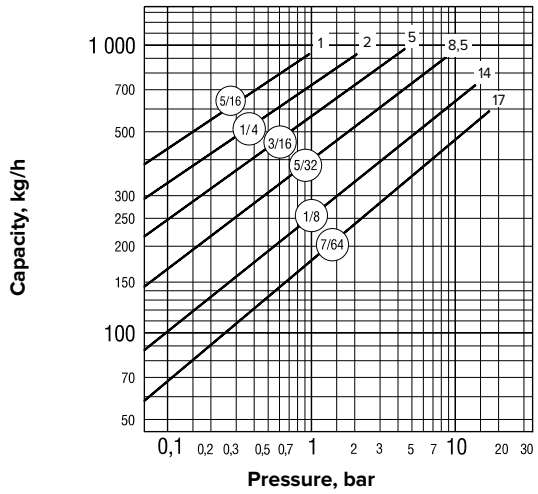
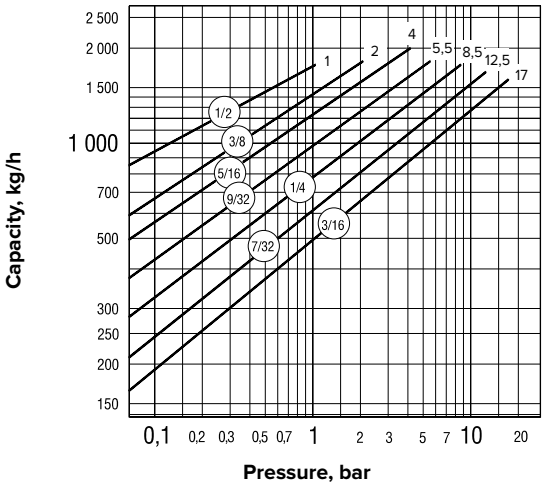


Table 81-4. Model 813 Capacity

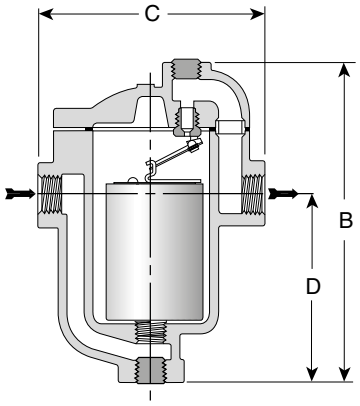


All dimensions and weights are approximate. Use certified print for exact dimensions. Design and materials are subject to change without notice.

814-816 Series Inverted Bucket Steam Traps

Cast Iron for Horizontal Installation

For Pressures to 17 bar...Capacities to 9 000 kg/h



Description

The most reliable steam trap known – the inverted bucket – provides efficient condensate drainage of virtually all types of steam-using equipment. Put the inverted bucket to work in a tough cast iron package, and you have the best of both worlds. Because they operate efficiently for longer periods of time, Armstrong cast iron inverted buckets add solid energy savings to lower replacement/labor costs. All Armstrong cast iron inverted bucket steam traps are repairable for even bigger maintenance savings.

A unique leverage system multiplies the force provided by the bucket to open the valve against system pressure. The mechanism is free-floating, and has no fixed pivots to create wear or friction.

Because the mechanism is located at the top of the trap, no dirt can collect on the orifice. Small particles of dirt are held in suspension until discharged by the full differential purging action when the bucket sinks, pulling the valve off the seat.

The discharge orifice is surrounded by a water seal, preventing live steam loss. Automatic air venting is provided by a small vent hole in the bucket, which provides continuous automatic air and CO_2 venting at steam temperature.

Inverted bucket traps drain continuously, although discharging intermittently, allowing no condensate backup. They are also resistant to water hammer.

Maximum Operating Conditions

Maximum allowable pressure (vessel design)†: 17 bar @ 232°C
Maximum operating pressure: 17 bar
Maximum back pressure: 99% of inlet pressure

Connections

Screwed BSPT and NPT
Flanges ASME B16.5 (screw on) available on request

Materials

Body:	ASTM A48 Class 30
Internals:	All stainless steel – 304
Valve and seat:	Stainless Steel 17-4PH
Test plug:	Carbon steel

Options

- Stainless steel internal check valve
- Thermic vent bucket
- Stainless steel pop drain
- Thermo drain
- Scrub wire
- Large vent 17 bar maximum

Specification

Inverted bucket steam trap, type ... in cast iron, with continuous air venting at steam temperature, free-floating stainless steel mechanism, and discharge orifice at the top of the trap. Maximum allowable back pressure 99% of inlet pressure.

How to Order

Specify:

- Model number
- Size and type of pipe connection
- Maximum working pressure or orifice size
- Any options required

Table ST-82-1. 814-816 Series Side Inlet, Side Outlet Trap (dimensions in mm)
Add suffix «CV» to model number for internal check valve, «T» for thermic vent bucket, "LV" for the large vent..

Model No.	814	815	816
Pipe Connections	1" – 1 1/4"	1 1/2" – 2"	2" – 2 1/2"
Test plug	1"	1 1/2"	2"
«B» Height	346	413	541
«C» Face-to-Face (screwed)	229	260	330
«D» Bottom to ℄ Inlet	198	203	279
Number of Bolts		8	
Weight in kg (screwed)	20,0	32,2	59,4

All models are CE Marked according to the PED (2014/68/UE), but PMA for 816 is 15 bar.
† May be derated depending on flange rating and type.

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

814-816 Series Inverted Bucket Steam Traps

Cast Iron for Horizontal Installation

For Pressures to 17 bar...Capacities to 9 000 kg/h

Table ST-83-1. Model 814 Capacity

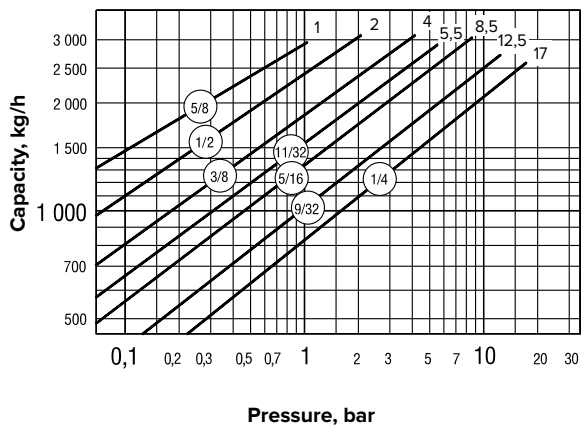


Table ST-83-2. Model 815 Capacity

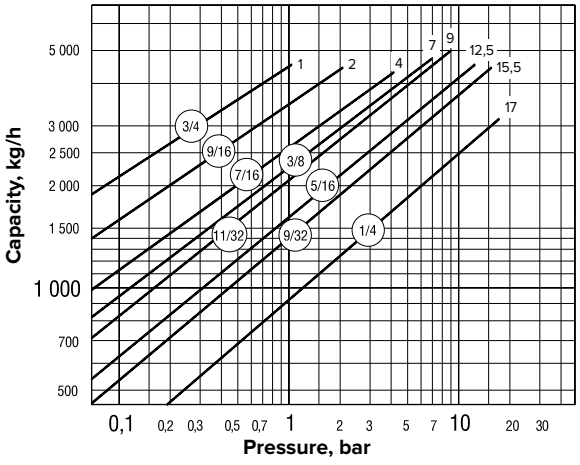
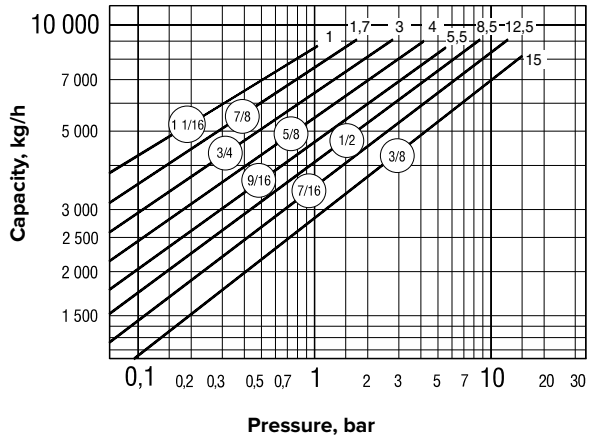


Table ST-83-3. Model 816 Capacity



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

614F-616F Series Inverted Bucket Steam Traps

Ductile Iron for Horizontal Installation

For Pressures to 17 bar...Capacities to 9 072 kg/h

Description

The most reliable steam trap known – the inverted bucket – provides efficient condensate drainage of virtually all types of steam-using equipment. Put the inverted bucket to work in a tough ductile iron package, and you have the best of both worlds. Because they operate efficiently for longer periods of time, Armstrong ductile iron inverted buckets add solid energy savings to lower replacement/ labor costs. All Armstrong ductile iron inverted bucket steam traps are repairable for even bigger maintenance savings.

A unique leverage system multiplies the force provided by the bucket to open the valve against system pressure. The mechanism is free-floating, and has no fixed pivots to create wear or friction.

Because the mechanism is located at the top of the trap, no dirt can collect on the orifice. Small particles of dirt are held in suspension until discharged by the full differential purging action when the bucket sinks, pulling the valve off the seat.

The discharge orifice is surrounded by a water seal, preventing live steam loss. Automatic air venting is provided by a small vent hole in the bucket, which provides continuous automatic air and CO_2 venting at steam temperature.

Inverted bucket traps drain continuously, although discharging intermittently, allowing no condensate backup. They are also resistant to water hammer.

Maximum Operating Conditions

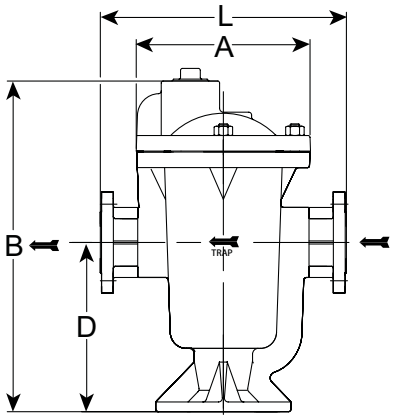
Maximum allowable pressure (vessel design):	17 bar @ 232°C
Maximum operating pressure:	17 bar
Maximum back pressure:	99% of inlet pressure

Connections

Integral Flanged EN1092-2 PN25

Materials

Body:	ASTM A395 Gr. 60-40-18
Internals:	All stainless steel – 304
Valve and seat:	Stainless Steel 17-4PH H900



Options

- Stainless steel internal check valve (add suffix CV)
- Thermic vent bucket (add suffix T)
- Large vent 17 bar maximum (add suffix LV)
- Scrub wire (add suffix BVSW)

Specification

Inverted bucket steam trap, type ... in ductile iron, with continuous air venting at steam temperature, free-floating stainless steel mechanism, and discharge orifice at the top of the trap. Maximum allowable back pressure 99% of inlet pressure.

How to Order

Specify:

- Model number
- Size and type of pipe connection
- Maximum working pressure or orifice size
- Any options required

Table 84-1. 614F-616F Series Side Inlet, Side Outlet Trap (dimensions in mm)
Add suffix «CV» to model number for internal check valve, «T» for thermic vent bucket.

Model No.	614F	615F	616F
Pipe Connections	25 – 32	40 – 50	50 – 65
Test plug	1"	1 1/2"	2"
«A» Face-toFace	203	229	292
«B» Height	346	413	541
«D» Bottom to ℄ Inlet	198	205	279
«L» Face-to-Face (Integral Flanged EN1092-2 PN25)	315 – 320	345 – 355	415 – 420
Number of Bolts	8	8	8
Weight in kg	24 – 26	39 – 41	68 – 70

All models are CE Marked according to the PED (2014/68/UE).

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

614F-616F Series Inverted Bucket Steam Traps

Ductile Iron for Horizontal Installation

For Pressures to 17 bar...Capacities to 9 072 kg/h

Table 85-1. Model 614F Capacity

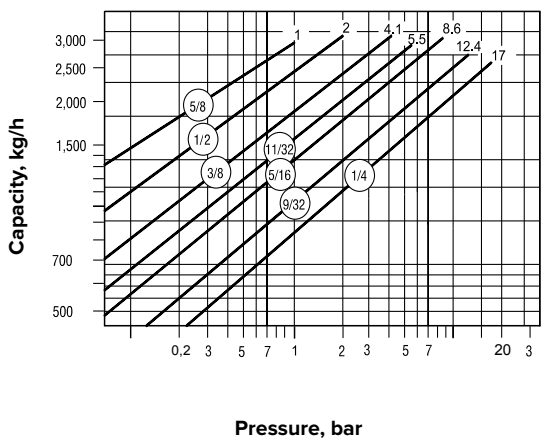


Table 85-2. Model 615F Capacity

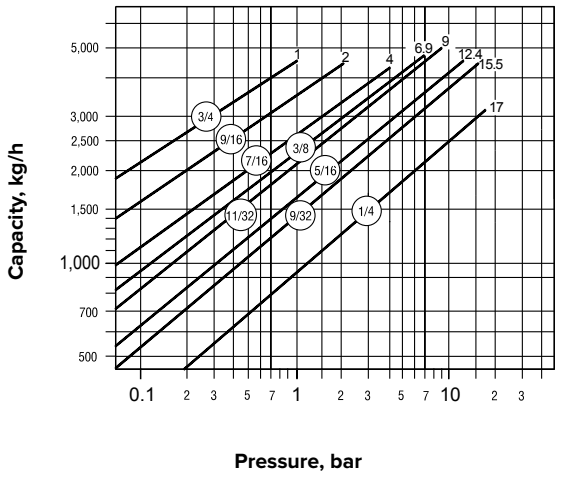
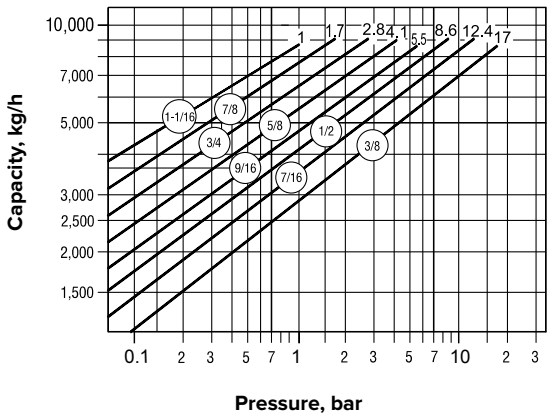


Table 85-3. Model 616F Capacity

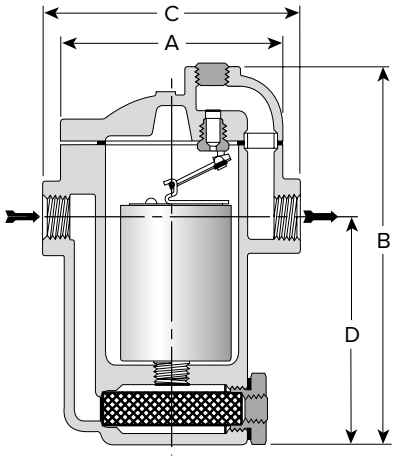


All dimensions and weights are approximate. Use certified print for exact dimensions. Design and materials are subject to change without notice.

880 Series Inverted Bucket Steam Traps

Cast Iron for Horizontal Installation, with Integral Strainer

For Pressures to 17 bar...Capacities to 2 000 kg/h



Description

The most reliable steam trap known – the inverted bucket – provides efficient condensate drainage of virtually all types of steam-using equipment. Put the inverted bucket to work in a tough cast iron package with an integral strainer, and you have the best of both worlds. Because they operate efficiently for longer periods of time, Armstrong cast iron inverted buckets add solid energy savings to lower replacement/labor costs. All Armstrong cast iron inverted bucket steam traps are repairable for even bigger maintenance savings.

A unique leverage system multiplies the force provided by the bucket to open the valve against system pressure. The mechanism is free-floating, and has no fixed pivots to create wear or friction.

Because the mechanism is located at the top of the trap, no dirt can collect on the orifice. Small particles of dirt are held in suspension until discharged by the full differential purging action when the bucket sinks, pulling the valve off the seat.

The discharge orifice is surrounded by a water seal, preventing live steam loss. Automatic air venting is provided by a small vent hole in the bucket, which provides continuous automatic air and CO_2 venting at steam temperature.

Inverted bucket traps drain continuously, although discharging intermittently, allowing no condensate backup. They are also resistant to water hammer.

Connections

Screwed BSPT and NPT
Flanged ASME B16.5 (screw on)**

Maximum Operating Conditions

Maximum allowable pressure (vessel design) ŧ:	17 bar @ 232°C
Maximum operating pressure:	Model 880: 10 bar Model 881 - 883: 17 bar
Maximum back pressure:	99% of inlet pressure

Materials

Body:	ASTM A48 Class 30
Internals:	All stainless steel – 304
Valve and seat:	Stainless Steel 17-4PH
Test plug:	Carbon steel
Strainer:	Stainless steel – 304

Options

- Stainless steel internal check valve
- Thermic vent bucket
- Scrub wire
- Large vent 17 bar maximum

Specification

Inverted bucket steam trap, type ... in cast iron with integral strainer, with continuous air venting at steam temperature, with free-floating stainless steel mechanism, and discharge orifice at the top of the trap. Maximum allowable back pressure 99% of inlet pressure.

How to Order

Specify:

- Model number
- Size and type of pipe connection
- Maximum working pressure that will be encountered or orifice size
- Any options required

Table ST-86-1. 880 Series Side Inlet, Side Outlet Trap with Integral Strainer (dimensions in mm)
Add suffix «CV» to model number for internal check valve, «T» for thermic vent bucket.

Model No.	880*	881	882	883
Pipe Connections	15 – 20	15 – 20 – 25	15 – 20	20 – 25 – 32
Test plug	1/4"	1/4"	1/2"	3/4"
«A» Diameter	95	95	143	179
«B» Height	154	179	244	314
«C» Face-to-Face	127	127	165	200
«D» Bottom to C Inlet	87	113	146	187
Number of Bolts	6			
Weight in kg	2,5	2,7	7	14,1

* Cannot be furnished with both thermic vent bucket and check valve.
** Dimensions on request.
All models comply with the Article 4.3 of the PED (2014/68/UE).
ŧ May be derated depending on flange rating and type.

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

880 Series Inverted Bucket Steam Traps

Cast Iron for Horizontal Installation, with Integral Strainer

For Pressures to 17 bar...Capacities to 2 000 kg/h

Table ST-87-1. Model 880 Capacity

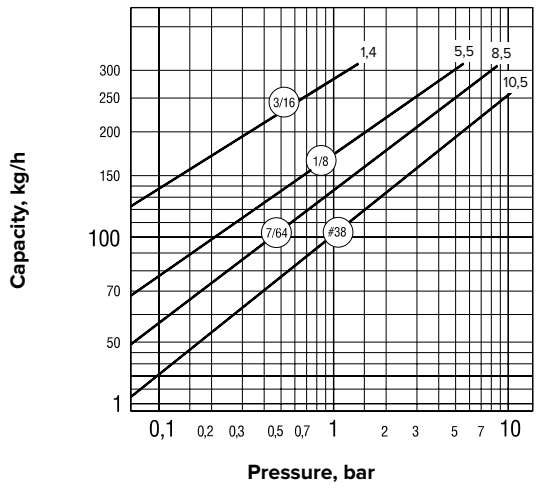


Table ST-87-2. Model 881 Capacity

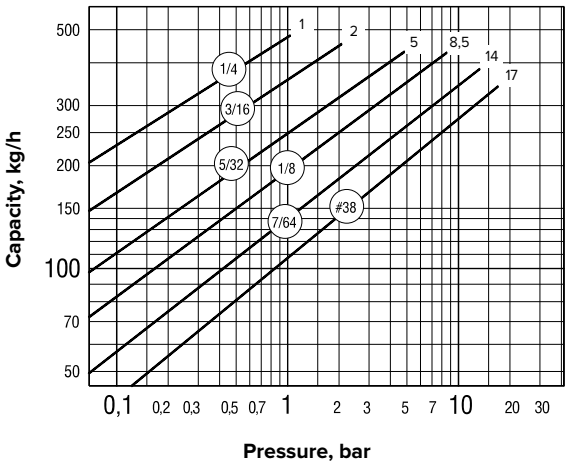


Table ST-87-3. Model 882 Capacity

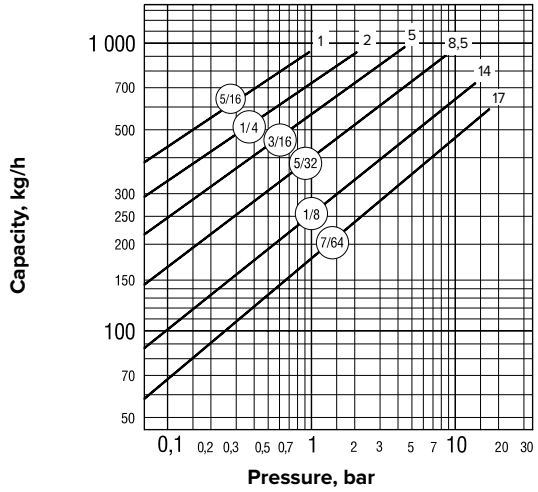
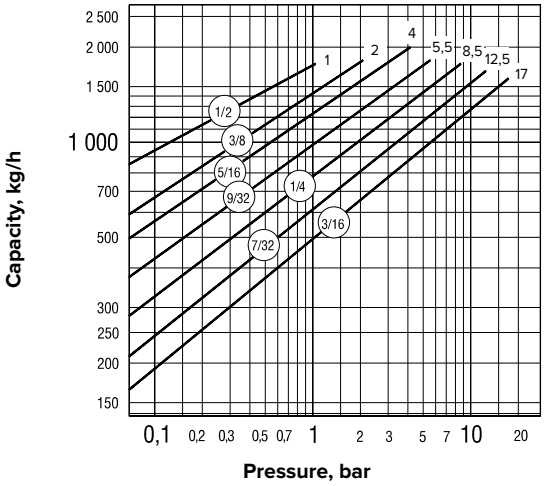


Table ST-87-4. Model 883 Capacity

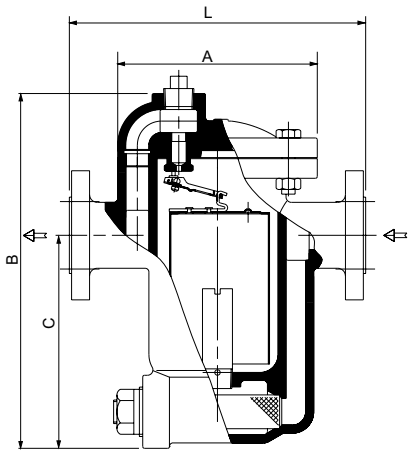


All dimensions and weights are approximate. Use certified print for exact dimensions. Design and materials are subject to change without notice.

680F Series Inverted Bucket Steam Traps

Ductile Iron for Horizontal Installation, with Integral Strainer

For Pressures to 17 bar...Capacities to 2 000 kg/h



Description

The most reliable steam trap known – the inverted bucket – provides efficient condensate drainage of virtually all types of steam-using equipment. Put the inverted bucket to work in a tough ductile iron package with an integral strainer, and you have the best of both worlds. Because they operate efficiently for longer periods of time, Armstrong ductile iron inverted buckets add solid energy savings to lower replacement/labor costs. All Armstrong ductile iron inverted bucket steam traps are repairable for even bigger maintenance savings.

A unique leverage system multiplies the force provided by the bucket to open the valve against system pressure. The mechanism is free-floating, and has no fixed pivots to create wear or friction.

Because the mechanism is located at the top of the trap, no dirt can collect on the orifice. Small particles of dirt are held in suspension until discharged by the full differential purging action when the bucket sinks, pulling the valve off the seat.

The discharge orifice is surrounded by a water seal, preventing live steam loss. Automatic air venting is provided by a small vent hole in the bucket, which provides continuous automatic air and CO_2 venting at steam temperature.

Inverted bucket traps drain continuously, although discharging intermittently, allowing no condensate backup. They are also resistant to water hammer.

Connections

Integral Flanged EN1092-2 PN25

Maximum Operating Conditions

Maximum allowable pressure :	21.8 bar @ 250 °C
Maximum operating pressure:	17 bar
Maximum back pressure:	99% of inlet pressure

Materials

Body:	ASTM A395 Gr.60-40-18
Internals:	All stainless steel – 304
Valve and seat:	Stainless Steel 17-4PH H900
Strainer:	Stainless steel – 304

Options

- Stainless steel internal check valve (add suffix CV)
- Thermic vent bucket (add suffix T)
- Large vent 17 bar maximum (add suffix LV)
- Scrub wire (add suffix BVSW)

Specification

Inverted bucket steam trap, type ... in ductile iron with integral strainer, with continuous air venting at steam temperature, with free-floating stainless steel mechanism, and discharge orifice at the top of the trap. Maximum allowable back pressure 99% of inlet pressure.

How to Order

Specify:

- Model number
- Size and type of pipe connection
- Maximum working pressure or orifice size
- Any options required

Table 88-1. 680F Series Side Inlet, Side Outlet Trap with Integral Strainer (dimensions in mm)
Add suffix «CV» to model number for internal check valve, «T» for thermic vent bucket.

Model No.	681F	682F	683F
Pipe Connections	15 – 20 – 25	15 – 20 – 25	20 – 25 – 32
Test plug	1/4"	1/2"	3/4"
«A» Face-toFace	95,2	143	178
«B» Height	179	244	314
«C» Bottom to ℄ Inlet	113	146	187
«L» Face-to-Face (Integral Flanged EN1092-2 PN25)	150 – 150 – 160	230	260
Number of Bolts	6	6	6
Weight in kg	3,8 – 4,1 – 4,5	9 – 10 – 10,5	22,5 – 23,5 – 24

All models comply with the Article 4.3 of the PED (2014/68/UE).

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

680F Series Inverted Bucket Steam Traps

Ductile Iron for Horizontal Installation, with Integral Strainer

For Pressures to 17 bar...Capacities to 2 000 kg/h

Table 89-1. Model 681F Capacity

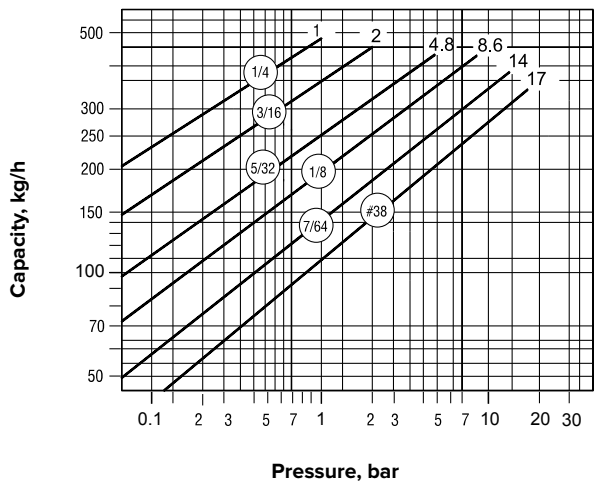


Table 89-2. Model 682F Capacity

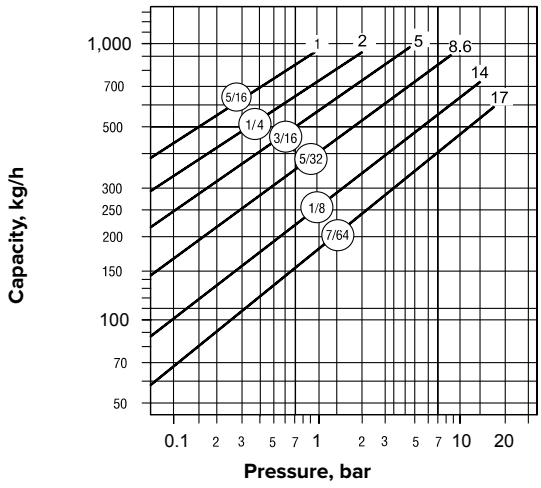
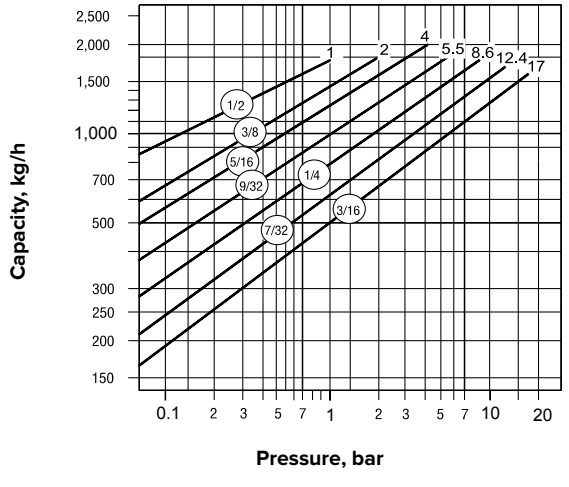


Table 89-3. Model 683F Capacity

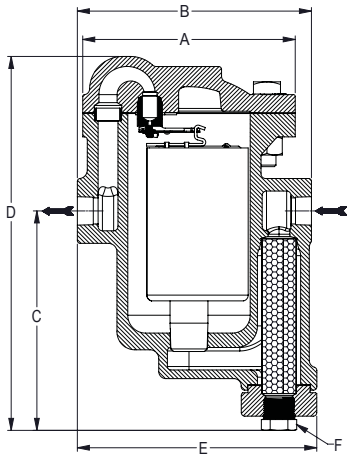


All dimensions and weights are approximate. Use certified print for exact dimensions. Design and materials are subject to change without notice.

970 Series Inverted Bucket Steam Traps

Cast Steel for Horizontal Installation With Integral Strainer

For Pressures to 41 bar (600 psig)...Capacities to 2 000 kg/hr (4 400 lb/hr)



Description

Armstrong offers two sizes of cast steel traps with in-line horizontal pipe connections and vertical integral strainers with a choice of screwed, socketweld or flanged connections.

A unique leverage system multiplies the force provided by the bucket to open the valve against system pressure. The mechanism is free-floating, and has no fixed pivots to create wear or friction. Because the mechanism is located at the top of the trap, no dirt can collect on the orifice. Small particles of dirt are held in suspension until discharged by the full differential purging action when the bucket sinks, pulling the valve off the seat.

The discharge orifice is surrounded by a water seal, preventing live steam loss. Automatic air venting is provided by a small vent hole in the bucket, which provides continuous automatic air and CO2 venting at steam temperature.

Inverted bucket traps drain continuously, although discharging intermittently, allowing no condensate backup. They are also resistant to water hammer.

Maximum Operating Conditions

Maximum allowable pressure (vessel design): 41 barg @ 343°C (600 psig @ 650°F)
51.7 barg @ 38°C (750 psig @ 100°F)
Maximum operating pressure: 41 barg (600 psig)

Connections

Screwed NPT and BSPT
Socketweld
Flanged

Note: For Integral Flanged connections option see 990F Series

Materials

Body: ASTM A216 WCB
Internals: All stainless steel—304
Valve and seat: < 34.5barg (500psig): Hardened chrome steel 17-4PH
> 34.5barg (500psig): Titanium
Strainer: Stainless steel—304
Cap: ASTM A351 Gr. CF8M Stainless Steel

Options

- Stainless steel internal check valve
- Thermic vent bucket (973 only) maximum operating pressure 17 barg
- Scrub wire

Specification

Inverted bucket steam trap, type ... in cast steel, with continuous air venting at steam temperature, free-floating stainless steel mechanism, integral strainer, and discharge orifice at the top of the trap.

How to Order

Specify:

- Model number
- Size and type of pipe connection. When flanges are required, specify type of flange in detail
- Maximum working pressure that will be encountered or orifice size
- Any options required

Table 90-1. 970 Series Traps

Model No.	971		973	
	in	mm	in	mm
Pipe Connections	1/2", 3/4", 1"	15, 20, 25	3/4", 1"	20, 25
«A» (Flange Diameter)	4.7	119	7.4	188
«B» (Face - Face, SCR or SW)	6.0	152	8.1	206
«C» (Center to Bottom Height)	5.4	138	7.5	190
«D» (Total Height)	9.0	229	12.9	328
«E» (Total Length)	5.7	145	8.3	211
«F» (Blowdown Connection)	3/8 NPT		3/4 NPT	
Weight, SCR or SW kg (lb)	6.8 (15)		20.0 (44)	

*Consult factory for flanged connections

Shading indicates products that are CE Marked according to the PED (2014/68/UE). All other models comply with Article 4.3 of the same directive.

*Face-to-face, other flanges on request. Also available with ANSI raised face, flat face or ring joint flanges.

970 Series Inverted Bucket Steam Traps

Cast Steel for Horizontal Installation With Integral Strainer

For Pressures to 41 bar (600 psig)...Capacities to 2 000 kg/hr (4 400 lb/hr)

Table 91-1. Model 971 Capacity

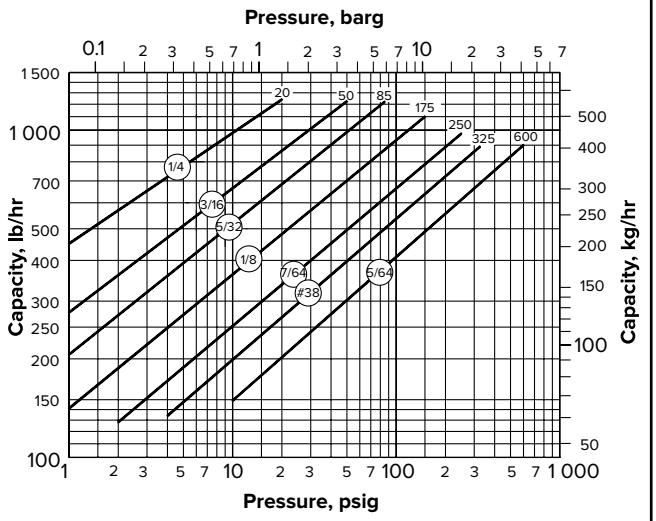
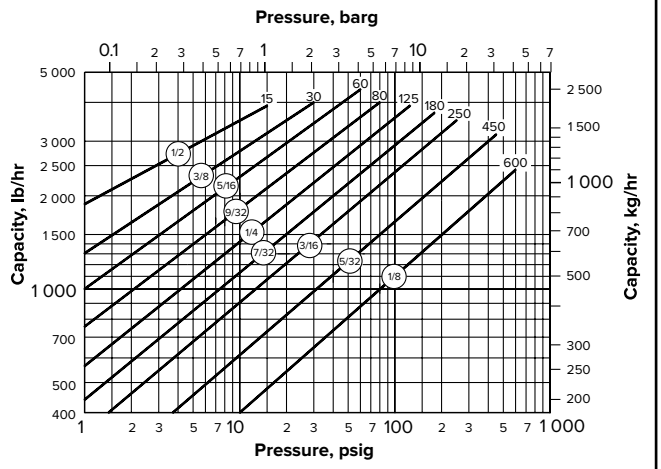


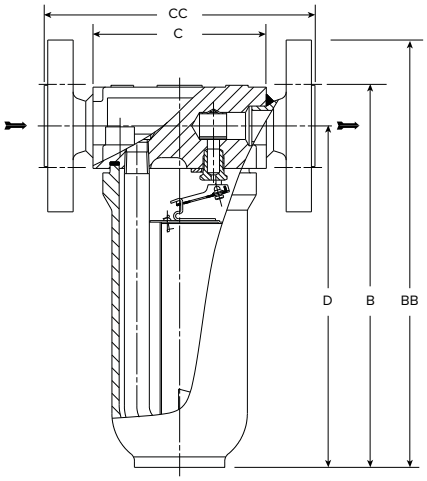
Table 91-2. Model 973 Capacity



EM Inverted Bucket Steam Trap

Forged Carbon Steel for Horizontal Installation

For Pressures to 32 bar... Capacities to 480 kg/h



Description

Armstrong's type EM forged steel inverted bucket steam trap combines the most reliable steam trap operating principle known in a body, which can be opened for Easy Maintenance.

- High resistance to wear, corrosion and water hammer.
- The free-floating guided lever valve mechanism is "friction less" with all wear points heavily reinforced. All working parts are stainless steel; valve and seat are hardened chrome steel, individually ground and lapped.
- Freedom from dirt problems. Condensate flow under bottom edge of bucket keeps sediment and "sludge" in suspension until discharged by full differential purging action. Valve orifice opens wide - closes tight. There is no buildup of dirt, no close clearances to be affected by scale. Under normal conditions of reasonably "clean steam", a strainer is not necessary. However, this is left to the user's discretion.
- Air handling ability. Vent in bucket top provides continuous automatic air and CO_2 venting with no cooling leg and prevents air binding. Wiggle wire ensures clean vent hole at all times. Any steam passing through vent is condensed and discharged as liquid.
- No steam loss. Steam does not reach the water-sealed valve.
- Inverted bucket traps require no adjustment and no live steam to operate.

Maximum operating conditions

Maximum allowable pressure (vessel design)ŧ:	32 bar - 250°C
Maximum operating pressure:	32 bar
Maximum back pressure:	99% of inlet pressure

Connections

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

Materials

Body:	Forged carbon steel
Internals:	All stainless steel – 304
Valve and seat:	Stainless Steel 17-4PH
Gasket:	Spiral wounded graphite
Bolts:	24 CrMo5

Options

- Bucket vent scrubbing wire for heavy dirt/oil conditions
- Large vent 17 bar maximum

Specification

Inverted bucket steam trap, type EM in forged steel, with automatic air vent, free-floating lever mechanism, with the orifice in the top. 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 or orifice size
- Maximum condensate load
- Any options required

Table ST-92-1. Model EM Side Inlet, Side Outlet Trap (dimensions in mm)

Pipe Connections	15	20	25
"C" Face-to-Face (screwed & SW)	98	98	—
"CC" Face-to-Face (flanged PN40*)	150	150	160
"D" Bottom to ℄ Inlet	189	189	189
"B" Height (screwed & SW)	210	210	—
"BB" Height (flanged PN40*)	235	240	245
Weight in kg (screwed & SW)	3,1	3,1	—
Weight in kg (flanged PN40*)	5,5	7,1	8,1

* Other flange sizes, ratings and face-to-face dimensions are available on request.
All sizes comply with the Article 4.3 of the PED (2014/68/UE).
ŧ May be derated depending on flange rating and type.

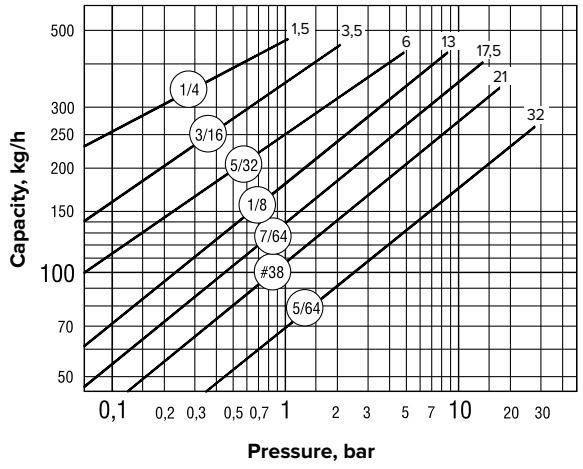
All dimensions and weights are approximate. Use certified print for exact dimensions. Design and materials are subject to change without notice.

EM Inverted Bucket Steam Trap

Forged Carbon Steel for Horizontal Installation

For Pressures to 32 bar... Capacities to 480 kg/h

Table ST-93-1. Model EM Capacity



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

300 Series Inverted Bucket Steam Traps

Forged Carbon Steel for Vertical Installation

For Pressures to 45 bar...Capacities to 9 000 kg/h

Description

Armstrong offers its 300 Series forged carbon steel traps for vertical installation with a choice of screwed, socketweld or flanged connections.

A unique leverage system multiplies the force provided by the bucket to open the valve against system pressure. The mechanism is free-floating, and has no fixed pivots to create wear or friction.

Because the mechanism is located at the top of the trap, no dirt can collect on the orifice. Small particles of dirt are held in suspension until discharged by the full differential purging action when the bucket sinks, pulling the valve off the seat.

The discharge orifice is surrounded by a water seal, preventing live steam loss. Automatic air venting is provided by a small vent hole in the bucket, which provides continuous automatic air and CO_2 venting at steam temperature.

Inverted bucket traps drain continuously, allowing no condensate backup. They are also resistant to water hammer.

For Superheat Service:

1. Don't oversize the orifice; a restricted orifice may be advisable.
2. Specify an extended inlet tube and a check valve.
3. Provide a drip leg of adequate diameter and length.
4. Provide a generous length (600-900 mm) of inlet piping, with the trap below the main.
5. Don't insulate the trap or the inlet piping.

Connections

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

Materials

Body:	ASTM A105 Models 312, 313, 316 are also available with forged stainless steel cap and bodies and all stainless steel internals
Internals:	All stainless steel – 304 (larger sizes have cast iron bucket weights)
Valve and seat:	Stainless Steel 17-4PH (<35 bar) Titanium (>35 bar)

Options

- Stainless steel internal check valve with extended inlet tube
- Thermic vent bucket 17 bar maximum
- Scrub wire
- Large vent 17 bar maximum

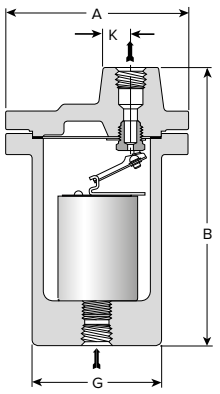
Specification

Inverted bucket steam trap, type ... in forged carbon steel, with continuous air venting at steam temperature, free-floating stainless steel mechanism, and discharge orifice at the top of the trap. Maximum allowable back pressure 99% of inlet pressure.

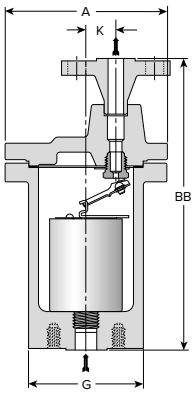
How to Order

Specify:

- Model number
- Size and type of pipe connection. When flanges are re quired, specify type of flange in detail
- Maximum working pressure that will be encountered or orifice size
- Any options required



Model 300 Trap



Series 300 FW Trap

Table ST-94-1. Pressure-Temperature Rating for Forged Steel Traps

Model No.	Maximum Oper. Pr., Saturated Steam	Maximum Allowable Pressure (Vessel Design)† of Pressure - Containing Parts at Indicated Temperature			
		-28°C / +343°C	371°C	399°C	427°C
	bar	bar			
310	27,5	53	**53**	50	41
312	41,5	41	**41**	38,5	34,5
313	45	74	**74**	67	54
314	45	**78**	77	68	56
315	45	**70**	66,5	59	47,5
316	45	**76**	72	65	52

Notes: Maximum operating pressure to be marked on nameplate will be determined by actual orifice used.
Maximum allowable pressures shown in boldface will be marked on nameplate, unless otherwise requested.
Traps with flanges may have different pressure-temperature ratings.
Maximum back pressure is 99% of inlet pressure.

Table ST-94-2. 300 Series Bottom Inlet, Top Outlet Trap (dimensions in mm)
Add suffix "CV" to trap number for internal check valve.

Model No. Screwed or SW Model No. Flanged	310 310-FW	312 312-FW	313 313-FW	314 314-FW	315 315-FW	316 316-FW
Pipe Connections	15 – 20	15 – 20 – 25	15 – 20 – 25	25 – 32	25 – 32 – 40	40 – 50
"A" Flange Diameter	114	171	203	219	248	302
"B" Face-to-Face (screwed & SW)	202	259	295	348	381	435
"BB" Face-to-Face (flanged PN100*)	282 – 287	307 – 314 – 320	343 – 349 – 355	409 – 411	442 – 444 – 446	499 – 505
"G" Body Outside Diameter	78	121	130	146	168	213
"K" ℄ Outlet to ℄ Inlet	14,3	31,7	36,5	36,5	44,4	54,0
Number of Bolts (junction cap - body)	6	6	8		9	10
Weight in kg (screwed & SW)	4,5	13,6	22,0	31,8	44,5	81,2
Weight in kg (flanged PN100*)	5,5 – 6,5	14,5 – 15,5 – 16	22,5 – 23,5 – 24	36,5 – 37,0	45,5 – 47,5 – 49	85,8 – 87,8

* Other flange sizes, ratings and face-to-face dimensions are available on request.
Shade indicates products that are CE Marked according to the PED (2014/68/UE). All the other models comply with the Article 4.3 of the same directive.
† May be derated depending on flange rating and type.

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

300 Series Inverted Bucket Steam Traps

Forged Carbon Steel for Vertical Installation

For Pressures to 45 bar...Capacities to 9 000 kg/h

Table ST-95-1. Model 310 Capacity

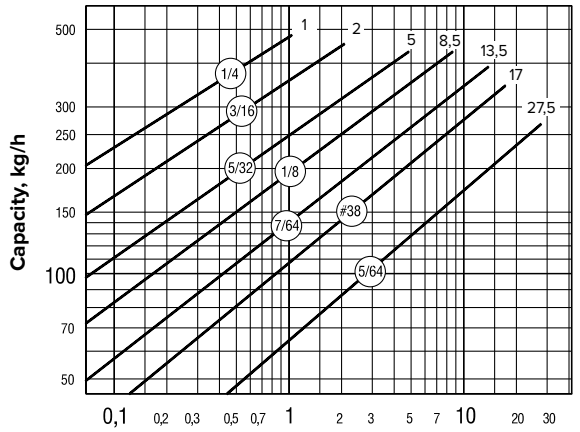


Table ST-95-2. Model 312 Capacity

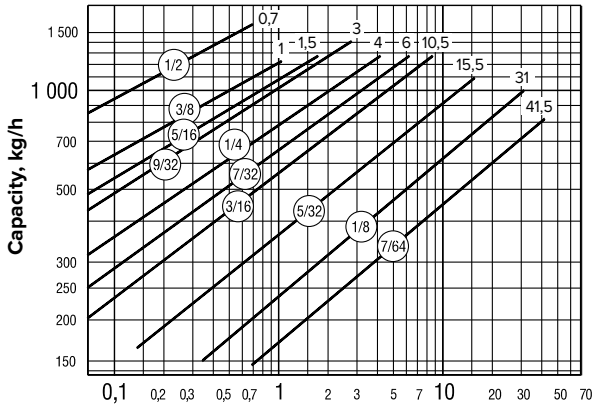


Table ST-95-3. Model 313 Capacity

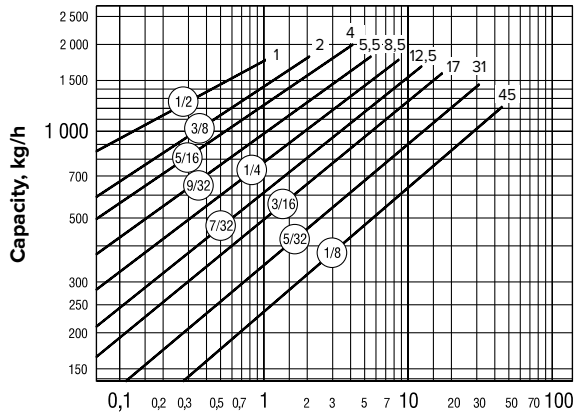


Table ST-95-4. Model 314 Capacity

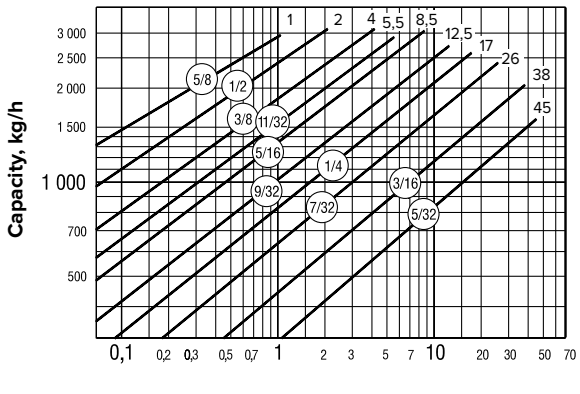


Table ST-95-5. Model 315 Capacity

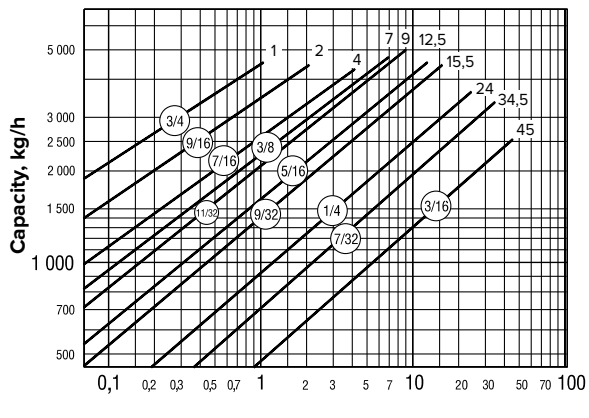
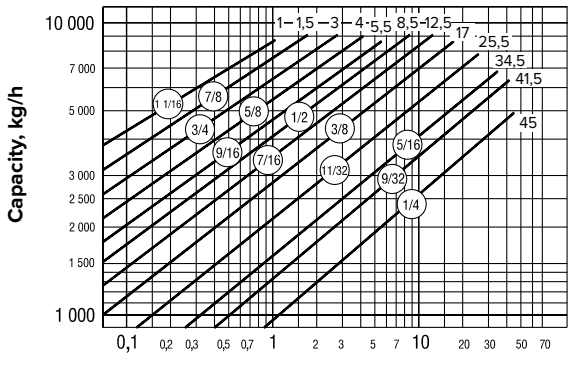


Table ST-95-6. Model 316 Capacity



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

411G Inverted Bucket Steam Traps

Forged Carbon Steel for Vertical Installation

For Pressures to 69 barg...Capacities to 590 kg/h

Description

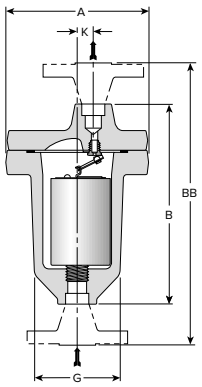
Armstrong Model 411G vertical installation offer smaller capacities at higher pressures.

A unique leverage system multiplies the force provided by the bucket to open the valve against system pressure. The mechanism is free-floating and has no fixed pivots to create wear or friction.

Because the mechanism is located at the top of the trap, no dirt can collect on the orifice. Small particles of dirt are held in suspension until discharged by the full differential purging action when the bucket sinks, pulling the valve off the seat.

The discharge orifice is surrounded by a water seal, preventing live steam loss. Automatic air venting is provided by a small vent hole in the bucket.

Inverted bucket traps drain continuously to prevent condensate backup. They are also resistant to water hammer.



Model 411G Trap

Connections

Screwed BSPT and NPT
Socketweld
Flanged DIN or ANSI (welded), (consult factory for material specification)

Materials

Body:	ASTM A105
Cap:	Stainless steel
Internals:	All stainless steel – 304
Valve and seat:	Titanium

Options

Stainless steel internal check valve

Specifications

Inverted bucket steam trap, type ... in forged carbon steel, with continuous air venting at steam temperature, free-floating stainless steel mechanism, with the discharge orifice at the top of the trap. Maximum allowable back pressure 99% of inlet pressure.

How to Order

Specify:

- Model number
- Size and type of pipe connection. When flanges are required, specify type of flange in detail
- Maximum working pressure that will be encountered or orifice size
- Any options required

Table ST-96-1. Model 411G Bottom Inlet, Top Outlet Trap (dimensions in mm)
Add suffix "CV" to trap number for internal check valve.

Model No. Screwed or SW **Model No. Flanged**	**411G** **411G-FW**
Pipe Connections	15 – 20
"A" Flange Diameter	160
"B" & "C" Face-to-Face (screwed & SW)	224
"BB" & "CC" Face-to-Face (flanged PN100*)	298 – 304
"G" Body Outside Diameter	103
"K" ℄ Outlet to ℄ Inlet	19
Number of Bolts	8
Weight in kg (screwed & SW)	11.3
Weight in kg (flanged PN100*)	14.4 – 15.4

* Other flange sizes, ratings and face-to-face dimensions are available on request.
All models comply with the Article 4.3 of the PED (2014/68/UE).

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

411G Inverted Bucket Steam Traps

Forged Carbon Steel for Vertical Installation

For Pressures to 69 barg...Capacities to 590 kg/h

Table ST-97-1. Model 411G Capacity

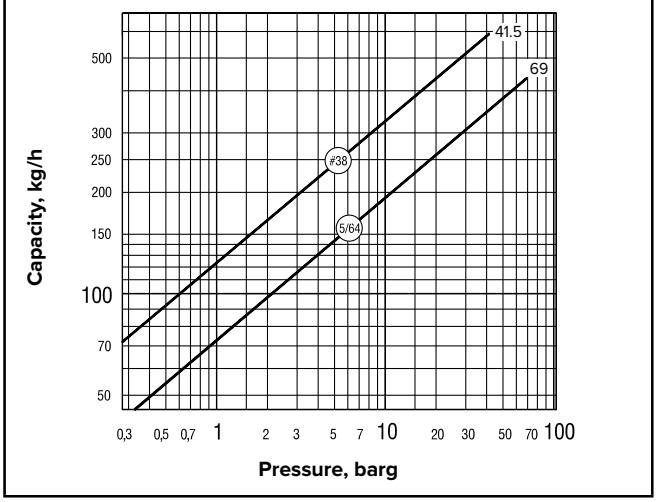


Table ST-97-2. Pressure-Temperature Rating for Forged Steel Traps

Model No.	Maximum Operating Pressure, Saturated Steam	Max. Allowable Pressure (Vessel Design)† of Pressure-Containing Parts at Indicated Temp.		
		-21 / +371°C	399°C	427°C
	barg	barg		
411G	69	**69**	65.5	58

Notes: Maximum operating pressure to be marked on nameplate will be determined by actual orifice used.
Maximum allowable pressures shown in boldface will be marked on nameplate, unless otherwise requested.
Traps with flanges may have different pressure-temperature ratings.
Maximum back pressure is 99% of inlet pressure.

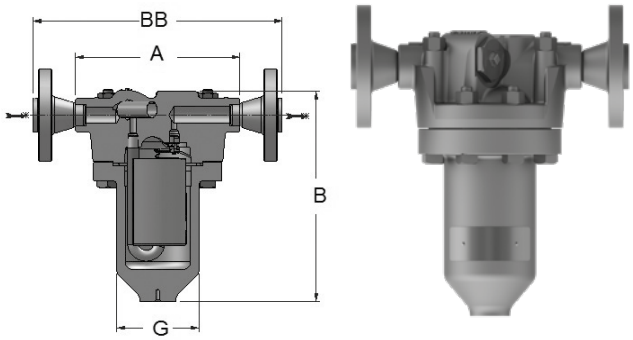
† May be derated depending on flange rating and type.

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

521 Series Inverted Bucket Steam Traps

Forged Carbon Steel for Horizontal Installation

For Pressures to 69 barg...Capacities to 590 kg/hr



Model 521 Trap

Table ST-98-1. Model 521 Side Inlet, Side Outlet Traps Add suffix "CV" to trap number for internal check valve.	
Model No. Screwed or SW **Model No. Flanged**	**521** **521-FW**
Pipe Connections	1/2", 3/4
"A"	203
"B" (Height, screwed & SW)	263
"G" Body Outside Diameter	102
Number of Bolts	8
Weight in kg (screwed & SW)	13.4

Other flange sizes available on request, consult factory.

Armstrong Model 521 horizontal installation offers smaller capacities at higher pressures.

A unique leverage system multiplies the force provided by the bucket to open the valve against system pressure. The mechanism is free-floating and has no fixed pivots to create wear or friction, because the mechanism is located at the top of the trap, no dirt can collect on the orifice. Small particles of dirt are held in suspension until discharged by the full differential purging action when the bucket sinks, pulling the valve off the seat. The discharge orifice is surrounded by a water seal, preventing live steam loss. Automatic air venting is provided by a small vent hole in the bucket. Inverted bucket traps drain continuously to prevent condensate backup. They are also resistant to water hammer. Model 521 adds the convenience and savings of in-line repairability and is designed to meet today's energy-management requirements efficiently and economically over a long, trouble-free service life. Model 521 also has an integral strainer to protect from dirt and scale

Connections

Screwed NPT and BSPT
Socketweld
Flanged EN 1092-1 or ASME B16.5

Materials

Body:	ASTM A105N
Cap:	ASTM A105N
Internals:	All stainless steel—304
Valve and seat:	Titanium
Strainer Screen	Stainless Steel
Bolt/Nut	ASTM A193 Gr B7/ASTM A194 Gr2H

Specifications

Inverted bucket steam trap with integral strainer, type ... in forged carbon steel, with continuous air venting at steam temperature, free-floating stainless steel mechanism, with the discharge orifice at the top of the trap.

How to Order

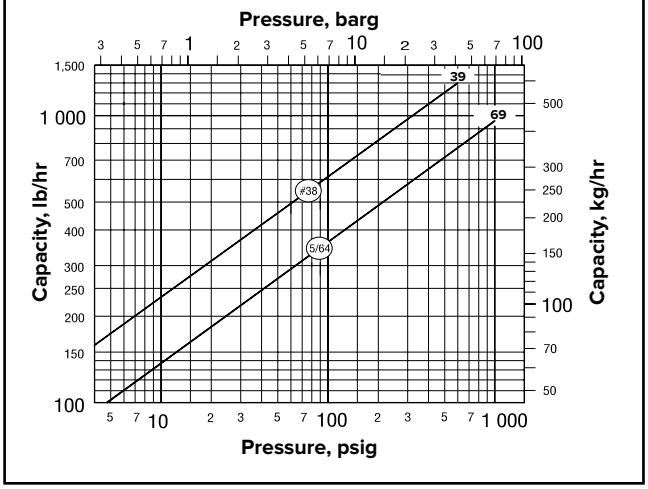
Specify:

- Model number
- Size and type of pipe connection. When flanges are required, specify type of flange in detail
- Maximum working pressure that will be encountered or orifice size
- Any options required

Table ST-98-2. Pressure-Temperature Rating for Forged Steel Traps					
Model No.	**Max. Oper. Pressure, Sat. Steam**	**Maximum Allowable Pressure (Vessel Design) of Pressure-Containing Parts at Indicated Temperature**			
		°C	°C	°C	°C
		-28/+343	371	399	427
	barg	barg	barg	barg	barg
521	69	69	69	65.5	58

NOTE: Maximum operating pressure to be marked on nameplate will be determined by actual orifice used. Traps with flanges may have different pressure-temperature ratings.

Table ST-98-3. Model 521 Capacity



NOTE: #38 orifice in Model 521 is limited to 39 barg.

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Notes

400 Series Inverted Bucket Steam Traps

Forged Chrome-moly Steel for Vertical Installation

For Pressures to 69 bar...Capacities to 9 000 kg/h

Description

Armstrong offers its 400 Series forged chrome-moly steel traps for vertical installation with a choice of screwed, socketweld or flanged connections.

A unique leverage system multiplies the force provided by the bucket to open the valve against system pressure. The mechanism is free-floating and has no fixed pivots to create wear or friction.

Because the mechanism is located at the top of the trap, no dirt can collect on the orifice. Small particles of dirt are held in suspension until discharged by the full differential purging action when the bucket sinks, pulling the valve off the seat.

The discharge orifice is surrounded by a water seal, preventing live steam loss. Automatic air venting is provided by a small vent hole in the bucket. This provides continuous automatic air and CO_2 venting at steam temperature.

Inverted bucket traps drain continuously to prevent condensate backup. They are also resistant to water hammer.

Operation on Superheat. A normally operating bucket trap is filled with saturated steam and condensate. Superheated steam can enter only as fast as the steam inside can condense. As a result, the temperature of the trap is at (or slightly below) saturated steam temperature, regardless of the degree of superheat.

Trap Selection. The pressure-containing parts of the steam trap should safely withstand the maximum pressure and temperature conditions of the system. For example, a trap is required for a 62 bar main at 482°C. The normal operating temperature of the trap will be about 278°C. A Model 415 trap should be selected, even though several smaller traps are capable of handling the working pressure.

For Superheat Service:

1. Don't oversize the orifice; a restricted orifice may be advisable.
2. Specify an extended inlet tube and a check valve..
3. Provide a drip leg of adequate diameter and length.
4. Provide a generous length (600-900 mm) of inlet piping, with the trap below the main.
5. Don't insulate the trap or the inlet piping.

Connections

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

Materials

Body:	ASTM A182 F22 Class 3 Models 413 and 415 are available with forged stainless steel cap and bodies and all stainless steel inter nals
Internals:	All stainless steel – 304
Valve and seat:	Stainless Steel 17-4PH (<35 bar) Titanium (>35 bar)

Options

- Stainless steel internal check valve with extented inlet tube.

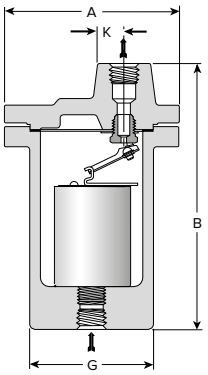
Specification

Inverted bucket steam trap, type ... in forged chrome-moly steel, with continuous air venting at steam temperature, free-floating stainless steel mechanism, with the discharge orifice at the top of the trap. Maximum allowable back pressure 99% of inlet pressure.

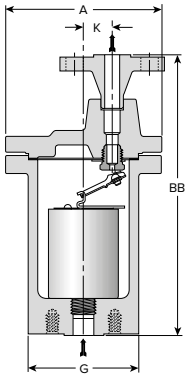
How to Order

Specify:

- Model number
- Size and type of pipe connection. When flanges are re quired, specify type of flange in detail
- Maximum working pressure that will be encountered or orifice size
- Any options required



Model 400 Trap



Series 400 FW Trap

Table ST-100-1. 400 Series Bottom Inlet, Top Outlet Trap (dimensions in mm)
Add suffix "CV" to trap number for internal check valve.

Model No. Screwed or SW **Model No. Flanged**	**413** **413-FW**	**415** **415-FW**	**416** **416-FW**
Pipe Connections	15 – 20 – 25	25 – 32 – 40	40 – 50
"A" Flange Diameter	219	273	317
"B" Face-to-Face (screwed & SW)	305	379	448
"BB" Face-to-Face (flanged PN100*)	353 – 360 – 366	440 – 444 – 446	513 – 519
"G" Body Outside Diameter	137	175	216
"K" ℄ Outlet to ℄ Inlet	36,5	44,4	54
Number of Bolts	8	9	12
Weight in kg (screwed & SW)	29,5	57,2	88,0
Weight in kg (flanged PN100*)	31,5 – 32,5 – 33,0	58,0 – 60,0 – 61,5	92,5 – 94,5

* Other flange sizes, ratings and face-to-face dimensions are available on request.
All models are CE Marked according to the PED (2014/68/UE).

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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400 Series Inverted Bucket Steam Traps

Forged Chrome-moly Steel for Vertical Installation

For Pressures to 69 bar...Capacities to 9 000 kg/h

Table ST-101-1. Model 413 Capacity

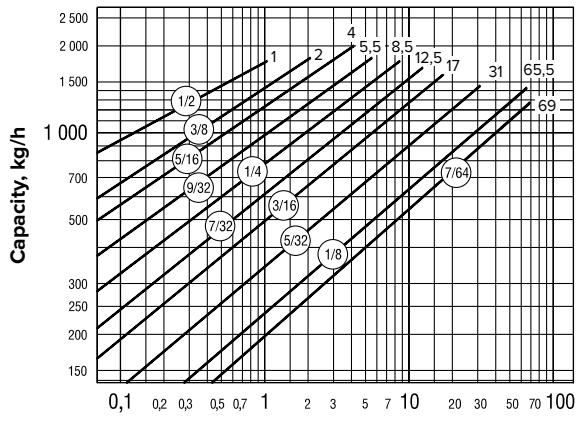


Table ST-101-2. Model 415 Capacity

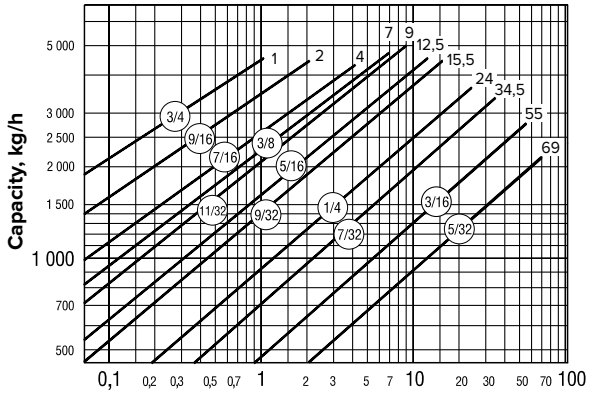


Table ST-101-3. Model 416 Capacity

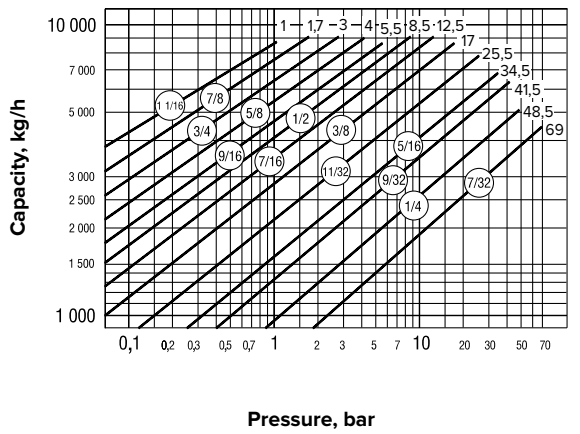


Table ST-101-4. Pressure-Temperature Rating for Forged Steel Traps

Model No.	Maximum Operating Pressure, Saturated Steam	Max. Allowable Pressure (Vessel Design)† of Pressure-Containing Parts at Indicated Temp.			
		-28 / +399°C	427°C	454°C	482°C
	bar	bar			
413	69	83	**83**	72	54
415	69	76	**76**	74,5	66,5
416	69	**117**	114	93	68

Notes: Maximum operating pressure to be marked on nameplate will be determined by actual orifice used.
Maximum allowable pressures shown in boldface will be marked on nameplate, unless otherwise requested.
Traps with flanges may have different pressure-temperature ratings.
Maximum back pressure is 99% of inlet pressure.

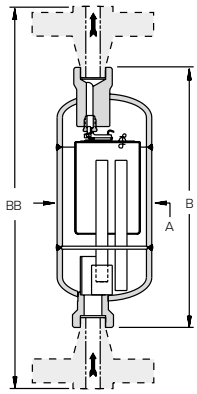
† May be derated depending on flange rating and type.

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

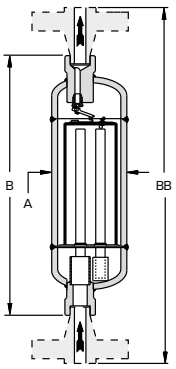
401-SH/501-SH Inverted Bucket Superheated Steam Traps

Carbon Steel or Stainless Steel for Vertical Installation

For Pressures to 106 bar...Capacities to 430 kg/h



Model 401-SH



Model 501-SH

Description

Armstrong's 401-SH/501-SH Series inverted bucket steam trap line **is made for overcoming the difficult combination of superheat and high pressure/low load service.**

To survive this most severe steam service, Armstrong created an inverted bucket trap with a unique accumulation chamber. The chamber collects sufficient condensate to ensure full discharge cycles. A cup in the chamber floats up and down on the steam inlet tube, sealing it off as the condensate level rises. At the same time as the chamber collects condensate, steam continues to flow under the bucket, making sure that the discharge valve closes tightly until the condensate rises into the trap body and the bucket falls down. The operation is on/off, no throttling or dribbling.

Furthermore, it combines all the advantages of an inverted bucket steam trap:

- High resistance to wear, corrosion and water hammer with **no gaskets.**
- A unique leverage system multiplies the force provided by the bucket, to open the valve against system pressure.
- The mechanism is located at the top. No dirt can collect on the orifice. Small particles of dirt will be held in suspen sion until discharged by the full differential purging action.
- The discharge orifice is surrounded by a water seal, pre venting live steam loss. Automatic air venting is provided by a small hole in the bucket.
- Inverted bucket traps require no adjustment. They do not allow condensate backup and are resistant to water hamer.

Connections

Screwed BSPT and NPT (401-SH only)
Socketweld
Flanged DIN or ANSI (welded)

Maximum Operating Conditions

Maximum allowable pressure (vessel design)ŧ:
Model 401-SH: 69 bar @ 427°C
Model 501-SH: 106 bar @ 454°C
Maximum operating pressure:
Model 401-SH: 69 bar
Model 501-SH: 106 bar
Maximum back pressure: 99% of inlet pressure

Materials

Body:
Model 401-SH Carbon steel ASTM A106 Gr. B Sch. 80 pipe
Model 501-SH Stainless steel 316L ASTM A312 Sch. 80 pipe
Internals: Stainless steel – 304
Valve and seat: Titanium
Connections:
Model 401-SH Stainless steel – 304
Model 501-SH Stainless steel – 316L

Specification

Inverted bucket steam trap, type 401-SH in carbon steel or 501-SH in stainless steel, with accumulation chamber, continuous air venting at steam temperature, stainless steel leverage system, with the discharge orifice at the top of the trap. Maximum allowable back pressure 99% of inlet pressure.

How to Order

Specify:
- Model number
- Size and type of pipe connection. When flanges are re quired, specify type of flange in detail
- Maximum working pressure that will be encountered or orifice size

Table ST-102-1. Model 401-SH and Model 501-SH Bottom Inlet, Top Outlet Trap (dimensions in mm)

Model No.	401-SH	501-SH
Pipe Connections	15 – 20	15 – 20
"A" Body Outside Diameter	100	100
"B" Face-to-Face (screwed & SW)	279	350
"BB" Height (flanged 401-SH PN100 & 501-SH PN250*)	356 – 390	476 – 480
Weight in kg (screwed & SW)	5,5	7
Weight in kg (flanged 401-SH PN100 & 501-SH PN250*)	6,7 – 7,3	13 – 13,5

* Other flange sizes, ratings and face-to-face dimensions are available on request.
All models are CE Marked according to the PED (2014/68/UE).
ŧ May be derated depending on flange rating and type.

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

401-SH/501-SH Inverted Bucket Superheated Steam Traps

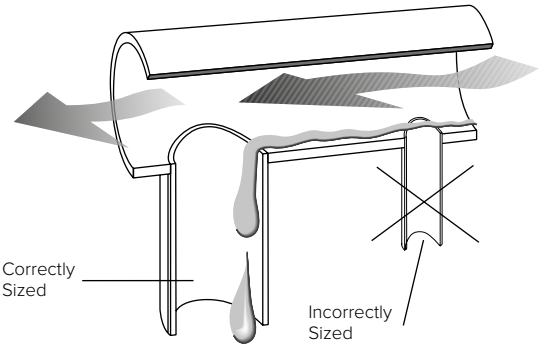
Carbon Steel or Stainless Steel for Vertical Installation

For Pressures to 106 bar...Capacities to 430 kg/h

Installation Recommendations

What little condensate there is on superheat and high pressure/low load service usually forms in drip legs and in the traps themselves. Therefore proper piping and drip legs of adequate size and diameter are essential for the successful operation of the Armstrong superheat trap.

Drip Leg Sizing



The properly sized drip leg will capture condensate. Too small a drip leg can actually cause a venturi "piccolo" effect where pressure drop pulls condensate out of the drip leg and trap.

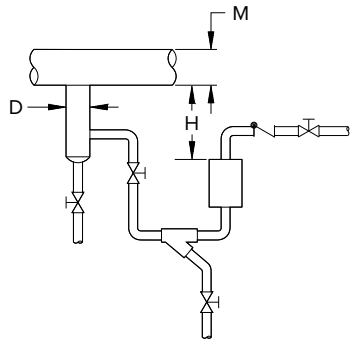


Table ST-103-1. Model 401/501 Capacity

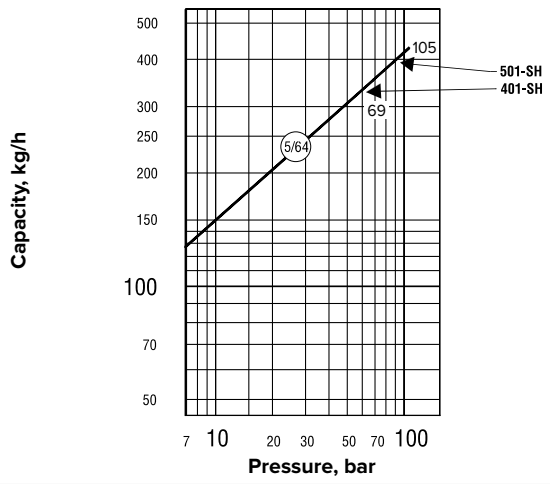
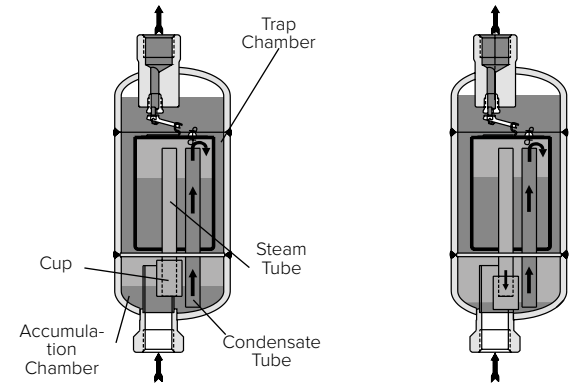


Table ST-103-2. Recommended Steam Main and Branch Line Drip Leg Tracing

M Steam Main Size		D Drip Leg Diameter		H Drip Leg Length Minimum Supervised Warm-Up		Automatic Warm-Up	
mm	in.	mm	in.	mm	in.	mm	in.
15	1/2"	15	1/2"	250	10"	710	28"
20	3/4"	20	3/4"	250	10"	710	28"
25	1"	25	1"	250	10"	710	28"
50	2"	50	2"	250	10"	710	28"
75	3"	75	3"	250	10"	710	28"
100	4"	100	4"	250	10"	710	28"
150	6"	100	4"	250	10"	710	28"
200	8"	100	4"	300	12"	710	28"
250	10"	150	6"	380	15"	710	28"
300	12"	150	6"	450	18"	710	28"
350	14"	200	8"	530	21"	710	28"
400	16"	200	8"	600	24"	710	28"
450	18"	250	10"	685	27"	710	28"
500	20"	250	10"	760	30"	760	30"
600	24"	300	12"	910	36"	910	36"

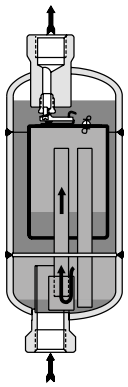
Trap Draining Drip Leg on Steam Main

Air Steam Condensate

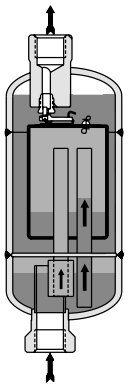


Cycling – Discharge Valve Wide Open
With the steam feed tube to the trap chamber sealed, condensate flows through the condensate feed tube (from accumulation chamber) into the trap chamber. This sinks the inverted bucket, which opens the discharge valve, cycling the trap.

Cycle Ending
As the level of condensate in the accumulation chamber falls, the cup sealing the steam feed tube moves downward, opening a passage for steam to flow into trap chamber.



Trap Closed
As steam begins to flow through the accumulation chamber and up the steam feed tube under the inverted bucket in the trap chamber, the discharge valve closes tightly.



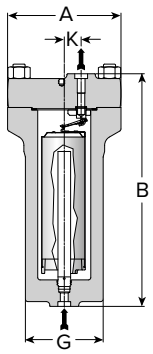
Cycle About to Repeat
As the level of condensate rises in the accumulation chamber, the cup floats up until it again seals the steam feed tube, and the cycle repeats.

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

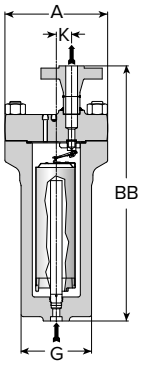
5000 Series Inverted Bucket Steam Traps

Forged Chrome-moly Steel for Vertical Installation

For Pressures to 124 bar...Capacities to 2 340 kg/h



Series 5133G & 5155G Traps



Series 5133G-FW & 5155G-FW Traps

Description

Armstrong offers its 5000 Series forged chrome-moly steel traps for vertical installation with a choice of screwed, socketweld or flanged connections.

A unique leverage system multiplies the force provided by the bucket to open the valve against system pressure. The mechanism is free-floating and has no fixed pivots to create wear or friction.

Because the mechanism is located at the top of the trap, no dirt can collect on the orifice. Small particles of dirt are held in suspension until discharged by the full differential purging action when the bucket sinks, pulling the valve off the seat.

The discharge orifice is surrounded by a water seal, preventing live steam loss. Automatic air venting is provided by a small vent hole in the bucket. This provides continuous automatic air and CO_2 venting at steam temperature.

Inverted bucket traps drain continuously, although discharging intermittently, to prevent condensate backup. They are also resistant to water hammer.

Operation on Superheat. A normally operating bucket trap is filled with saturated steam and condensate. Superheated steam can enter only as fast as the steam inside can condense. As a result, the temperature of the trap is at (or slightly below) saturated steam temperature, regardless of the degree of superheat.

Trap Selection. The pressure-containing parts of the steam trap should safely withstand the maximum pressure and temperature conditions of the system. For example, a trap is required for a 68 bar main at 510°C. The normal operating temperature of the trap will be about 286°C.
A Model 5133G trap should be selected, even though several smaller traps are capable of handling the working pressure.

For Superheat Service:

1. Don't oversize the orifice; a restricted orifice may be advisable.
2. Specify an extended inlet tube and a check valve..
3. Provide a drip leg of adequate diameter and length.
4. Provide a generous length (600-900 mm) of inlet piping, with the trap below the main.
5. Don't insulate the trap or the inlet piping.

Connections

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

Materials

Body:	ASTM A182 F22 Class 3
Internals:	All stainless steel – 304
Valve and seat:	Titanium

Options

- Stainless steel internal check valve with extented inlet tube.

Table ST-104-1. 5000 Series Bottom Inlet, Top Outlet Trap (dimensions in mm)
Add suffix "CV" to trap number for internal check valve.

Model No. Screwed or SW **Model No. Flanged**	**5133G** **5133G-FW**	**5155G** **5155G-FW**
Pipe Connections	15 – 20 – 25	20 – 25 – 32
"A" Flange Diameter	216	264
"B" Face-to-Face (screwed & SW)	362	412
"BB" Face-to-Face (flanged PN160*)	457 – 463 – 470	540 – 540 – 540
"G" Body Outside Diameter	140	194
"K" ℄ Outlet to ℄ Inlet	33,0	44,5
Number of Bolts	8	10
Weight in kg (screwed & SW)	44,5	77,5
Weight in kg (flanged PN160*)	47,0 – 47,5 – 48,0	89,0 – 89,5 – 90,0

* Other flange sizes, ratings and face-to-face dimensions are available on request.
All models are CE Marked according to the PED (2014/68/UE).

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

5000 Series Inverted Bucket Steam Traps

Forged Chrome-moly Steel for Vertical Installation

For Pressures to 124 bar...Capacities to 2 340 kg/h

Table ST-105-1. Model 5133G Capacity

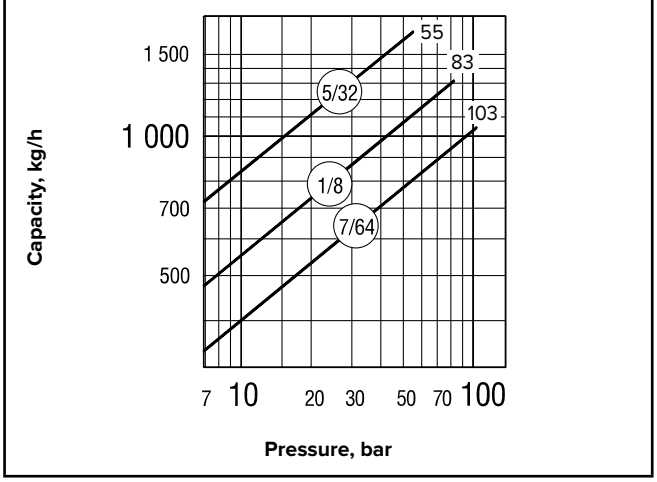


Table ST-105-2. Model 5155G Capacity

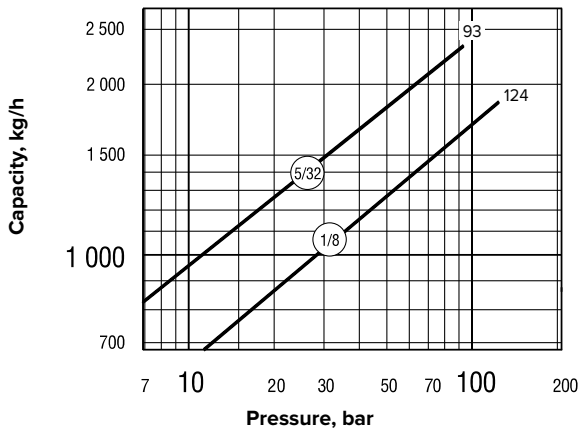


Table ST-105-3. Pressure-Temperature Rating for Forged Steel Traps

Model No.	Maximum Operating Pressure, Saturated Steam	Maximum Allowable Pressure (Vessel Design)† of Pressure-Containing Parts at Indicated Temperature							
		-28 / +343°C	371°C	399°C	427°C	454°C	482°C	510°C	538°C
	bar	bar							
5133G	103	146	146	146	**146**	137	119	93	64
5155G	124	174	174	174	**174**	163	143	111	76,5

Notes: Maximum operating pressure to be marked on nameplate will be determined by actual orifice used.
Maximum allowable pressures shown in boldface will be marked on nameplate, unless otherwise requested.
Traps with flanges may have different pressure-temperature ratings.
Maximum back pressure is 99% of inlet pressure.

Options

Internal Check Valves are spring loaded stainless steel and screw into an extended inlet tube having a pipe coupling at the top to save fittings, labor and money. Internal check valves may result in slightly reduced capacities.

Screwed Connections are available in all sizes for pressures of 63 bar or less. Traps for pressures of 63 bar or higher are available with socketweld or flanged connections.

Specification

Inverted bucket steam trap, type ... in forged chrome-moly steel, with continuous air venting at steam temperature, free-floating stainless steel mechanism, with the discharge orifice at the top of the trap. Maximum allowable back pressure 99% of inlet pressure.

How to Order

Specify:

- Model number
- Size and type of pipe connection. When flanges are required, specify type of flange in detail
- Maximum working pressure that will be encountered or orifice size
- Any options required

† May be derated depending on flange rating and type.

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

6000 Series Inverted Bucket Steam Traps

Forged Chrome-moly Steel for Vertical Installation

For Pressures to 186 bar...Capacities to 2 950 kg/h

Description

Armstrong offers its 6000 Series forged chrome-moly steel traps for vertical installation with a choice of socketweld or flanged connections.

A unique leverage system multiplies the force provided by the bucket to open the valve against system pressure. The mechanism is free-floating and has no fixed pivots to create wear or friction.

Because the mechanism is located at the top of the trap, no dirt can collect on the orifice. Small particles of dirt are held in suspension until discharged by the full differential purging action when the bucket sinks, pulling the valve off the seat.

The discharge orifice is surrounded by a water seal, preventing live steam loss. Automatic air venting is provided by a small vent hole in the bucket. This provides continuous automatic air and CO_2 venting at steam temperature.

Inverted bucket traps drain continuously, although discharging intermittently, to prevent condensate backup. They are also resistant to water hammer.

Operation on Superheat. A normally operating bucket trap is filled with saturated steam and condensate. Superheated steam can enter only as fast as the steam inside can condense. As a result, the temperature of the trap is at (or slightly below) saturated steam temperature, regardless of the degree of superheat.

Trap Selection. The pressure-containing parts of the steam trap should safely withstand the maximum pressure and temperature conditions of the system. For example, a trap is required for a 102 bar main at 538°C. The normal operating temperature of the trap will be about 299°C. A Model 6155G trap should be selected, even though several smaller traps are capable of handling the working pressure.

For Superheat Service:

1. Don't oversize the orifice; a restricted orifice may be advisable.
2. Specify an extended inlet tube and a check valve..
3. Provide a drip leg of adequate diameter and length.
4. Provide a generous length (600-900 mm) of inlet piping, with the trap below the main.
5. Don't insulate the trap or the inlet piping.

Connections

Socketweld
Flanged EN 1092-1 & ASME B16.5 (welded)

Materials

Body:	ASTM A182 F22 Class 3
Internals:	All stainless steel – 304
Valve and seat:	Titanium

Options

- Stainless steel internal check valve with extented inlet tube.

Screwed connections are available in all sizes for pressures of 62 bar or less. Traps for pressures of 62 bar or higher are available with socketweld or flanged connections.

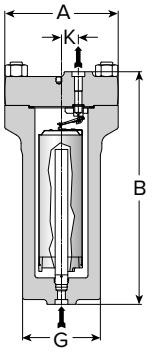
Specification

Inverted bucket steam trap, type 6155 in forged chrome-moly steel, with continuous air venting at steam temperature, free-floating stainless steel mechanism, with the discharge orifice at the top of the trap. Maximum allowable back pressure 99% of inlet pressure.

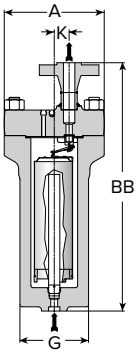
How to Order

Specify:

- Model number
- Size and type of pipe connection. When flanges are required, specify type of flange in detail
- Maximum working pressure that will be encountered or orifice size
- Any options required



Model 6000 Trap



Series 6000 FW Trap

Table ST-106-1. 6000 Series Bottom Inlet, Top Outlet Trap (dimensions in mm)
Add suffix "CV" to trap number for internal check valve.

Model No. Screwed or SW **Model No. Flanged**	**6155G** **6155G-FW**
Pipe Connections	25 – 32
"A" Flange Diameter	300
"B" Face-to-Face (SW)	613
"BB" Face-to-Face (flanged PN250*)	740 – 740
"G" Body Outside Diameter	213
"K" ℄Outlet to ℄ Inlet	44,5
Number of Bolts	10
Weight in kg (SW)	147,4
Weight in kg (flanged PN250*)	151,0 – 154,0

* Other flange sizes, ratings and face-to-face dimensions are available on request.
All models are CE Marked according to the PED (2014/68/UE).

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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Table ST-107-1. Model 6155G Capacity

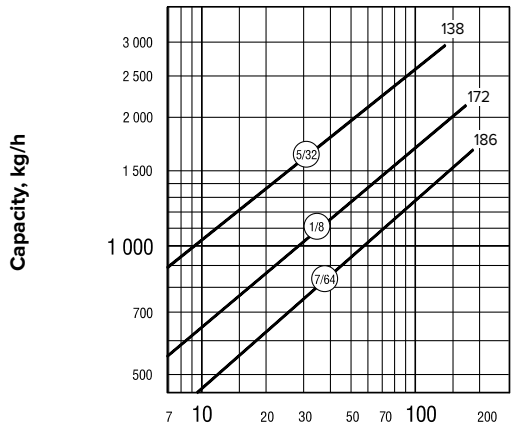


Table ST-107-2. Pressure-Temperature Rating for Forged Steel Traps

Model No.	Maximum Operating Pressure, Saturated Steam	Maximum Allowable Pressure (Vessel Design)† of Pressure-Containing Parts at Indicated Temperature							
		-28 / +343°C	371°C	399°C	427°C	454°C	482°C	510°C	538°C
	bar	bar							
6155G	186	241	241	241	241	**241**	213	166	114

Notes: Maximum operating pressure to be marked on nameplate will be determined by actual orifice used.
Maximum allowable pressures shown in boldface will be marked on nameplate, unless otherwise requested.
Traps with flanges may have different pressure-temperature ratings.
Maximum back pressure is 99% of inlet pressure.

Options

Internal Check Valves are spring loaded stainless steel and screw into an extended inlet tube having a pipe coupling at the top to save fittings, labor and money. Internal check valves may result in slightly reduced capacities.

† May be derated depending on flange rating and type.

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

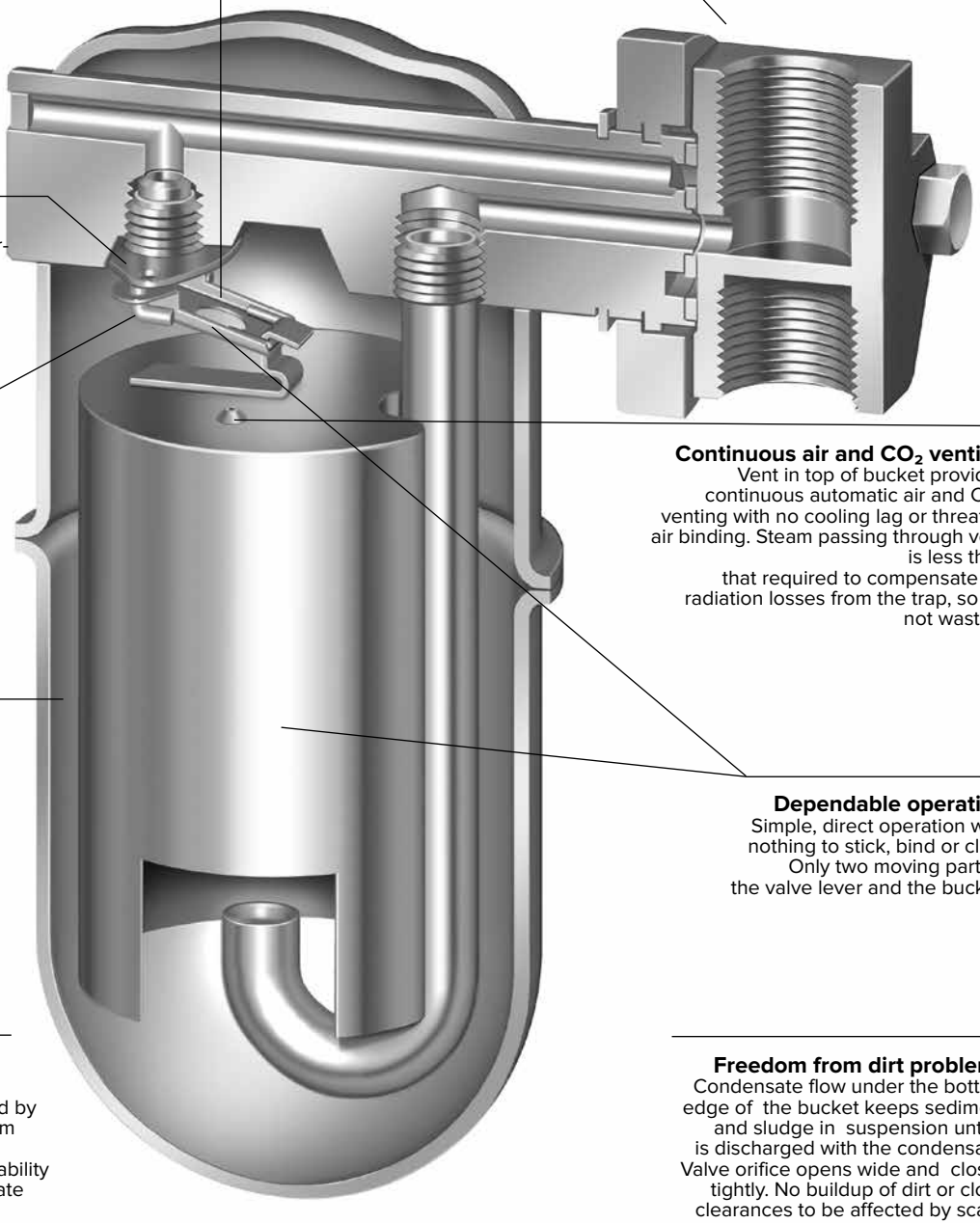
2000 Series Stainless Steel Steam Traps

The Armstrong stainless steel traps – Series 1000, Series 1800 and Series 2000 – have high resistance to damage from freeze-ups. They also offer high resistance to wear and corrosion for longer service reliability, and they provide continuous air venting.

Armstrong stainless steel traps provide maximum ease and economy of installation, inspection or replacement. What's more, an Armstrong stainless steel trap is the ideal solution for trapping applications such as tracer lines, steam mains and heating and processing applications.

Wear and corrosion resistance
Free-floating guided lever valve mechanism is "frictionless," and all wear points are heavily reinforced. All working parts are stainless steel. Valve and seat are stainless steel, individually ground and lapped together in matched sets.

360° universal 304 stainless steel connector
Provides quick, easy in-line renewability along with all the proven advantages of an inverted bucket operation. Also available with optional IS-2 integral strainer connector with 20 x 20 mesh stainless steel strainer.



Virtually no steam loss
Steam does not reach the water-sealed discharge valve.

Purging action
Snap opening of the valve creates a momentary pressure drop and turbulence in the unit drained. This breaks up films of condensate and air and speeds their flow to the trap.

Continuous air and CO_2 venting
Vent in top of bucket provides continuous automatic air and CO_2 venting with no cooling lag or threat of air binding. Steam passing through vent is less than that required to compensate for radiation losses from the trap, so it's not wasted.

Sealed, tamperproof 304-L stainless steel package
Able to withstand freeze-ups without damage.

Dependable operation
Simple, direct operation with nothing to stick, bind or clog. Only two moving parts – the valve lever and the bucket.

Excellent operation against back pressure
Since trap operation is governed by the difference in density of steam and water, back pressure in the return line has no effect on the ability of the trap to open for condensate and close against steam.

Freedom from dirt problems
Condensate flow under the bottom edge of the bucket keeps sediment and sludge in suspension until it is discharged with the condensate. Valve orifice opens wide and closes tightly. No buildup of dirt or close clearances to be affected by scale.

Resistance to damage from water hammer
Open bucket or float will not collapse as a result of water hammer.

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2000 Series Stainless Steel Steam Traps

For Pressures to 45 bar...Capacities to 590 kg/h
With the Series 2000 360° universal connector, you can install inverted bucket efficiency and long service life in any piping configuration with little or no repiping. You get the reliability of the inverted bucket operating principle, plus all the benefits of all-stainless steel construction:

- A sealed, tamperproof package
- A compact, lightweight trap
- The ability to withstand freeze-ups without damage
- Exceptional corrosion resistance
- A three-year guarantee against defective materials or workmanship

Series 2000 steam traps combine savings in three important areas: energy, installation and replacement. The 360° universal connector provides quick, easy in-line renewability along with all the proven advantages of an inverted bucket operation. Choice of NPT or BSPT screwed connections, or socketweld connections.

Also available with optional IS-2 integral strainer connector.

Available with
trap valve station TVS-4000
Material: ASTM A351 Gr. CF8M

Available with Standard Connector
Material: 304 Stainless Steel

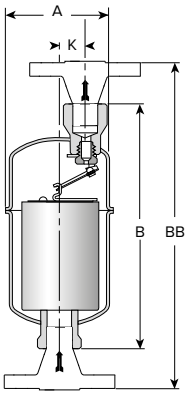
Available with
IS-2 Integral Strainer Connector
(shown with optional blowdown valve)
Material: 304 Stainless Steel

Available with
IS-4 Connector
Material: ASTM A351 Gr. CF8M

1000 Series Inverted Bucket Steam Traps

All Stainless Steel for Vertical Installation

For Pressures to 45 bar...Capacities to 2 000 kg/h



Description

Armstrong 1000 Series stainless steel inverted bucket steam traps normally last three to four times longer than conventional traps used in identical services. Heat-treated stainless steel valves and seats are of the same design, material and workmanship as those used in traps for pressures up to 62 bar and temperatures to 482°C. More compact than cast iron or carbon steel equivalents, 1000 Series traps are ideal for trapping applications such as tracer lines, steam mains and heating/process applications.
The 1000 series is guaranteed for three years.

Description Maximum Operating Conditions

Maximum allowable pressure (vessel design)ŧ:

Model 1010, 1011:	27.5 bar @ 427°C
Model 1022:	44.8 bar @ 316°C
Model 1013:	31.0 bar @ 427°C
Maximum operating pressure:	
Model 1010:	10.3 bar
Model 1011:	27.5 bar
Model 1022:	44.8 bar
Model 1013:	31.0 bar
Maximum back pressure:	99% of inlet pressure

Connections

Screwed BSPT and NPT
Socketweld
Flanged EN 1092-1 or ASME B16.5 (welded)*

Materials

Body:	ASTM A240 Grade 304L
Internals:	All stainless steel – 304
Valve and seat:	Stainless Steel 17-4PH (<35 bar) Titanium (>35 bar)
Strainer body:	Carbon steel
Strainer screen:	Stainless steel

Options

- Stainless steel internal check valve
- Thermic vent bucket 17 bar maximum
- Wiggle wire
- With the 1000N Series inverted bucket, copper oxide plugging problems can be eliminated.

Specification

Inverted bucket steam trap, type ... in all stainless steel, freeze resistant, without gaskets, with continuous air venting at steam temperature, free-floating stainless steel mechanism, and orifice at the top of the trap. Maximum allowable back pressure 99% of inlet pressure.

How to Order

Specify:
- Model number
- Size and type of pipe connection
- Maximum working pressure that will be encoutered or orifice size
- Any options required

Table 110-1. 1000 Series Bottom Inlet, Top Outlet Trap (dimensions in mm)

Model No.	1010	1011	1022	1013
Pipe Connections	15 – 20	15 – 20	20	25
«A» Body Outside Diameter	70	70	100	114
«B» Face-to-Face (screwed & SW)	152 – 152 / 146 – 138	183 – 183 / 169 – 176	221 / 214	289 / 289
«BB» Face-to-Face (flanged EN1092-1 PN40*)	195 – 200	225 – 230	271	375
«K» ℄ Outlet to ℄ Inlet	14	14	23	30
Weight in kg (screwed & SW)	0,7	0,8	2	3,4
Weight in kg (flanged EN1092-1 PN40*)	2,1 – 2,8	2,2 – 2,9	4,1	6,0

* Standard flanges are in carbon steel, stainless steel flanges are optional. Other flange sizes, ratings and face-to-face dimensions are available on request.
Shade indicates products that are CE Marked according to the PED (2014/68/UE). All the other models comply with the Article 4.3 of the same directive.
ŧ May be derated depending on flange rating and type.

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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1000 Series Inverted Bucket Steam Traps

All Stainless Steel for Vertical Installation

For Pressures to 45 bar...Capacities to 2 000 kg/h

Table 111-1. Model 1010 Capacity

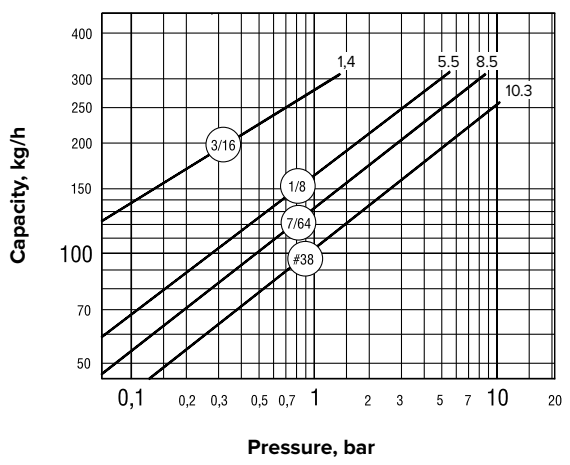


Table 111-2. Model 1011 Capacity

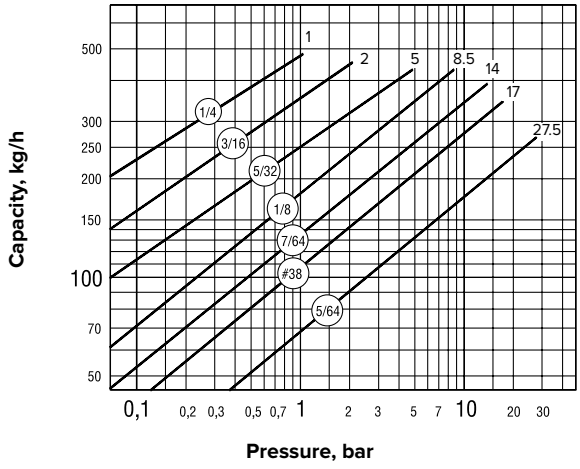


Table 111-3. Model 1022 Capacity

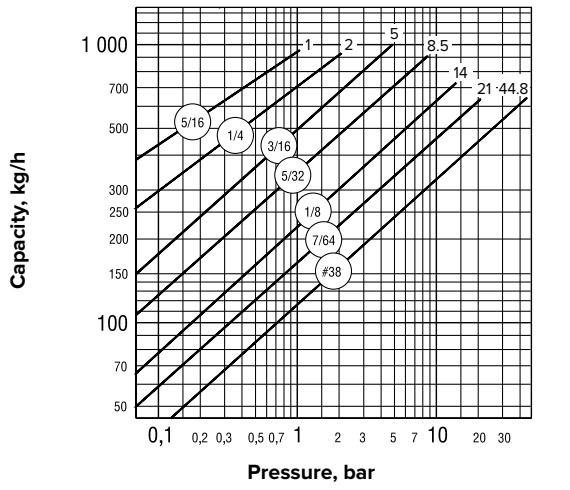
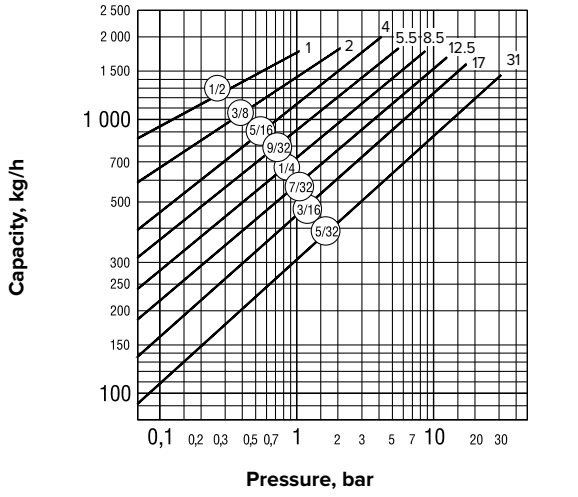


Table 111-4. Model 1013 Capacity

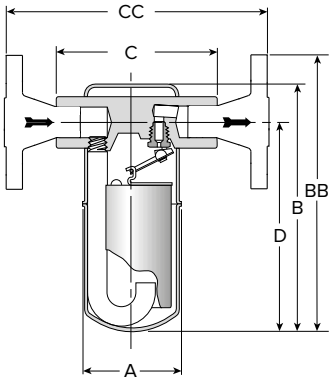


All dimensions and weights are approximate. Use certified print for exact dimensions. Design and materials are subject to change without notice.

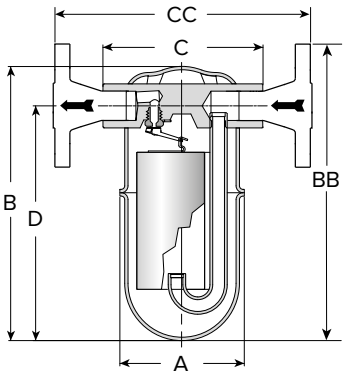
1800 Series Inverted Bucket Steam Traps

All Stainless Steel for Horizontal Installation

For Pressures to 45 bar...Capacities to 1 090 kg/h



Model 1811 Trap



Model 1822 Trap

Description

A quick and easy "in-line" replacement for other types of side inlet/side outlet traps, the Armstrong 1800 Series brings together all the benefits of energy-efficient inverted bucket operation. Side inlet/outlet all-welded construction means an inverted bucket trap that will operate efficiently on applications such as tracer lines, drips, heating, processing and similar applications.

With the 1800 Series you get freeze-resistant, all-stainless steel construction, with a **three-year guarantee**, plus all the benefits of inverted bucket operation:

- Long, trouble-free service life
- Excellent purging action
- Continuous air venting
- Ease and flexibility of in-line installation

Maximum Operating Conditions

Maximum allowable pressure (vessel design)ŧ:

Model 1810, 1811:	28 bar @ 427°C
Model 1822:	45 bar @ 315°C

Maximum operating pressure:

Model 1810:	14 bar
Model 1811:	28 bar
Model 1822:	45 bar @ 316°C 43 bar @ 371°C 41,6 bar @ 427°C
Maximum back pressure:	99% of inlet pressure

Connections

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

Materials

Body:	ASTM A240 Grade 304L
Internals:	All stainless steel – 304
Valve and seat:	Stainless Steel 17-4PH (<35 bar) Titanium (>35 bar)

Options

- Insu-Pak™ insulation for Models 1810/1811
- Stainless steel pop drain for Models 1811/1822
- Probe connection
- With the in-line 1800N Series inverted bucket, copper oxide plugging problems can be eliminated.

Specification

Inverted bucket steam trap, type ... in all stainless steel, freeze resistant, without gaskets, with continuous air venting at steam temperature, free-floating stainless steel mechanism, and orifice at the top of the trap. Maximum allowable back pressure 99% of inlet pressure.

How to Order

Specify:

- Model number
- Size and type of pipe connection
- Maximum working pressure that will be encountered or orifice size
- Any options required

Table ST-112-1. 1800 Series Side Inlet, Side Outlet Trap (dimensions in mm)

Model No.	1810	1811	1822
Pipe Connections	10 – 15 – 20 – 25**	15 – 20 – 25**	15 – 20 – 25
"A" Body Outside Diameter	70	70	99
"B" Height	136	167	218
"C" Face-to-Face (screwed & SW)	110	110	127
"CC" Face-to-Face (flanged PN40*)	N/A – 150 – 150 – 160	150 – 150 – 160	190 – 190 – 200
"D" Bottom to ℄ Inlet	113	138 – 141	186 – 181
Weight in kg (screwed & SW)	0,8	0,9 – 1,0	3
Weight in kg (flanged PN40*)	2,3 – 2,3 – 2,8	2,5 – 3,2	4,5 – 5,2 – 5,6

* Standard flanges are in carbon steel, stainless steel flanges are optional. Other flange sizes, ratings and face-to-face dimensions are available on request.
** pipe connections only available if flanged.
All models comply with the Article 4.3 of the PED (2014/68/UE). ŧ May be derated depending on flange rating and type.

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

1800 Series Inverted Bucket Steam Traps

All Stainless Steel for Horizontal Installation

For Pressures to 45 bar...Capacities to 1 090 kg/h

Table ST-113-1. Model 1810 Capacity

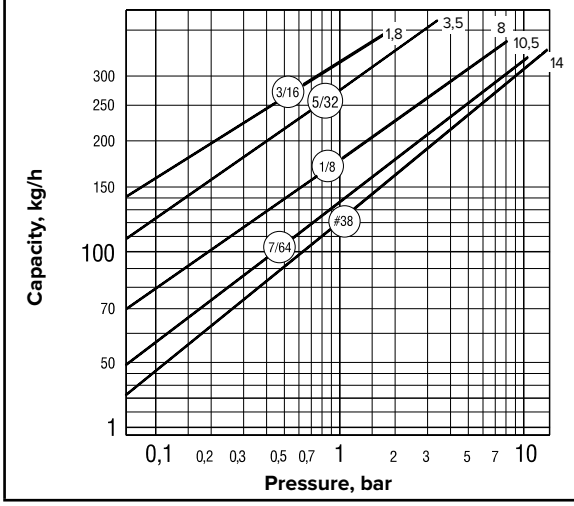
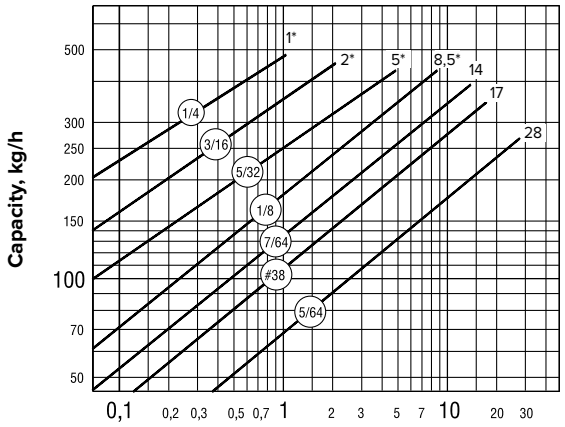


Table ST-113-2. Model 1811 Capacity



* Orifices available only with 3/4" connections.

Options

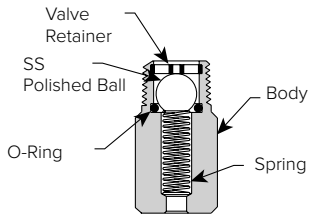
Pop Drain for Freeze Protection

In general, a properly selected and installed Armstrong trap will not freeze as long as steam is coming to the trap. If the steam supply is shut off, a pop drain should be used to automatically drain the trap. Stainless steel pop drain available for Models 1811 and 1822.

Maximum Operating Conditions

Pressure:	41 bar
Temperature:	177°C

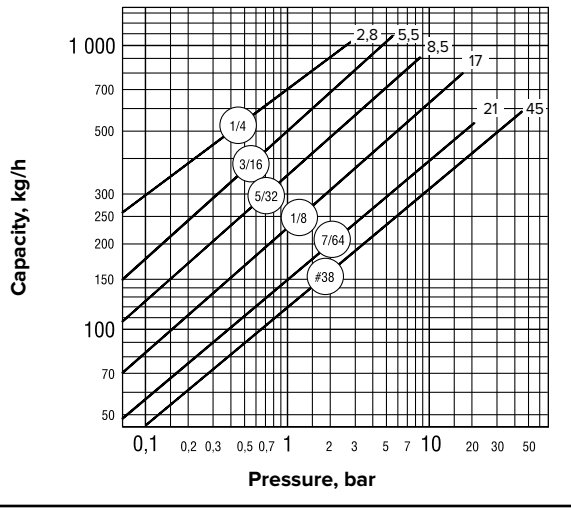
Insu-Pak™



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. Insu-Pak can prevent trap freeze-up when used with a properly designed condensate manifold. Designed for use with Model 1810 and Model 1811 traps.

Probe connections are available for trap monitoring on Models 1811 and 1822.

Table ST-113-3. Model 1822 Capacity



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

2000 Series Inverted Bucket Steam Traps

All Stainless Steel with 360° Connector

For Pressures to 45 bar...Capacities to 590 kg/h

Description

With the 2000 Series' 360° universal connector, you can install inverted bucket efficiency and long service life in any piping configuration with little or no repiping. You get the reliability of the inverted bucket operating principle, plus all the benefits of all-stainless steel construction:

- A sealed, tamperproof package
- A compact, lightweight trap
- The ability to withstand freeze-ups without damage
- Exceptional corrosion resistance
- A **three-year guarantee** against defective materials, defec tive workmanship.

2000 Series steam traps combine savings in three important areas: energy, installation and replacement. The 360° universal connector provides quick, easy in-line replacement along with all the proven advantages of inverted bucket operation. Also available with optional IS-2 integral strainer connector.

Maximum Operating Conditions

Maximum allowable pressure (vessel design)†:

Model 2010, 2011:	28 bar @ 427°C
Model 2022:	45 bar @ 315°C

Maximum operating pressure:

Model 2010:	14 bar
Model 2011:	28 bar
Model 2022:	45 bar @ 316°C 43 bar @ 371°C 41,6 bar @ 427°C
Maximum back pressure:	99% of inlet pressure

Connections

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

Materials

Body:	ASTM-A 240 Grade 304L
Loose Flange:	Zinc Plated Steel
Internals:	All stainless steel – 304
Valve and seat:	Stainless Steel 17-4PH (<35 bar) Titanium (>35 bar)
Standard connector:	Stainless steel – 304
IS-2 connector with integral strainer:	ASTM A351 Gr.CF8 20 x 20 mesh 304 SS Screen

Specification

Inverted bucket steam trap, type ... in all stainless steel, freeze resistant, with 360° universal connector, having continuous air venting at steam temperature, free-floating stainless steel mechanism, and orifice at the top of the trap. Maximum allowable back pressure 99% of inlet pressure.

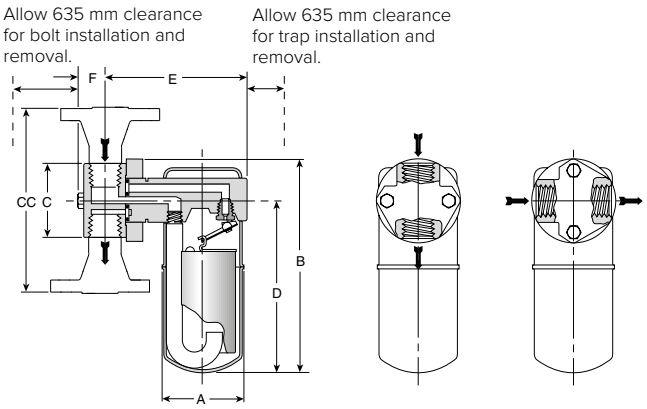
How to Order

Specify:

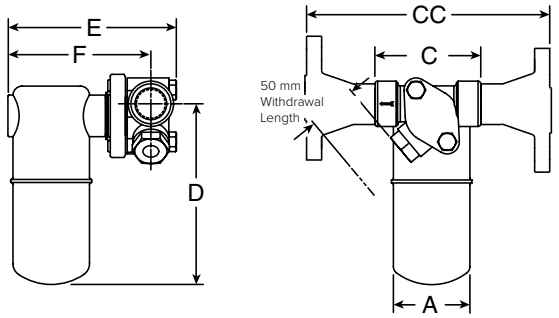
- Model number
- Size and type of pipe connection
- Type of 360° connector (with or without strainer)
- Maximum working pressure that will be encountered or orifice size
- Any options required

Options

- Insu-Pak™ insulation for Models 2010/2011
- Stainless steel pop drain for Models 2011/2022
- Stainless steel loose flange
- Probe connection for Models 2011/2022
- Standard connector
- IS-2 connector with integral strainer
- With the 2000N Series 360° universal connector, copper oxide plugging problems can be eliminated.



Model 2011 Trap with Standard Connector



Model 2010-2022 with IS-2 Connector

Table ST-114-1. 2000 Series Traps with Standard Connector

Model No.	2010	2011	2022
Pipe Connections	15 – 20 – 25		
"A" Body Outside Diameter	68	68	98
"B" Height**	152	176	221
"C" Face-to-Face (screwed & SW)	60	60	60
"CC" Face-to-Face (flanged PN40*)	150 – 150 – 160		
"D" Bottom to ℄ Inlet	117	142	187
"E" ℄ to Outside (Standard)***	116	116	146
"F" ℄ to Bolt	25	25	25
Weight in kg (screwed & SW)	1,9	2,0	3,0
Weight in kg (flanged PN40*)	3,6 – 4,2 – 4,7	3,7 – 4,3 – 4,8	4,7 – 5,3 – 5,7

Table ST-114-1. 2000 Series Traps with IS-2 Integral Strainer Connector

Model No.	2010		2011		2022	
Pipe Connections	15 – 20	25	15 – 20	25	15 – 20	25
"C" Face-to-Face (screwed & SW)	89	102	89	102	89	102
"CC" Face-to-Face (flanged PN40*)	150	160	150	160	150	160
"D" Bottom to ℄ Inlet**	127	127	152	152	197	197
"E" Outside to Bolt	140	144	140	144	170	175
"F" ℄ to Outside	117	122	117	122	148	152
Weight in kg (screwed & SW)	2,2	2,4	2,3	2,5	3	3
Weight in kg (flanged PN40*)	3,9 – 4,5	5,1	4,0 – 4,6	5,2	4,7 – 5,3	5,7

*Standard flanges are in carbon steel, stainless steel flanges are optional. Other flange sizes, ratings and face-to-face dimensions are available on request.
** For IS-2 connector, add 15 mm to "B" and "D" dimensions when optional probe connections is required.
*** When trap is installed in vertical position on flanged connector, the "Export - Long Neck" version should be used.
All models comply with the Article 4.3 of the PED (2014/68/UE).
† May be derated depending on flange rating and type.

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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2000 Series Inverted Bucket Steam Traps

All Stainless Steel with 360° Connector

For Pressures to 45 bar...Capacities to 590 kg/h

Table ST-115-1. Model 2010 Capacity

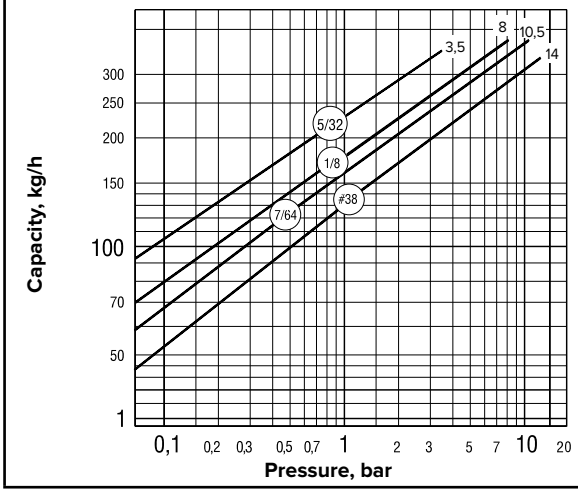
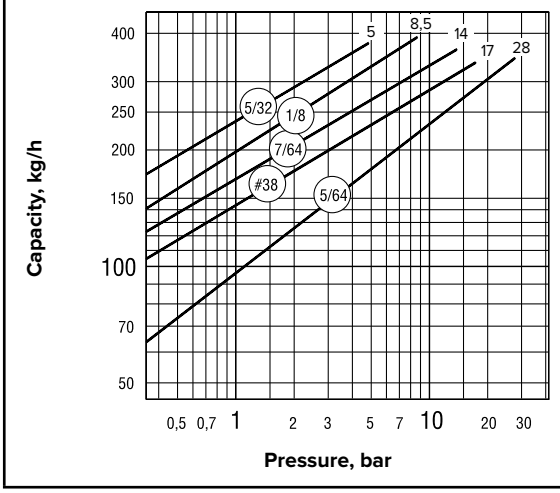


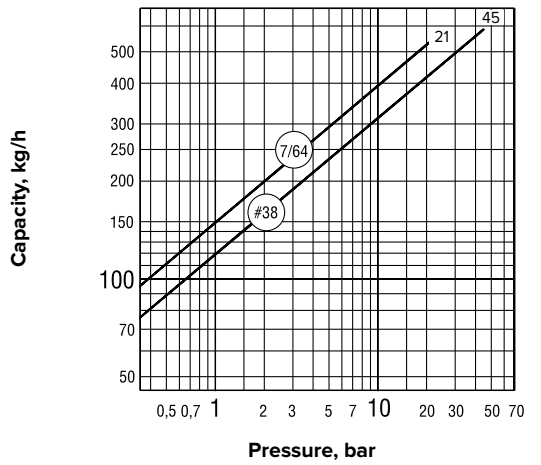
Table ST-115-2. Model 2011 Capacity



Connectors

Besides the inverted bucket traps, the standard connector, IS-2 connector with integral strainer and TVS-4000 can also be used on thermostatic, thermostatic wafer and disc traps.

Table ST-115-3. Model 2022 Capacity



Options

Pop Drain for Freeze Protection

In general, a properly selected and installed Armstrong trap will not freeze as long as steam is coming to the trap. If the steam supply is shut off, a pop drain should be used to automatically drain the trap. Stainless steel pop drain available for Models 2011 and 2022.

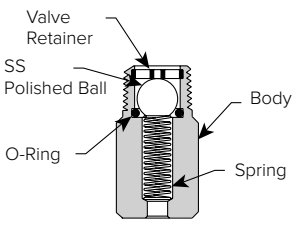
Maximum Operating Conditions

Pressure: 41 bar
Temperature: 177°C

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.

Probe connections are available for trap monitoring for 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.

4000 Series Inverted Bucket Steam Trap

All Stainless Steel With IS-4 Connector

For Pressures to 45 bar...Capacities to 590 kg/hr

Description

With the 4000 Series IS-4 connector, you can install 4-bolt compatible inverted bucket efficiency and long service life in any piping configuration with little or no repiping. You get the reliability of the inverted bucket operating principle, plus all the benefits of all-stainless steel construction:

A sealed, tamperproof package
A compact, lightweight trap
The ability to withstand freeze-ups without damage
Exceptional corrosion resistance
A three-year guarantee against defective materials, defective workmanship.

4000 Series steam traps combine savings in three important areas: energy, installation and replacement. The 4-bolt connector provides quick, easy in-line replacement along with all the proven advantages of inverted bucket operation.

Maximum Operating Conditions

Maximum allowable pressure (vessel design):

Model IB4011:	28 bar @ 427°C
Model IB4022:	45 bar @ 315°C 43 bar @ 371°C 41 bar @ 427°C

Maximum operating pressure:

Model IB4011:	28 bar
Model IB4022:	45 bar

Connections

Screwed NPT
Socketweld
Flanged (consult factory)

Materials

Body:	ASTM-A 240 Grade 304L
Internals:	All stainless steel—304
Valve and seat:	Hardened chrome steel—17-4PH or Titanium
Connector body:	ASTM A351 Gr. CF8M

Options

Stainless steel pop drain for Models 4011/4022
Probe connection for Models 4011/4022
Wiggle wire

Connector Styles

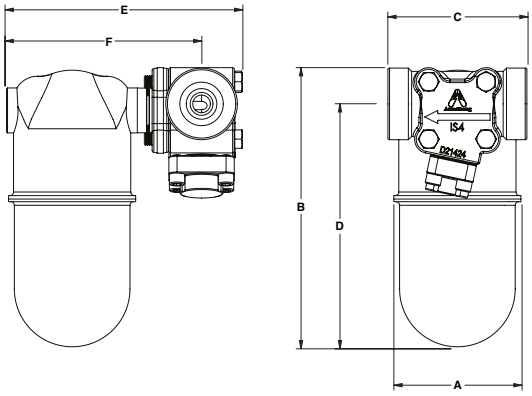
Standard with strainer
With strainer blowdown valve
With block/bleed valves

Specification

Inverted bucket steam trap, type ... in all stainless steel, freeze resistant, with 360° universal connector, having continuous air venting at steam temperature, free-floating stainless steel mechanism, and orifice at the top of the trap.

How to Order

Specify:
Model number
Size and type of pipe connection
Maximum working pressure that will be encountered or orifice size
Any options required



Model IB4022 Trap With IS-4 Connector

Table ST-116-1. 4000 Series Traps With Standard IS-4 Connector

Model No.	IB4011		IB4022	
Pipe Connections	mm	mm	mm	mm
	20	25	20	25
"A" (Diameter)	68	68	98	98
"B" (Height)*	176	176	221	221
"C" (Face to Face)	108	108	108	108
"D" (Bottom to ℄)*	152	152	197	197
"E" (Outside to Bolt)	156	156	186	186
"F" (℄ to Outside)	125	125	156	156
Weight kg	3,5		4,9	

*Add 15 mm to "B" and "D" dimensions when optional probe connection is required.

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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4000 Series Inverted Bucket Steam Trap

All Stainless Steel With IS-4 Connector

For Pressures to 45 bar...Capacities to 590 kg/hr

Table ST-117-1. Model IB4011 Capacity

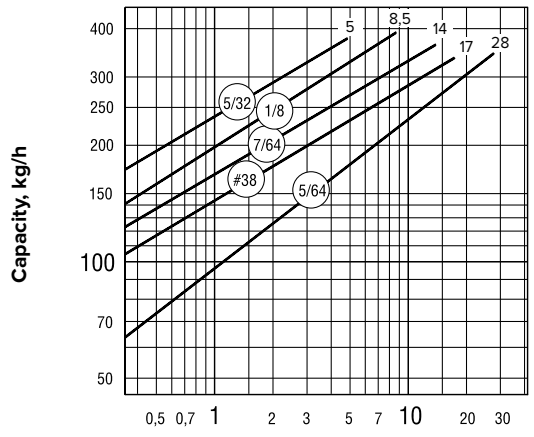
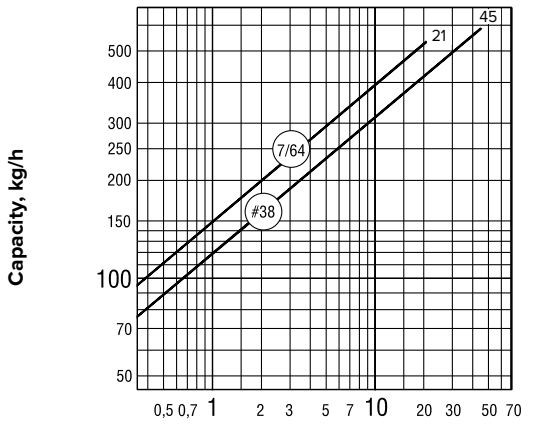
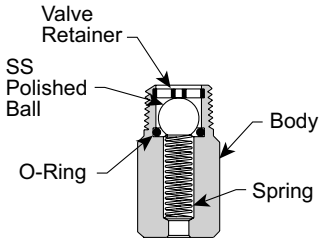


Table ST-117-2. Model IB4022 Capacity



Options

Pop Drain for Freeze Protection
In general, a properly selected and installed Armstrong trap will not freeze as long as steam is coming to the trap. If the steam supply is shut off, a pop drain should be used to automatically drain the trap. Stainless steel pop drain available for Models 4011 and 4022.



Maximum Operating Conditions

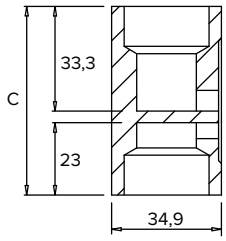
Pressure:	41 bar
Temperature:	177°C

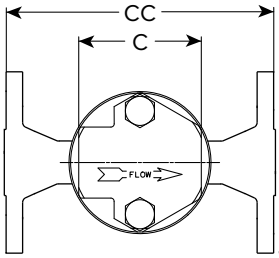
All dimensions and weights are approximate. Use certified print for exact dimensions. Design and materials are subject to change without notice.

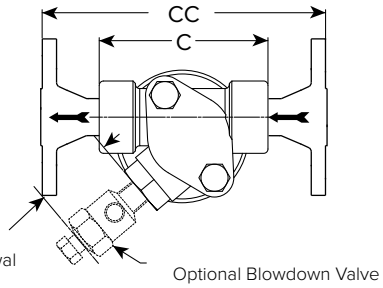
FT-2000 Float & Thermostatic Steam Trap

All Stainless Steel with 360° Connector

For Pressures to 18 bar...Capacities to 600 kg/h







Armstrong's FT-2000 Float and Thermostatic Steam Trap has a mechanical principal of operation. The float inside the trap follows the condensate level, thus opening and closing the discharge valve. Non-condensable gases accumulate at the top of the trap and are discharged by the wafer thermostatic air vent. This one is located over the main body, thus air volume does not limit condensate level inside of the trap and allows better real-life capacities than for other F&T designs.

Features

- Compact and lightweight
- Corrosion resistant stainless steel assembly
- Integral strainer on the air vent
- Easy to install and replace
- Universal connector allows flexibility
- Multiple pipe sizes and connections available

Armstrong's FT-2000 has a sealed, stainless steel body that is lightweight, compact and highly resistant to corrosion. 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, Bimetallic, Thermostatic and Thermodynamic) can be installed on the same connector.

Maximum Operating Conditions

Maximum allowable pressure
(vessel design)ŧ: 25 barg @ 350°C
Maximum operating pressure: 18 barg (orifice #38)

Connections

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

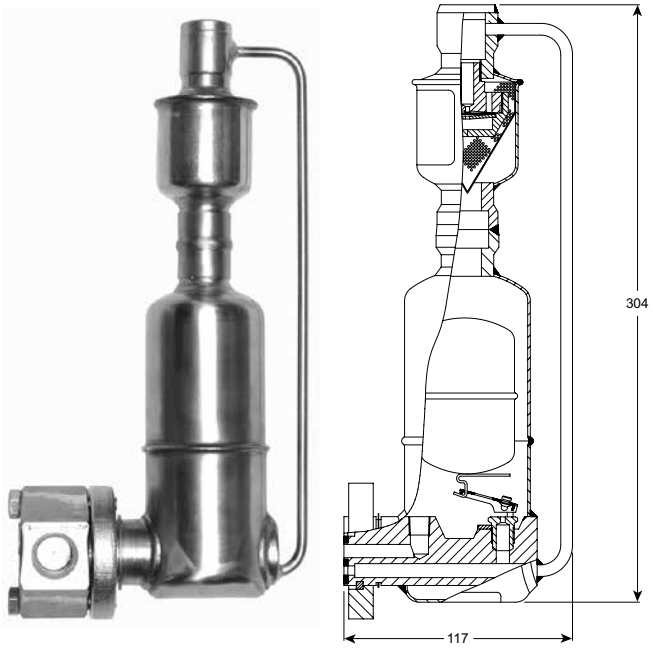


Table ST-118-1. FT-2000 Materials

Body	Connector	Trap Valve	Trap Seat	Vent Capsule	Vent Wafer
304L Stainless Steel	304 Stainless Steel	Hardened Chrome Steel – 440F		303 Stainless Steel	Hastelloy

Table ST-118-2. Model F&T 2000 Trap (dimensions in mm)

Model No.	**F&T 2000**		
	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
Blowdown Connection Size	—	1/4" NPT	1/4" NPT
Weight in kg (screwed)	2,3	2,6	2,8
Weight in kg (flanged PN40*)	4,0 – 4,6 – 5,1	4,3 – 4,9	5,6

* Other flange sizes, ratings and face-to-face dimensions are available on request.
All sizes comply with the Article 4.3 of the PED (2014/68/UE).
ŧ May be derated depending on flange rating and type.

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

FT-2000 Float & Thermostatic Steam Trap

All Stainless Steel with 360° Connector

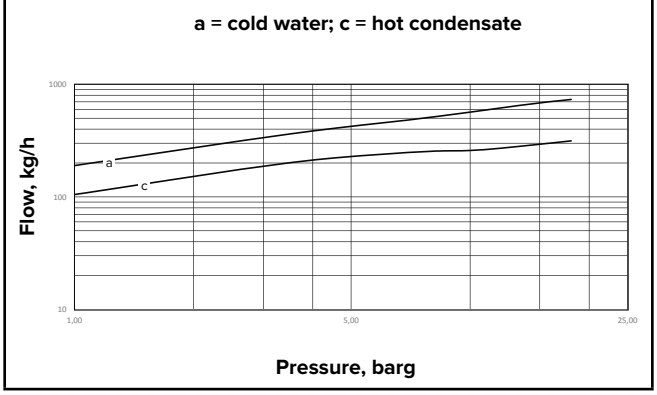
For Pressures to 18 bar...Capacities to 600 kg/h

Options
Blowdown valve – IS-2 connector only

How to Order
Specify:
- Size and type of pipe connection
- Type of 360° connector (with or without strainer)
- Any options required

Specification
Float and thermostatic steam trap, type FT-2000 in stainless steel, with thermostatic air vent. Piped through 360° Universal Connector or Trap Valve Station (TVS). Maximum allowable back pressure 99% of inlet pressure.

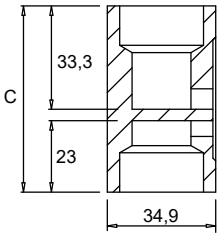
Chart ST-119-1. Model FT-2000 Orifice #38 – Flow



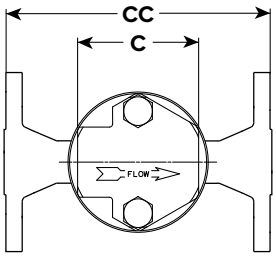
FT-2022 – Float and Thermostatic Steam trap

Stainless Steel with Universal Connector

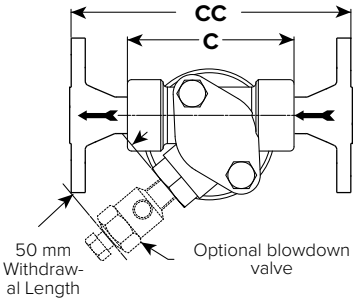
Pressures up to 18 barg...Flows up to 2126 kg/h



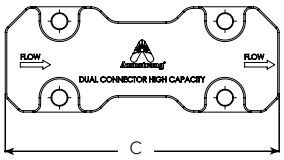
360° Standard Connector



IS-2 Connector with Integral Strainer



Dual Connector



Operation of the FT-2022 steam trap is based on mechanical principles. The float inside the steam trap tracks the level of condensate and opens or closes the discharge valve. The non-condensable gases that accumulate in the top of the trap are discharged by a thermostatic wafer steam trap. This vent is located above the main body; the level of condensate in the trap is therefore not limited by the volume of air and the trap flows are therefore significantly higher than those of conventional F&T traps.

Features

- Compact and lightweight
- Corrosion-resistant stainless steel assembly
- Integral strainer on the air vent
- Ease of installation and replacement
- Flexible installation due to universal connector
- Numerous connection sizes available

The Armstrong Series FT-2022 steam traps have a compact, lightweight and extremely corrosion-resistant stainless steel body. The connection uses a universal connector or a dual connector or Armstrong trap valve station (TVS). This type of connection facilitates installation and replacement because the trap can be removed while leaving the connector in line. It also allows for installation of other types of steam traps on the same connector, which results in labor cost savings and greater flexibility of installation.

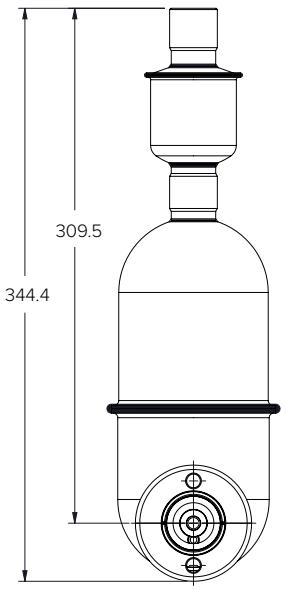
Maximum Operating Conditions

Maximum Allowable Pressure (design pressure)†: 25 barg at 350°C
Maximum Service Pressure: 18 barg (orifice 7/64)

Connections

- Screwed BSPT and NPT
- SW socketweld
- DIN (EN1092-1) or ANSI flanges (ASME B16.5, welded)

Standard horizontal installation, for vertical installation of the FT-2022 consult the factory.



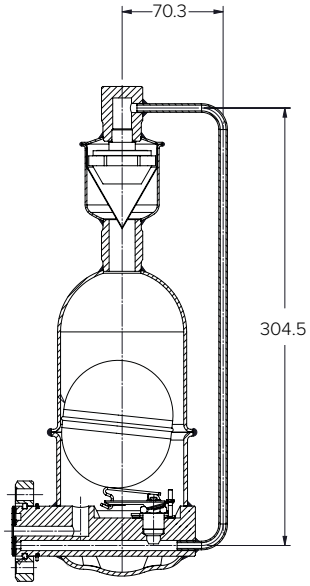


Table ST-120-1. Model FT-2022 - Materials

Body	Connector	Valve	Seat	Vent Capsule	Vent Wafer
Grade 304L Stainless Steel	Grade 304 Stainless Steel	17-4PH		Grade 303 Stainless Steel	Hastelloy

All dimensions and weights are approximate. For exact dimensions, please refer to certified drawing.
Design and materials subject to modification without notice.

FT-2022 – Float and Thermostatic Steam trap

Stainless Steel with Universal Connector

Pressures up to 18 barg...Flows up to 2126 kg/h

Table ST-121-1. Model FT-2022 Steam Trap (dimensions in mm)

Model	F&T 2022			
	Standard Connector	IS-2 Connector with Integral Strainer		Dual Connector
Connection size	15 – 20 – 25	15 – 20	25**	15 – 20 – 25
"C " Space req. (screwed and welded model)	60 – 60 – N/A	89	102	182
"CC" Space req. (flanged PN40*)	150 – 150 – 160	150	160	320*
Blowdown connection strainer size	–	1/4" NPT	1/4" NPT	–
Weight in kg (screwed model)	3.84	4.14	4.34	6.6
Weight in kg (flanged PN40* model)	5.54 – 6.14 – 6.64	5.84 – 6.44	7.14	–

Options

- Blowdown valve (IS-2 connector only)
- Seal (dual connector)

How to Order

Please provide the following information:

- Model number
- Connection size and type
- Connector type
- Options requested

Specifications

FT-2022 Stainless steel float and thermostatic Steam trap. Connection uses a 360° universal connector, a dual connector or trap valve station (TVS). Maximum allowable back pressure = 99% of inlet pressure

Table ST-121-2. Model FT-2022 Orifice 7/64" - Single Connector Flows

a = cold water; c = hot condensate

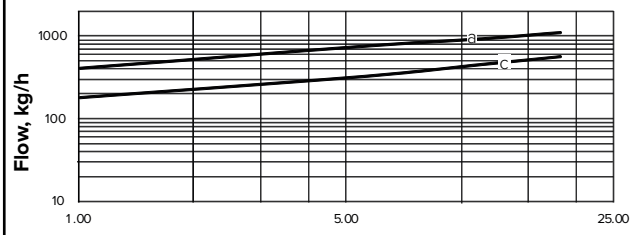
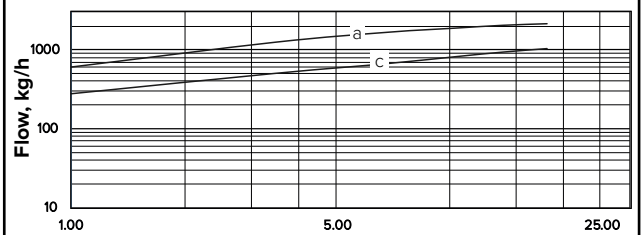


Table ST-121-3. Model FT-2022 Orifice 7/64" - Dual Connector Flows

a = cold water; c = hot condensate



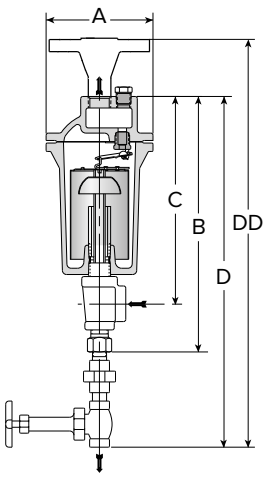
* Other flange dimensions, ratings and face-to-face dimensions available upon request.
** IS-2 available only with right/left (R/L) direction
All sizes comply with Article 4.3 of Directive 2014/68/EU.
+ May vary depending on type of flange.

All dimensions and weights are approximate. For exact dimensions, please refer to certified drawing.
Design and materials subject to modification without notice.

20-DC Series Automatic Differential Condensate Controllers

Cast Iron for Vertical Installation

For Pressures to 17 bar...Capacities to 9 000 kg/h



Secondary Steam

Description

Armstrong automatic differential condensate controllers (DC) are designed to function on applications where condensate must be lifted from a drain point or in gravity drainage applications where increased velocity will aid in condensate drainage.

When lifting from the drain point, often referred to as syphon drainage, the reduction in pressure that occurs when the condensate is elevated causes a portion of it to flash back into steam.

Ordinary steam traps, unable to differentiate between flash steam and live steam, close and impede drainage. Increased velocity with gravity drainage will aid in drawing the condensate and air to the DC. This increased velocity is caused by an internal steam by-pass, controlled by a manual metering valve, so the condensate controller will automatically vent the by-pass or secondary steam. This is then directed to the condensate return line or collected for use in other heat exchangers.

Maximum Operating Conditions

Maximum allowable pressure (vessel design)ŧ:	17 bar @ 232°C
Maximum operating pressure:	17 bar
Maximum back pressure:	99% of inlet pressure

Connections

Screwed BSPT and NPT
Flanged DIN or ANSI (screw on)

Materials

Body:	ASTM A48 Class 30
Cap:	ASTM A48 Class 30 ASTM A-105 (Only 25-DC if PMO > 9 bar)
Internals:	All stainless steel – 304
Valve and seat:	Stainless Steel 17-4PH
Fittings metering valve:	Metering valve – Stainless steel. Fittings 250# malleable iron

Specification

Automatic differential condensate controller, type ... in cast iron. Maximum allowable back pressure 99% of inlet pressure.

How to Order

- Specify model number
- Specify size and type of pipe connection
- Specify maximum working pressure that will be encountered or orifice size
- Specify any options required

Table ST-122-1. 20-DC Series Bottom Inlet, Top Outlet Differential Condensate Controllers (dimensions in mm)

Model No.	21-DC	22-DC	23-DC	24-DC	25-DC	26-DC
Inlet & Outlet Connections	15	20	25	32	40	50
Secondary Steam Connection	3/8"	1/2"	1/2"	3/4"	3/4"	1"
"A" Flange Diameter	108	133	162	190	216	259
"B" Height of Trap	248	311	394	457	514	597
"C" ℄ Inlet to top of trap	197	241	324	381	425	502
"D" Height valve included (screwed)	378	460	543	606	679	787
"DD" Height valve included (flanged PN40*)	393	492	575	669	746	856
Weight in kg (screwed)	3,2	6,4	10,9	17,2	24,0	39,0
Weight in kg (flanged PN40*)	4,7	8,5	13,5	21,4	28,6	45,2

* Other flange sizes, ratings and face-to-face dimensions are available on request.
Shade indicates products that are CE Marked according to the PED (2014/68/UE). All the other models comply with the Article 4.3 of the same directive.
ŧ May be derated depending on flange rating and type.

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

20-DC Series Automatic Differential Condensate Controllers

Cast Iron for Vertical Installation

For Pressures to 17 bar...Capacities to 9 000 kg/h

Table ST-123-1. Model 21-DC Capacity

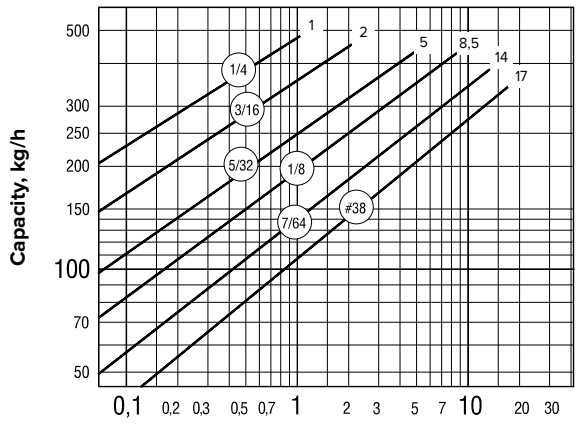


Table ST-123-2. Model 22-DC Capacity

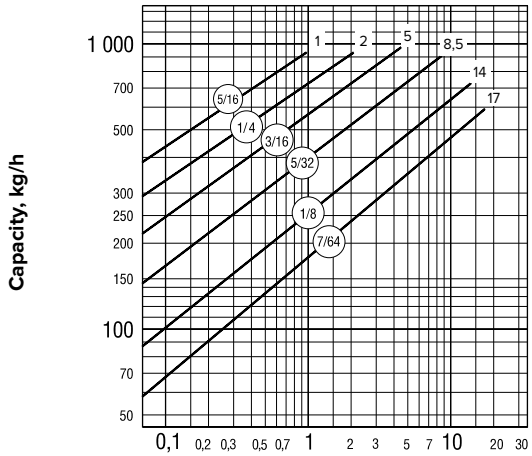


Table ST-123-3. Model 23-DC Capacity

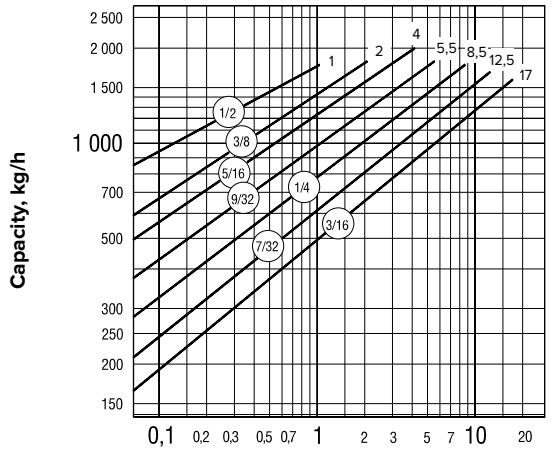


Table ST-123-4. Model 24-DC Capacity

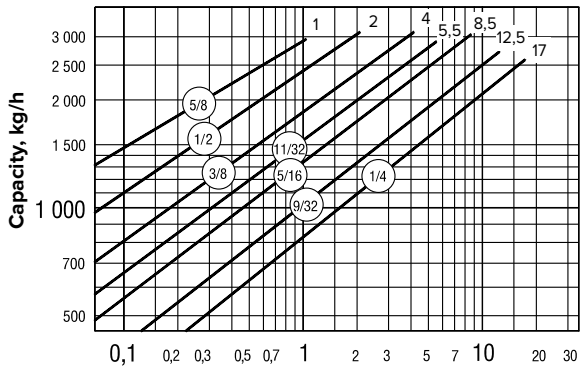


Table ST-123-5. Model 25-DC Capacity

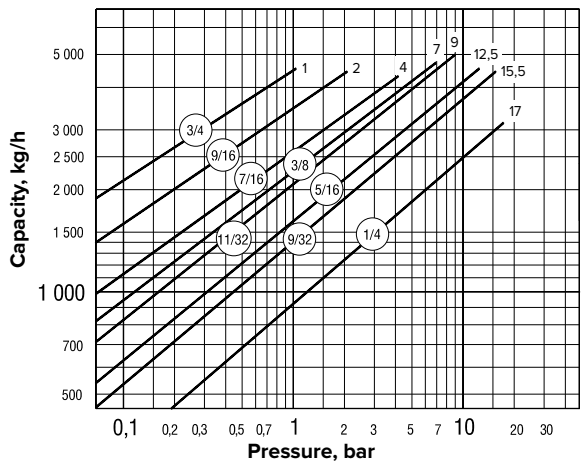
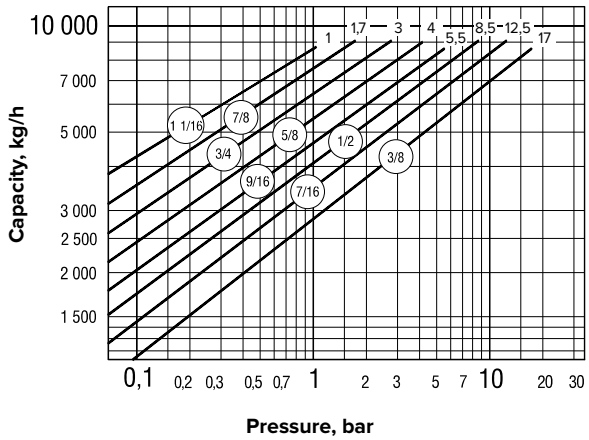


Table ST-123-6. Model 26-DC Capacity

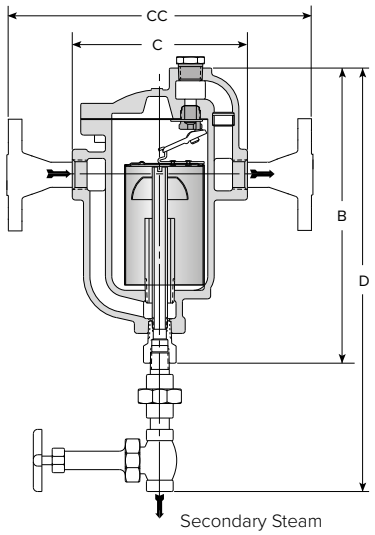


All dimensions and weights are approximate. Use certified print for exact dimensions. Design and materials are subject to change without notice.

80-DC Series Automatic Differential Condensate Controllers

Cast Iron for Horizontal Installation

For Pressures to 17 bar...Capacities to 9 000 kg/h



Description

Armstrong automatic differential condensate controllers (DC) are designed to function on applications where condensate must be lifted from a drain point or in gravity drainage applications where increased velocity will aid in condensate drainage.

When lifting from the drain point, often referred to as syphon drainage, the reduction in pressure that occurs when the condensate is elevated causes a portion of it to flash back into steam.

Ordinary steam traps, unable to differentiate between flash steam and live steam, close and impede drainage. Increased velocity with gravity drainage will aid in drawing the condensate and air to the DC. This increased velocity is caused by an internal steam by-pass, controlled by a manual metering valve, so the condensate controller will automatically vent the by-pass or secondary steam. This is then directed to the condensate return line or collected for use in other heat exchangers.

Maximum Operating Conditions

Maximum allowable pressure (vessel design)ŧ:	17 bar @ 232°C
Maximum operating pressure:	17 bar
Maximum back pressure:	99% of inlet pressure

Connections

Screwed BSPT and NPT
Flanged DIN or ANSI (screw on)

Materials

Body:	ASTM A48 Class 30
Internals:	All stainless steel – 304
Valve and seat:	Stainless Steel 17-4PH
Fittings metering valve:	Metering valve – Stainless steel. Fittings 250# malleable iron.

Specification

Automatic differential condensate controller, type ... in cast iron. Maximum allowable back pressure 99% of inlet pressure.

How to Order

- Specify model number
- Specify size and type of pipe connection
- Specify maximum working pressure that will be encountered or orifice size
- Specify any options required

Table ST-124-1. 80-DC Series Side Inlet, Side Outlet Differential Condensate Controllers (dimensions in mm)

Model No.	81-DC	82-DC	83-DC	84-DC	85-DC	86-DC
Inlet & Outlet Connections	20	20	25	32	50	50
Secondary Steam Connection	3/8"	1/2"	1/2"	3/4"	1"	1 1/2"
"B" Height	203	267	330	381	445	584
"D" Height (valve included)	337	445	476	552	610	813
"C" Face-to-Face (screwed)	127	165	197	229	260	330
"CC" Face-to-Face (flanged PN40*)	191	229	261	355	398	468
Weight in kg (screwed)	3,4	7,9	13,7	21,3	34,0	63,0
Weight in kg (flanged PN40*)	5,3	9,4	15,3	25,5	39,0	69,0

* Other flange sizes, ratings and face-to-face dimensions are available on request.
Shade indicates products that are CE Marked according to the PED (2014/68/UE), but PMA for 86-DC is 15 bar. All the other models comply with the Article 4.3 of the same directive.
ŧ May be derated depending on flange rating and type.

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

80-DC Series Automatic Differential Condensate Controllers

Cast Iron for Horizontal Installation

For Pressures to 17 bar...Capacities to 9 000 kg/h

Table ST-125-1. Model 81-DC Capacity

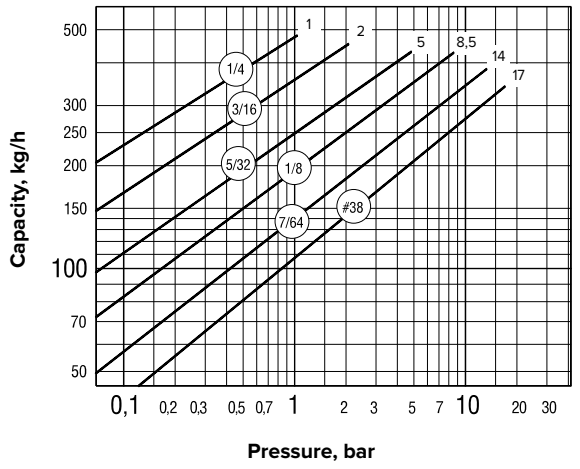


Table ST-125-2. Model 82-DC Capacity

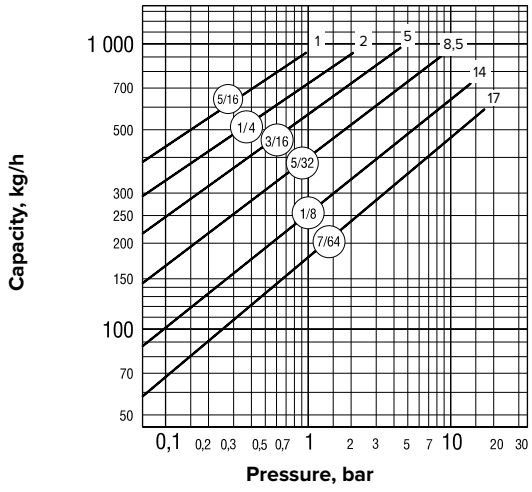


Table ST-125-3. Model 83-DC Capacity

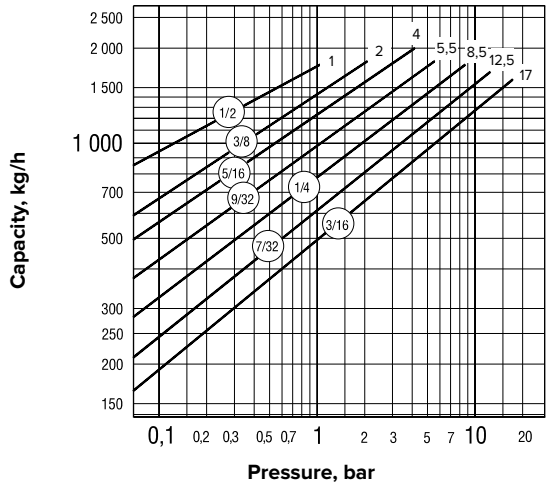


Table ST-125-4. Model 84-DC Capacity

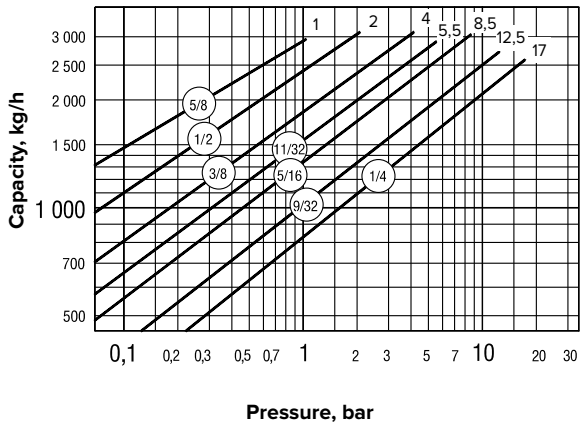


Table ST-125-5. Model 85-DC Capacity

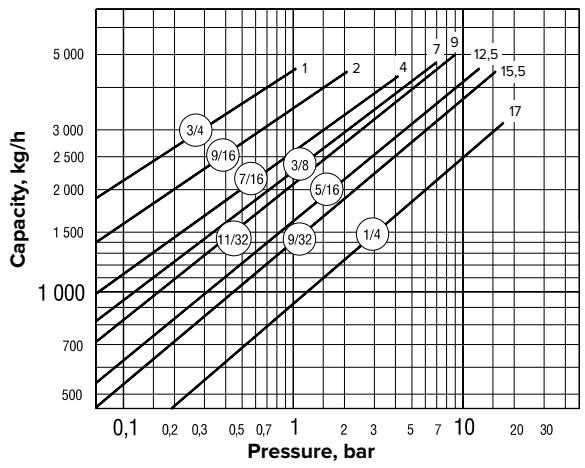
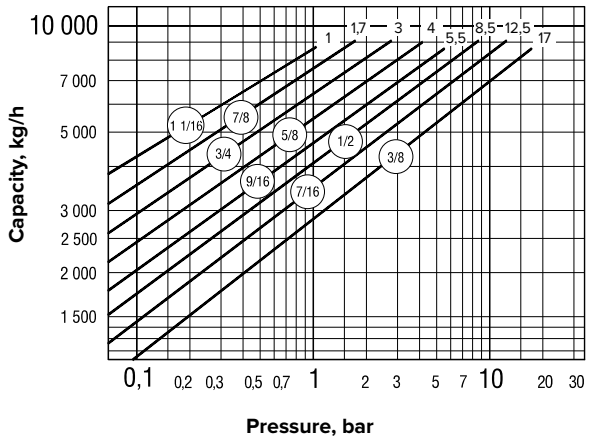


Table ST-125-6. Model 86-DC Capacity



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

The Float & Thermostatic Steam Trap

The More Your Steam Pressure Varies, the More You Need Armstrong F&T Traps
When steam pressure may vary from maximum steam supply pressure to vacuum, Armstrong F&Ts are your most energy-efficient choice. Our line of F&Ts brings Armstrong performance, dependability and long life to trapping services requiring continuous drainage with high air venting capacity. Thanks to separate orifices for condensate and air, they provide continuous condensate drainage and air venting – even under conditions of zero pressure.

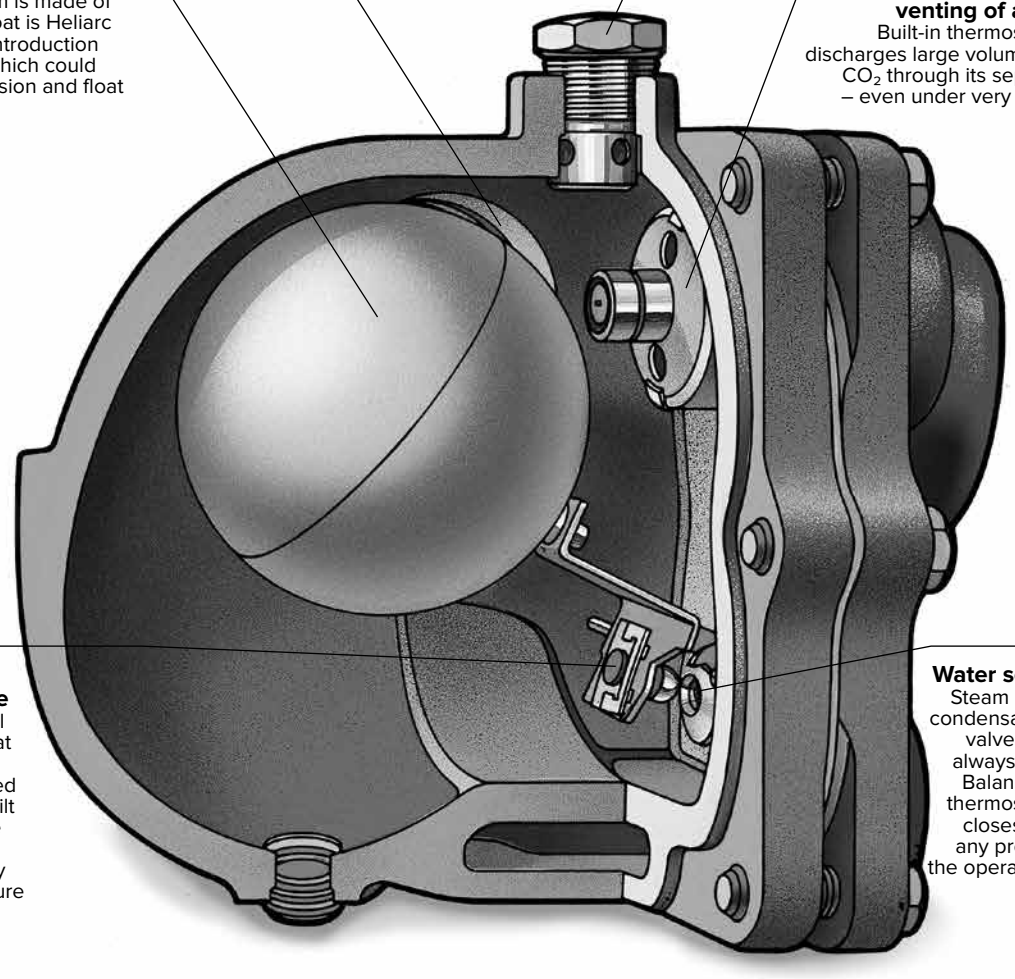
All the benefits detailed below have been designed into Armstrong F&Ts through long experience in the manufacture of pressure float-type drain traps. They assure you of optimum operating efficiency for long periods with minimum trouble.

No water seal at inlet
Inlet high on body and condensate discharge valve in the bottom of the body prevent formation of a water seal that could block flow of air to vent under very low pressure conditions.

Optional integral vacuum breaker
Provide maximum protection against freezing and water hammer in condensing equipment under modulated control. They also eliminate another fitting being installed in the line.

Corrosion resistance
Entire float mechanism is made of stainless steel. The float is Heliarc welded to avoid the introduction of dissimilar metals, which could lead to galvanic corrosion and float failure.

High-capacity venting of air and CO_2
Built-in thermostatic air vent discharges large volumes of air and CO_2 through its separate orifice – even under very low pressure conditions.



Long life and dependable service
Valve is stainless steel in all sizes. Seat is heat treated in 1 1/2" pipe size and larger. Rugged float mechanism is built to resist wear, and the stainless steel float provides exceptionally high collapsing pressure and resistance to hydraulic shock.

Water sealed valve
Steam cannot reach condensate discharge valve because it is always under water. Balanced pressure thermostatic air vent closes on steam at any pressure within the operating range of the trap.

Operation against back pressure
Trap operation is governed solely by the condensate level in the trap. Back pressure in the return line will not render the trap inoperative as long as there is any pressure differential to force condensate through the discharge valve.

Continuous drainage
No pressure fluctuations due to intermittent condensate drainage. Condensate is discharged at very close to steam temperature.
No priming needed.

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The Float & Thermostatic Steam Trap

Built as Tough as the Jobs They Do
Armstrong float and thermostatic traps are unique in their super heavy duty construction. Armstrong uses high quality ASTM A48 Class 30 cast iron or astm A216 WCB cast steel – normally found in pressure vessels rated to 17 bar or 32 bar. Internal mechanisms are made from stainless steel and are heavily reinforced. No brass cotter pins here. Valves and seats are stainless steel, hardened, ground and lapped to withstand the erosive forces of flashing condensate.

Why go to all this trouble on traps normally recommended for low-pressure, modulating service? The answer is in the word modulating. Modulating pressures mean widely varying loads, thermal cycling and high air and non-condensable gas loads.

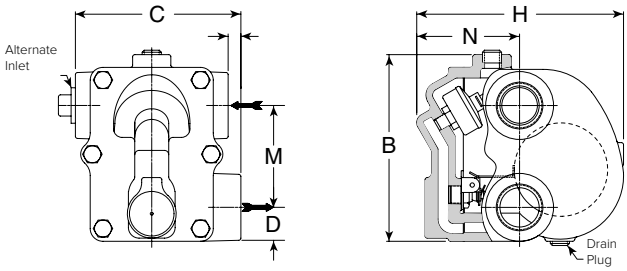
In other words, tough service. Inferior, lightweight construction is a mistake waiting to happen. Trap failures on modulating pressure may lead to water hammer, corrosion and even heat exchanger damage.

Armstrong's published capacities are based on actual measurements of traps handling hot, flashing condensate. Competitive F&Ts may utilize theoretical calculated capacities. Armstrong uses its own steam lab to give you actual capacity – especially important on high-capacity traps such as those in our ultra-capacity line. Not only does Armstrong offer super heavy duty construction for long life and reliability, but we also supply the data to back up performance. Here's a simple, easy-to-remember summary: The more your pressure varies, the more you need Armstrong F&Ts.

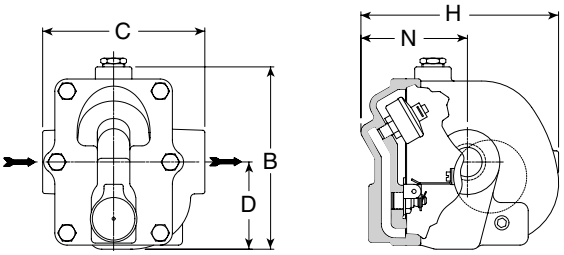
B and BI Series Float & Thermostatic Steam Traps

Cast Iron for Horizontal Installation, with Thermostatic Air Vent

For Pressures to 2 bar...Capacities to 4 040 kg/h



Model B Traps Standard Configuration



Model BI Traps

Description

Armstrong B and BI Series F&T traps combine high standards of performance and long life with economy for heating service where continuous drainage with high air-venting capacity is required.

Because of the wide use of vacuum returns in systems of this type, the thermostatic air vent element is charged to give it the capability of compensated response to the pressure-temperature curve of steam at any pressure from less than 500 mm Hg vacuum to 2 bar gauge. B and BI Series F&T traps will vent air at slightly below steam temperature throughout this entire range of operation.

All B Series traps, except the 1/2" and 3/4", have inlet connections on both sides of the body to provide flexibility in piping. The **BI Series F&T traps** in sizes 1/2", 3/4" and 1" feature the convenience of in-line connections with the same internals as the B Series.

Maximum Operating Conditions

Maximum allowable pressure (vessel design)ŧ:

Model B2-B3:	8,5 bar @ 178°C
Model B4-B8:	12 bar @ 192°C

Maximum operating pressure:

15B, BI:	1 bar saturated steam
30B, BI:	2 bar saturated steam

Maximum back pressure: 99% of inlet pressure

Note: Cast iron traps should not be used in systems where freezing, excessive hydraulic or thermal shock are present.

Connections

Screwed BSPT and NPT
Flanged EN 1092-1 or ASME B16.5 (screw on) on request

Materials

Body and cap:	ASTM A48 Class 30
Internals:	All stainless steel – 304
Valve:	Stainless steel – 303 or 440
Seat:	Stainless steel – 303 (ASTM A582) Stainless steel – 440F in 1-1/2" and 2"
Thermostatic air vent:	Stainless steel and bronze with phosphor bronze bellows, caged in stainless steel

Options

Integral vacuum breaker. Add suffix VB to model number.

CAUTION: Do not use a conventional vacuum breaker open to the atmosphere in any system that incorporates a mechanical return system that carries pressure less than atmospheric pressure. This includes all return systems designated as vacuum returns, variable vacuum returns or subatmospheric returns. If a vacuum breaker must be installed in such a system, it should be of the type that is loaded to open only when the vacuum reaches a calibrated level well in excess of the design characteristics of the system.

Specification

Float and thermostatic steam trap, type ... in cast iron, with thermostatic air vent. Maximum allowable back pressure 99% of inlet pressure.

How to Order

Pressure	Model	Connection Size	Option
15	B	2	VB
15 = 1 bar 30 = 2 bar	B = Standard Connection	2 = DN15 3 = DN20 4 = DN25 5 = DN32 6 = DN40 8 = DN50	VB = Vacuum Breaker
	BI = In-line Connection	2 = DN15 3 = DN20 4 = DN25	

Table ST-128-1. B Series Side Inlet, Side Outlet and BI Series In-Line Trap (dimensions in mm)

Model No.	B					BI
Pipe Connections	15 – 20	25	32	40	50	15 – 20 – 25
"B" Height	124	140	140	189	244	143
"C" Face-to-Face (screwed)	98	124	117	146	194	127
"D" Bottom to ℄	22,2	25,4	31,0	36,5	42,9	68,0
"H" Width	137	152	197	214	295	168
"K" Connection Offset	3,2	9,5	—	—	—	—
"M" ℄ to ℄	69,8	76,2	76,2	106,0	152,0	—
"N" Top to ℄	65,1	76,2	85,7	95,2	127,0	83,0
Weight in kg (screwed)	2,7	3,9	5,0	8,6	18,1	4,4

Shade indicates products that are CE Marked according to the PED (2014/68/UE). All the other sizes comply with the Article 4.3 of the same directive.
ŧ May be derated depending on flange rating and type.

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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B and BI Series Float & Thermostatic Steam Traps

Cast Iron for Horizontal Installation, with Thermostatic Air Vent

For Pressures to 2 bar...Capacities to 4 040 kg/h

Table ST-129-1. B & BI Series Capacity – 1 bar

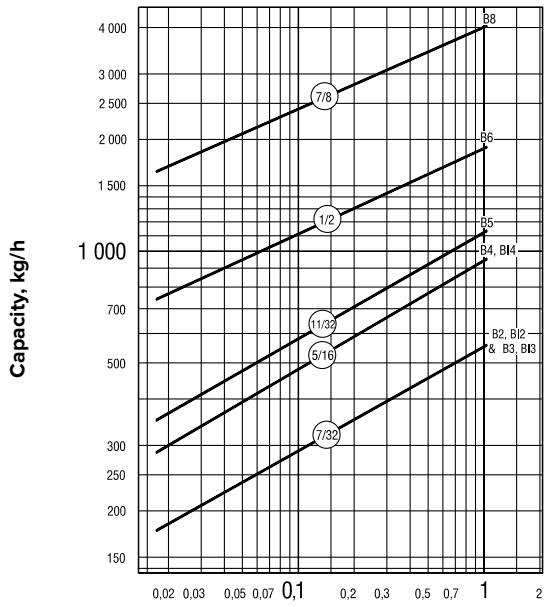
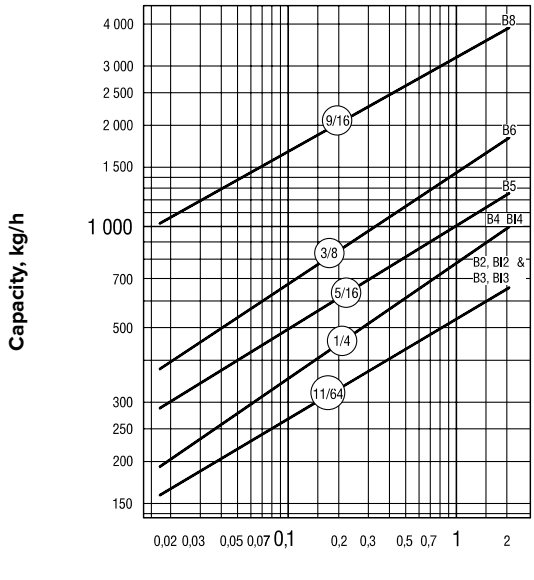


Table ST-129-2. B & BI Series Capacity – 2 bar



Options

Vacuum Breaker – 3/8" and 1/2" NPT

Many times, condensate will be retained ahead of steam traps because of the presence of a vacuum. To break a vacuum, air must be introduced into the system by means of a vacuum breaker.

For maximum protection against freezing and water hammer in condensing equipment under modulated control, vacuum breakers are recommended. Armstrong B and BI Series F&T traps are available with integral vacuum breakers. Maximum pressure is 10 bar.

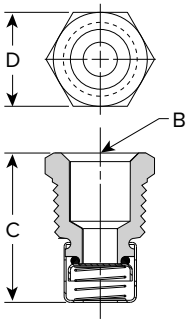


Table ST-129-3. Vacuum Breaker (dimensions in mm)

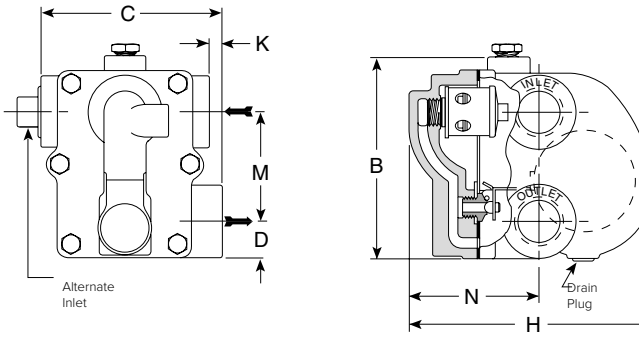
Size	1/2" NPT	3/8" NPT
"B" Pipe Connections	3/8"	1/4"
"C" Height	30	28
"D" Width	22 Hex	17 Hex

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

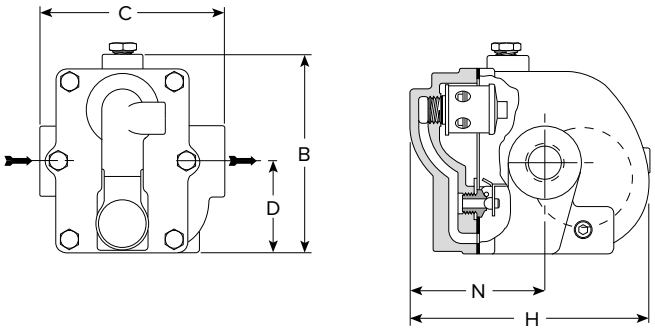
A & AI Series Float & Thermostatic Steam Traps

Cast Iron for Horizontal Installation, with Thermostatic Air Vent

For Pressures to 12 bar...Capacities to 3 900 kg/h



Model A Traps Standard Configuration



Model AI Traps

Description

Armstrong A & AI Series F&T traps are for industrial service from 0 to 12 bar and feature a balanced pressure phosphor-bronze type bellows caged in stainless steel. Armstrong A & AI Series F&T traps are designed for service on heat exchange equipment where there is a need to vent air and non-condensable gases quickly.

The AI Series F&T traps feature the convenience of in-line connections with the same rugged internals found in the A Series.
Maximum Operating Conditions
Maximum allowable pressure (vessel design)ŧ: 12 bar @ 192°C

Maximum operating pressure:

Model 30-A, AI:	2 bar saturated steam
Model 75-A, AI:	5 bar saturated steam
Model 125-A, AI:	8,5 bar saturated steam
Model 175-A, AI:	12 bar saturated steam
Maximum back pressure:	99% of inlet pressure

Note: Cast iron traps should not be used in systems where freezing, excessive hydraulic or thermal shock are present.

Connections

Screwed BSPT and NPT
Flanged EN 1092-1 or ASME B16.5 (screw on) on request

Materials

Body and cap:	ASTM A48 Class 30
Internals:	All stainless steel – 304
Valve:	Stainless steel – 440
Seat:	Stainless steel – 303 (ASTM A582) Stainless steel – 440F in 1 1/2" and 2"
Thermostatic air vent:	Stainless steel and bronze with phosphor bronze bellows, caged in stainless steel

Options

Integral vacuum breaker. Add suffix VB to model number.

CAUTION: Do not use a conventional vacuum breaker open to the atmosphere in any system that incorporates a mechanical return system that carries pressure less than atmospheric pressure. This includes all return systems designated as vacuum returns, variable vacuum returns or subatmospheric returns. If a vacuum breaker must be installed in such a system, it should be of the type that is loaded to open only when the vacuum reaches a calibrated level well in excess of the design characteristics of the system.

Specification

Float and thermostatic steam trap, type ... in cast iron, with thermostatic air vent. Maximum allowable back pressure 99% of inlet pressure.

How to Order

Pressure	Model	Connection Size	Option
75	AI	2	VB
30 = 2 bar 75 = 5 bar 125 = 8,5 bar 175 = 12 bar	A = Standard Connection	3 = DN20 4 = DN25 5 = DN32 6 = DN40 8 = DN50	VB = Vacuum Breaker
	AI = In-line Connection	2 = DN15 3 = DN20 4 = DN25	

Table ST-130-1. A Series Side Inlet, Side Outlet and AI Series In-Line Trap (dimensions in mm)

Model No.	A					AI
Pipe Connections	20	25	32	40	50	15 – 20 – 25
"B" Height	130	130	148	189	248	140
"C" Face-to-Face (screwed)	124	124	117	146	194	127
"D" Bottom to ℄	25,4	25,4	31,0	35,7	42,9	65,1
"H" Width	164	164	206	214	295	165
"K" Connection Offset	95,2	95,2	—	—	—	—
"M" ℄ to ℄	76,2	76,2	76,2	106,0	152,0	—
"N" Top to ℄	85,7	85,7	95,2	95,2	127,0	93,7
Weight in kg (screwed)	4,3	3,7	5,0	8,5	18,1	4,4

Shade indicates products that are CE Marked according to the PED (2014/68/UE). All the other sizes comply with the Article 4.3 of the same directive.
ŧ May be derated depending on flange rating and type.

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

A & AI Series Float & Thermostatic Steam Traps

Cast Iron for Horizontal Installation, with Thermostatic Air Vent

For Pressures to 12 bar...Capacities to 3 900 kg/h

Table ST-131-1. A & AI Series Capacity – 2 bar

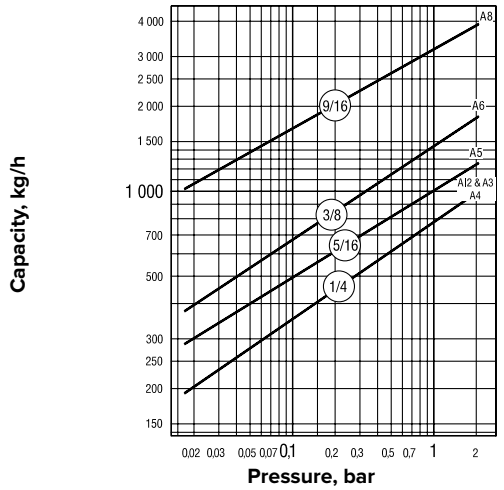


Table ST-131-2. A & AI Series Capacity – 5 bar

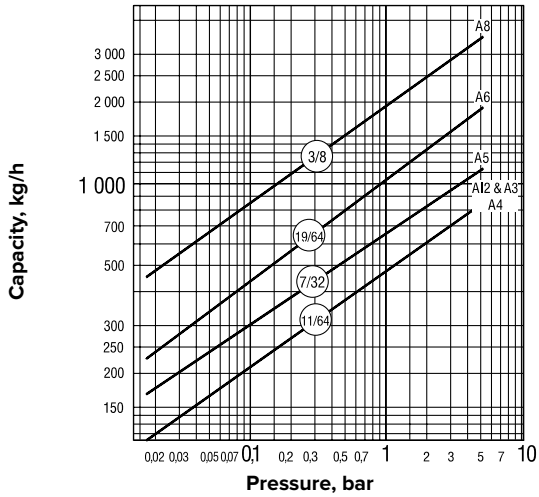


Table ST-131-3. A & AI Series Capacity – 8,5 bar

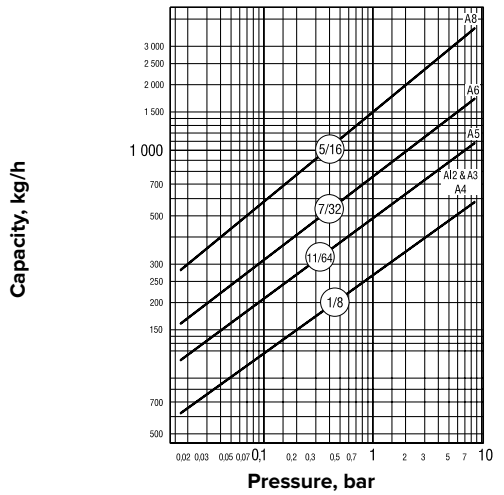
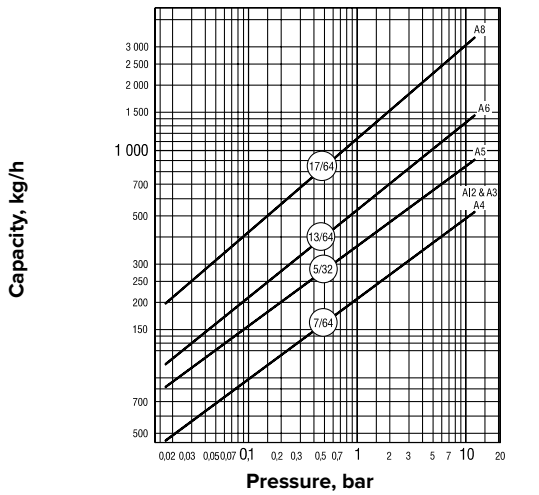


Table ST-131-4. A & AI Series Capacity – 12 bar



Options

Vacuum Breaker – 3/8" and 1/2" NPT

Many times, condensate will be retained ahead of steam traps because of the presence of a vacuum. To break a vacuum, air must be introduced into the system by means of a vacuum breaker.

For maximum protection against freezing and water hammer in condensing equipment under modulated control, vacuum breakers are recommended. Armstrong A and AI Series F&T Traps are available with integral vacuum breakers. Maximum service pressure is 10 bar.

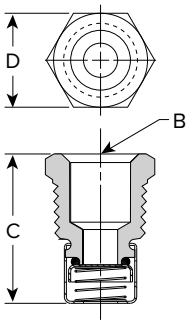


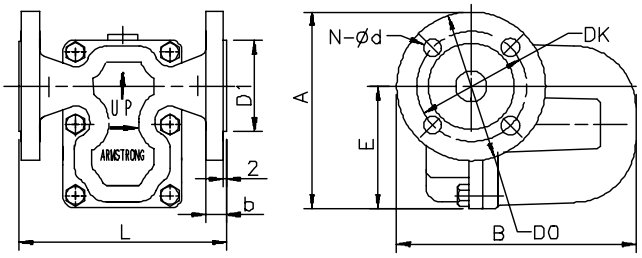
Table ST-131-5. Vacuum Breaker (dimensions in mm)		
Size	**1/2" NPT**	**3/8" NPT**
"B" Pipe Connections	3/8"	1/4"
"C" Height	30	28
"D" Width	22 Hex	17 Hex

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

AIC Series DN15-25 Float & Thermostatic Steam Trap

Ductile Iron for Horizontal Installation, with Thermostatic Air Vent

For Pressures to 14,2 bar...Capacities to 1 024 kg/h



Description

Armstrong AIC Series F&T traps are designed for industrial service to 14,2 bar. They feature all the benefits of Armstrong F&T traps, such as operation against back pressure, continuous drainage, high-capacity venting of air and CO_2, long life and dependable service and enjoys the convenience of in-line connections.

Armstrong AIC Series F&T traps are the perfect solution for applications where there is a need to vent air and non-condensable gases quickly at start-up.

Maximum Operating Conditions

Maximum allowable pressure (screwed): 17 bar @ 232°C (vessel design):
14,2 bar @ 232°C (EN1092-2 PN16)
Maximum Allowable Pressure: 17 barg (screwed)
14,2 barg (EN1092-2 PN16)
Maximum Allowable Temperature: 232°C
Maximum Operating Pressure: 14,2 barg

Note: Caution should be used when Float and Thermostatic steam traps are applied in systems where freezing or excessive hydraulic shock can occur.

Materials

Body & Cap	ASTM A395 Gr. 60-40-18 EN 1563 Gr. EN-GIS-400-18U
Gasket	Graphite
Seat	Stainless Steel 303
Internals	Stainless Steel 304
Valve	Stainless Steel 17-4-PH
Thermostatic Air Vent	Hastelloy Wafer
Hex Bolt	12.9

Connections

Screwed BSPT and NPT
Flanged EN1092-2 PN16

Options

Integral vacuum breaker.
Add suffix VB to model number.
Caution: Do not use a conventional vacuum breaker open to the atmosphere in any system that incorporates a mechanical return system that carries pressure less than atmospheric pressure. This includes all return systems designated as vacuum returns, variable vacuum returns or subatmospheric returns. If a vacuum breaker must be installed in such a system, it should be of the type that is loaded to open only when the vacuum reaches a calibrated level well in excess of the design characteristics of the system.

Flow Direction

Left to right

How to Order

Model	Flow Direction	Connection Size	Connection Type	Pressure	Option
AIC F+T	L/R	DN20	PN16	3/32	VB
AIC F+T	L/R = Left to Right	1/2" 3/4" 1"	Screwed	1/4 = 1 bar 7/32 = 2 bar 1/8 = 5 bar 3/32 = 8,5 bar 5/64 = 14,2 bar	VB = Vacuum Breaker (limited to 10 bar)
		DN15 DN20 DN25	Flanged		
AIC-HC F+T		1"	Screwed	11/32 = 1 bar 5/16 = 2 bar 7/32 = 5 bar 11/64 = 9 bar 1/8 = 14 bar	
		DN25	Flanged		

Table 132-1. Table Available Connections and Face-To-Face (dimensions in mm)

Connection	1/2" DN15	3/4" DN20	1" DN25	AIC-HC 1" - DN25
«A» (Height Screwed)	135	135	135	135
«A» (Height Flanged PN16)	142	147	152	152
«B» (Length Screwed)	175	175	175	220
«B» (Length Flanged PN16)	175	180	185	238
«L» (Face-to-face Screwed)	160	160	160	160
«L» (Face-to-face Flanged PN16)	150	150	160	160
«b» (Flange width)	16	16	18	18
«E» (Bottom to centerline of inlet)	96	96	96	96
«D1»	ø 48	ø 58	ø 68	ø 68
«Do»	ø 95	ø 105	ø 115	ø 115
«Dk»	ø 65	ø 75	ø 85	ø 85
«N - ød»	4 - ø 14	4 - ø 14	4 - ø 14	4 - ø 14
Vacuum Breaker (optional)	3/8"	3/8"	3/8"	3/8"
Weight in kg screwed	4.4 kg	4.4 kg	4.4 kg	4.6 kg
Weight in kg flanged	6.2 kg	6.5 kg	7.0 kg	7.25 kg

All the sizes comply with the Article 4.3 of the PED (2014/68/UE)

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

AIC Series DN15-25 Float & Thermostatic Steam Trap

Ductile Iron for Horizontal Installation, with Thermostatic Air Vent

For Pressures to 14,2 bar...Capacities to 1 024 kg/h

Table 133-1. Model AIC DN15-25 – Capacity Chart

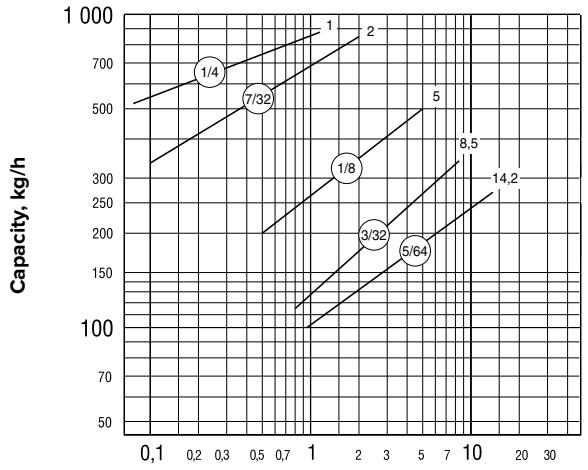
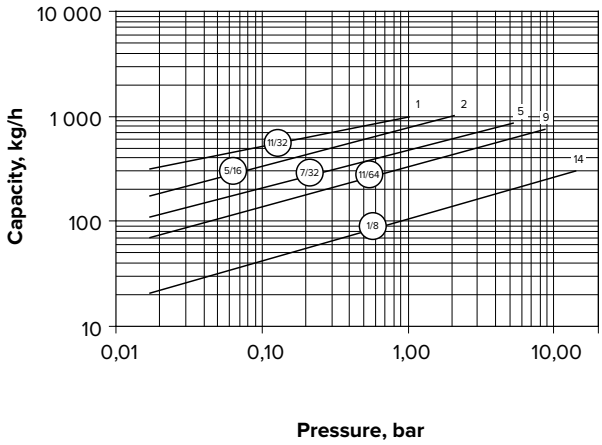


Table ST-133-2. 2 Model AIC-HC DN25 – Capacity Chart



Specification

The steam trap shall be an Armstrong model AIC (AICF) float & thermostatic type. Cap and body shall be ASTM A395 Gr. 60-40-18 (EN1563) or EN-GJS-400-18U Ductile Iron. Pipe connections shall be in the cap and the entire mechanism attached to the cap. Float and seat shall be stainless steel with heat-treated chrome steel valve. The float shall be Heliarc welded to avoid introduction of dissimilar metals. The thermostatic Air Vent shall be a balanced pressure Hastelloy wafer with chrome steel seat. Maximum allowable back pressure should be 99% of the inlet pressure.

Options

Vacuum Breaker. Many times, condensate will be retained ahead of steam traps because of the presence of a vacuum. To break a vacuum, air must be introduced into the system by means of a vacuum breaker.

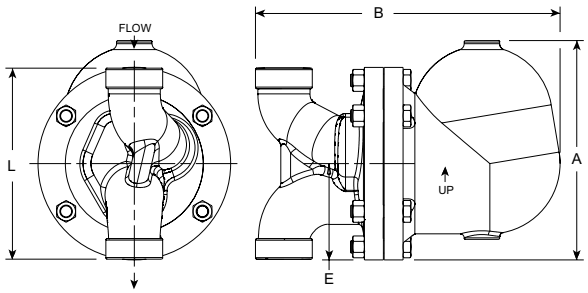
For maximum protection against freezing and water hammer in condensing equipment under modulated control, vacuum breakers are recommended. Armstrong AIC Series F&T Traps are available with integral vacuum breakers. Maximum service pressure is 10 bar.

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

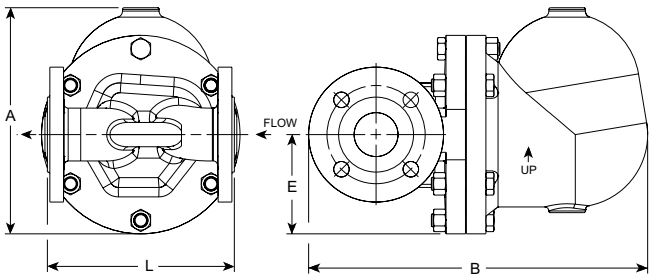
AIC Series DN40-50 Float & Thermostatic Steam Trap

Nodular Cast Iron (GS) for Horizontal & Vertical Installation, with Thermostatic Air Vent

For Pressures to 32 bar... Capacities to 27 250 kg/h



Model AIC Vertical



Model AICF Horizontal

Armstrong AIC Series F&T traps are designed for industrial service up to 32 bar. They feature all the benefits of Armstrong F&T traps, such as operation against back pressure, continuous drainage, high-capacity venting of air and CO_2, long life and dependable service and enjoys the convenience of in-line connections.

Armstrong AIC Series F&T traps are the perfect solution for applications where there is a need to vent air and non-condensable gases quickly at start-up.

Maximum Operating Conditions

Maximum allowable pressure (vessel design)ŧ:	40 bar @ 300°C (screwed) 32 bar @ 300°C (EN1092-2 PN40)
Maximum Allowable Pressure:	40 barg (screwed) 32 barg (EN1092-2 PN40)
Maximum Allowable Temperature:	300°C
Maximum Operating Pressure:	32 barg

Note: Caution should be used when Float and Thermostatic steam traps are applied in systems where freezing or excessive hydraulic shock can occur.

Connections

Screwed BSPT and NPT
Flanged EN1092-2 PN40 or ANSI

Materials

Body & Cap	ASTM A395 Grade 60-40-18 EN1563 Grade EN-GJS-400-18U
Gasket	Graphite
Seat	Stainless Steel 17-4PH
Internals	Stainless Steel
Valve	Stainless Steel 17-4PH
Thermostatic Air Vent	Hastelloy Wafer
Hex Bolt	ASTM A193 Gr. B7 ASTM A194

Options

Integral vacuum breaker.
Add suffix VB to model number.

Flow Direction

Right to Left (Horizontal).
Top to Bottom (Vertical).

How to Order

Model	Flow Direction	Connection Size	Connection Type	Pressure	Option
AIC F+T	R/L	DN50	PN40	1-3/8"	VB
AIC F+T	VERT = Top to Bottom (Vertical)	1-1/2" 2"	Screwed Connec-tion	1-3/8" = 7 bar 1" = 14 bar 3/4" = 32 bar	VB = Vacuum Breaker (limited to 10 bar)
	R/L = Right to Left	DN40 DN50	Flanged Connec-tion		

Table 134-1. Table Available Connections and Face-To-Face Dimensions

Connection	1 1/2" DN40	2" DN50
«A» Height in mm	278	278
«B» (Length Screwed) in mm	326	333
«B» (Length Flanged EN1092-2 PN40) in mm	410	417
«L» (Face-to-face Screwed) in mm	270	300
«L» (Face-to-face Flanged EN1092-2 PN40) in mm	230	230
«E» (Bottom to centerline of inlet) in mm	122	122
Vacuum Breaker (optional) in inch	3/8"	3/8"
Weight in kg screwed	32	32
Weight in kg flanged	34	34

All are CE Marked according to the PED (2014/68/UE).
ŧ May be derated depending on flange rating and type.

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

AIC Series DN40-50 Float & Thermostatic Steam Trap

Nodular Cast Iron (GS) for Horizontal & Vertical Installation, with Thermostatic Air Vent

For Pressures to 32 bar... Capacities to 27 250 kg/h

Table 135-1. Model AIC DN40 – Capacity Chart

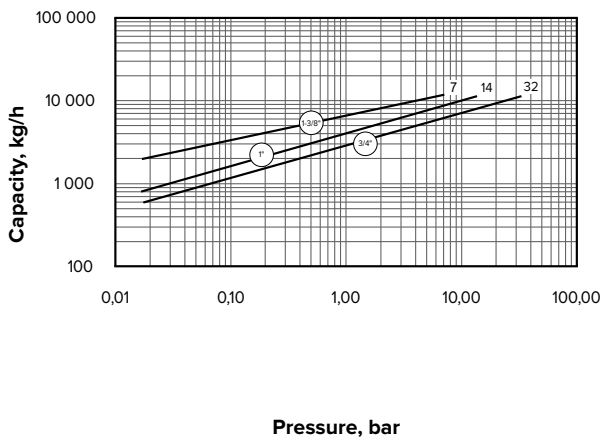
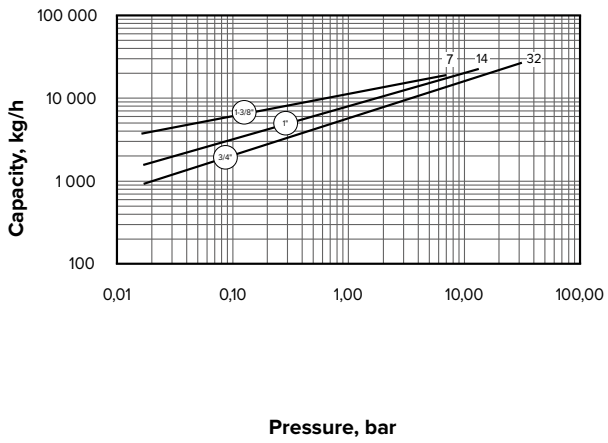


Table 135-2. Model AIC DN50 – Capacity Chart



Options

Vacuum Breaker

Many times, condensate will be retained ahead of steam traps because of the presence of a vacuum. To break a vacuum, air must be introduced into the system by means of a vacuum breaker.

For maximum protection against freezing and water hammer in condensing equipment under modulated control, vacuum breakers are recommended. Armstrong AIC Series F&T Traps are available with integral vacuum breakers. Maximum service pressure is 10 bar.

CAUTION: Do not use a conventional vacuum breaker open to the atmosphere in any system that incorporates a mechanical return system that carries pressure less than atmospheric pressure. This includes all return systems designated as vacuum returns, variable vacuum returns or subatmospheric returns. If a vacuum breaker must be installed in such a system, it should be of the type that is loaded to open only when the vacuum reaches a calibrated level well in excess of the design characteristics of the system.

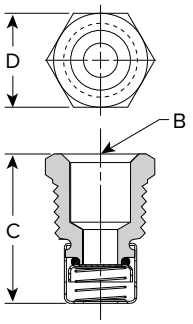


Table 135-3. Vacuum Breaker (dimensions in mm)

Size	1/2" NPT	3/8" NPT
«B» Pipe Connections	3/8"	1/4"
«C» Height	30	28
«D» Width	22 Hex	17 Hex

Specification

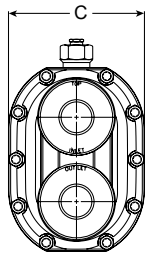
The steam trap shall be an Armstrong model AIC (AICF) float & thermostatic type. Cap and body shall be EN-GJS-400-15 (EN1563) Nodular Iron. Pipe connections shall be in the cap and the entire mechanism attached to the cap. Float and seat shall be stainless steel with heat-treated chrome steel valve. The float shall be Heliarc welded to avoid introduction of dissimilar metals. The thermostatic Air Vent shall be a balanced pressure Hastelloy wafer with chrome steel seat. Maximum allowable back pressure should be 99% of the inlet pressure.

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

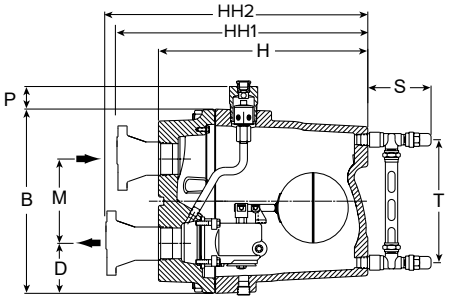
JD & KD Series Ultra-Capacity Float & Thermostatic Steam Traps

Ductile Iron for Horizontal Installation, with Thermostatic Air Vent

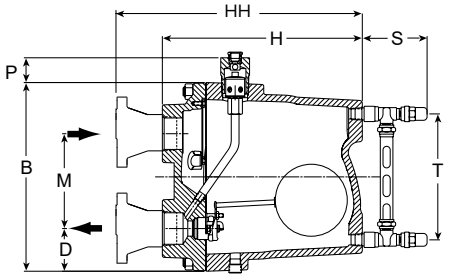
For Pressures to 21 bar...Capacities to 64 400 kg/h



Series JD & KD Cap



Series KD, F&T Shown



Series JD, F&T Shown

Description

The simple, yet rugged, ductile iron construction of the JD & KD Series Ultra-Capacity F&T steam traps offers long, trouble-free service. All floats, valves and seats, and lever mechanisms are constructed of stainless steel.

The integral thermostatic air vent is a balanced-pressure phosphor bronze bellows caged in stainless steel. It is designed especially for heavy-duty industrial applications where highly efficient, uninterrupted service is essential. This balanced-pressure-type air vent will respond to the pressure-temperature curve of steam at any pressure from zero to 21 bar. Thus – up to 21 bar – air is vented at slightly below steam temperature.

Maximum Operating Conditions

Maximum allowable pressure (vessel design)†:
Model JD & KD 21 bar @ 343°C[1]

Maximum operating pressure:

Model 15-JD:	1 bar saturated steam
Model 20-JD:	1,4 bar saturated steam
Model 30-JD:	2 bar saturated steam
Model 75-JD:	5 bar saturated steam
Model 125-JD:	8,5 bar saturated steam
Model 175-JD:	12 bar saturated steam
Model 250-JD:	17 bar saturated steam
Model 300-JD:	21 bar saturated steam
Model 30-KD:	2 bar saturated steam
Model 50-KD:	3,5 bar saturated steam
Model 300-KD:	21 bar saturated steam

Maximum back pressure:	99% of inlet pressure
Maximum operating temperature:	217°C

Connections

Screwed BSPT and NPT
Flanged DIN or ANSI (screw on)

Materials

Body and cap:	ASTM A395 ductile iron
Internals:	All stainless steel – 304
Valve(s) and seat(s):	Stainless steel
Drain plug:	Carbon steel
Thermostatic air vent:	Stainless steel and bronze with phosphor bronze bellows, caged in stainless steel

Options

- Integral vacuum breaker 10 bar maximum. Add suffix VB to model number
- No internal thermostatic air vent for liquid drainer service. Add suffix LD to model number
- Integral flash release for syphon drainage service. Add suffix CC to model number
- Armored gauge glass 17 bar @ 217°C

Specification

Float and thermostatic steam trap, type ... in ductile iron, with thermostatic air vent. Maximum allowable back pressure 99% of inlet pressure.

1 applicable for condensate controller (CC) or liquid drainer (LD) configurations

How to Order

Pressure	Model	Connection Size	Option
75	JD	8	VB
15 20 30 75 125 175 250 300	JD	8 = DN50	VB = Vacuum Breaker LD = Liquid Drainer CC = Condensate Controller GG = Gauge Glass
30	KD	8 = DN50	
50	KD	10 = DN65	
300	KD	10 = DN65 12 = DN80	

Special Configurations

Condensate controller with flash release for syphon drainage and/or cascade service. The condensate controller (CC) configuration was developed especially to meet very large capacity needs in applications where condensate must be lifted from the drain point to the trap. Under such conditions – often referred to as syphon drainage – the reduction in pressure that occurs when the condensate is elevated causes a portion of the condensate to flash into steam. Ordinary traps, unable to differentiate between flash steam and live steam, close and impede drainage.
The JD & KD Series condensate controllers (CC) are equipped with a fixed, restricted orifice near the top of the body to bleed off the flash steam (and all air present). This permits the trap to function properly on condensate.

Liquid drainer with back vent for exceptionally high-capacity drainage of liquid from gas under pressure. The liquid drainer (LD) configuration was developed to meet very large capacity needs in draining water and other liquids from air or other gases under pressure. To prevent air or gas binding, the access port in the top of the body serves as a back vent connection to the equipment being drained. For capacity data, see pages LD-335 and LD-360 or consult your Armstrong Representative.

Table ST-136-1. JD and KD Series Side Inlet, Side Outlet Trap

Model No.	JD	KD
Pipe Connections	50	50, 65, 80
“B” Height	332	332
“C” Width	246	246
“H” Face-to-Face (screwed)	348	373
“HH1” Inlet Face-to-Face (flanged PN40*)	420	448
“HH2” Outlet Face-to-Face (flanged PN40*)	420	548
“D” Bottom to ℄	74,6	90
“M” ℄ to ℄	168	152
“P” Trap top to VB top	46	46
“S” (Gauge Glass width)	114	114
“T” (Gauge Glass height)	222	222
Weight in kg (screwed)	36,3	39,5
Weight in kg (flanged PN40*)	45	49

Dimensions in mm * Other flange sizes, ratings and face-to-face dimensions are available on request.
All models are CE Marked according to PED (2014/68/UE) † May be derated depending on flange rating and type.

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

JD & KD Series Ultra-Capacity Float & Thermostatic Steam Traps

Ductile Iron for Horizontal Installation, with Thermostatic Air Vent

For Pressures to 21 bar...Capacities to 64 400 kg/h

Table ST-137-1. JD Series Capacity

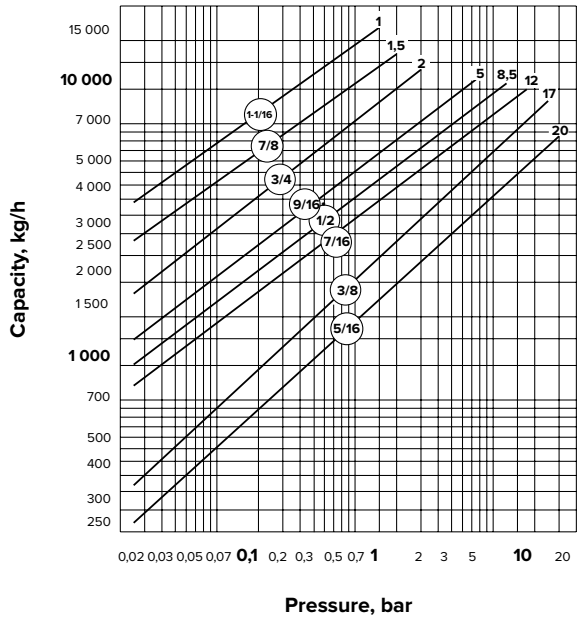


Table ST-137-2. Model 30-K8/50-KD10 Capacity

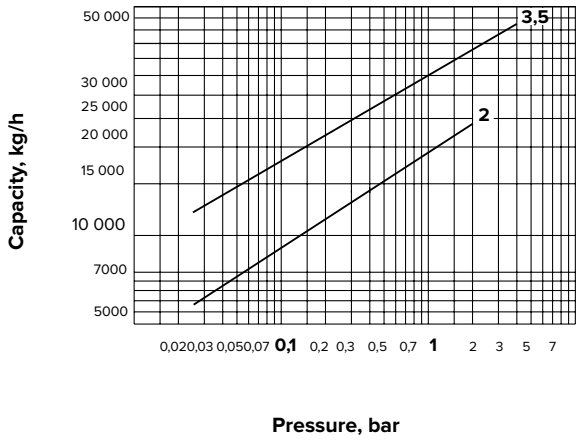


Table ST-137-3. Model 300-KD10 Capacity

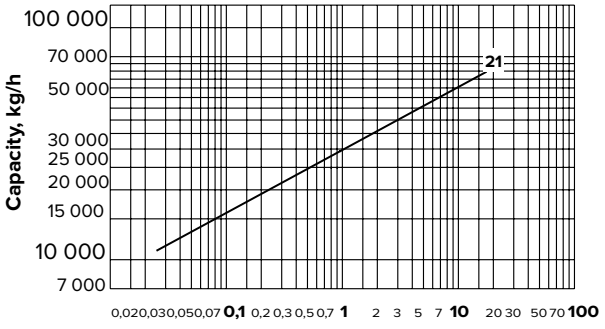
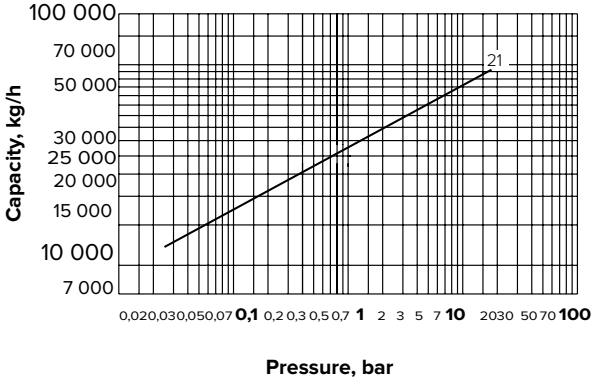


Table ST-137-5. Model 300-KD12 Capacity



Options

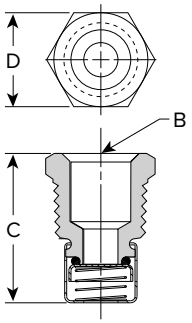
Vacuum Breaker – 1/2" NPT

Many times, condensate will be retained ahead of steam traps because of the presence of a vacuum. To break a vacuum, air must be introduced into the system by means of a vacuum breaker.

For maximum protection against freezing and water hammer in heating coils under modulated control, for example, vacuum breakers are recommended in conjunction with freeze protection devices.

Table ST-137-4. Vacuum Breaker (dimensions in mm)

Size	1/2" NPT	Max. allow. pres.
"B" Pipe Connections	3/8"	10 bar
"C" Height	30	
"D" Width	22 Hex	

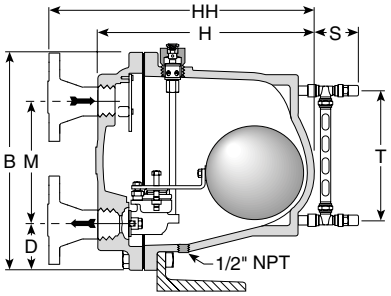


All dimensions and weights are approximate. Use certified print for exact dimensions. Design and materials are subject to change without notice.

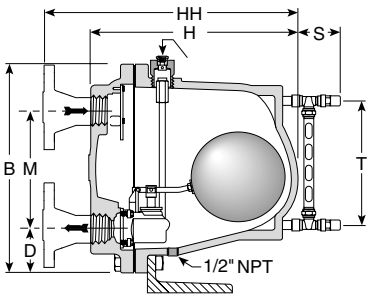
L & M Series Ultra-Capacity Float & Thermostatic Steam Traps

Cast Iron for Horizontal Installation, with Thermostatic Air Vent

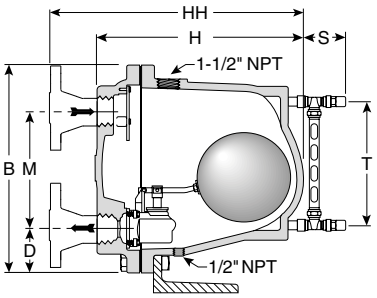
For Pressures to 17 bar...Capacities to 94 350 kg/h



Series L, F&T Shown



Series M, CC Shown



Series M, LD Shown

Description

The simple yet rugged cast iron construction of the L & M Series Ultra-Capacity F&T steam traps offers long, trouble-free service. All floats, valves and seats, and lever mechanisms are constructed of stainless steel.

The integral thermostatic air vent is a balanced-pressure phosphor bronze bellows caged in stainless steel. It is designed especially for heavy-duty industrial applications where highly efficient, uninterrupted service is essential. This balanced pressure type air vent will respond to the pressure-temperature curve of steam at any pressure from zero to 17 bar. Thus – up to 17 bar – air is vented at slightly below steam temperature.

Maximum Operating Conditions

Maximum allowable pressure (vessel design)ŧ:

Model L: 17 bar @ 232°C
Model M: 17 bar @ 232°C

Maximum operating pressure:

Model 30-L: 2 bar saturated steam
Model 100-L: 7 bar saturated steam
Model 150-L: 10 bar saturated steam
Model 250-L: 17 bar saturated steam
Model 250-M: 17 bar saturated steam

Maximum back pressure: 99% of inlet pressure
Maximum operating temperature bellows: 217°C

Note: Cast iron traps should not be used in systems where freezing, excessive hydraulic or thermal shock are present.

Connections

Screwed BSPT and NPT
Flanged DIN or ANSI (screw on)

Materials

Body and cap:	ASTM A48 Class 30
Internals:	All stainless steel – 304
Valve(s) and seat(s):	Stainless steel
Drain plug:	Carbon steel
Thermostatic air vent:	Stainless steel and bronze with phosphor bronze bel lows, caged in stainless steel

Options

- Integral vacuum breaker 10 bar maximum. Add suffix VB to model number
- No internal thermostatic air vent for liquid drainer service. Add suffix LD to model number
- Integral flash release for syphon drainage service. Add suffix CC to model number
- Armored gauge glass 17 bar @ 218°C
- L and M Series available with floor mounting bracket. Consult factory.

Specification

Float & thermostatic steam trap, type ... in cast iron, with thermostatic air vent. Maximum allowable back pressure 99% of inlet pressure.

How to Order

Pressure	Model	Connection Size	Option
250	M	12	GG
30 = 2 bar 100 = 7 bar 150 = 10,5 bar 250 = 17 bar	L	8 = DN50 10 = DN65	VB = Vacuum Breaker LD = Liquid Drainer CC = Condensate Controller G/G = Gage Glass
250 = 17 bar	M	12 = DN80	

Special Configurations

Condensate controller with flash release for syphon drainage and/or cascade service. The condensate controller (CC) configuration was developed especially to meet very large capacity needs in applications where condensate must be lifted from the drain point to the trap. Under such conditions – often referred to as syphon drainage – the reduction in pressure that occurs when condensate is elevated causes a portion of the condensate to flash into steam. Ordinary traps, unable to differentiate between flash steam and live steam, close and impede drainage.

The L & M Series condensate controllers (CC) are equipped with a fixed, restricted orifice near the top of the body to bleed off the flash steam (and all air present). This permits the trap to function properly on condensate.

Liquid drainer with back vent for exceptionally high capacity drainage of liquid from gas under pressure. The liquid drainer (LD) configuration was developed to meet very large capacity needs in draining water and other liquids from air or other gases under pressure. To prevent air or gas binding, the access port in the top of the body serves as a back vent connection to the equipment being drained. For capacity data, see pages LD-335 and LD-358 or consult your Armstrong Representative.

Table ST-138-1. L and M Series Side Inlet, Side Outlet Trap

Model No.	L		M
Pipe Connections	50	65	80
"B" Height	514		514
"C" Width (not shown on drawing)	375		375
"D" Bottom to ℄	106		106
"H" Face-to-Face (screwed)	502		502
"HH" Face-to-Face (flanged PN40*)	574	580	583
"M" ℄ to ℄	287		287
"S" Gauge Glass Width	95,2		95,2
"T" Gauge Glass Height	305		305
Weight in kg (screwed)	88,9		88,9
Weight in kg (flanged PN40*)	97	99	101

Dimensions in mm
* Other flange sizes, ratings and face-to-face dimensions are available on request.
All models comply with Article 4.3 of the PED (2014/68/UE), but PMA is 11 bar.
ŧ May be derated depending on flange rating and type.

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

L & M Series Ultra-Capacity Float & Thermostatic Steam Traps

Cast Iron for Horizontal Installation, with Thermostatic Air Vent

For Pressures to 17 bar...Capacities to 94 350 kg/h

Table ST-139-1. L Series Capacity

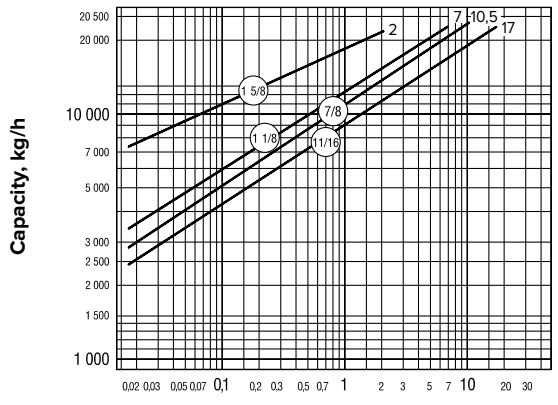
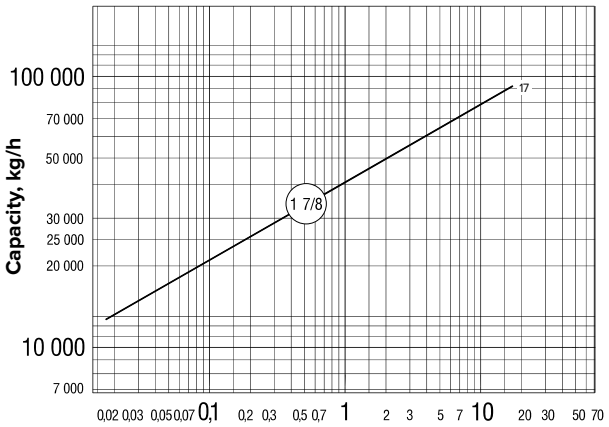


Table ST-139-2. M Series Capacity



Installation Notes

Under conditions where the load may approach the maximum capacity of the trap, it is recommended that the size of the discharge line be increased one size as close to the trap cap as is practical. When L and M Series units are used in severe service conditions or at pressures exceeding 2 bar, use an anchoring bracket or other supportive measures to minimize stress on piping.

Ultra-Capacity L and M Series units MUST BE WARMED UP in the proper sequence and gradually. Recommended warm-up rate – not to exceed 55°C/8 minutes.

See your Armstrong Representative.

Vacuum Breaker – 3/8" and 1/2" NPT

Many times, condensate will be retained ahead of steam traps because of the presence of a vacuum. To break a vacuum, air must be introduced into the system by means of a vacuum breaker.

For maximum protection against freezing and water hammer in heating coils under modulated control, for example, vacuum breakers are recommended in conjunction with freeze protection devices.

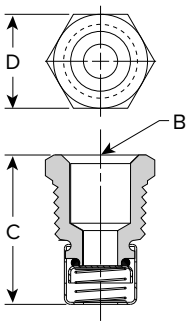


Table ST-139-3. Vacuum Breaker (dimensions in mm)

Size	1/2" NPT	3/8" NPT
"B" Pipe Connections	3/8"	1/4"
"C" Height	30	28
"D" Width	22 Hex	17 Hex

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

FT-4000 Series Float and Thermostatic Steam Trap

All Stainless Steel

For Pressures to 32 bar... Capacities to 490 kg/hr

Description

With the FT-4000 Series, you can install a float and thermostatic trap in any piping configuration with little or no repiping. You get the reliability of the float and thermostatic operating principle, plus all the benefits of all-stainless steel construction.

- A sealed, tamperproof package
- A compact, lightweight trap
- Exceptional corrosion resistance
- A one-year guarantee against defective materials and workmanship

FT-4000 Series Float & Thermostatic steam traps combine savings in three important areas: energy, installation and replacement. Mounting the FT-4000 on universal connectors with integral strainers provides quick, easy in-line replacement with added protection from dirt and scale.

Maximum Operating Conditions

Maximum allowable pressure (vessel design)†:
33 bar @ 315°C

Maximum operating pressure:
Model FT-4075: 5 bar saturated steam
Model FT-4150: 10 bar saturated steam
Model FT-4225: 16 bar saturated steam
Model FT-4300: 21 bar saturated steam
Model FT-4465: 32 bar saturated steam

Materials

Body:	ASTM A240 Grade 304L
Loose Flange:	Zinc Plated Steel (stainless steel available on request)
Internals:	All stainless steel – 304
Valve and seat:	Stainless steel
Thermostatic air vent:	Wafer type-stainless steel with Hastelloy element

Specification

Steam trap shall be float and thermostatic type having stainless steel construction, stainless steel valve, seat and float, for use on an IS-2 connector with integral strainer or TVS-4000 trap valve station. Integral thermostatic element shall be wafer type constructed of Hastelloy and stainless steel. Thermostatic element shall be capable of withstanding 25°C of superheat and be resistant to water hammer damage.

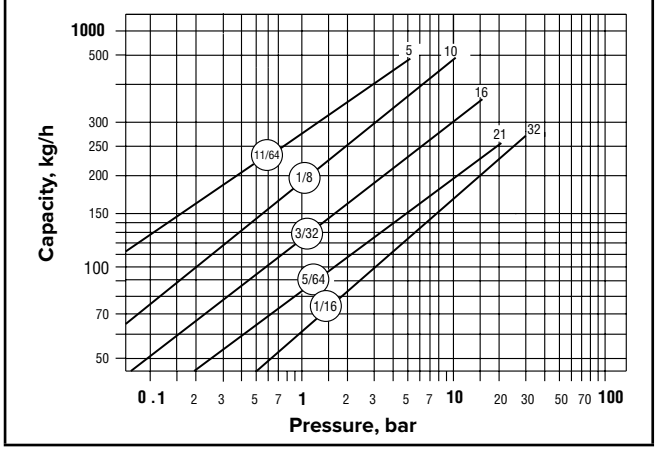
How to order

- Specify model number
- Select 360° connector style (IS-2 or TVS 4000)
- Specify maximum working pressure that will be encountered or orifice size
- Specify any options required

TVS 4000 Trap Valve Station with FT-4000 Float and Thermostatic Trap

IS-2 Connector with FT-4000 Float and Thermostatic Trap

Table ST-140-1. Model FT-4000 Series Capacity



† May be derated depending on flange rating and type.

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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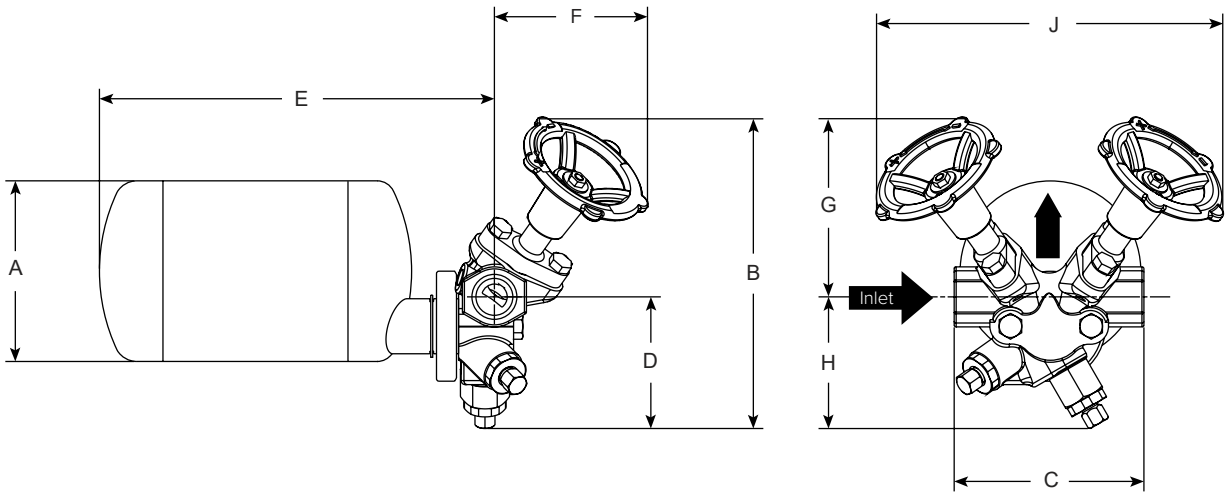
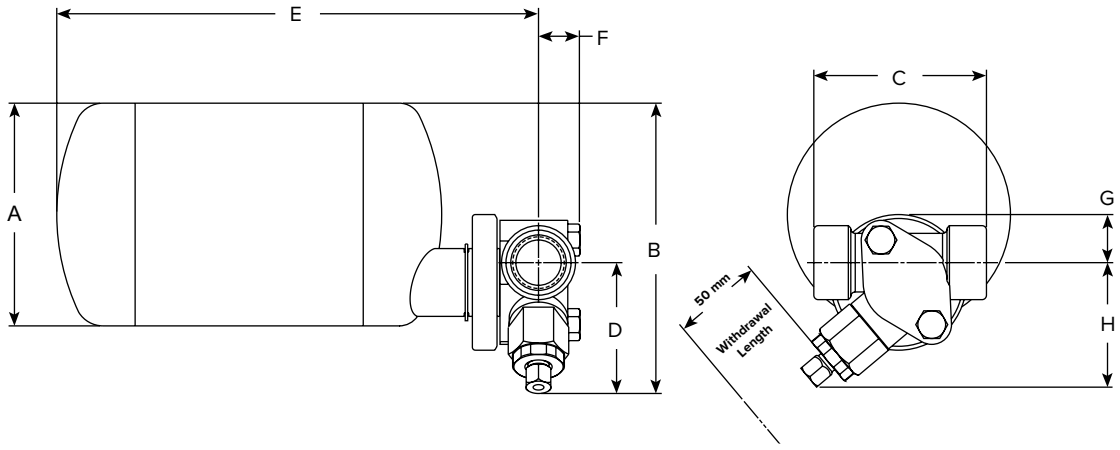
FT-4000 Series Float and Thermostatic Steam Trap

All Stainless Steel

For Pressures to 32 bar... Capacities to 490 kg/hr



Series FT-4000 with TVS 4000 Trap Valve Station



Series FT-4000 With IS-2 Connector with Integral Strainer and Optional Blowdown Valve

Table ST-141-1. FT-4000 Series Float and Thermostatic Steam Trap

Trap Series	FT-4000		
Model	IS-2 Connector With Integral Strainer		TVS 4000 Connector
	mm	mm	mm
Pipe Connections	**15 – 20**	**25**	**15 – 20**
"A" Trap Diameter	114	114	114
"B" Total Height	149	149	198
"C" Face-to-Face	89	101	120
"D" Connection ℄ to Bottom	67	67	83
"E" Connection ℄ to Outside of Trap	255	259	250
"F" Connection ℄ to Front of Connector	22	22	98
"G" Connection ℄ to Top	25	25	114
"H" Connection ℄ to Bottom of Connector	64	64	83
"J" Width across Handwheels (valve open)	N/A		221
Test Port Connection	N/A		1/4 NPT
Maximum Operating Pressure (saturated steam)	32 bar		
Maximum Allowable Pressure (vessel design)	33 bar @ 315°C		
Trap Only Weight, in kg	2,8		
Trap and Connector Weight, in kg	4		5,8

FF-4000 Series Free Float and Thermostatic Steam Trap

All Stainless Steel

For Pressures to 31 barg... Capacities to 476 kg/hr

Description

With the FF-4000 Series' 360° universal connector, you can install a free float and thermostatic trap to fit any piping configuration. You get the reliability of the free float and thermostatic design plus all the benefits of all-stainless steel construction.

- A sealed, tamperproof package
- A compact, lightweight trap
- Exceptional corrosion resistance
- A three-year guarantee against defective materials and workmanship

FF-4000 Series Free Float and Thermostatic steam traps combine savings in three important areas: energy, installation and replacement. Mounting the FF-4000 on universal connectors provide quick and easy in-line replacement.

Maximum Operating Conditions

Maximum allowable pressure (vessel design):

Model FF-4250	20.7 barg @ 343°C
Model FF-4450	41.4 barg @ 427°C

Maximum operating pressure:

Model FF-4250	17 barg @ 343°C
Model FF-4450	31 barg @ 427°C

Materials

Body:	ASTM A240 Grade 304L
Internals:	All stainless steel-304
Ball seat:	Stainless Steel
Float:	Stainless Steel
Air Vent:	Bimetal

360° Universal Connector Styles

- Standard 2-bolt connector
- IS-2 connector with integral strainer and optional blowdown valve
- Trap Valve Station

How to order

- Specify model number
- Size and type of pipe connection, style of 360° universal connector.

FF-4250 with TVS-4000

Table ST-142-2. Model FF-4000 Series Capacities

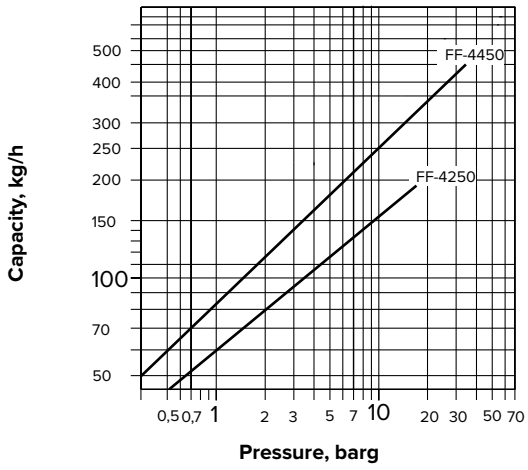
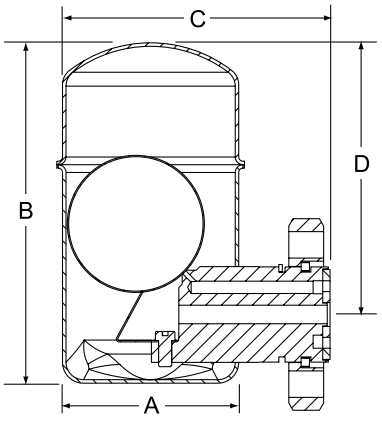


Table ST-142-1. FF-4000 Series

Model No.	FF-4250	FF-4450
Pipe Connection	15, 20 mm	15, 20 mm
"A" Diameter	68	98
"B" Height	124	157
"C" Outside to Flange"D"	98	125
"D" C Flange to Top	102	125
Trap Only Weight, lb (kg)	0.9	1.8



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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Notes

ICS Series Float and Thermostatic Steam Trap

Carbon Steel with Integral Flanges for Horizontal Installation with Thermostatic Air Vent

For pressures to 32 bar ... Capacities to 27 215 kg/h

Description

Armstrong ICS Series F&T traps are for industrial service from 0 to 32 bar. The simple yet rugged construction of the ICS series carbon steel float and thermostatic trap is designed to assure long, trouble-free service. A full range in flanged connection sizes is offered: 1/2" through 2".

Materials

Body and Cap:	ASTM A352 Gr. LCB
Internals:	Stainless Steel
Valve and Seat:	Stainless Steel
Thermostatic Air Vent:	Wafer type stainless steel with hastelloy element

Connections

Flanged	ASME B16.5 Class 150 - 300 EN1092-1 PN40
Socketweld	
NPT / BSPT	

Options

Integral vacuum breaker. Add suffix VB to model number (PMA:10 barg@184 °C)

Condensate controller. Add suffix CC to model number.

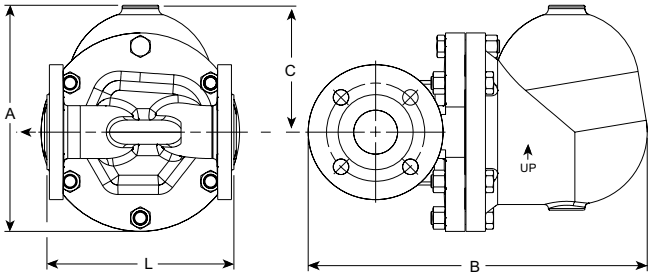


Table 144-1. Flow Direction

	mm	Flow Direction
Horizontal	15, 20, 25	Left-to-Right
Horizontal	40, 50	Right-to-Left
Vertical*	All	Down

* For vertical applications and dimensions, please consult factory.

Table 144-2. Face-to-Face Dimensions - NPT / BSPT / Socketweld

Connection Size	mm 15	mm 20	mm 25	mm 40	mm 50
A	196	196	211	288	288
B	278	279	314	374	380
C	126	126	131	166	166
L	184	178	188	266	273
Weight, kg	10	10	13	35	35
Maximum Allowable Pressure (Vessel Design)	40 barg @ 343 °C				
Maximum Operating Pressure	32 barg				

Table 144-3. Face-to-Face Dimensions - ASME B 16.5 Class 150#

Connection Size	mm 15	mm 20	mm 25	mm 40	mm 50
A	196	196	211	288	288
B	301	306	344	399	412
C	126	126	131	166	166
L	203	205	208	321	312
Weight, kg	11	11	15	38	38
Maximum Allowable Pressure (Vessel Design) †	13,6 barg @ 205 °C				
Maximum Operating Pressure	13,6 barg				

Table 144-4. Face-to-Face Dimensions - PN40

Connection Size	mm 15	mm 20	mm 25	mm 40	mm 50
A	196	196	211	288	288
B	304	309	347	413	420
C	126	126	131	166	166
L	150	150	160	230	230
Weight, kg	11	12	20	36	40
Maximum Allowable Pressure (Vessel Design) †	34,4 barg @ 250 °C				
Maximum Operating Pressure	32 barg				

Table 144-5. Face-to-Face Dimensions - ASME B 16.5 Class 300#

Connection Size	mm 15	mm 20	mm 25	mm 40	mm 50
A	196	196	211	288	288
B	304	314	352	414	419
C	126	126	131	166	166
L	209	209	212	327	321
Weight, kg	11	12	16	40	40
Maximum Allowable Pressure (Vessel Design) †	40,4 barg @ 260 °C				
Maximum Operating Pressure	32 barg				

Note: Shade indicates products that are CE Marked according to the PED (2014/68/UE). All other models comply with the Article 4.3 of the same directive.

† May be derated depending on flange rating and type.

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

ICS Series Float and Thermostatic Steam Trap

Carbon Steel with Integral Flanges for Horizontal Installation with Thermostatic Air Vent

For pressures to 32 bar ... Capacities to 27 215 kg/h

Table 145-1. Model ICS Series Capacity 1/2" and 3/4" - DN15, DN20

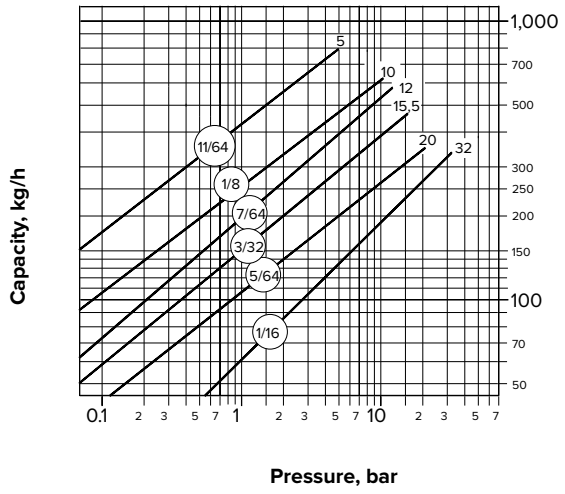


Table 145-2. Model ICS Series Capacity 1" - DN25

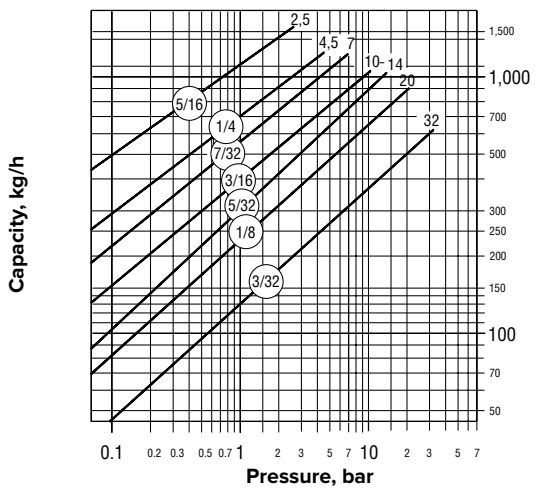


Table 145-3. Model ICS Series Capacity 1-1/2" - DN40

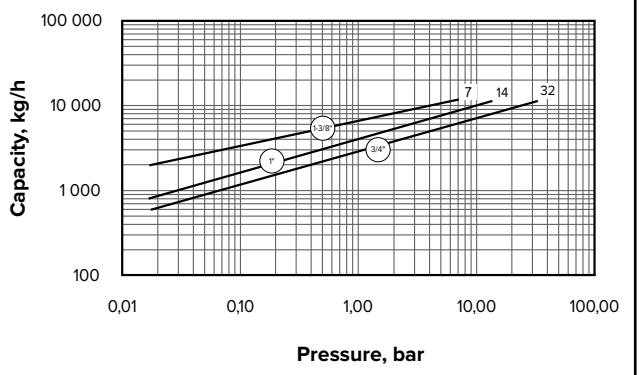
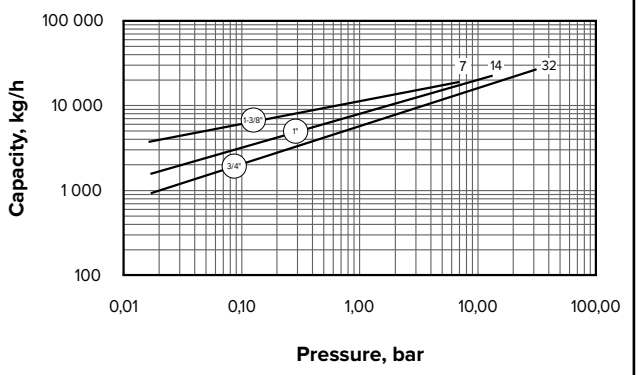


Table 145-4. Model ICS Series Capacity 2" - DN50



Note: PMA/TMA are limited according to the flange selected on the trap model.

Table 145-5. Models with flanges - Limitations

Flange Type	PMA/TMA	Orifice available (depending on connection size)	
		Connection	Available Orifice
ASME B16.5 Class 150	13,8 barg @ 200 °C	15 - 20	11/64 - 1/8 - 7/64
		25	5/16 - 1/4 - 7/32 - 3/16 - 5/32
		40 - 50	1-3/8 - 1
ASME B16.5 Class 300	40,8 barg @ 250 °C	15 - 20 - 25 - 40 - 50	all orifices available consult charts
PN40	35,1 barg @ 250 °C	15 - 20 - 25 - 40 - 50	all orifices available consult charts

How to Order

Model	Flow Direction	Connection Size	Connection Type	Pressure	Option
ICS F+T	R/L	DN50	PN40	1-3/8"	VB
ICS F+T	L/R = Left to Right or Vertical	1/2"/DN15 3/4"/DN20 1"/DN25	Flanged Connection or Sock-etwelded or NPT or BSPT	Consult Capacity Charts to specify orifice.	VB = Vacuum Breaker (limited to 10 bar)
	R/L = Right to Left or Vertical	1-1/2"/DN40 2"/DN50			

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

ICS Series Float & Thermostatic Steam Traps

Carbon Steel for Vertical Installation, With Thermostatic Air Vent

For Pressures to 32 barg Capacities to 27 215 kg/hr

Description

Armstrong ICS Series F&T traps are designed for industrial service up to 32 barg. The simple yet rugged construction of the ICS series carbon steel float and thermostatic trap is designed to assure long, trouble-free service.

Materials

Body & Cap:	Carbon Steel ASTM A352 GR.LCB
Internals:	Stainless steel
Valve(s) and Seat(s):	Hardened Stainless Steel, 17-4PH
Thermostatic Air Vent:	Hastelloy Wafer
Bolting:	Low Alloy Steel, ASTM A193 GR.b7
Gasket:	Graphite

Connections

Flanged:	ASME B16.5 Class 150, Class 300 *
Screwed:	NPT / BSPT
Socket Welded	

Option

Integral Vacuum Breaker: Add suffix VB to model number (limited to 10.3 barg)
Liquid Drainer: Add suffix LD to model number

Flow Direction

Vertical: Top to Bottom

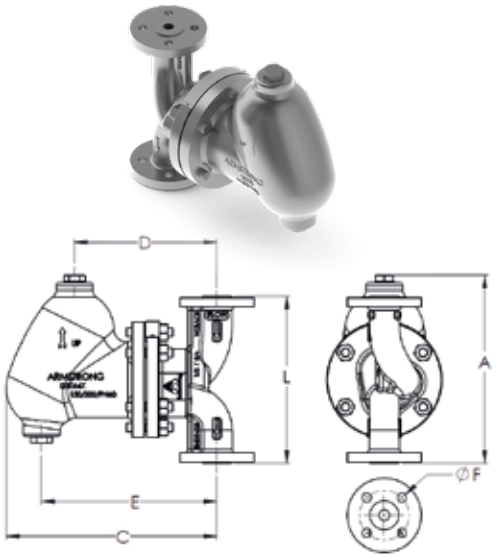


Table ST-146-1. Dimensions Table - Screwed and Socketweld (dimensions in mm)

Pipe Connection	1/2"	3/4"	1"	1-1/2"	2"
"A" Height	216	216	228	319	319
"C" Length	279	279	309	380	380
"D" Length Cap CL to Body CL (Vent)	173	173	193	238	238
"E" Length Cap CL to Body CL (Drain)	213	213	228	238	238
"L" Face-to-Face	178	178	188	306	305
Weight lb (kg)	10.4 kg	10.4 kg	14.1 kg	38.6 kg	38.6 kg
Maximum Allowable Pressure (Vessel Design)	40 barg @ 343°C				
Maximum Operating Pressure	32 barg				

Table ST-146-2. Dimensions Table - ASME B16.5 Class 150 (dimensions in mm)

Pipe Connections	1/2"	3/4"	1"	1-1/2"	2"
"A" Height	228	229	238	321	321
"C" Length	301	306	339	399	399
"D" Length Cap ℄ to Body ℄ (Vent)	173	173	193	238	238
"E" Length Cap ℄ o Body ℄ Drain)	213	213	228	238	238
"F" Bolt Hole Size	1/2" - 13 UNC	1/2" - 13 UNC	16.0	1/2" - 13 UNC	19.1
Number of Flange Holes	4				
"L" Face-to-Face	203	205	208	309	309
Weight lb (kg)	11.7 kg	12.2 kg	16.3 kg	42.6 kg	42.6 kg
Maximum Allowable Pressure (Vessel Design)	13.6 barg @ 205°C				
Maximum Operating Pressure	14 barg				

Table ST-146-3. Dimensions Table - ASME B16.5 Class 300 (dimensions in mm)

Pipe Connections	1/2"	3/4"	1"	1-1/2"	2"
"A" Height	231	231	241	324	324
"C" Length	304	314	347	414	419
"D" Length Cap ℄ to Body ℄ (Vent)	173	173	193	238	238
"E" Length Cap ℄ to Body ℄ (Drain)	213	213	228	238	238
"F" Bolt Hole Size	1/2" - 13 UNC	19.1	19.1	22.2	19.1
Number of Flange Holes	4				8
"L" Face-to-Face	209	209	212	315	315
Weight lb (kg)	11.7 kg	12.2 kg	16.3 kg	42.6 kg	42.6 kg
Maximum Allowable Pressure (Vessel Design)	40 barg @ 260°C				
Maximum Operating Pressure	32 barg				

ICS Series Float & Thermostatic Steam Traps

Carbon Steel for Vertical Installation, With Thermostatic Air Vent

For Pressures to 32 barg Capacities to 27 215 kg/hr

Table ST-147-1. Model ICS Series Capacity 1/2" & 3/4"

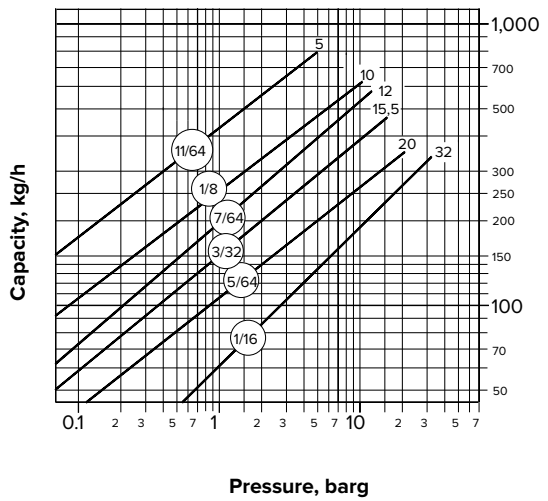


Table ST-147-2. Model ICS Series Capacity 1"

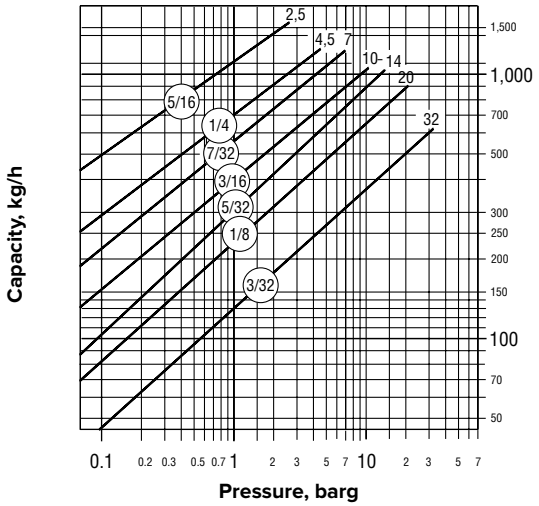


Table ST-147-3. Model ICS Series Capacity 1-1/2"

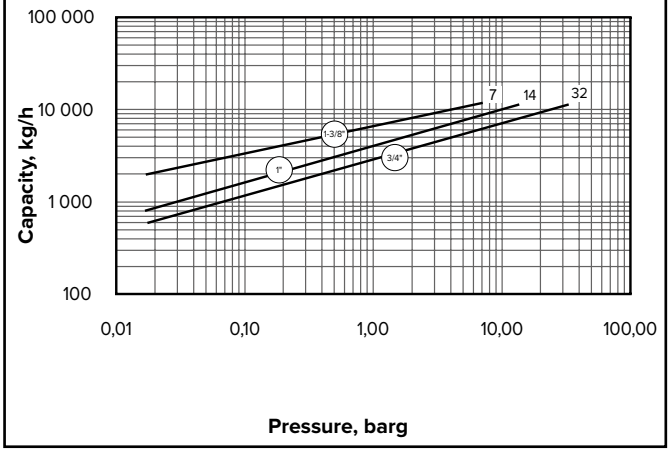
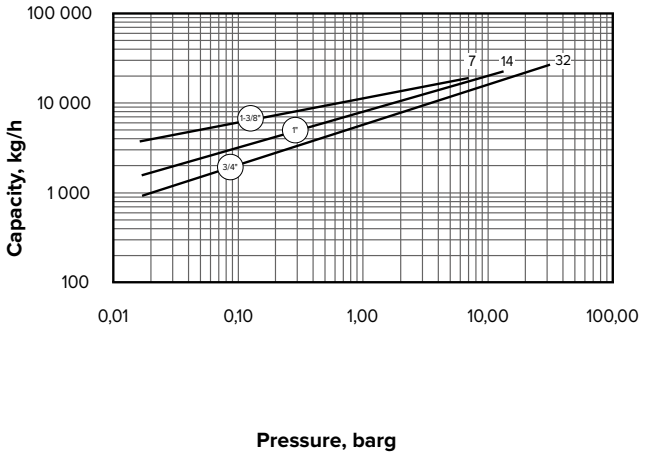
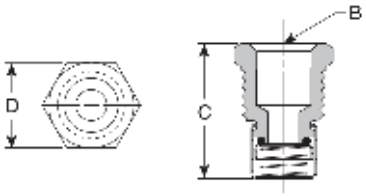


Table ST-147-4. Model ICS Series Capacity 2"



Pressure	Model	Connection Size	Flow Direction	Connection Type
20	ICS	8	V	SCREWED
Refer to capacity charts to determine orfice.	ICS	2 = 1/2" 3 = 3/4" 4 = 1" 6 = 1-1/2" 8 = 2"	Top to Bottom	Screw SW 150RF 300RF



Options

Vacuum Breaker 1/2" NPT

Many times, condensate will be retained ahead of steam traps because of the presence of a vacuum. To break a vacuum, air must be introduced into the system by means of a vacuum breaker.

For maximum protection against freezing and water hammer in condensing equipment under modulated control, vacuum breakers are recommended. Armstrong ICS Series F&T Traps are available with integral vacuum breakers. Maximum service pressure is 10.3 barg.

Table ST-147-5. Vacuum Breaker

Size	1/2 NPT	Max. allow. pres.
"B" Pipe Connections	3/8 NPT	10.3 barg
"C" Height	32	
"D" Width	22 Hex	

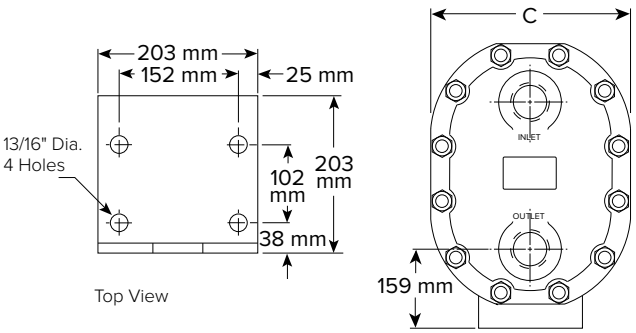
CAUTION: Do not use a conventional vacuum breaker open to the atmosphere in any system that incorporates a mechanical return system that carries pressure less than atmospheric pressure. This includes all return systems designated as vacuum returns, variable vacuum returns or subatmospheric returns. If a vacuum breaker must be installed in such a system, it should be of the type that is loaded to open only when the vacuum reaches a calibrated level well in excess of the design characteristics of the system.

* Standard flanges are ASME B16.5 Class 150, Class 300. No other flanges type available.

LS & MS Series Ultra-Capacity Float & Thermostatic Steam Traps

Cast Steel for Horizontal Installation, with Thermostatic Air Vent

For Pressures to 31 bar...Capacities to 127 000 kg/h



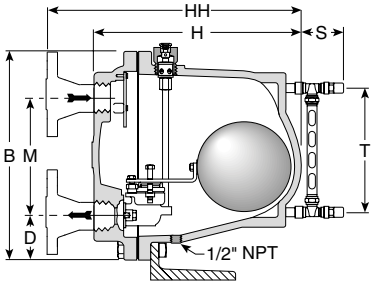
LS and MS Floor Mounting Bracket

Table ST-148-1. LS and MS Series Side Inlet, Side Outlet Trap			
Model No.	**LS & MS**		
Pipe Connections	50	65	80
"B" Height	508		
"C" Width (not shown on drawing)	387		
"D" Bottom to ℄	106		
"H" Face-to-Face (screwed & SW)	508		
"HH" Face-to-Face (flanged PN40*)	553	557	563
"M" ℄ to ℄	287		
"S" Gauge Glass Width	95,2		
"T" Gauge Glass Height	305		
Weight in kg (screwed & SW)	131,5		
Weight in kg (flanged PN40*)	137,5	140,5	143,5

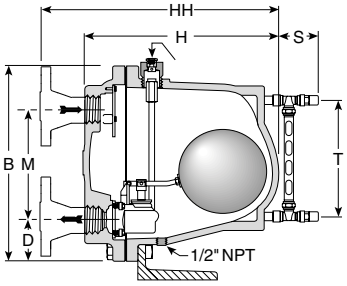
Dimensions in mm

* Other flange sizes, ratings and face-to-face dimensions are available on request.

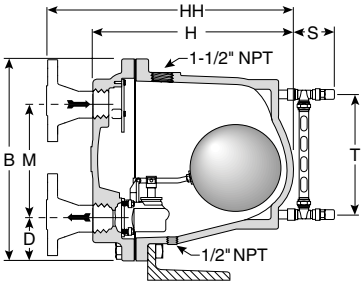
All models are CE Marked according to the PED (2014/68/UE).



Series LS, F&T Shown



Series MS, CC Shown



Series MS, LD Shown

Description

The simple yet rugged cast steel construction of the LS & MS Series Ultra-Capacity F&T steam traps offers long, trouble-free service. All floats, valves and seats, and lever mechanisms are constructed of stainless steel.

The integral thermostatic air vent is a balanced-pressure phosphor bronze bellows caged in stainless steel. It is designed especially for heavy-duty industrial applications where highly efficient, uninterrupted service is essential. This balanced-pressure air vent will respond to the pressure-temperature curve of steam at any pressure from zero to 17 bar. Thus – up to 17 bar – air is vented at slightly below steam temperature.

Maximum Operating Conditions

Maximum allowable pressure (vessel design)ŧ:

Model LS:	31 bar @ 338°C
Model MS:	31 bar @ 338°C

Maximum operating pressure:

Model 30-LS:	2 bar saturated steam
Model 100-LS:	7 bar saturated steam
Model 150-LS:	10 bar saturated steam
Model 250-LS:	17 bar saturated steam
Model 250-MS:	17 bar saturated steam
Model 450-LS:	31 bar saturated steam
Model 450-MS:	31 bar saturated steam

Maximum back pressure: 99% of inlet pressure

Maximum operating temperature bellows: 217°C

Note: For pressures above 17 bar, the thermostatic vent should be removed and only a CC or LD version should be used.

Connections

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

Materials

Body and cap:	ASTM A216 WCB
Internals:	All stainless steel – 304
Valve(s) and seat(s):	Stainless steel
Drain plug:	Carbon steel
Thermostatic air vent:	Stainless steel and bronze with phosphor bronze bellows, caged in stainless steel

Options

- Integral vacuum breaker 10 bar maximum. Add suffix VB to model number.
- No internal thermostatic air vent for liquid drainer service. Add suffix LD to model number.
- Integral flash release for syphon drainage service. Add suf fix CC to model number.
- Armored gauge glass 17 bar @ 218°C
- LS and MS Series available with floor mounting bracket. Consult factory.

Specification

Float and thermostatic steam trap, type ... in cast steel, with thermostatic air vent. Maximum allowable back pressure 99% of inlet pressure.

ŧ May be derated depending on flange rating and type.

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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www.**armstrong**international.eu • info@**armstrong**international.eu

LS & MS Series Ultra-Capacity Float & Thermostatic Steam Traps

Cast Steel for Horizontal Installation, with Thermostatic Air Vent

For Pressures to 31 bar...Capacities to 127 000 kg/h

Table ST-149-1. LS Series Capacity

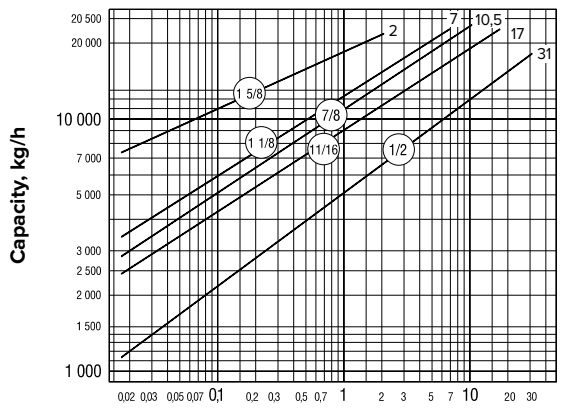
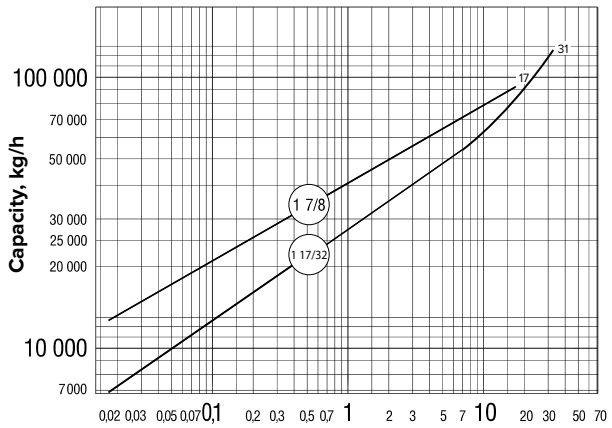


Table ST-149-2. MS Series Capacity



Special Configurations

Condensate controller with flash release for syphon drainage and/or cascade service. The condensate controller (CC) configuration was developed especially to meet very large capacity needs in applications where condensate must be lifted from the drain point to the trap. Under such conditions – often referred to as syphon drainage – the reduction in pressure that occurs when condensate is elevated causes a portion of the condensate to flash into steam. Ordinary traps, unable to differentiate between flash steam and live steam, close and impede drainage.

The LS & MS Series condensate controllers (CC) are equipped with a fixed, restricted orifice near the top of the body to bleed off the flash steam (and all air present). This permits the trap to function properly on condensate.

Liquid drainer with back vent for exceptionally high capacity drainage of liquid from gas under pressure. The liquid drainer (LD) configuration was developed to meet very large capacity needs in draining water and other liquids from air or other gases under pressure. To prevent air or gas binding, the access port in the top of the body serves as a back vent connection to the equipment being drained. For capacity data, see pages LD-337 and LD-360 or consult your Armstrong Representative.

Installation Notes

Under conditions where the load may approach the maximum capacity of the trap, it is recommended that the size of the discharge line be increased one size as close to the trap cap as is practical.

When LS and MS Series units are used in severe service conditions or at pressures exceeding 2 bar, use an anchoring bracket or other supportive measures to minimize stress on piping.

Ultra-Capacity LS and MS Series units MUST BE WARMED UP in the proper sequence and gradually. Recommended warm-up rate not to exceed 55°C/8 minutes.

See your Armstrong Representative.

Vacuum Breaker – 3/8" and 1/2" NPT

Many times, condensate will be retained ahead of steam traps because of the presence of a vacuum. To break a vacuum, air must be introduced into the system by means of a vacuum breaker.

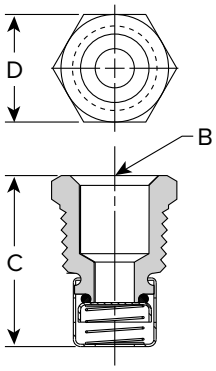
For maximum protection against freezing and water hammer in heating coils under modulated control, for example, vacuum breakers are recommended in conjunction with freeze protection devices.

How to Order

Pressure	Model	Connection Size	Option
100	**LS**	**10**	**VB**
30 = 2 bar 100 = 7 bar 150 = 10,5 bar 250 = 17 bar 450 = 31 bar	LS	8 = DN50 10 = DN65	VB = Vacuum Breaker LD = Liquid Drainer CC = Condensate Controller G/G = Gage Glass
250 = 17 bar 450 = 31 bar	MS	12 = DN80	

Table ST-149-3. Vacuum Breaker (dimensions in mm)

Size	1/2" NPT	3/8" NPT
"B" Pipe Connections	3/8"	1/4"
"H" Height	30	28
"D" Width	22 Hex	17 Hex



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

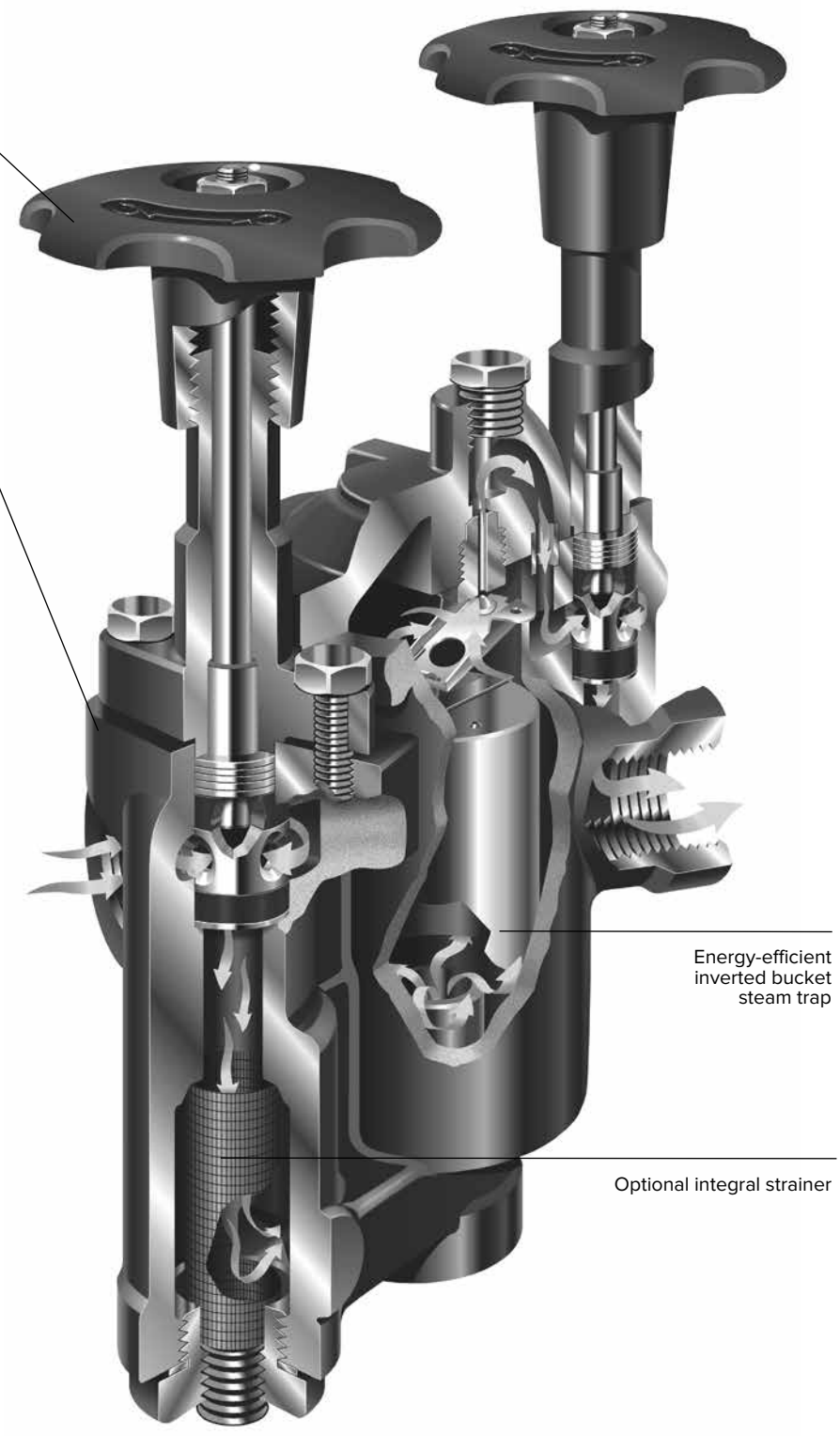
TVS-800 Series Cast Iron Trap Valve Station

Put the principle of the inverted bucket to work in a tough cast iron package and you have the best of both worlds – energy efficiency and long-lasting reliability. Add the advantages of valves integrated into one compact trap/valve casting, and you extend the benefits into installation, trap testing and maintenance.

All the components are concentrated in a single, accessible package and can be dealt with in-line. And if you have existing Armstrong cast iron traps in-line, identical face-to-face dimensions will make retrofitting with a new, patented* Armstrong Trap Valve Station (TVS) a snap. You'll also reduce your inventory requirements. So you'll eliminate what you're paying just to keep parts on hand.

Integral isolation valves

Rugged cast iron package



Energy-efficient inverted bucket steam trap

Optional integral strainer

Reduced costs
TVS saves on these fronts: energy, installation and maintenance.

Integration of trap and valves
Inverted bucket long life and energy efficiency, plus the savings and convenience of components merged into one space-saving package.

A full range of options
TVS will accommodate a test valve, strainer, internal check valve, thermic vent bucket, and SteamEye™ – remote steam trap monitoring system for steam traps.

Easy, in-line repairability

Elimination of potential leak points

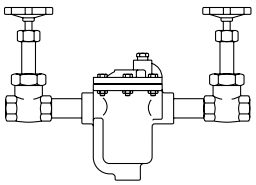
Reduced design time
Permits combining products with exact face-to-face dimensions.

*U.S. Patent 5 947 145

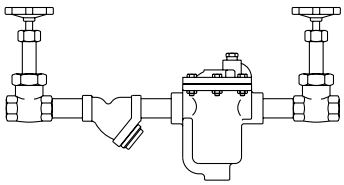
TVS-800 Series Cast Iron Trap Valve Station

TVS makes a long story...short.

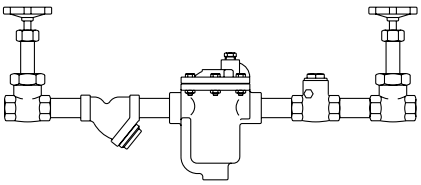
Typical Installation



Inverted bucket trap with two isolation valves

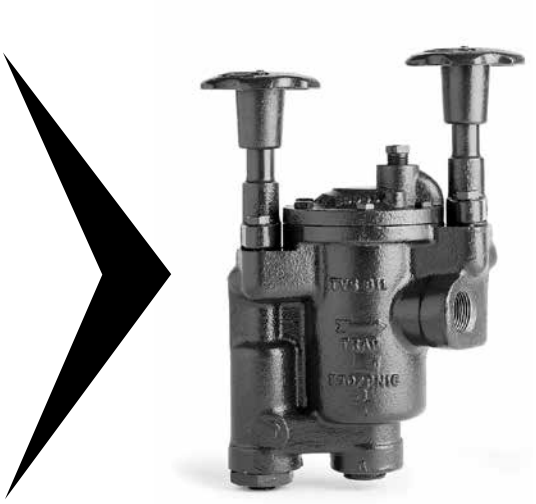


Inverted bucket trap with two isolation valves, strainer



Inverted bucket trap with two isolation valves, strainer and check valve

Trap Valve Station



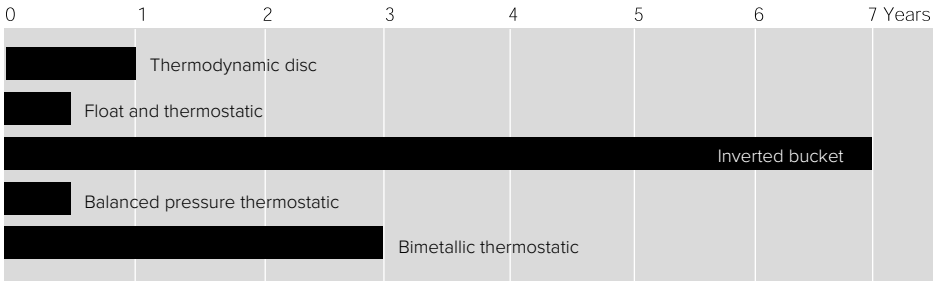
The Innovation Is Integration

The Armstrong TVS makes what used to be long, complicated steam installation stories simple and compact. It shortens installations by integrating components – specifically an inverted bucket steam trap with two or more valves.

For example, here's an old description for a typical installation: valve-nipple-strainer-nipple-trap-nipple-valve. It's a long tale, even for this simple piping arrangement. The Trap Valve Station rewrites this steam story: pipe-TVS-pipe. In other words, the TVS makes it all one, delivering the functions of multiple components in a dramatically smaller unit. It integrates two high-value products in a package of revolutionary versatility.

Look above to see how the Armstrong cast iron Trap Valve Station has rewritten these typical steam installations.

Average Service Life for Different Trap Types 14 bar Steam Pressure

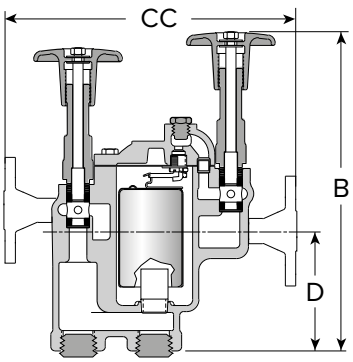


Above data from "ICI Engineer" January 1993 special issue with permission from ICI Engineering.

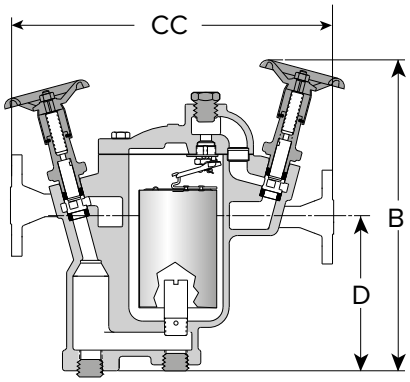
TVS-800 Series Trap Valve Stations

Cast Iron for Horizontal Installation, with Integral Piston Valves

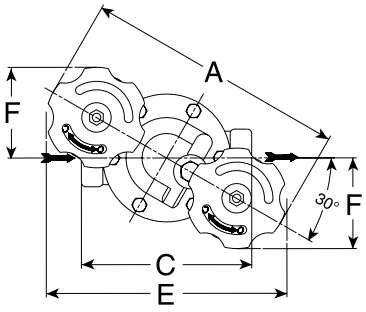
For Pressures to 17 bar...Capacities to 2 000 kg/h



Model TVS-811



Series TVS-812/813



Series TVS-811/812/813 - Top View

Same principle. Different package. 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. But what you'll find new are all the benefits of a piston valve integrated into the same space-saving package.

Maximum Operating Conditions

Maximum allowable pressure (vessel design)ŧ:	17 bar @ 232°C
Maximum operating pressure:	17 bar
Maximum back pressure:	99% of inlet pressure

Connections

Screwed BSPT and NPT
Flanged DIN or ANSI (screw on)

Materials

Cap and Body:	ASTM A48 Class 30
Internals:	All stainless steel – 304
Valve and seat:	Stainless Steel 17-4PH
Piston Valve Handle :	Cast Iron ASTM A47
Internals:	Stainless Steel
Valve Sealing Rings:	Graphite and Stainless Steel
Blowdown valve:	Stainless Steel

Options

- Stainless steel internal check valve
- Thermic vent bucket
- Stainless steel pop drain
- Integral strainer
- Scrub wire
- Probe connection
- Blowdown valve (TVS-811 and TVS-812 only)

Specification

Inverted bucket steam trap, type ... in cast iron, with continuous air venting at steam temperature, free-floating stainless steel mechanism, and discharge orifice at the top of the trap. Integral upstream and downstream shutoff piston style valves in same dimensional space as standard bucket trap. Maximum allowable back pressure 99% of inlet pressure.

How to Order

Specify:

- Model number
- Size and type of pipe connection
- Maximum working pressure that will be encountered or orifice size
- Any options required

Table ST-152-1. TVS-800 Series Trap Valve Station (dimensions in mm)

Model No.	TVS-811	TVS-812	TVS-813
Pipe Connections	15 – 20	15 – 20	20 – 25
Test Plug	1/4"	1/2"	3/4"
"A" Width Across Handwheels	197	349	384
"B" Height Valve Open	254	298	362
"C" Face-to-Face (screwed)	127	165	197
"CC" Face-to-Face (flanged PN40*)	247 – 257	285 – 295	327 – 359
"D" Bottom to ℄ Inlet	94	121	184
"E" Width	179	330	365
"F"	68	114	124
Number of Bolts	6	6	6
Weight in kg (screwed)	5,4	11,3	24,0
Weight in kg (flanged PN40*)	6,8 – 7,0	12,7 – 13,5	25,8 – 26,3

* Other flange sizes, ratings and face-to-face dimensions are available on request.
All models comply with the Article 4.3 of the PED (2014/68/UE).
ŧ May be derated depending on flange rating and type.

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

TVS-800 Series Trap Valve Stations

Cast Iron for Horizontal Installation, with Integral Piston Valves

For Pressures to 17 bar...Capacities to 2 000 kg/h

Table ST-153-1. Model TVS-811 Capacity

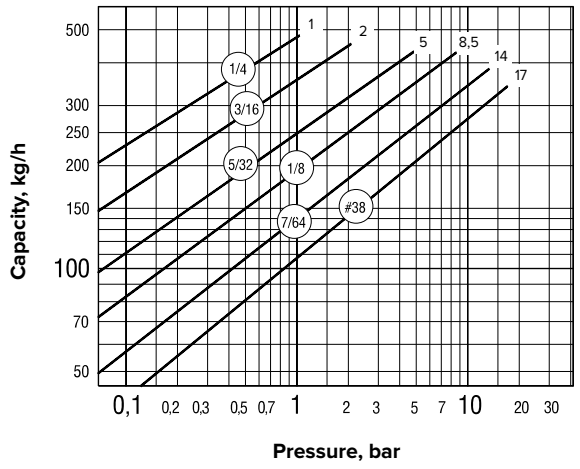


Table ST-153-2. Model TVS-812 Capacity

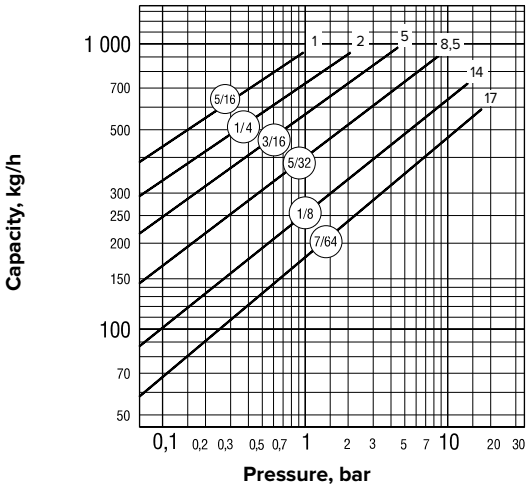
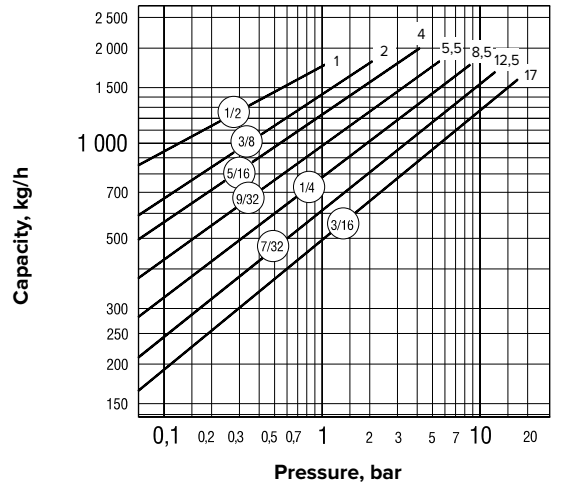


Table ST-153-3. Model TVS-813 Capacity



Options

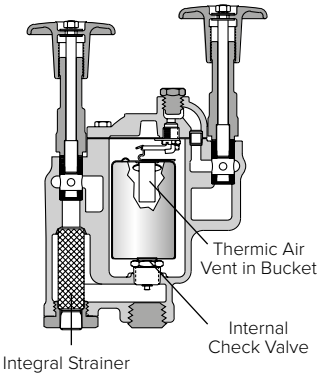
Internal Check Valves are spring-loaded stainless steel and screw directly into the trap inlet or into an extended inlet tube having a pipe coupling at the top to save fittings, labor and money.

Thermic Vent Buckets have a bimetal controlled auxiliary air vent for discharging large amounts of air on start-up.

Integral Strainer is made from 20 x 20 stainless steel screen.

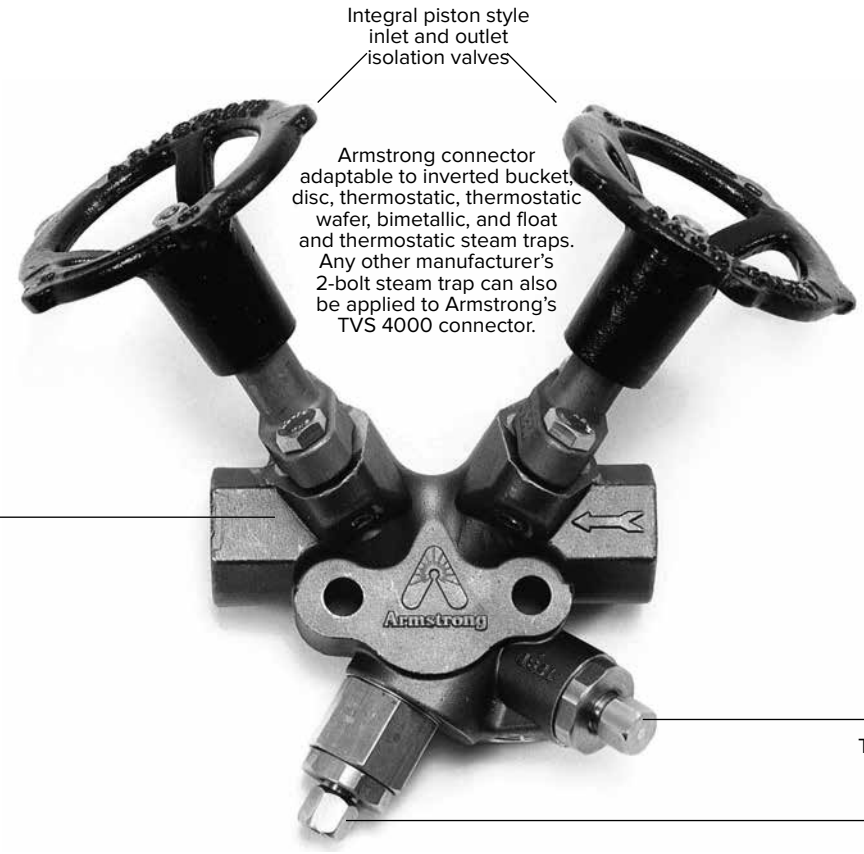
Probe Connections are available for trap monitoring.

Blowdown Valve for clearing strainer of dirt and debris.



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

TVS-4000 Series Stainless Steel Trap Valve Station



3-years guarantee

Description
Same principle. Different package with two piston-style isolation valves, test valve and integral stainless steel strainer with blowdown valve. What you'll find new are all the benefits of a piston valve integrated into the same space-saving package.

Maximum Operating Conditions
Maximum allowable pressure:
45 bar @ 315°C

Materials—TVS 4000 Connector

Connector:	ASTM A351 Gr. CF8M
Strainer screen:	Stainless steel
Test valve:	Stainless steel
Blowdown valve:	Stainless steel

Isolation Valve Components

All wetted parts:	Stainless steel
Valve sealing rings:	Graphite and stainless steel
Handwheel:	Ductile iron

Weight
2,9 kg

Description
- **Reduced costs.** TVS saves on these fronts: reduced leak points, installation and maintenance time.
- **A full range of features.** TVS has test and strainer blowdown valves. When installed with Armstrong Model 2011 and 2022 steam traps, it will also accommodate the Armstrong pop drain as well as 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.
- **Easy, in-line repairability with maximum safety.** TVS allows isolation at point of service with upstream/downstream depres surization.
- **Installation versatility.** The connector design makes the TVS adaptable to any manufacturer's 2-bolt steam trap and piping configuration.
- **Simplified trap testing**. TVS enhances your capability to check trap operation and offers a built-in method to block and bleed traps.

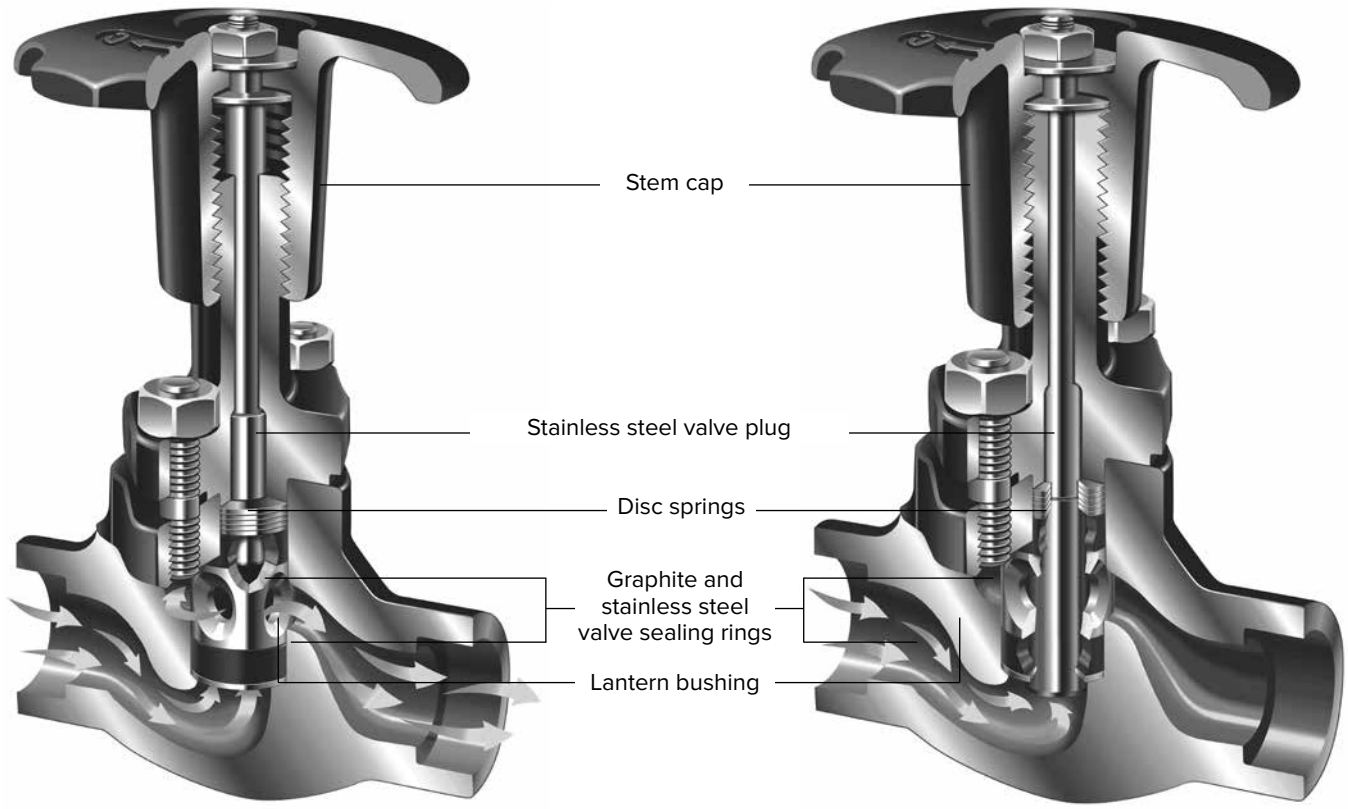
Table ST-154-1. How to Order

Model	Connection	Type of Connection Inlet/Outlet	Flow Direction	Trap Type
TVS-4000	1/2" 3/4"	NPT SW BSPT Flanged*	R = Right to Left L = Left to Right	Inverted Bucket Disc Thermostatic wafer Bimetallic Float and Thermostatic

*Consult factory.

TVS-4000 Series Stainless Steel Trap Valve Station

The Piston Valve



Open Position

Closed Position

- **Dual sealing action**

The piston valve is a seatless valve that includes two graphite and stainless steel valve sealing rings that seal the stem and function as a valve seat. This combination provides long-term protection against leaks to the atmosphere and downstream piping.

- **Self-cleaning action**

Stainless steel piston slides without rotating between the two valve sealing rings, preventing dirt from damaging the sealing surfaces.

- **Sealing integrity**

Flexible disc springs automatically provide leak tightness by exerting pressure which keeps the upper and lower valve sealing rings compressed at all times. Sealing tightness is assured by the compression of the sealing rings against the piston and the valve body. This combination of disc springs and dual valve seal rings protects against expansion and contraction due to heating and cooling. This assures dependable operation, even after years of service.

- **Protected valve stem**

The valve stem and sealing surfaces are completely protected from dirt and corrosion by the stem cap, whether in an open or closed position.

- **In-line repairability**

All valve components may be easily replaced in-line.

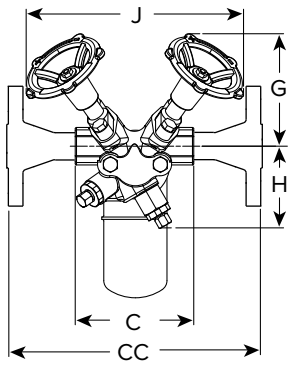
- **Long-term operation**

Piston valve design assures actuation even after many years without operation.

TVS-4000 Stainless Steel Trap Valve Station

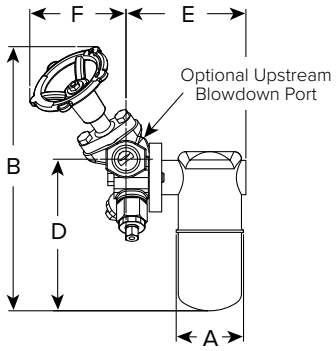
Stainless Steel with 360° Connector

For Pressures to 45 bar...Capacities to 590 kg/h
(Using 2000 Series Inverted Bucket Steam Traps)



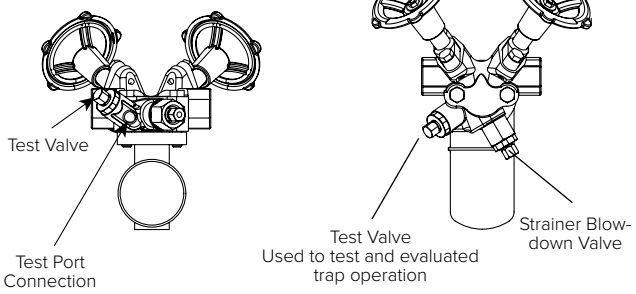
Model TVS-4000 with 2000 series SS Trap

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:	Stainless Steel 17-4PH (<35 bar) Titanium (>35 bar)

Table ST-156-1. 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)	98	98	98
"G" Connection ℄ to Top of Handwheel (Valve Open)	114	114	114
"H" Connection ℄ to Bottom of Connector	83	83	83
"J" Width Across Handwheels (Valve Open)	235	235	235
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) ǂ	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 4.3 of the PED (2014/68/UE).
ǂ May be derated depending on flange rating and type.

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

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 ST-157-1. Model 2010 Capacity

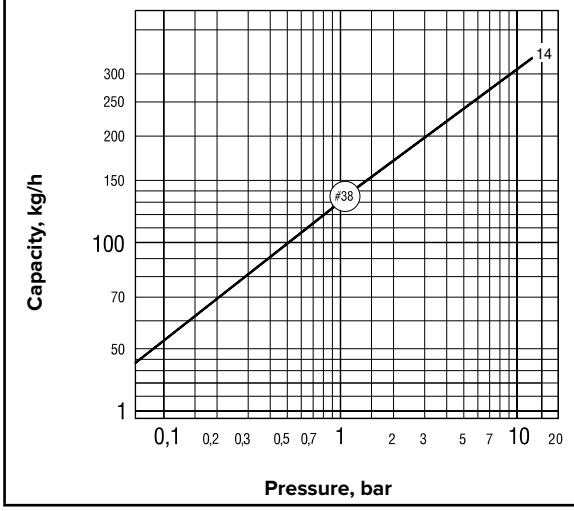


Table ST-157-2. Model 2011 Capacity

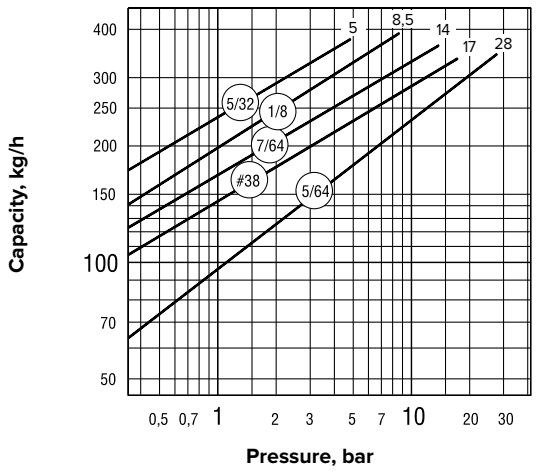
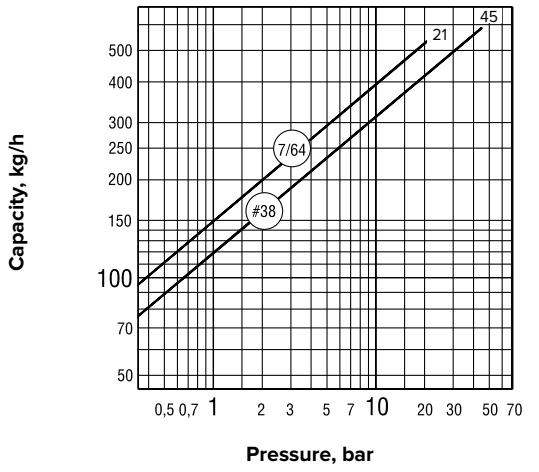


Table ST-157-3. How to Order

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 ST-157-4. Model 2022 Capacity



Options

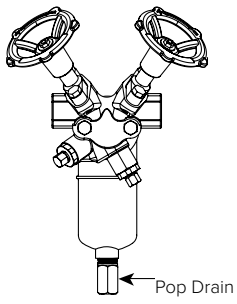
Insu-Pak™

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.

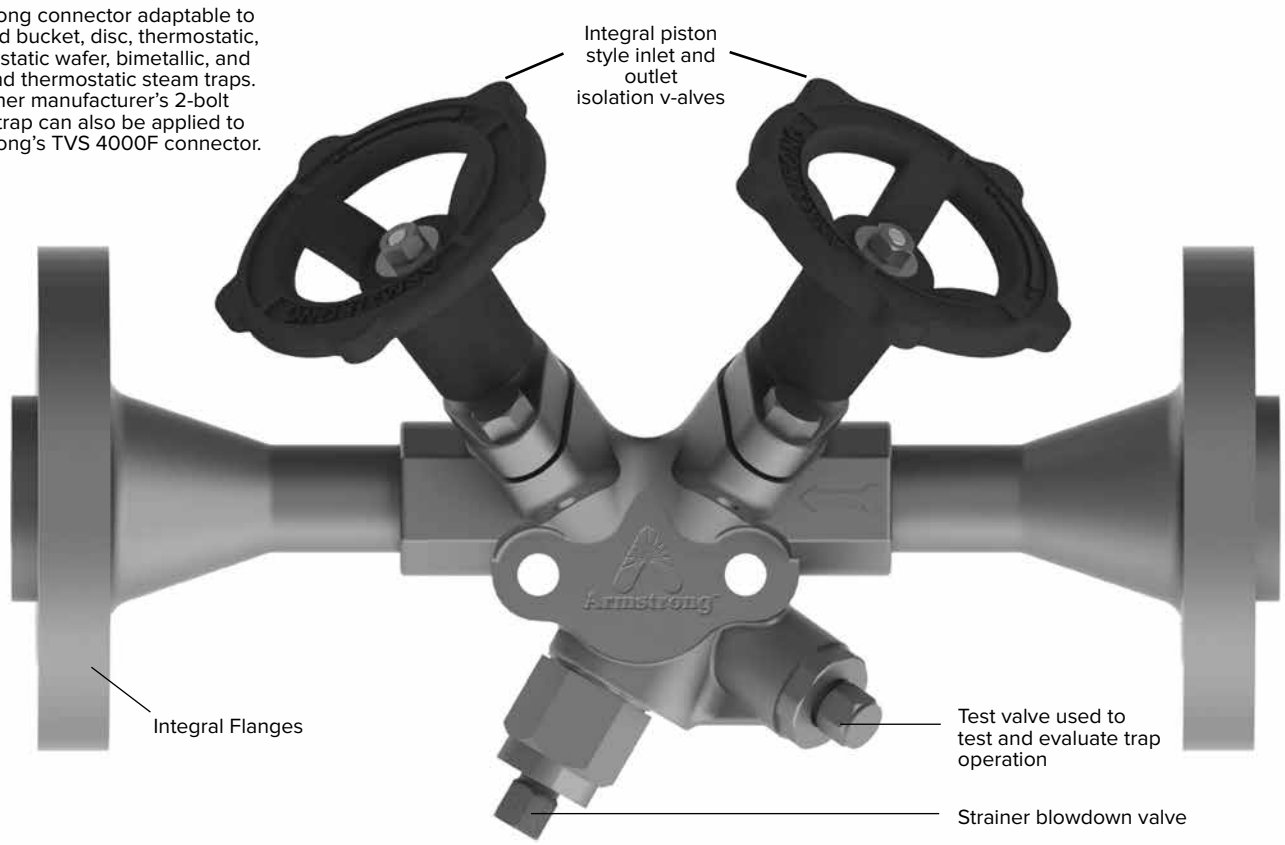


All dimensions and weights are approximate. Use certified print for exact dimensions. Design and materials are subject to change without notice.

TVS-4000F Series Stainless Steel Trap Valve Station

For Pressures to 45 bar...Capacities to 590 kg/hr
Using 2000 Series Inverted Bucket Steam Traps)

Armstrong connector adaptable to inverted bucket, disc, thermostatic, thermostatic wafer, bimetallic, and float and thermostatic steam traps. Any other manufacturer's 2-bolt steam trap can also be applied to Armstrong's TVS 4000F connector.



Description

A complete package featuring two piston-style isolation valves, test valve and integral stainless steel strainer with blowdown valve. You'll realize all the benefits of a piston valve integrated into the same space-saving package.

Maximum Operating Conditions

Maximum allowable pressure:
45 bar @ 315°C

Materials—TVS-4000F Connector

Connector	ASTM A351 Gr. CF8M
Strainer screen	Stainless steel
Test valve	Stainless steel
Blowdown valve	Stainless steel

Isolation Valve Components

All wetted parts	Stainless steel
Valve sealing rings	Graphite and stainless steel
Handwheel	Ductile iron

Weight

6,4 kg

Features

- **Reduced costs.** TVS saves on these fronts: reduced leak points, installation and maintenance time.
- **A full range of features.** TVS has test and strainer blowdown valves.
- **Reduced design time.** Permits combining products with exact face-to-face dimensions.
- **Three-year guarantee.** The TVS-4000F is guaranteed for three years.
- **Easy, in-line repairability with maximum safety.** TVS allows isolation at point of service with upstream/downstream depressurization.
- **Installation versatility.** The connector design makes the TVS adaptable to any manufacturer's 2-bolt steam trap and piping configuration.
- **Simplified trap testing.** TVS enhances your capability to check trap operation and offers a built-in method to block and bleed traps.
- **Integral Flanges.** The body and connections are of one piece construction, free of welds and other potential leak paths.

How to Order

Model	Connection	Type of Connection Inlet/Outlet	Flow Direction	Trap Type
TVS-4000F	3/4"	Flanged ASME B16.5 Class 150, 300, 600	R = Right to Left L = Left to Right	Inverted Bucket • Disc • Thermostatic wafer Bimetallic • Float and Thermostatic
	1"	Flanged ASME B16.5 Class 150, 300		

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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TVSA30S00 Trap Valve Station

Description
The Trap Valve Station TVSA30S00 is a connector that packages two piston-style isolation valves, test valve and stainless steel strainer with blowdown valve into one connector. This connector can accomodate a choice of inverted bucket, disc, thermostatic wafer, thermostatic bimetallic or float and thermostatic style Armstrong steam traps. Any other manufacturer's 2-bolt steam trap can also be applied to the Armstrong Trap Valve Station TVSA30S00.

Maximum Operation Conditions
Maximum allowable pressure:
45 bar @ 315°C (650 psig @ 600 °F)

Material - TVSA30S00 Connector

Body and Bonnet:	ASTM A105N / ASTM 350 Gr. LF2
Strainer screen:	Stainless steel
Test valve:	Stainless steel
Blowdown valve:	Stainless steel

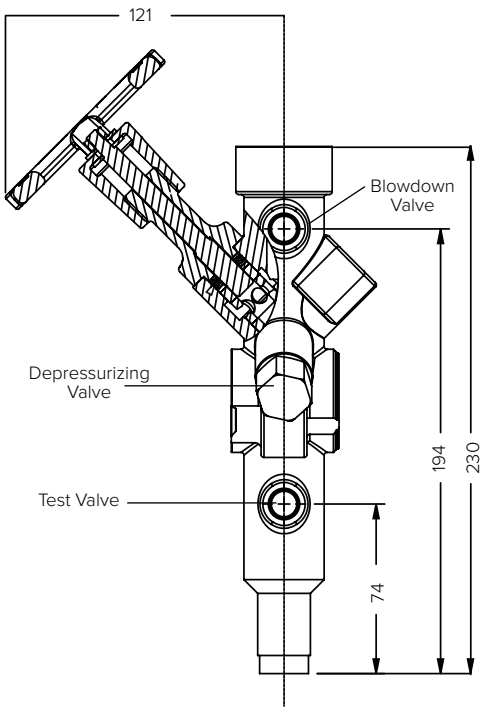
Isolation Valve Components

Spring Washers:	Stainless steel
Stem:	17-4PH
Valve/Lantern Bushing:	Stainless steel
Valve sealing rings:	Graphite and stainless steel
Handwheel:	Cast Iron
Bolts:	A193B7 / A1942H / A2 SS

Options
Blowdown Valve
Depressurizing Valve
Test Valve

Weight
2.83 kg

Features
- **Reduced costs.** TVS saves on these fronts: reduced leak points, installation and maintenance time.
- **A full range of features.** TVS has test and strainer blowdown valves.
- **Reduced design time.** Permits combining products with exact face-to-face dimensions.
- **Easy, in-line repairability with maximum safety.** TVS allows isolation at point of service with upstream/downstream depressur ization.
- **Installation versatility.** The connector design makes the TVS adaptable to any manufacturer's 2-bolt steam trap and piping configuration.
- **Simplified trap testing.** TVS enhances your capability to check trap operation and offers a built-in method to block and bleed traps.



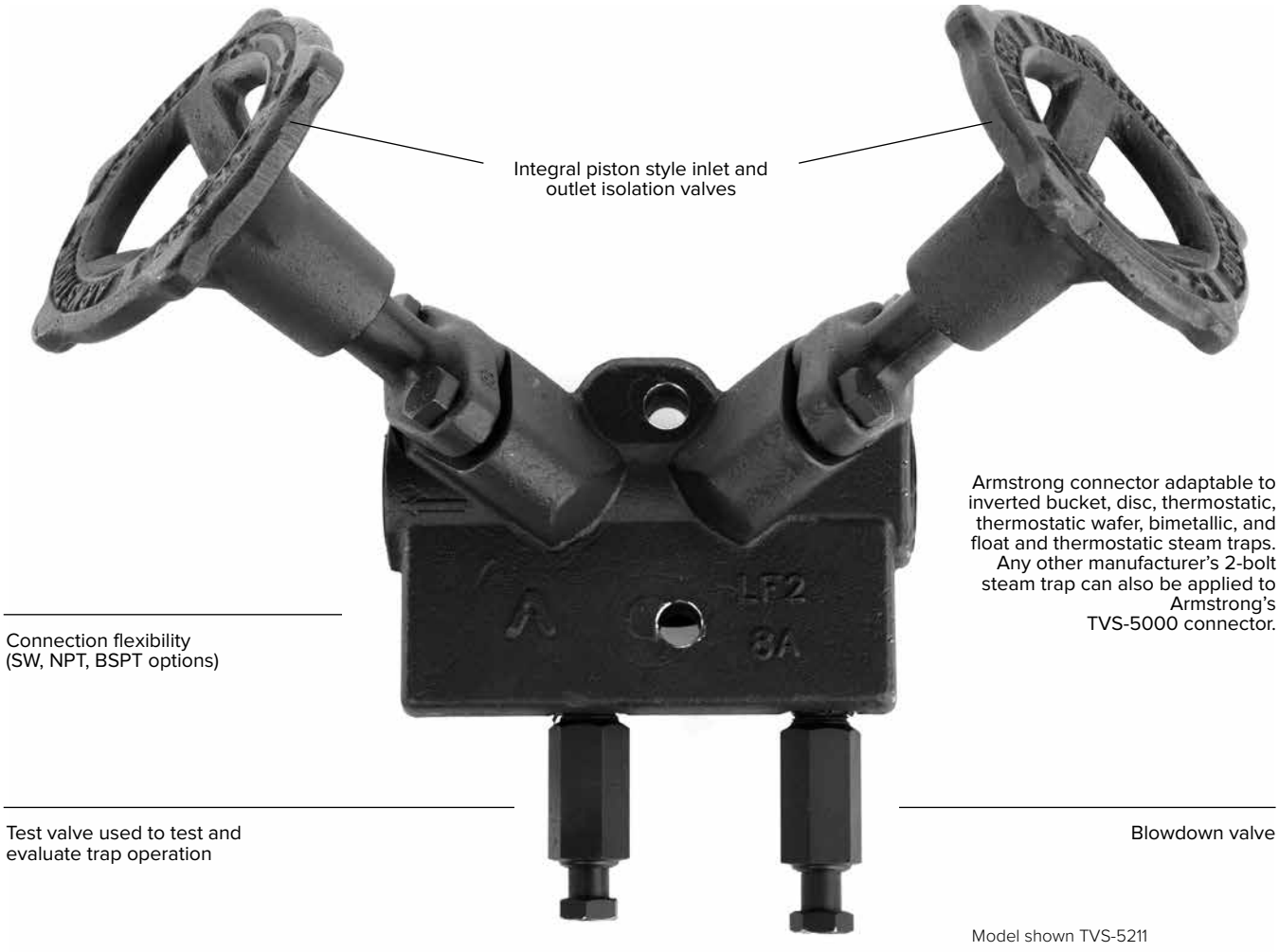
Model shown: R/L

Table ST-159-1. How to Order

Model	Connection	Type of Connection Inlet/Outlet	Flow Direction	Trap Type
TVSA30S00	1/2" 3/4"	BSPT NPT SW	R/L = Right to Left L/R = Left to Right	Inverted Bucket Disc Thermostatic wafer Bimetallic Float and Thermostatic

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

TVS-5000 Series Forged Steel Trap Valve Station



Model shown TVS-5211

Description

Armstrong's TVS-5000 is designed as a one piece body equipped with a piston valve(s) combined with a removable steam trap mounted with a connecting flange.

Maximum Operating Conditions

Maximum Allowable Pressure :	45 bar @ 315 °C
Maximum Allowable Temperature :	315 °C
Maximum Operating Pressure :	45 bar
Maximum Hydrostatic Pressure :	68 bar

Materials – TVS-5000 Connector

Connector:	ASTM A350 LF2
Test valve:	ASTM A582 T303
Blowdown valve:	ASTM A582 T303

Isolation Valve Components

Valve sealing rings :	Graphite & Stainless Steel
Bonnet :	ASTM A350 LF2
Bolts :	DIN 933 8.8
Valve plug :	ASTM A564 17-4 H900
Lantern bushings :	ASTM A582 T304
Valve washer :	ASTM A582 T304
Disc springs :	AISI T301
Nut :	AISI T304
Handwheel :	Ductile Iron

Weight

3.660 kg (without any trap)

Features

- **Reduced costs.** TVS-5000 saves on these fronts : reduced leak points, installation and maintenance time.
- **Reduced design time**. Permits combining products with exact face-to-face dimensions.
- **Easy, in-line repairability.**
- **Simplified trap testing.** TVS enhances your capability to check trap operation and offers a built-in method to block and bleed traps.

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

TVS-5000 Series Forged Steel Trap Valve Station

Table ST-161-1. Available Configurations

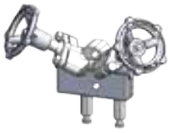
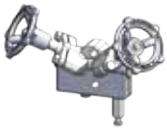
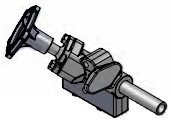
	TVS-5211	TVS-5210	TVS-5200	TVS-5111	TVS-5110	TVS-5100
Model						
Size	1/2" 3/4"	1/2" 3/4"	1/2" 3/4"	1/2" 3/4"	1/2" 3/4"	1/2" 3/4"
Connection	Screwed, Socketweld, Flanged	Screwed, Socketweld, Flanged	Screwed, Socketweld, Flanged	Screwed, Socketweld, Flanged	Screwed, Socketweld, Flanged	Screwed, Socketweld, Flanged
Flow	L/R or R/L	L/R or R/L	L/R or R/L	L/R or R/L	L/R or R/L	L/R or R/L
Upstream Isolating Piston Valve	1	1	1	1	1	1
Downstream Isolating Piston Valve	1	1	1	N/A	N/A	N/A
Blowdown Valve	1	1	plugged	1	1	plugged
Test Valve	1	plugged	plugged	1	plugged	plugged

Table ST-161-2. How to Order

Model	Connection	Type of Connection Inlet/Outlet	Flow Direction	Trap Type
TVS-5000	1/2" 3/4"	NPT SW BSPT Flanged*	R/L = Right to Left L/R = Left to Right	Inverted Bucket Disc Thermostatic wafer Bimetallic F&T

*Consult factory.

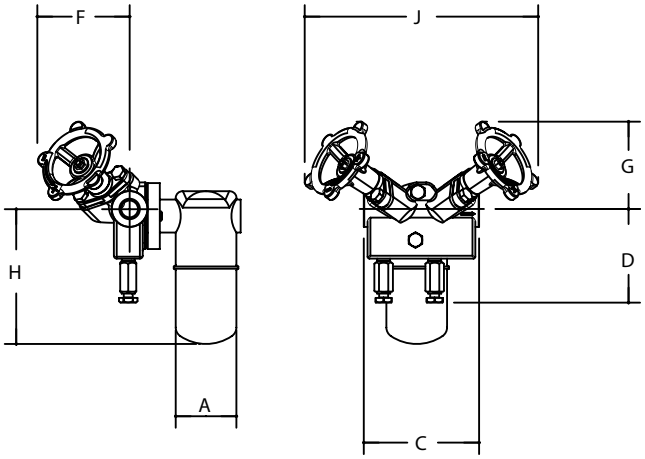
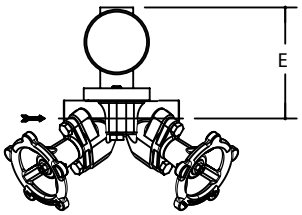


Table ST-161-3. TVS-5000 Series – TVS-5211 Trap Valve station mounted with 2011 Steam Trap

Pipe Connections	15 – 20
"A" Trap Diameter	68
"C" Face to Face (screwded NPT and socketwelded models)	122
"D" Connection ℄ to bottom	99
"E" Connection ℄ to Outside of Trap	117
"F" Connection ℄ to Front of Handwheel (Valve Open)	98
"G" Connection ℄ to Top of Handwheel (Valve Open)	108
"H" Connection ℄ to Bottom of Connector	143
"J" Width Across Handwheels (Valve Open)	270

Pressures and capacities depending on the steam trap mounted on the Trap Valve Station.



TVS-6000UD Forged Steel Trap Valve Station

Compact double isolation and bleed concept (Up and Downstream) with 360° Connector

For pressure up to 45 bar ... Capacities to 590 kg/h (Using 2000 Series IB Steam Traps)

Description

This original concept has been developed to meet new demanding requirements regarding safety when operating steam equipments such as steam traps in many industrial environments. It packages, in a very compact connector block, most of the features required to safely operate, check and maintain steam trap. You will still enjoy all the well knowns benefits of the inverted bucket steam trap now coupled to this new forged steel connector using the piston valve technology which has proven its reliability for 40 years. This new concept TVS6000UD is covered by a 3 year guarantee.
The TVS6000UD can be fitted with steam traps of different technologies (thermodynamic, thermostatic, float and thermostatic or free float. Please refer to specific capacity charts)

Connections

Screwed BSPT and NPT
Socketweld and Buttweld
Flanged EN1092-1 PN40 or ASME B16.5

Materials – TVS-6000UD Connector

Connector:	ASTM A350 LF2
Test valve:	ASTM A582 T303 – Nitronic 60
Blowdown valve:	ASTM A582 T303 – Nitronic 60
Depressurising valve:	ASTM A582 T303 – Nitronic 60
Flanges:	P250GJ (other material on request)

Isolation Valve Components

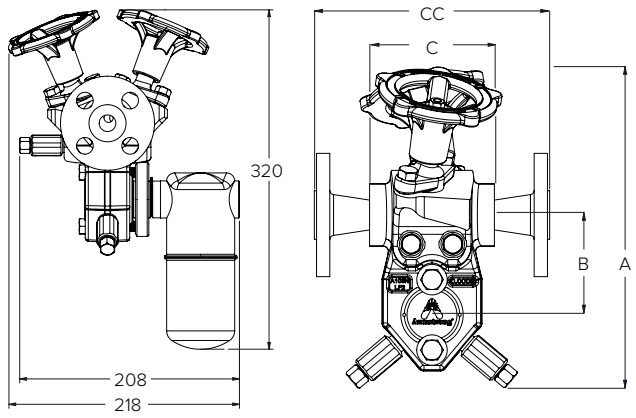
Valve Sealing Rings:	Graphite and Stainless Steel
Bonnet	ASTM A350 LF2
Bonnet Bolting	DIN933 8.8
Stem and washers	ASTM A564 17-4 H900
Lantern bushings :	ASTM A582 T304
Valve washer :	ASTM A582 T304
Disc springs :	AISI T301
Nut :	AISI T304
Handwheel :	Ductile Iron

Flow Direction

Left to Right (L/R)
Right to Left (R/L)

Table ST-162-1. TVS-6000UD Compact double isolation and bleed (dimensions in mm)

Connection Size	1/2" DN15	3/4" DN20	1" DN25
"A" valve closed	230	230	230
"A" valve open	250	250	250
"B"	72	72	72
"C" Face-to-Face (screwed, SW & BW)	100	100	100
"CC" Face-to-Face (flanged EN1092-1 PN40)	150	150	160
"CC" Face-to-Face (flanged ASME B16.5 #150)	170	172	179
"CC" Face-to-Face (flanged ASME B16.5 #300)	179	182	192
Weight in kg (screwed, SW & BW)	5.16	5.16	5.16
Weight in kg (flanged EN1092-1 PN40)	6.86	7.46	7.86
Maximum Allowable Pressure †	45 bar @ 315 °C		
Maximum Hydrotest Temperature	315 °C		
Maximum Hydrotest Pressure	68 bar		



† May be derated depending on flange rating and type.

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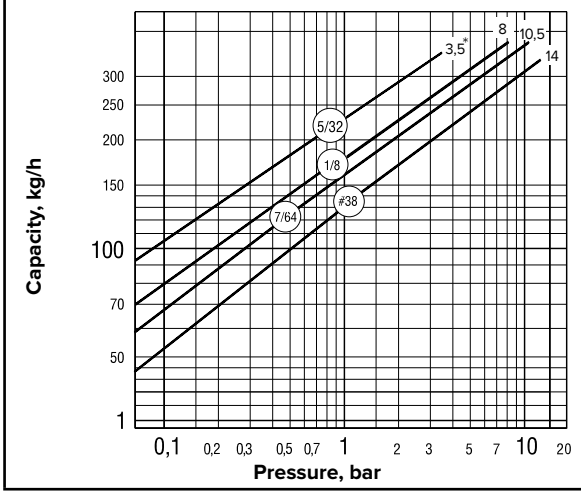
TVS-6000UD Forged Steel Trap Valve Station

Compact double isolation and bleed concept (Up and Downstream) with 360° Connector

For pressure up to 45 bar ... Capacities to 590 kg/h (Using 2000 Series IB Steam Traps)

Table ST-163-1. Model 2010 Capacity



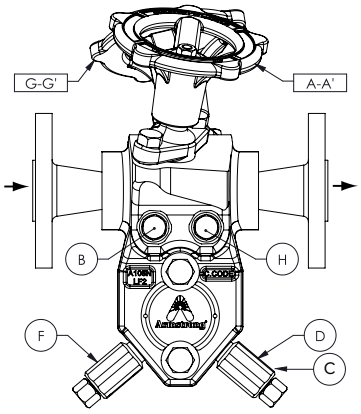
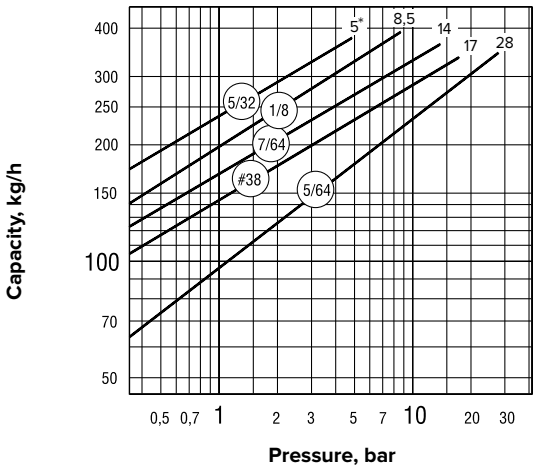
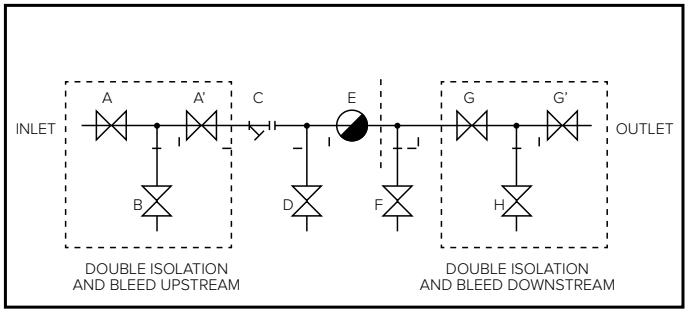


Table ST-163-2. Model 2011 Capacity



TVS 6000 UD - L/R version



UPSTREAM

A : INLET FIRST ISOLATION VALVE
A' : INLET SECOND ISOLATION VALVE
B : BLEED INLET
C : STRAINER
D : DEPRESSURIZING VALVE
E : STEAM TRAP CONNECTION

DOWNSTREAM

F : TEST VALVE
G : OUTLET FIRST ISOLATION VALVE
G' : OUTLET SECOND ISOLATION VALVE
H : BLEED OUTLET

Table ST-163-3. Model 2022 Capacity

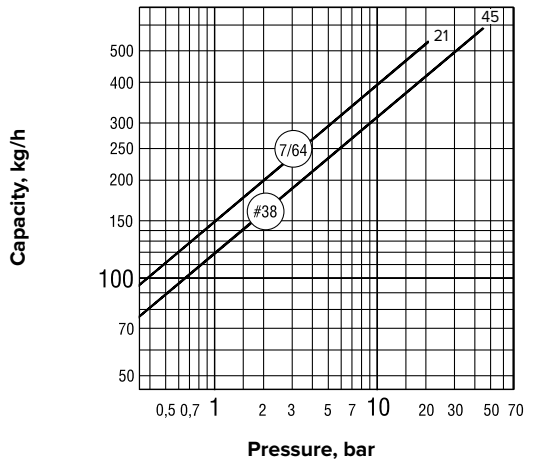


Table ST-163-4. How to Order

Model	Connection	Type of Connection	Flow Direction
TVS-6000UD	DN15 DN20 DN25	Flanges EN1092-1 & PN Class	L/R = Left to Right R/L = Right to Left
	1/2" 3/4" 1"	BSPT, NPT, SW, BW, Flanges ASME B16.5 & Class RF	

* Capacities to be reduced by 5% for pressur below 5 bar (tested with Armstrong stem traps.

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

Armstrong Universal Stainless Steel Connector

IS-2 Stainless Steel Connector with Integral Strainer Provides:

- A full line stainless steel strainer in the connector eliminates leak points and reduces installation time
- A strainer that is not discarded when the trap is replaced
- Easy strainer screen replacement
- Optional blowdown valve
- Accommodates Armstrong's inverted bucket, disc, thermostatic, thermostatic wafer, bimetallic, and float and thermostatic traps. Any manufacturer's 2-bolt steam trap can also be applied to Armstrong's IS-2 connector.

Maximum Operating Conditions

Maximum allowable pressure: 45 barg @ 315°C

Connector Styles

- IS-2 connector with integral strainer
- IS-2 connector with integral strainer with blowdown valve

Connection Sizes

- 1/2", 3/4", 1"

Connection Types

Screwed NPT and BSPT
Socketweld
Flanged (consult factory)

Materials

Connector Body:	All stainless steel—304
Strainer:	20 x 20 Mesh 304 stainless steel

Weight

0.91 kg

How to Order IS-2 Connector with Integral Strainer

Specify:

- Connection size
- Connection type
- Inlet flow direction
  - Left to Right (not available for 1" connection size)
  - Right to Left

Standard 360° Stainless Steel Connector Provides:

- A compact, lightweight assembly
- Standardization, reducing inventory
- A compact design, simplifying piping
- Accommodates Armstrong's inverted bucket, disc, thermostatic, thermostatic wafer and bimetallic steam traps. Any manufac turer's 2-bolt steam trap can also be applied to Armstrong's standard connector.

Maximum Operating Conditions

Maximum allowable pressure: 45 barg @ 315°C

Connector Styles

- Standard 360°

Connection Sizes

- 1/2", 3/4"

Connection Types

Screwed NPT and BSPT
Socketweld
Flanged (consult factory)

Weight

0.70 kg

How to Order Standard 360° Stainless Steel Connector

Specify:

- Connection size
- Connection type

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

Armstrong Universal Stainless Steel Connector - IS-4

With the IS-4 universal connector, you can install a 4-bolt compatible steam trap to fit most piping configurations and applications. The IS-4 combines the integrity of an all welded installation with the versatility of a quick change steam trap replacement.

The IS-4 works with Armstrong Intelligent Monitoring (AIM™) to bring intelligence to wireless technology by applying smart devices to monitor critical plant applications in real time.

- Class 900 design
- All stainless steel construction
- Integral strainer
- Exceptional corrosion resistance
- Recessed gasket surface
- Three-year guarantee against defects in materials and workmanship (connector only)

Maximum Operating Conditions
Maximum allowable pressure (connector design):
IS-4 85,8 bar @ 482°C
IS-4BD 75,8 bar @ 426°C

Materials and Weights
Body ASTM A351 Gr. CF8M
Screen Stainless steel
Screen retainer ASTM A351 Gr. CF8M
Retainer bolts ASTM A193 Gr. B16

Weights:
IS-4 2,15 kg
IS-4BD 4,5 kg

4-Bolt Connector Steam Traps Available
- SH4000 Series
- IB4022
- IB4011

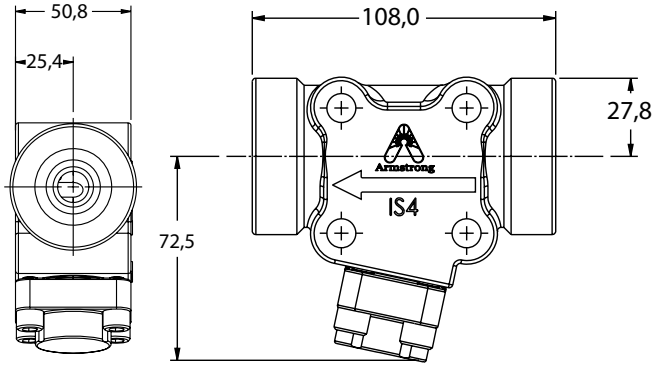
Specification
All stainless steel in-line universal connector with integral strainer able to accept steam traps compatible with the 4-bolt technology. Up to Class 900 service.

IS-4

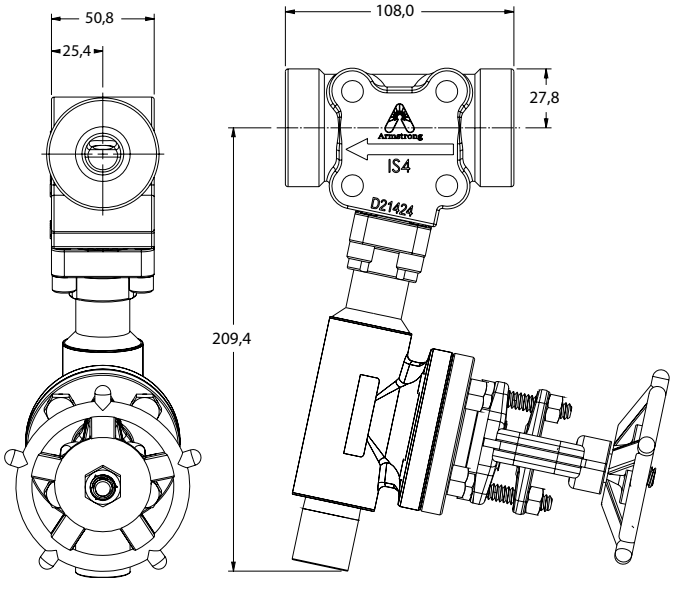
How to order

IS4-BD	3FL	900	DBB	DBB
Model	**Connection Size/Type**	**Flanges**	**Inlet Configuration**	**Outlet Configuration**
IS-4 or IS-4BD	3/4" NPT 3/4" Socketweld 3/4" Flanged 1" NPT 1" Socketweld 1" Flanged	Class 600 Class 900	None **SB**=Single Block **DBB**=Double Block & Bleed	None **SB**=Single Block **DBB**=Double Block & Bleed

Notes:
1. Right to left flow only available.
2. IS-4BD includes Class 800 forged steel gate valve for blowdown service.
3. Connection Size/Type based on the system condensate supply and return requirements.
4. All connections for SB or DBB will be socketweld.
5. Flanges available in Class 600 and 900.
6. For Block & Bleed dimensions: Consult Factory



IS-4



IS-4BD

Armstrong Universal Stainless Steel Dual Connector

Stainless steel dual universal connector provides
- A compact, lightweight assembly
- Standardization, reducing inventory
- Simpler piping and compact design
- Ideal design for use with FT-2022 floats, it can also be adapted for Armstrong's inverted bucket steam traps as well as wafer, thermostatic, thermostatic steam and bimetallic traps.

Maximum Operating Conditions
Maximum Allowable Pressure: 45 barg at 315°C

Model
Dual connector

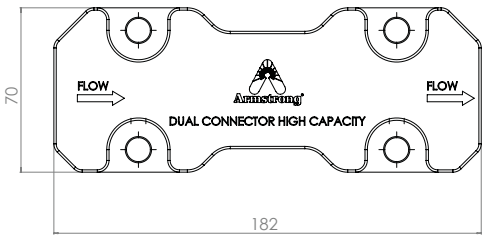
Connection Sizes
1/2", 3/4", 1"

Connection Types
Screwed BSPT and NPT
SW socketweld
Flanged

Options
Seal (dual connector)

Weight
3.4 kg

How to order the stainless steel dual universal connector
Provide the following information:
- Connection type
- Connection size



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Notes

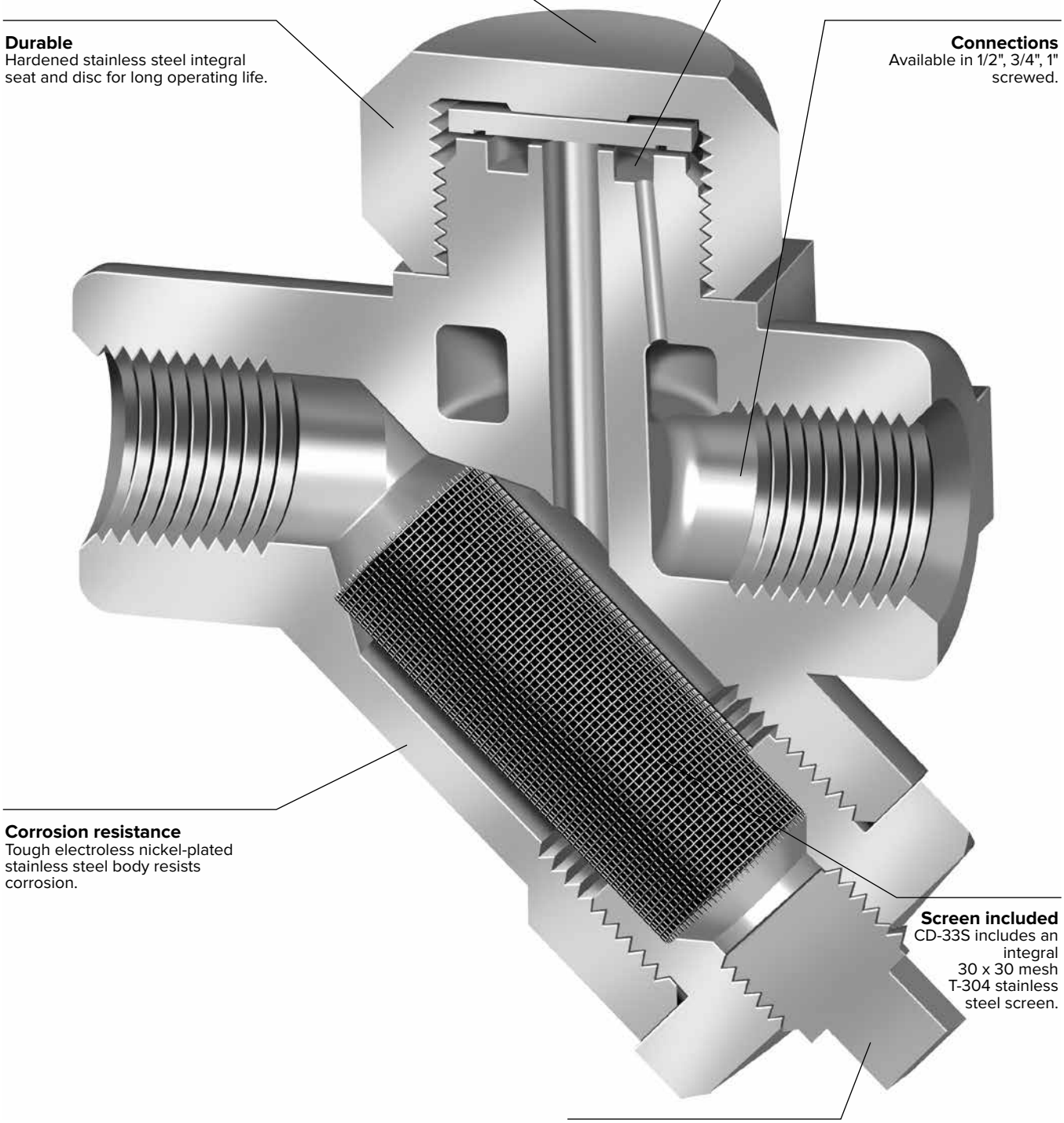
CD-33/CD-33S Controlled Disc Steam Traps

Adapts to outdoors
Optional rain guard insulating cap available to prevent excessive radiant heat loss in outside applications.

Extended life
Three discharge port design offers stable disc operation to extend trap operating life.

Durable
Hardened stainless steel integral seat and disc for long operating life.

Connections
Available in 1/2", 3/4", 1" screwed.



Corrosion resistance
Tough electroless nickel-plated stainless steel body resists corrosion.

Screen included
CD-33S includes an integral 30 x 30 mesh T-304 stainless steel screen.

Blowdown choice
Blowdown plug standard. Blowdown valve available as an option.

CD-33/CD-33S Controlled Disc Steam Traps

The Armstrong CD-33 is a controlled disc style trap designed to control the trap's cycle rate. By reducing the cycle rate, the Armstrong CD-33 will have a longer service life than typical disc traps. This enhanced performance will ensure that maintenance time is minimized and steam costs are greatly reduced.

The CD-33 is designed with three discharge ports, which offer stable disc operation to extend trap operating life. The capacities of the Armstrong CD-33 have been engineered specifically for the following applications: large steam main drips, process equipment, and HVAC heating equipment on constant pressure. The CD-33L (low capacity) trap is designed for the low capacity applications of steam main drips and steam tracing lines. By ensuring that the capacities are designed to suit the application, and are not oversized, the CD-33 Series will last longer than other disc traps with excessive capacity ratings.

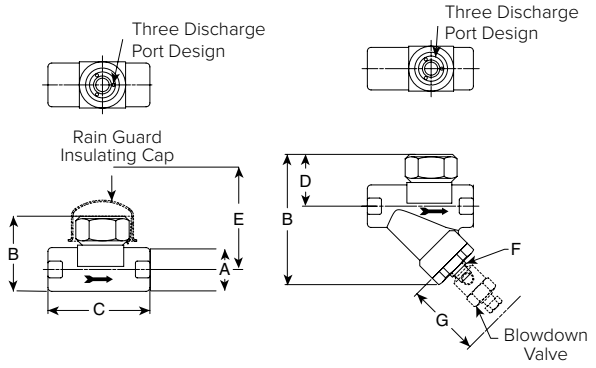
Advantages
- Three discharge port design
- Minimum wear with controlled cycling
- Freeze-resistant
- Hardened seat and disc

Specification
Steam trap shall be stainless steel controlled disc type, integral seat design with hardened disc and seating surfaces, and electroless nickel plated finish. When required, trap shall be supplied with an integral Y strainer, integral blowdown valve or rain guard insulating cap. Maximum allowable pressure (vessel design) shall be 63 bar @ 400°C. Maximum operating pressure shall be 42 bar @ 400°C.

CD-33 Series Controlled Disc Steam Traps

All Stainless Steel

For Pressures to 41 bar...Capacities to 1 130 kg/h



CD-33/CD-33L Series

CD-33S/CD-33SL Series with Integral Strainer

The Armstrong CD-33 is a controlled disc style trap designed to control the trap's cycle rate. By reducing the cycle rate, the Armstrong CD-33 will have a longer service life than typical disc traps. This enhanced performance will ensure that maintenance time is minimized and steam costs are greatly reduced.

The CD-33 is designed with three discharge ports, which offer stable disc operation to extend trap operating life. The capacities of the Armstrong CD-33 have been engineered specifically for the following applications: large steam main drips, process equipment, and HVAC heating equipment on constant pressure. The CD-33L (low capacity 1/2" and 3/4" only) trap is designed for the low capacity applications of steam main drips and steam tracing lines. By ensuring that the capacities are designed to suit the application, and are not oversized, the CD-33 Series will last longer than other disc traps with excessive capacity ratings.

Connections

Screwed BSPT and NPT

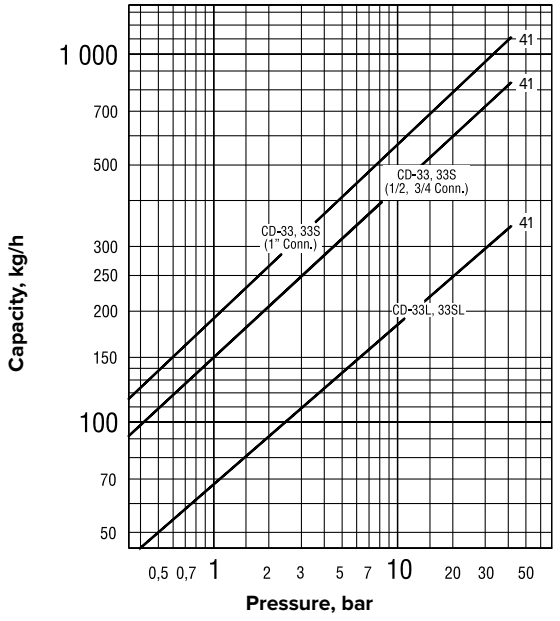
Specification

Steam trap shall be stainless steel controlled disc type, integral seat design with hardened disc and seating surfaces, and electroless nickel plated finish. When required, trap shall be supplied with an integral Y strainer, integral blowdown valve or rain guard insulating cap. Maximum allowable pressure (vessel design) shall be 63 bar @ 400°C. Maximum operating pressure shall be 41 bar @ 252°C.

Table ST-170-1. List of Materials

Name of Part	Material
Body	ASTM A743 Gr. CA40
Cap	ASTM A743 Gr. CA40
Disc	ASTM A276 Gr. 420
Strainer Screen	30 x 30 Mesh T-304 Stainless Steel
Screen Retainer	ASTM A743 Gr. CA40
Blowdown Plug (CD-33S only)	Carbon Steel
Options	
Blowdown Valve	Stainless Steel
Rain Guard Insulating Cap (1/2", 3/4" Sizes Only)	Stainless Steel

Table ST-170-2. CD-33 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.

Table ST-170-3. CD-33 Series Trap (dimensions in mm)

Model No.	CD-33		CD-33S (with strainer)		CD-33L (low capacity)	CD-33SL (with strainer) (low capacity)
Pipe Connections	15 – 20	25	15 – 20	25	10 – 15 – 20	15 – 20
«A» Body Diameter	37	44	37	44	37	37
«B» Height	63	79	108	121	63	108
«C» Face-to-Face (screwed)	84	100	90	105	84	90
«D» C to Top of Cap	44	57	44	57	44	44
«E» Withdrawal Distance Rain Guard Insulating Cap	—	—	76	76	—	76
«F» Blowdown Connection Size	—	—	1/4" NPT	1/4" NPT	—	1/4" NPT
«G» Withdrawal Distance Blowdown Valve	—	—	89	89	—	89
Weight in kg	0,64	1,1	1,0	1,5	0,64	1,0
Maximum Allowable Pressure	63 bar @ 400°C					
Minimum Operating Pressure	0,24 bar					
Maximum Operating Pressure	41 bar @ 252°C					

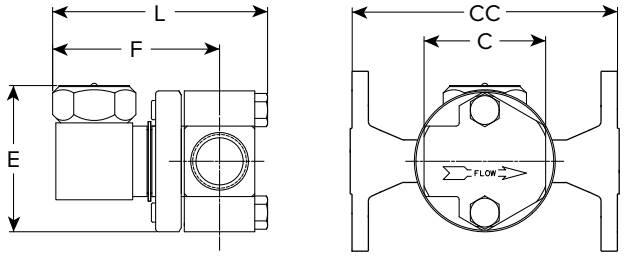
All models comply with the Article 4.3 of the PED (2014/68/UE).

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

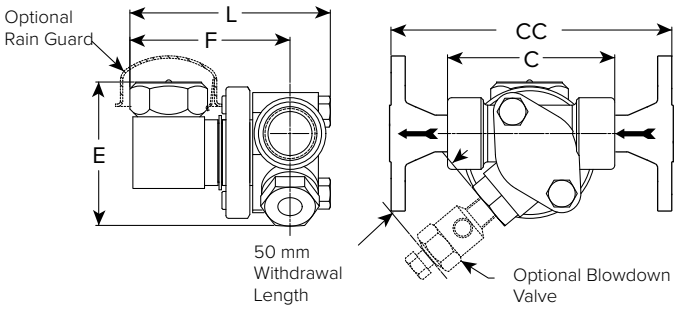
CD-3300 Series Controlled Disc Steam Traps

All Stainless Steel 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.

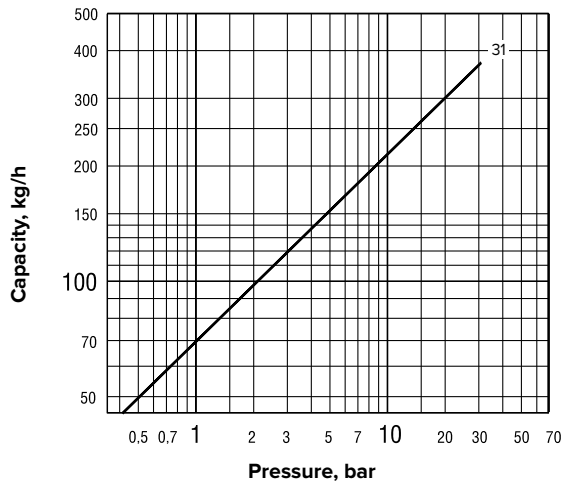
Materials

Trap 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 ST-171-1. Model CD-3300 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

Table ST-171-2. 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 4.3 of the PED (2014/68/UE).

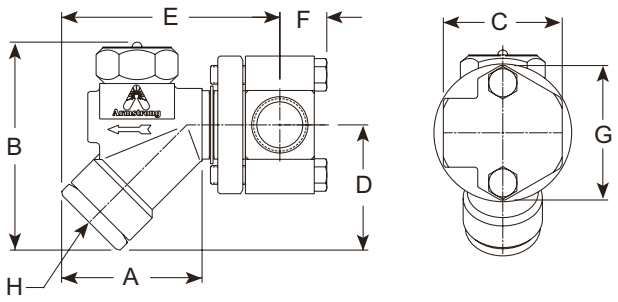
† May be derated depending on flange rating and type.

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

CD-3300S Series Controlled Disc Steam Traps

All Stainless Steel with 360 °C Connector

For Pressures to 41 barg...Capacities to 820 kg/h



The Armstrong CD-3300S is a three discharge port design, which provides stable disc operation to extend operating life.
The CD-3300S 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 makes the CD-3300S easy to install, easy to replace. You save on labor time and cost because the connector simplifies piping and remains in-line.
CD-3300S is designed with integral strainer, do not use connector with integral strainer to install the trap but standard connector.

Materials

Trap Body	ASTM A743 Gr. CA40
Trap Cap	ASTM A743 Gr. CA40
Disc	ASTM A276 Gr. 420
Screen Retainer	ASTM A743 Gr. CA40
Blowdown Plug	Carbon steel

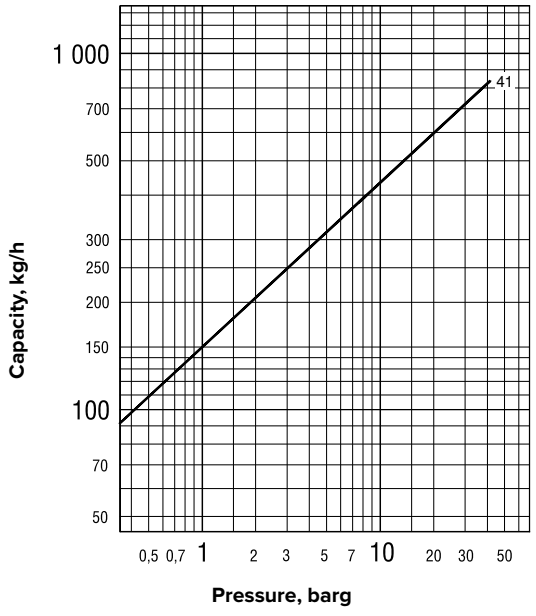
How to Order

- Model
- Connector: Specify size and connection NPT/BSPT/SW (Flanged Consult Factory)

Table ST-172-1. CD-3300S Disc Trap with standard connector

Model	CD-3300S with standard connector	
Pipe Size	1/2"	3/4"
«A»	70	
«B»	105	
«C»	60	
«D»	64	
«E»	111	
«F»	20	
«G»	70	
«H» (Blowdown connector)	1/2" NPT	
Weight (kg)	1.9	
Maximum Operating Pressure	41 barg @ 252 °C	
Maximum Allowable pressure (Vessel Design)	50 barg @ 400 °C	

Table ST-172-2. CD-3300S Capacity



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

CD72SR Series Disc Traps

For Steam Service up to 69.6 barg and Capacities from 435 Kg/hr

Armstrong CD72SR is a disc styled trap designed to control the trap's cycle rate. The reduced cycle rate provides Armstrong CD72SR trap with a longer service life than typical disc traps. This enhanced performance ensures minimum maintenance time and reduced steam costs.
The capacity of Armstrong CD72SR has been engineered specifically for the following applications: large steam main drips, process equipments and HVAC heating equipments at constant pressure.

Advantages of CD72SR

- Minimum wear with controled cycling
- Freeze-resistant
- Hardened Seat and disc
- Weldable
- In-line repairable

Connections

Screwed BSPT and NPT
Scoketweld
Flanged EN 1092-1 or ASME B16.5 (Welded).
Consult factory for dimensions and weight

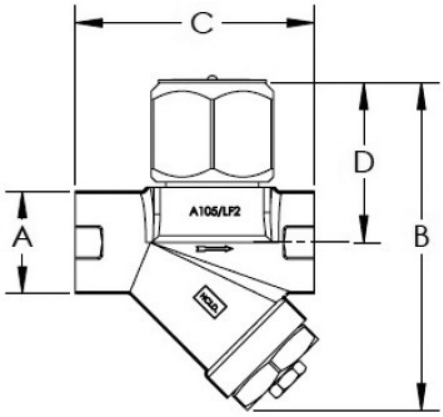


Table ST-173-1. CD72SR List of materials

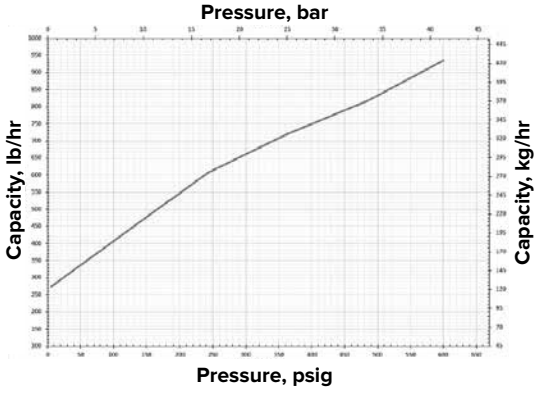
Name of Part	Material
	CD72SR
Body	Dual certified Forged Corten Steel ASTM A 105N / A350 LF2 Cl. 1
Cap	
Disc & Seat	ASTM A 564 TYP630, H900
Strainer Screen	Stainless steel TYP304, 30 x 30 Mesh
Screen Retainer	Dual certified Forged Corten Steel ASTM A 105N / A350 LF2 Cl. 1
Blowdown Plug	ASTM A350 Gr. LF2 CL.1

Table ST-173-2. CD72SR Dimensions and Weights

Model No.	CD72SR			
	1/2" and 3/4" (DN 15 DN20)		1" (DN25)	
	in	mm	in	mm
"A"	1.53	38.8	1.89	48.0
"B" Height	4.89	124.1	5.12	130.0
"C" Length	3.56	90.5	4.41	112.0
"D" CL to top of cap	2.38	60.5	2.58	65.6
Weight, Kg (lb)	1.5 (3.31)		2.0 (4.59)	
Max. allowable pressure (Vessel Design)	69.6 barg @ 399°C (1010 psig @ 750°F)			
Mln. operating pressure	0.24 barg (3.5 psig)			
Max. operating pressure	41.4 barg @ 252°C (600 psig @ 486°F)			

CD72SR CAPACITY CHART

Capacities given are in continuous discharge capacities in pounds and kilograms of hot condensate per hour at pressure differential indicated with condensate temperatures approximately 25° F (14°C) below steam temperature.



OTHER FACE TO FACE DIMENSIONS ARE AVAILABLE ON REQUEST

CD72SR	1/2" (DN15)				3/4" (DN20)				1" (DN25)			
			INDIA - IBR				INDIA - IBR				INDIA - IBR	
	Inch	mm	Inch	mm	Inch	mm	Inch	mm	Inch	mm	Inch	mm
150#	6,7	169	8,3	210	6,9	174	7,9	200	7,9	200	8,7	220
300#	7,0	179	8,8	224	7,2	183	8,7	220	8,4	213	9,4	240
600#	7,6	192	9,3	235	7,7	195	9,1	230	8,9	226	10	253
PN40	5,9	150	-	-	5,9	150	-	-	6,3	160	-	-

CD-80S Series Disc Trap

For steam service up to 68.9 barg (1 000 psig)...Capacities to 362 kg/hr (800 lb/hr)

The Armstrong CD-80S series are durable disc style steam traps designed for medium to high-pressure use. Perfectly suited for drip trap applications, the CD-80S series was engineered to meet the demanding conditions found in Power and Petrochemical applications.

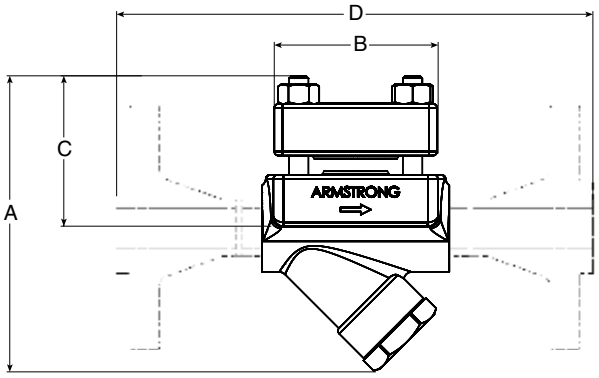
With an integral strainer and rugged construction, the CD-80S series offers a compact, reliable solution for high pressure applications with low condensate loads.

Advantages

- Compact
- Integral Strainer
- Freeze-resistant
- Replaceable seat and disc
- Weldable

Connections

- Screwed NPT and BSPT
- Socketweld and Buttweld
- Flanged EN 1092-1 or ASME B16.5



ST-174-1. Series CD-80S List of Materials

Name of Part	Material	
	CD-80S	CD-82S
Body	ASTM A182 F11 Class 2	ASTM A182 F22 Class 3
Cap		
Screen Retainer		
Disc	ASTM A681 TYP D2	
Seat		
Bolts/Nuts	ASTM A193 Gr. B16 / ASTM A194 Gr. 7	
Strainer Screen	30 x 30 Mesh T-304 Stainless Steel	

ST-174-2. Dimensions and Weights - NPT, BSPT and SW Connection

	mm
	1/2", 3/4"
"A" Height	144
"B" Length*	92
"C" ℄ to top of cap	75
Weight, lb (kg)*	3.5
Minimum Operating Pressure	6.9 barg
Maximum Operating Pressure	68.9 barg @ 285°C
Maximum Allowable Pressure	103.4 barg @ 343°C

ST-174-3. Dimensions and Weights - ASME B 16.5 Class 150# Flanged Connection

	mm	mm
	1/2"	3/4"
"A" Height	144	144
"D" Face-to-Face	222	231
"C" ℄ to top of cap	75	75
Weight, lb (kg)*	5.3	
Minimum Operating Pressure	6.9 barg	
Maximum Operating Pressure	13.7 barg @ 204°C	
Maximum Allowable Pressure	13.7 barg @ 204°C	

ST-174-4. Dimensions and Weights - ASME B 16.5 Class 600# Flanged Connection

	mm	mm
	1/2"	3/4"
"A" Height	144	144
"D" Face-to-Face	244	254
"C" ℄ to top of cap	75	75
Weight, lb (kg)*	6.2	7.1
Minimum Operating Pressure	6.9 barg	
Maximum Operating Pressure	68.9 barg @ 285°C	
Maximum Allowable Pressure	83.7 barg @ 316°C	

ST-174-5. Dimensions and Weights - BW Connection

	mm
	1/2", 3/4"
"A" Height	144
"B" Length*	120
"C" ℄ to top of cap	75
Weight, lb (kg)*	3.6
Minimum Operating Pressure	6.9 barg
Maximum Operating Pressure	68.9 barg @ 285°C
Maximum Allowable Pressure	103.4 barg @ 343°C

ST-174-6. Dimensions and Weights - ASME B 16.5 Class 300# Flanged Connection

	mm	mm
	1/2"	3/4"
"A" Height	144	144
"D" Face-to-Face	231	241
"C" ℄ to top of cap	75	75
Weight, lb (kg)*	5.3	6.2
Minimum Operating Pressure	6.9 barg	
Maximum Operating Pressure	45.6 barg @ 260°C	
Maximum Allowable Pressure	45.6 barg @ 260°C	

ST-174-7. Dimensions and Weights - ASME B 16.5 Class 900# Flanged Connection

	mm	mm
	1/2"	3/4"
"A" Height	144	144
"D" Face-to-Face	260	279
"C" ℄ to top of cap	75	75
Weight, lb (kg)*	9.9	
Minimum Operating Pressure	6.9 barg	
Maximum Operating Pressure	68.9 barg @ 285°C	
Maximum Allowable Pressure	103.4 barg @ 343°C	

Armstrong EMEA recommend the use of CD-82S model. This model is the most suitable for EMEA markets.

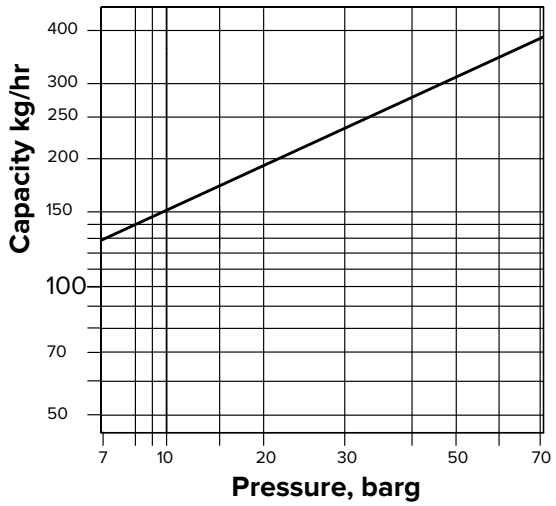
CD-80S Series Disc Trap

For steam service up to 68.9 barg (1 000 psig)...Capacities to 362 kg/hr (800 lb/hr)

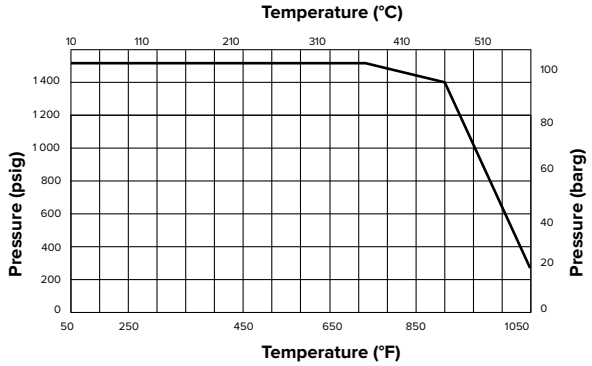
Specification

Steam trap shall be forged steel (ASTM A182 F11 or ASTM A182 F22) thermodynamic type. Trap shall be supplied with bolted cover and replaceable disc and seating surfaces. Trap shall be supplied with an integral Y strainer with stainless steel mesh. Maximum allowable pressure (vessel design) shall be 103.4 barg @ 343°C (1500 psig @ 650°F). Maximum operating pressure shall be 68.9 barg @ 285°C (1000 psig @ 546°F).

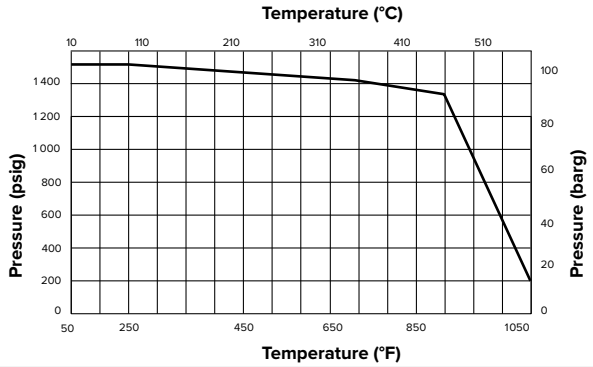
ST-175-1. Series CD-80S Series Capacity



ST-175-2. CD-80S Allowable Pressure/Temperature



ST-175-3. CD-82S Allowable Pressure/Temperature



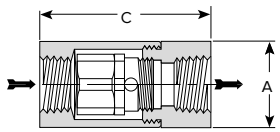
All dimensions and weights are approximate. Use certified print for exact dimensions. Design and materials are subject to change without notice.

Notes

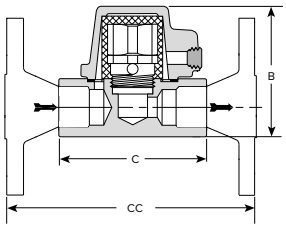
CD-40 and CD-60 Series Controlled Disc Steam Traps

Carbon Steel

For Pressures to 41 bar...Capacities to 1 300 kg/h



CD-40 Series Trap



CD-60 Series Trap
(CD-63 Model shown)

Description

Armstrong CD-40 and CD-60 Series controlled disc traps contain a replaceable capsule, making it possible to renew a worn trap by simply replacing the capsule. A heating chamber in the shell ensures consistent operation. This steam jacket provides a relatively constant temperature in the control chamber regardless of ambient conditions. Cycling rate is controlled and does not increase when the trap is exposed to cold winds, rain or snow. CD-40 Series traps are also available with optional integral 0,045" perforated stainless steel strainer screens. CD-60 Series traps contain integral strainers with ratios of open area to inside area of pipe that equal or exceed those of most separate "Y" type strainers.

Maximum Operating Conditions

Maximum allowable pressure (vessel design)ŧ:

Model CD-40	41 bar @ 260°C
Model CD-60	41 bar @ 399°C
Maximum operating pressure:	41 bar at saturated steam temp.
Minimum operating pressure:	0,7 bar
Maximum back pressure:	50% of inlet pressure (recommended)

Connections

Model CD-40 and CD-60	Screwed BSPT and NPT
Model CD-60	Socketweld
Model CD-60	EN 1092-1 or ASME B16.5 (welded)

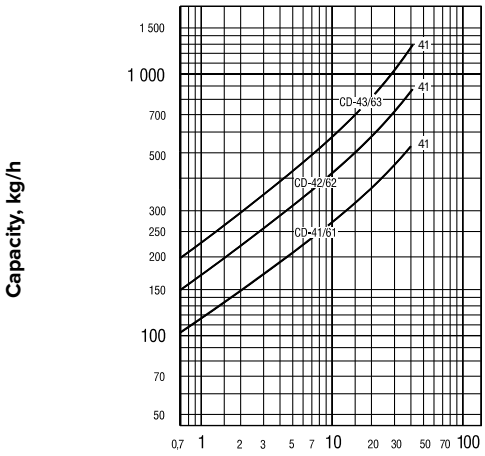
Materials Model CD-40

Body:	Carbon steel – C-1215
Control chamber:	Hardened stainless steel
Disc:	Hardened stainless steel
Capsule body:	Hardened stainless steel
Strainer screen (option):	Stainless steel

Materials Model CD-60

Body:	ASTM A216 WCB
Cap:	ASTM A216 WCB or ASTM A105
Control chamber:	Hardened stainless steel
Disc:	Hardened stainless steel
Capsule body:	Hardened stainless steel
Strainer screen:	20 x 20 mesh stainless steel

Table ST-177-1. CD-40 & CD-60 Series Capacity



Option

CD-40 Series integral strainer screen (0,045" perforated stainless steel). Capacities given are continuous discharge capacities in kilograms of hot condensate per hour at pressure differential indicated with condensate temperatures approximately 14°C below steam temperatures.

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.

Specification

Controlled disc steam trap, type ... in carbon steel. CD-60 includes integral strainer. Maximum allowable pressure 41 bar.

How to Order

Specify:

- Model number
- Size and type of pipe connection
- Any options required

Table ST-177-1. CD-40 and CD-60 Series Trap (dimensions in mm)

Model No.	CD-41*		CD-42*	CD-43*	CD-61		CD-62	CD-63
Pipe Connections	3/8"	1/2"	3/4"	1"	10	15	20	25
"A" Body Outside Diameter	31,7	31,7	41,3	60,3	—	—	—	—
"B" Height	—	—	—	—	66,7	66,7	87,3	108,0
"B" Face-to-Face (screwed & SW)	76,2	86,5	100,0	117,5	88,9	88,9	117,0	122,0
"C" Face-to-Face (flanged PN40**)	—	—	—	—	—	150	170	180
Weight in kg (screwed & SW)	0,3		0,8	1,9	1,2	1,1	2,2	3,1
Weight in kg (flanged PN40**)	—		—	—	—	2,6	4,3	5,7

* Optional integral strainer available.

** Other flange sizes, ratings and face-to-face dimensions are available on request.

All models comply with the Article 4.3 of the PED (2014/68/UE).

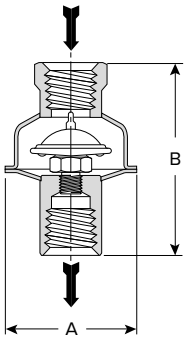
ŧ May be derated depending on flange rating and type.

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

WMT Series Thermostatic Wafer Steam Traps

Stainless Steel or Carbon Steel

For Pressures to 17 bar...Cold Water Start-up Capacities to 450 kg/h



Model WMT-1 Trap

Description

The thermostatic wafer steam trap is sized precisely to handle the extremely low condensate load found in most instrument steam tracer lines. The WMT thermostatic wafer traps are designed to last longer than other oversized, all-purpose thermostatic and thermodynamic steam traps.

A water seal prevents loss of steam through the orifice of the WMT Series.

Adjusts automatically to flow rates, including large start-up loads, at all pressures within its range.

Specification

Thermostatic wafer steam trap, type WMT-1 in stainless steel. Maximum allowable back pressure 99% of inlet pressure.

How to Order

- Specify model number
- Specify size and type of pipe connection. When flanges are required, specify type of flange in detail

Table ST-178-1. WMT Series 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

* 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 ST-178-2. WMT-1 Trap (dimensions in mm)

Model No.	WMT-1	
Pipe Connections	1/4" - 3/8"	1/2"
"A" Diameter	57	57
"B" Face-to-Face (screwed & SW)	84	84
Weight in kg (screwed & SW)	0,1	0,1

Table ST-178-3. WMT-1 Traps

Model	WMT-1
Connections	Screwed BSPT and NPT
Material	
Cap and Body	ASTM A240 to 304L
Capsule	All stainless steel – 304
Maximum Operating Conditions	
Maximum allowable pressure (vessel design)ŧ	17 bar @ 204°C
Maximum operating pressure	17 bar

Maximum back pressure: 99% of inlet pressure

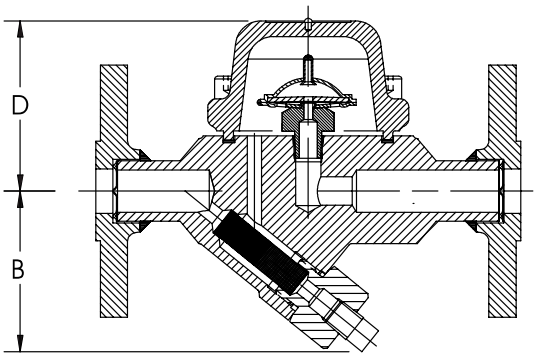
ŧ May be derated depending on flange rating and type.

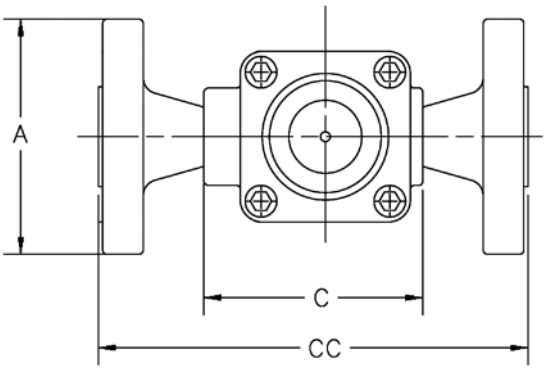
All dimensions and weights are approximate. Use certified print for exact dimensions. Design and materials are subject to change without notice.

TC-300 Series Thermostatic Capsule Steam Traps

Carbon Steel

For Pressures to 17 bar...Cold Water Start-up Capacities to 454 kg/h





Description

The TC-300 is sized precisely to handle the extremely low condensate load found in most instrument steam tracer lines. The TC-300 traps are designed to last longer than other oversized, all-purpose thermostatic and thermodynamic steam traps.

This steam trap adjusts automatically to flow rates, including large start-up loads, at all pressures within its range.

How to Order

Specify: Model Number, Size and type of pipe connection. When flanges are required, specify type of flange in detail.

Table ST-179-1. TC-300 Series Capacity

Differential Pressure*	Cold Water Start-Up 21°C	Hot Water Start-Up 100°C	Operating Condensate 10°C Below Saturation
barg	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

* 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 ST-179-2. TC-300 Trap (dimensions in mm)

Pipe Connections	15 – 20 – 25
"B" Height (Screwed & SW)	117
"A" Height (flanged PN40*)	117
"C" Face-to-Face (Screwed & SW)	90 – 90 – N/A
"CC" Face-to-Face (Flanged PN40*)	150 – 150 – 160
"D" CL to Top	60
Weight in kg (Screwed & SW)	1.9
Weight in kg (Flanged PN40)	4.3 – 4.5 – 4.7

Table ST-179-3. TC-300 Traps

Model	TC-300
Connections	Screwed BSPT and NPT Socketwelded Flanged EN 1092-1 or ASME B16.5***
Material	
Cap and Body	ASTM A105 ASTM A350-LF2
Capsule	All Stainless Steel – 304
Maximum Operating Conditions	
Maximum allowable pressure (vessel design)†	40 barg @ 350 °C
Maximum operating pressure	17 barg @ 204 °C

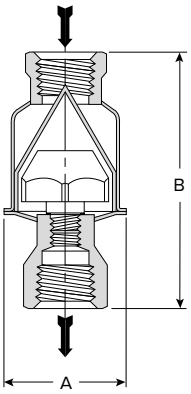
† May be derated depending on flange rating and type. *** Standard flanges are in carbon steel, ASTM A350 LF2 are optional.

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

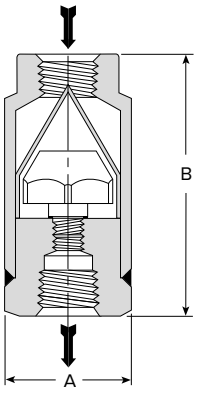
WT Series Thermostatic Wafer Steam Traps

Stainless Steel or Carbon Steel

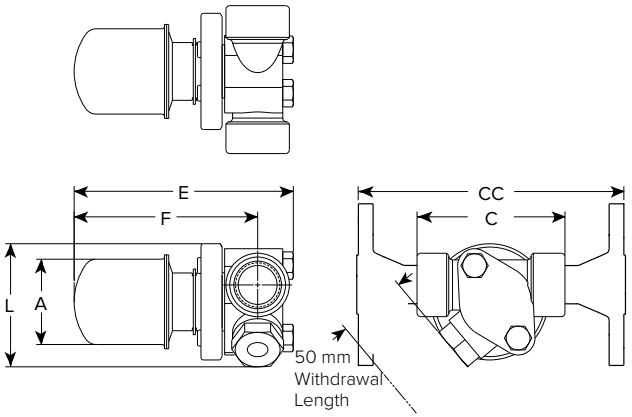
For Pressures to 41 bar...Cold Water Start-Up Capacities to 730 kg/h



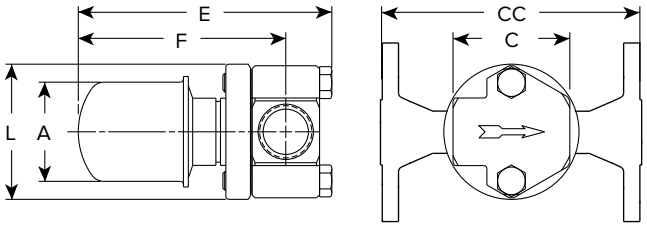
Model WT-1 Trap



Model WT-3 Trap



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



Model WT-2000 with Standard Connector

Description

Armstrong offers three thermostatic wafer steam traps. The WT-1 is ideal for low-capacity steam tracers and features an exclusive non-welded wafer design and internal strainer screen two to three times larger than that of other thermostatic traps in a sealed stainless steel body. Choice of NPT or BSPT screwed connections.

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.

Armstrong's WT-3 is a carbon steel thermostatic wafer trap for superheated drip service. It features an exclusive non-welded wafer design, which eliminates problems associated with weld stress. The WT-3 has no thin-walled enclosures such as bellows or welded diaphragms. It is also resistant to water hammer. Choice of NPT or BSPT screwed connections, or socketweld connections.

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 ... in stainless steel or carbon steel. Maximum allowable back pressure 99% of inlet pressure.

How to Order

Specify:

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

Table ST-180-1. WT Series Trap (dimensions in mm)

Model No.	WT-1		WT-3
Pipe Connections	1/2"	3/4"	1/2" – 3/4"
"A" Diameter	57	57	57
"B" Face-to-Face (screwed & SW)	114	119	118
Weight in kg (screwed & SW)	0,5	0,6	1,4

Table ST-180-2. WT Series Trap (dimensions in mm)

Model No.	WT-2000		
	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 models comply with the Article 4.3 of the PED (2014/68/UE).

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

WT Series Thermostatic Wafer Steam Traps

Stainless Steel or Carbon Steel

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

Table ST-181-1. WT Series 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.

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 ST-181-2.

Model	WT-1 All Stainless Steel	WT-2000 Stainless Steel w/360° Connector	WT-3 Carbon Steel
Design	Welded		
Connections	Screwed BSPT and NPT – Socketweld – Flanged (WT-2000 only)		
Material			
Body	ASTM A240 – 304L		Carbon Steel C-1018
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		41 bar @ 399°C
Maximum operating pressure	28 bar		41 bar
Options WT-2000			
Blowdown Valve IS-2 Connector Only			

Maximum back pressure: 99% of inlet pressure

† May be derated depending on flange rating and type.

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

SH-300 Bimetallic Steam Trap

Carbon Steel

For Pressures to 22 bar...Capacities to 1 800 kg/h

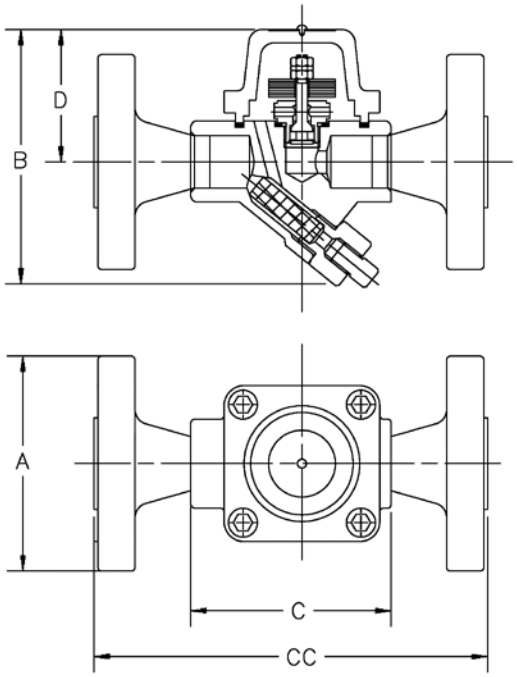


Table ST-182-2. SH-300 Traps	
Model	**SH-300**
Connections	Screwed BSPT and NPT Socketwelded Flanged EN 1092-1 or ASME B16.5***
Matériau	
Cap and Body	ASTM A105 ASTM A350-LF2
Valve	Acier au chrome 440C
Seat	Stainless steel 303
Bimetallic elements	Nickel plated

Description

The SH-300 steam trap operates on the temperature principle using two layers of bimetallic elements that have different expansion coefficients. The stem connected to these elements moves a valve into either an open or closed position. During start-up, the trap is cold so the elements are flat and the valve is wide open. This results in air and condensate being easily removed from the system.

In standard operation, the position of the valve depends on two parameters: first, the pressure, which will cause the valve to open; and second, the temperature, which will cause the elements to convex and the valve to close. When no condensate is present and set temperature is reached, the force of the elements is then high enough to completely close the valve.

The SH-300 steam trap can adjust itself to changing conditions, because if the pressure rises, the higher pressure works on the valve. At the same time, the higher temperature will work on the elements.

Table 182-1. Model SH-300 Trap (dimensions in mm)	
Model No.	**SH-300**
Pipe Connections	15 – 20 – 25**
«B» Height (screwed & SW)	115
«A» Height (flanged EN1092-1 PN40*)	95 – 105 – 115
«C» Face-to-Face (screwed & SW)	90 – 90 – N/A
«CC» Face-to-Face (flanged EN1092-1 PN40*)	150 – 150 – 160
«D» ℄ to Top	60
Weight in kg (screwed & SW)	1,9
Weight in kg (flanged PN40*)	4,3 – 4,5 – 4,7

Maximum Operating Conditions

Maximum allowable pressure (vessel design)ŧ: 40 bar @ 350°C
Maximum operating pressure: 22 bar
Maximum back pressure: 99% of inlet pressure

Specification

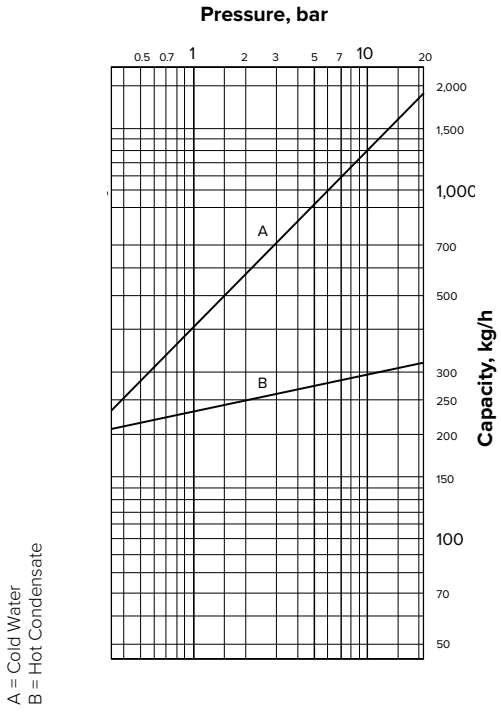
Bimetallic steam trap, type SH-300 in carbon steel. Maximum allowable back pressure 99% of inlet pressure.

How to Order

Specify:

- Model number
- Size and type of pipe connection.

Table ST-182-3. SH-300 Capacity



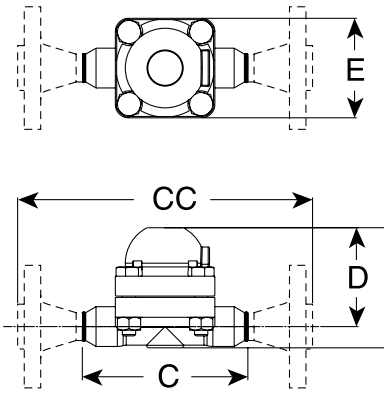
ŧ May be derated depending on flange rating and type. * Other flange sizes, ratings and face-to-face dimensions are available on request. ** pipe connections only available if flanged. ***Standard flanges are in carbon steel, ASTM A350 LF2 are optional.
All sizes comply with the Article 4.3 of the PED (2014/68/UE).

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

SH-900 Bimetallic Steam Trap

Stainless Steel

For Pressures to 62 bar...Capacities to 4 990 kg/h



Model SH-900

Description

SH Series superheat steam traps operate by the effect that rising temperature has on the thermostatic bimetallic elements.

At start-up the valve is wide open, which allows a large volume of non-
condensables and cold condensate to be removed from the system. When the system reaches steam temperature, the elements become sufficiently hot to pull on the trap's valve stem, closing the valve.

The valve remains closed until the bimetallic elements cool, thus allowing the valve to crack open, vent the condensate and non-condensables, and then close again when steam temperature is reached.

The SH Series superheat steam traps adjust automatically to changing conditions. Hot elements in the valve generate forces to offset rises in pressure.

Specification

Bimetallic style steam traps type SH-900 in stainless steel with integral stainless steel strainer, inline repairable. The mechanism shall consist of a stacked nickel-chrome bimetal operator with titanium valve and seat. The steam trap shall be capable of operation on low-load applications throughout its pressure/temperature range. Maximum allowable back pressure 99% of inlet pressure.

How to Order

Specify:

- **SH-900 is available in two versions: low pressure from 14 - 44 barg (SH-900L) and high pressure from 41 - 62 barg (SH-900H)**
- Size and type of pipe connection
- Maximum working pressure that will be encountered
- Maximum condensate load

Table ST-183-3. SH Series

Model	SH-900*
Pipe Connections	mm
	15 – 20 – 25
"B" Height	115
"C" Face-to-Face (screwed & SW)	158
"CC" Face-to-Face (flanged PN63*)	233 – 240 – 278
"D" ℄ to Top	95
"E" Width	95
Weight kg (screwed & SW)	4,4

* 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 4.3 of the PED (2014/68/UE).

Table ST-183-1. Model SH-900 Cold Water Capacity

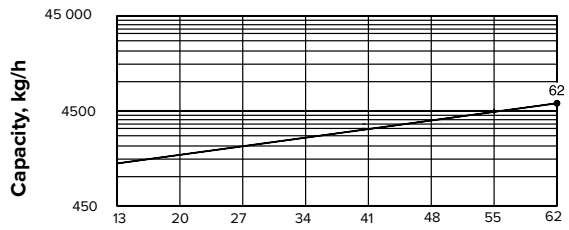
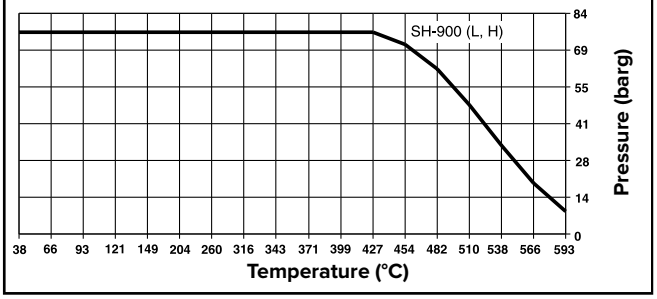


Table ST-183-2. Model SH-900 Pressure/Temperature Rating



Maximum operating conditions

Maximum allowable pressure (vessel design)ŧ:	62 bar @ 482°C
Maximum operating pressure:	62 bar
Maximum back pressure:	99% of inlet pressure
Suggested minimum operating pressure	14 bar

Table ST-183-4. Model SH-900

Connections	15 – 20: Screwed NPT, BSPT, socketweld, flanged EN 1092-1 or ASME B16.5, buttweld	25: Flanged EN 1092-1 or ASME B16.5, buttweld
Material		
Body and Cap	ASTM A351 Gr. CF8M	
Valve	Titanium	
Seat		
Bimetallic Elements	Nickel-chrome and stainless steel	
Strainer	Stain Steel Screen	

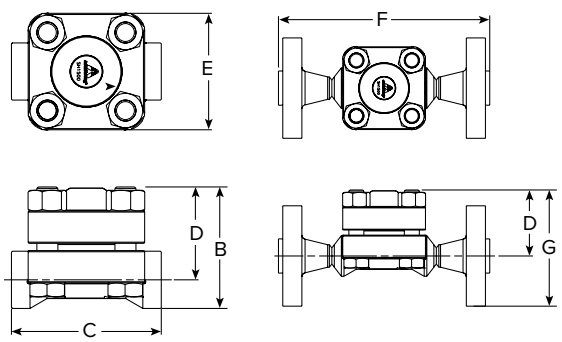
ŧ May be derated depending on flange rating and type. *** Standard flanges are in carbon steel, ASTM A350 LF2 are optional.

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

SH-1500 Bimetallic Superheat Steam Trap

Cast Chromemoly Steel

For Pressures to 124 bar...Capacities to 3 180 kg/h



Model SH-1500

Description

SH Series superheat steam traps operate by the effect that rising temperature has on the thermostatic bimetallic elements.

At start-up the valve is wide open, which allows a large volume of non-condensables and cold condensate to be removed from the system. When the system reaches steam temperature, the elements become sufficiently hot to pull on the trap's valve stem, closing the valve.

The valve remains closed until the bimetallic elements cool, thus allowing the valve to crack open, vent the condensate and non-condensables, and then close again when steam temperature is reached.

The SH Series superheat steam traps adjust automatically to changing conditions. Hot elements in the valve generate forces to offset rises in pressure. The SH 1500 series utilizes titanium valves and seats to ensure extremely long service life in the harsh environment of superheated steam systems.

Specification

Bimetallic style steam traps type SH-1500 in investment cast chromemoly steel with integral stainless steel strainer, inline repairable. The mechanism shall consist of a stacked nickel-chrome bimetal operator with titanium valve and seat. The steam trap shall be capable of operation on low-load applications throughout its pressure/temperature range. 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-184-1. Model SH-1500 Cold Water Capacity

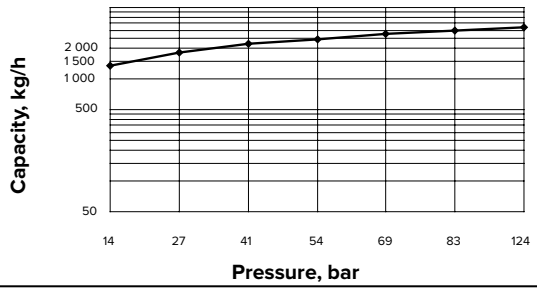


Table ST-184-2. Model SH-1500 Pressure/Temperature Rating

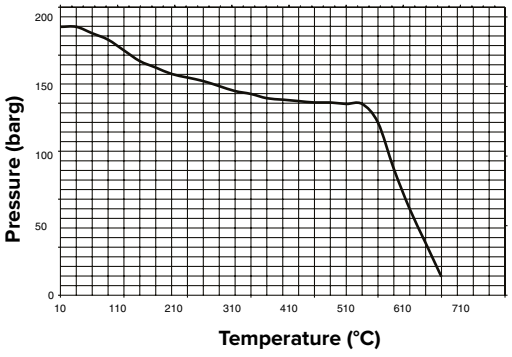


Table ST-184-3. SH Series

Model	SH-1500*	
Pipe Connections	mm	
	20	25
"B" (Height BW) in mm	129	129
"C" (Face-to-face BW - with extended nipples) in mm	157	157
"D" (Centerline to Top) in mm	98	98
"E" (Width) in mm	123	123
"F" (Face-to-face Flanged ANSI 1500#) in mm	475	481
"G" (Height Flanged ANSI 1500lbs) in mm	163	173
Weight in kg (BW)	10,4 kg	10,4 kg
Weight in kg (Flanged ANSI 1500#)	16,5 kg	18,5 kg

* 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 4.3 of the PED (2014/68/UE).

Maximum operating conditions

Maximum allowable pressure (vessel design)ŧ: 124 bar @ 565°C
Maximum operating pressure: 124 bar
Maximum back pressure: 99% of inlet pressure
Suggested minimum operating pressure: 41 bar

Table ST-184-4. Model SH-1500

Connections	20 – 25: Buttweld, Flanged EN 1092-1 or ASME B16.5
Material	
Body and Cap	ASTM 217 Gr. C12A
Valve	Titanium
Seat	
Bimetallic Elements	Nickel-chrome and stainless steel
Strainer	Stain Steel Screen

ŧ May be derated depending on flange rating and type.

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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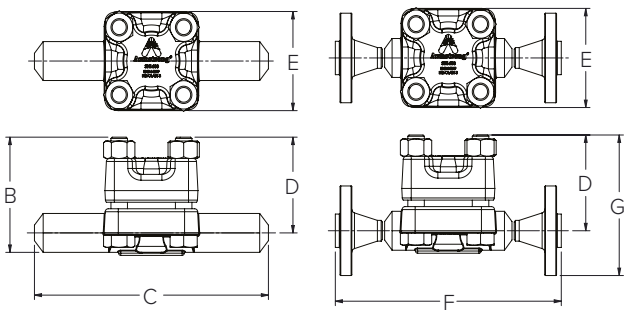
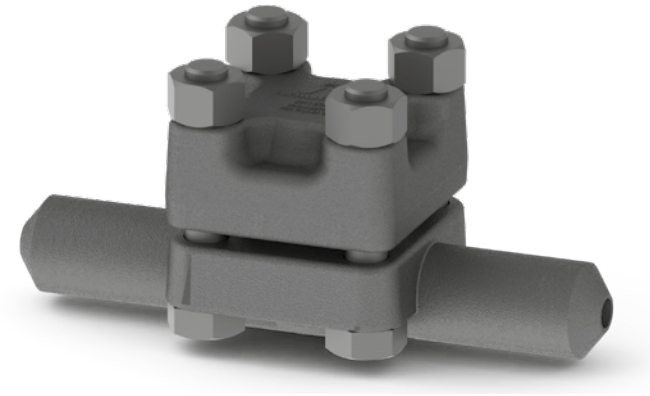
SH-1600 Bimetallic Steam Trap for Superheat Conditions

For Pressures to 120.6 barg (1 750 psig)...Cold Water Capacities to 2 950 kg/hr (6 500 lb/hr)



Model SH-1600



Description

SH Series superheat steam traps operate by the effect that rising temperature has on the bimetallic elements.

At start-up the valve is wide open, which allows a large volume of non-condensables and cold condensate to be removed from the system. When the trap reaches steam temperature, the bimetallic elements pull the valve into the seat closing the trap. The valve remains closed until the bimetallic elements cool, thus allowing the valve to crack open, vent the condensate and non-condensables, and then close again when steam temperature is reached.

The SH Series superheat steam traps adjust automatically to changing conditions. The SH-1600 series utilizes titanium valves and seats to ensure extremely long service life in the harsh environment of superheated steam systems.

Specifications

Steam trap shall be a bimetallic style. The trap shall be forged chrome-moly steel with integral stainless steel strainer,in-line repairable. The mechanism shall consist of a stacked nickel-chrome bimetal operator, with titanium valve and seat. The steam trap shall be capable of operation on low load and superheat applications throughout its pressure/temperature range.

How to Order

- Specify model number.
- Specify maximum operating pressure.
- Specify size and type of pipe connections.
- When flanges are required specify type of flange.

Maximum operating conditions

Maximum allowable pressure
(vessel design): 120.6 barg @ 520°C
Maximum operating pressure: 120.6 barg
Suggested minimum operating pressure: 41 bar)

Table ST-185-2. Model SH-1600 Cold Water Capacity

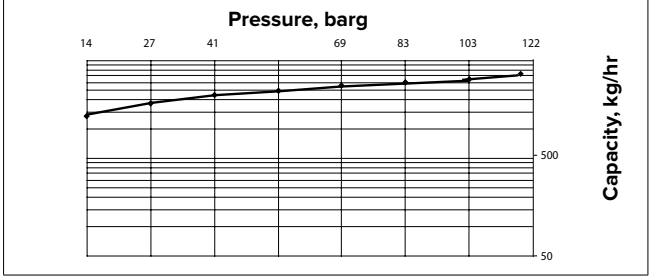


Table ST-185-2 Model SH-1600 Pressure/Temperature Rating

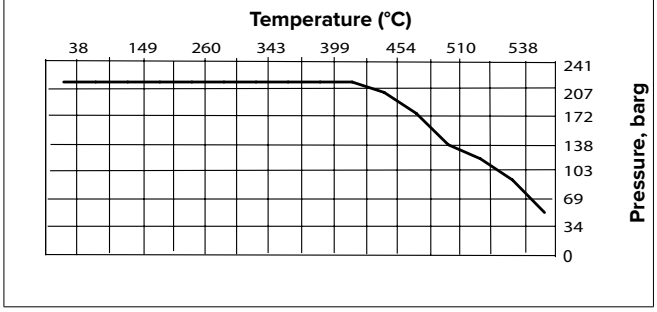


Table ST-185-3.SH-1600

Model	SH-1600	
Pipe Connections	mm	
	20	25
"B" (Height)	148	148
"C" (End-to-End) - Socket Weld / Butt Weld	315	315
"D" (Centerline to Top)	123	123
"E" (Width)	129	129
"F" (Face-to-Face) - Flanged 1500#	475	481
"G" (Height) - Flanged 1500#	188	198
Weight in kg - SW/BW	17.3	17.3
Weight in kg - Flanged 1500#	22.6	22.6

Table ST-185-4 SH-1600

Connections	Socketweld, Buttweld, Flanged EN 1092-1 or ASME B16.5
Material	
Body and Cap	ASTM A-182 F22 Class 3
Valve	Titanium
Seat	
Bimetallic Elements	Nickel-chrome and stainless steel
Screen	Stainless Steel
Bolts	ASTM A193 Gr. B16
Nuts	ASTM A194 GR. 7

SH-2000 Bimetallic Steam Traps

All Stainless Steel

For pressures to 28 bar...Cold Water Capacities to 2175 kg/hr

Description

SH Series Superheat Steam Traps operate by the effect that rising temperature has on the thermostatic bimetallic elements.

The effect of rising temperature on bimetallic elements operates the Armstrong SH-2000 bimetallic steam trap. It adjusts to changing conditions because the curving of the bimetallic elements, caused by increasing temperature, compensates for increasing pressure.

At start-up, the valve is wide open, which allows a large volume of non-condensables and cold condensate to be removed from the system. When the system reaches steam temperature, the elements become sufficiently hot to pull on the trap's valve stem, closing the valve.

The valve remains closed until the bimetallic elements cool, thus allowing the valve to crack open, venting the condensate and non-condensables, and then close again when steam temperature is reached.

The Armstrong SH-2000 has a sealed, stainless steel body that is lightweight, compact and highly resistant to corrosion. It is adaptable to an Armstrong 360° Universal Connector or a Trap Valve Station (TVS). This makes it easy to install and replace, as the trap can be removed while the connector remains in-line. That means savings in labor cost and ultimate flexibility—because inverted bucket, thermostatic, thermostatic wafer, disc, and float and thermostatic steam traps can all be installed on the same connector.

Maximum Operating Conditions

Maximum allowable pressure (vessel design):
28 bar @ 427°C

Maximum operating pressure: 400 psi (28 bar)

Materials

Body:	Stainless Steel
Valve & Seat Elements:	Titanium, Ni-Cr and Stainless Steel
Ring:	Stainless Steel
Cap Assembly:	Stainless Steel
Flange:	ASTM A105 Zinc plated
Retainer Ring:	Carbon Steel
Spiral Wound Gasket:	Stainless Steel
Label:	Aluminum

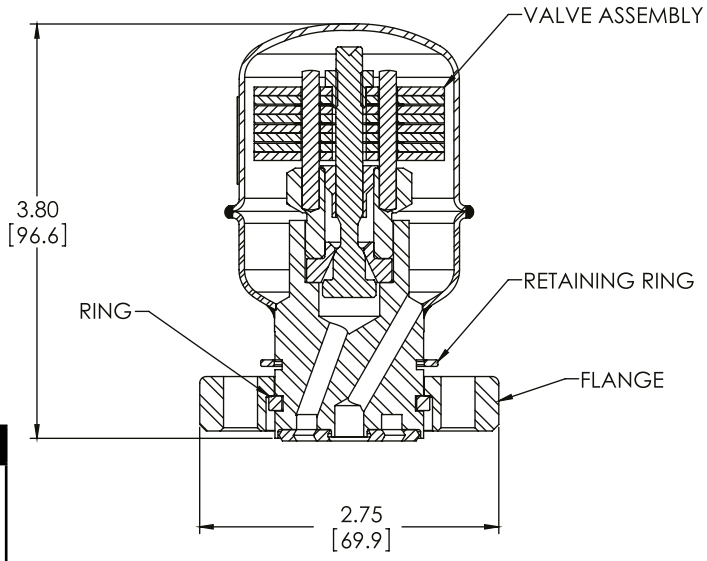
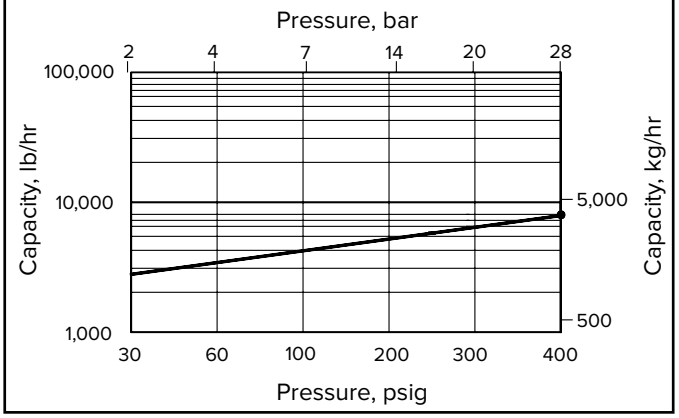


Table ST-186-1. SH-2000 Cold Water Capacity



SH-2500 Bimetallic Steam Trap

All Stainless Steel

For Pressures to 45 bar (650 psig)...Capacities to 2722 kg/hr (6,000 lb/hr)

Description

Armstrong's SH-2500 Bimetallic Steam Trap is the ideal design for applications involving superheated steam.

During start-up, the bimetallic mechanism is fully open and allows large volumes of non-condensable gases and condensate to be removed from the system. As the system reaches saturated steam conditions, the mechanism begins to close preventing any live steam loss. The superheat during normal operating steam conditions keep the valve closed to ensure long service life.

In the event that operating conditions change and condensate forms at the steam trap inlet, the cooling effect allows the bimetallic mechanism to open and discharge any accumulation. The valve quickly closes once normal operating conditions return.

The SH-2500 consists of an investment cast, stainless steel body that is compact and highly resistant to harsh, corrosive environments. The integral mounting flange is compatible with the Armstrong IS-2, TVS-4000, std connector making for labor savings and easy steam trap replacement.

Maximum Operating Conditions

Maximum allowable pressure (vessel design):
45 bar @ 315°C

Maximum operating pressure:
45 bar @ 315°C

Materials and Weight

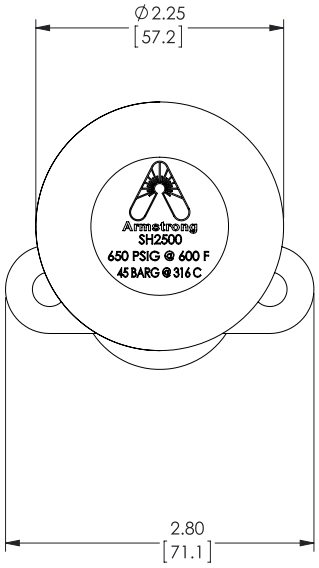
Body:	ASTM A351 Gr. CF8M
Valve & Seat Elements:	Titanium Ni-C Stainless Steel
Spiral Wound Gasket:	Stainless Steel
Bolts:	ASTM A193 B7
Weight:	2.8 lbs (1.3 kg)

Specification

Steam traps shall be a bimetallic style designed for superheated steam applications. The steam trap body shall be tamperproof, investment cast stainless steel A351 Gr. CF8M. The mechanism shall consist of a stacked nickel-chrome bimetal operator with titanium valve and seat. The gaskets shall be captured stainless steel spiral wound. The steam trap shall be compatible with the 2-bolt universal connector technology.

How to Order

Specify model number
Maximum working pressure and temperature



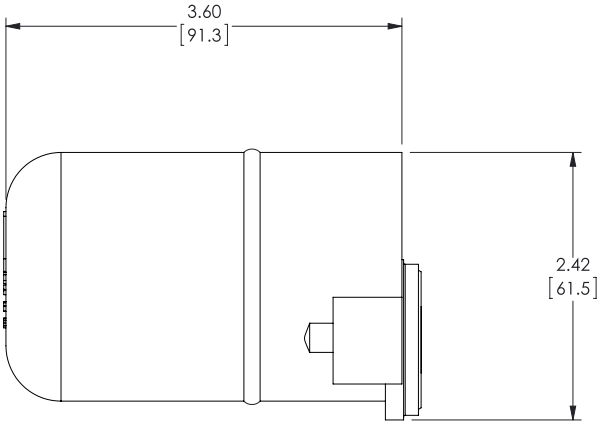
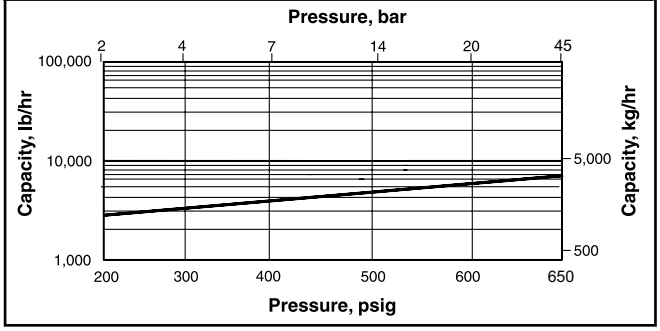


Table ST-187-1. SH-2500 Cold Water Capacity (Start Up)



Note: Cold water capacity for start-up loads only. When superheat present, there will be minimal condensate.

SH-4000 Series Bimetallic Steam Traps

All Stainless Steel

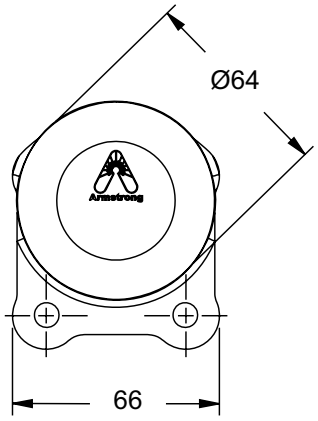
For Pressures to 86 bar ... Cold Water Start-up Capacities to 2 722 Kg/h

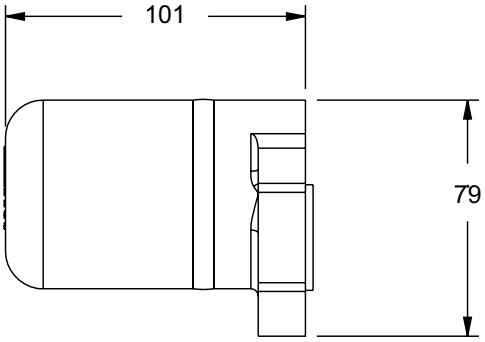
Armstrong's SH-4000 Bimetallic Steam Trap is the ideal design for applications involving superheated steam.

During start-up, the bimetallic mechanism is fully open and allows large volumes of non-condensable gases and condensate to be removed from the system. As the system reaches saturated steam conditions, the mechanism begins to close preventing any live steam loss. The superheat during normal operating steam conditions keep the valve closed to ensure long service life.

In the event that operating conditions change and condensate forms at the steam trap inlet, the cooling effect allows the bimetallic mechanism to open and discharge any accumulation. The valve quickly closes once normal operating conditions return.

The SH-4000 consists of an investment cast, stainless steel body that is compact and highly resistant to harsh, corrosive environments. The integral mounting flange is compatible with the Armstrong IS-4, 4-bolt, Class 900, connector making for labor savings and easy steam trap replacement.





Maximum Operating Conditions

Maximum allowable pressure (vessel design):
86 bar @ 482°C (1245 psig @ 900°F)

Maximum operating pressure:

SH-4009L	45 bar @ 482°C (650 psig @ 900°F)
SH-4009H	62 bar @ 482°C (900 psig @ 900°F)
SH-4015	86 bar @ 482°C (1245 psig @ 900°F)

Materials and Weight

Body:	ASTM A351 Gr. CF8M
Valve & Seat Elements:	Titanium Ni-Cr Stainless Steel
Spiral Wound Gasket:	Stainless Steel
Bolts:	ASTM A193 B7
Weight:	1,7 kg (3,75 lbs)

Specification

Steam traps shall be a bimetallic style designed for superheated steam applications. The steam trap body shall be tamperproof, investment cast stainless steel A351 Gr. CF8M. The mechanism shall consist of a stacked nickel-chrome bimetal operator with titanium valve and seat. The gaskets shall be captured stainless steel spiral wound. The steam trap shall be compatible with the 4-bolt universal connector technology.

How to Order

Specify model number
Maximum working pressure and temperature

Table 188-1. SH-4009L and SH-4009H Cold Water Capacity

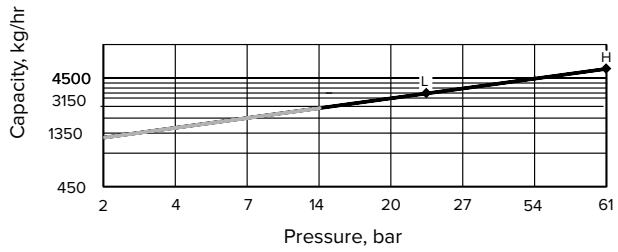
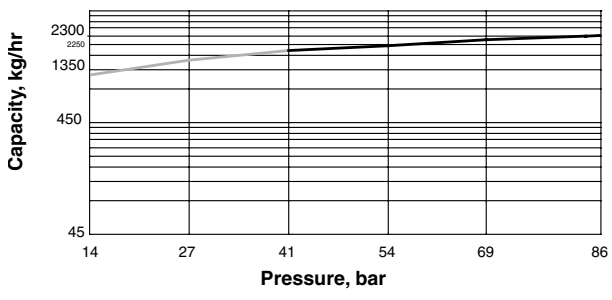


Table 188-2. SH-4015 Cold Water Capacity



Note: Cold water capacity for start-up loads only. When superheat present, there will be minimal condensate.
Grey curve indicates that trap can not be used in this area.

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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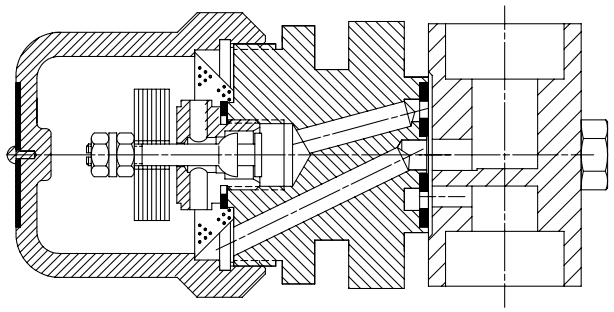
Notes

AB-3000 Bimetallic Steam Trap

Stainless Steel

For Pressures to 22 bar...Capacities to 1 800 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.

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.

Maximum operating conditions

Maximum allowable pressure (vessel design)ŧ:	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
Seat:	303 Stainless steel
Elements:	Nickel plated
Strainer:	304 Stainless steel

Specification

Bimetallic repairable steam trap, 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-190-1. 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 4.3 of the PED (2014/68/UE).

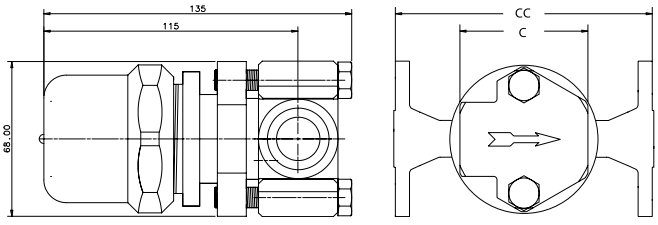
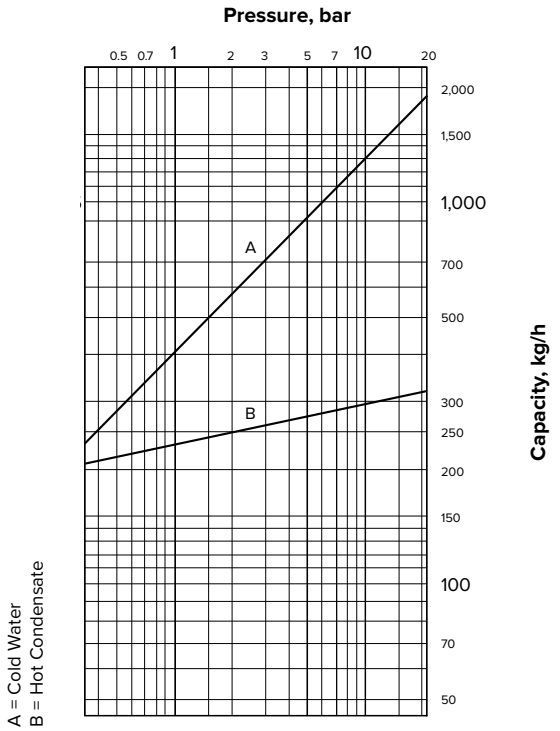


Table ST-190-2. Model AB-3000 Capacity



ŧ May be derated depending on flange rating and type.

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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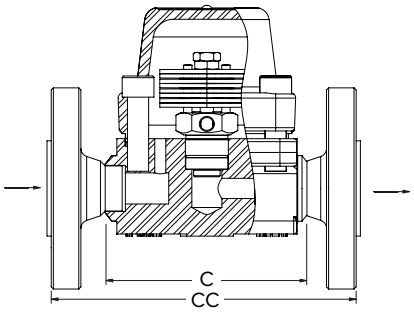
AB-600 Bimetallic Steam Trap

Carbon Steel

For Pressures to 41 bar...Capacities to 4 000 kg/h



Description

Armstrong's AB-600 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.

Armstrong's AB-600 Bimetallic Steam Trap is the ideal solution for applications where other trap styles are not resisting to tough operating conditions. It also has the ability to handle the large start up loads associated with superheat applications. The unique bimetallic element allows for tight shut off before superheat reaches the trap thus preventing steam loss. The AB-600 utilizes a titanium valve and seat to ensure extremely long service life in the harsh environment of superheated steam systems.

Maximum operating conditions

Maximum allowable pressure (vessel design)ŧ:	41 bar @ 400°C
Maximum operating pressure:	41 bar
Maximum back pressure:	99% of inlet pressure

Connections

Screwed BSPT and NPT
Socketweld
Flanged EN 1092-1 or ASME B16.5 (welded)

Material

Body:	Carbon steel C22.8 (corrosion resistant stainless steel body is optional)
Cap:	Carbon steel ASTM A105
Valve:	Titanium
Seat:	Titanium
Elements:	Ni-Cr and Stainless steel
Strainer:	304 Stainless steel

Specification

Bimetallic steam trap with titanium valve, type AB-600 in carbon steel, with integral strainer. Suitable also for superheated steam applications. 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-191-2. Model AB-600 Trap (dimensions in mm)

Pipe Connections	15 – 20	25
"C" Face-to-Face (screwed & SW)	98	—
"CC" Face-to-Face (flanged PN40*)	150	160
Weight in kg (screwed & SW)	2,8	—
Weight in kg (flanged PN40*)	4,3 – 4,5	4,7

* Other flange sizes, ratings and face-to-face dimensions are available on request.
All sizes comply with the Article 4.3 of the PED (2014/68/UE).

Table ST-191-1. Model AB-600 Pressure / Temperature

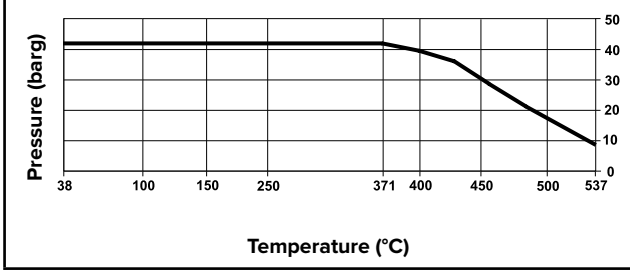
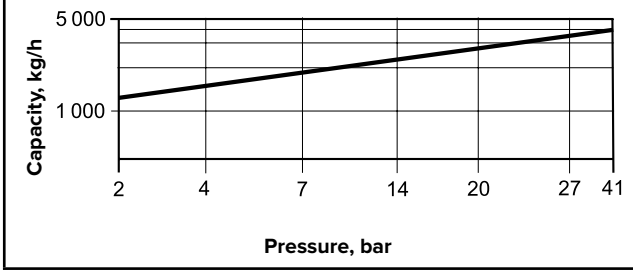


Table ST-191-3. Model AB-600 Cold Water Capacity



ŧ May be derated depending on flange rating and type.

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

TT Series Thermostatic Bellows Steam Traps

All Stainless Steel

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

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. TTF-1 is available with straight-thru or right angle connections. 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-304).

Specification

Thermostatic steam trap, type ... 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 (TT-2000)

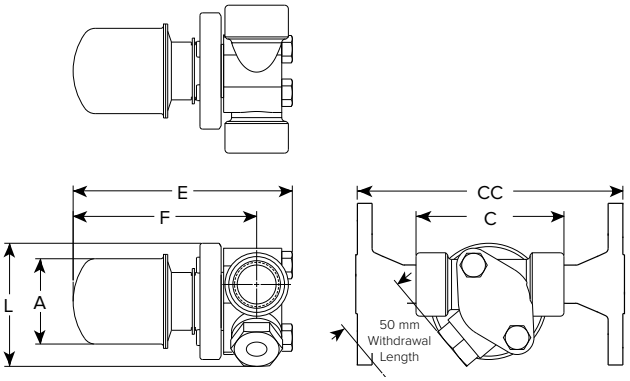
Connections

Screwed BSPT and NPT
TT-2000: Socketweld
TT-2000: Flanged DIN or ANSI (welded)

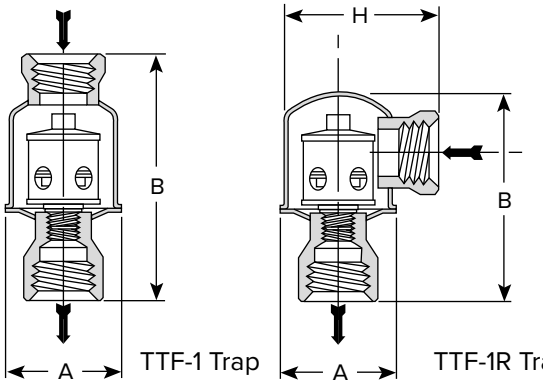
Materials

Body:	304L Stainless steel
Connector:	304 Stainless steel (TT-2000)
Bellows:	Stainless steel and bronze with phosphor-bronze bellows, caged in stainless steel

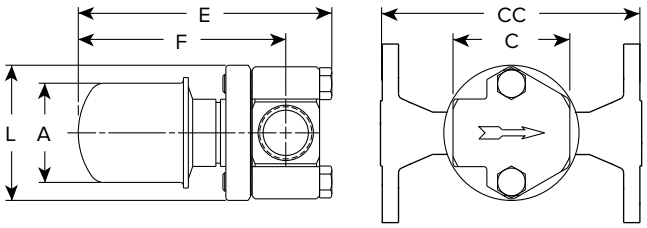
Model TT-2000 with Standard Connector



Model TT-2000 with Standard Connector



TTF-1 Trap TTF-1R Trap



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

Table ST-192-1. TTF Series Trap (dimensions in mm)

Model No.	TTF-1 Straight-Thru Connections		TTF-1R Right-Angle Connections		TT-2000		
					Standard Connector	IS-2 Connector with Integral Strainer	
Pipe Connections	15	20	15	20	15 – 20 – 25	15 – 20	25
"A" Diameter	57	57	57	57	57	57	57
"B" Height	114	119	95	100	—	—	—
"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 to Body End	—	—	—	—	108	111	111
"L" Overall Height	—	—	—	—	72	72	72
"H" Width for angle connection	—	—	78	76	—	—	—
Weight in kg (screwed & SW)	0,4	0,5	0,4	0,5	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 models comply with the Article 4.3 of the PED (2014/6-8/UE).

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

TT Series Thermostatic Bellows Steam Traps

All Stainless Steel

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

Table ST-193-1.			
Model	**TTF-1**	**TTF-1R**	**TT-2000**
Design	Welded		
Connections	Screwed BSPT and NPT – Socketweld – Flanged (TT-2000 only)		
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			
Maximum allowable pressure (vessel design)ŧ	20 bar @ 232°C		
Maximum operating pressure	20 bar		
Maximum operating temperature bellows	190°C		

Maximum back pressure: 99% of inlet pressure

Table ST-193-2. TTF Series Capacity

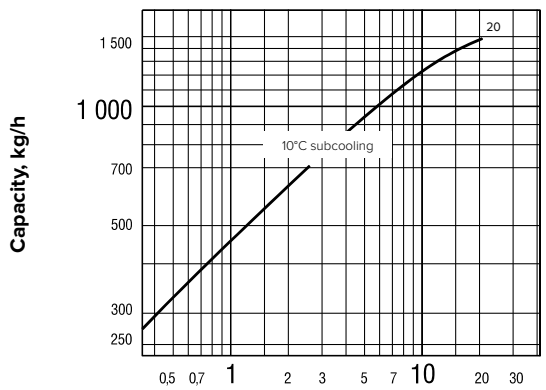
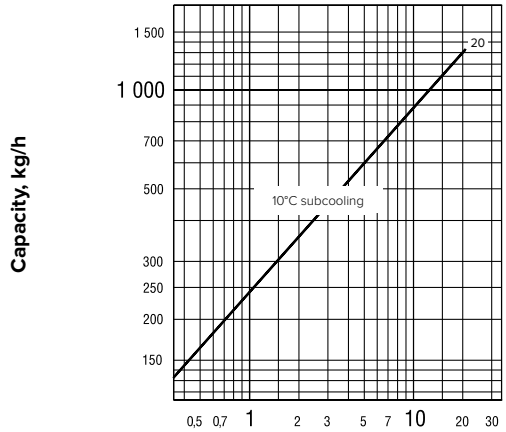


Table ST-193-3. Model TT-2000 Capacity



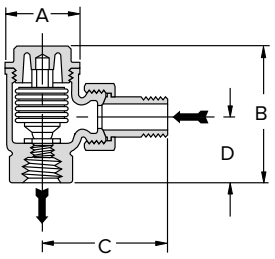
ŧ May be derated depending on flange rating and type.

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

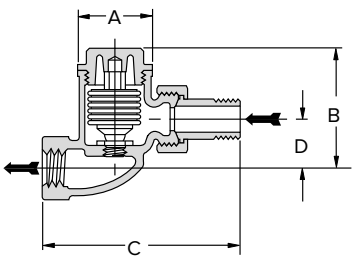
TS Series Radiator Traps

Bronze

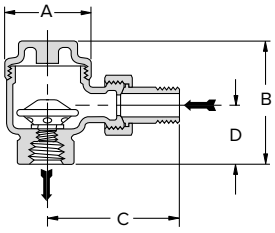
For Pressures to 4,5 bar...Capacities to 730 kg



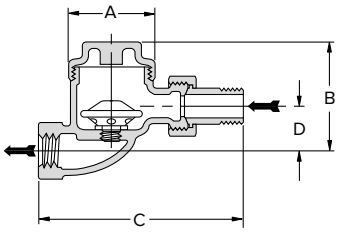
TS-2 Trap Angle Type



TS-2 Trap Straight Type



TS-3 Trap Angle Type



TS-3 Trap Straight Type

Armstrong Series TS radiator traps are offered in both angle and straight patterns. The TS-2 has a balanced pressure thermostatic element with a high quality multiple-convolution bellows. It's ideal for draining equipment such as steam radiators and convectors, small heat exchangers, unit heaters and steam air vents. The TS-2 comes with a strong, cast bronze body and a stainless seat. The valve and seat are renewable in-line.

The TS-3 is a heavy duty, wafer type trap for the drainage of all types of steam radiators and convectors. Its wafer design is well suited to systems prone to water hammer, which may damage conventional bellows type units. The TS-3 is repairable in-line and has an all-stainless steel wafer element.

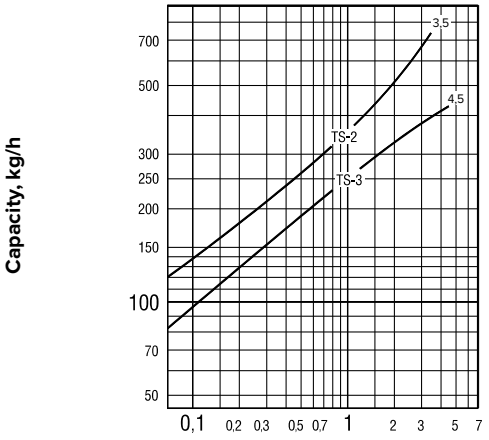
Materials

Cap:	Bronze, ASTM B 62
Body:	Bronze, ASTM B 62
Union Nipple:	Brass, ASTM B 584
Valve:	
Model TS-2:	Brass
Model TS-3:	Stainless steel
Valve Seat:	Stainless steel
Element:	
Model TS-2:	Phosphor-bronze bellows
Model TS-3:	T-316 SS Wafer w/T-304 SS Housing

Connections

Screwed BSPT and NPT

Table ST-194-2. TS Series Capacity



Maximum Operating Conditions

Maximum allowable pressure (vessel design):	
Model TS-2:	3,5 bar @ 149°C
Model TS-3:	4,5 bar @ 157°C
Maximum operating pressure:	
Model TS-2:	3,5 bar
Model TS-3:	4,5 bar
Maximum back pressure:	99% of inlet pressure

Table ST-194-1. TS Series Radiator Trap (dimensions in mm)

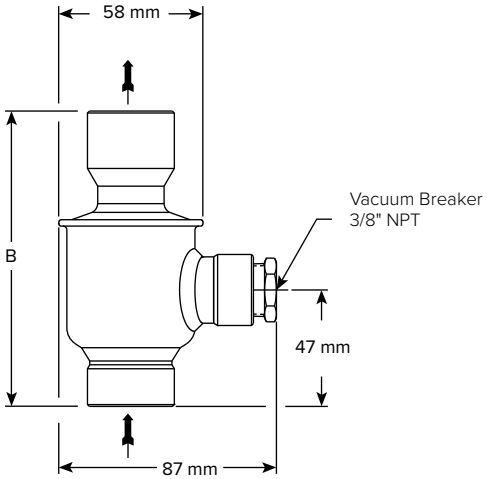
Model	TS-2				TS-3					
Type	Angle		Straight		Angle			Straight		
Pipe Connections	15	20	15	20	15	20	25	15	20	25
"A" Diameter	41,3	41,3	41,3	41,3	50,8	50,8	60,3	50,8	50,8	60,3
"B" Height	74,6	76,2	68,3	73,0	73,0	92,1	98,4	66,7	85,7	88,9
"C"	65,1	73,0	101,6	114,3	79,4	88,9	105,0	124,0	133,0	165,0
"D"	34,9	41,3	28,6	33,3	34,9	41,3	50,8	28,6	34,9	41,3
Weight in kg (screwed)	0,7	0,8	0,7	0,9	0,7	0,9	1,1	0,7	1	1,4

All models comply with the Article 4.3 of the PED (2014/68/UE).

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

Stainless Steel Thermostatic Air Vent/Vacuum Breaker

For Pressures to 10 bar...Capacities to 93 m^3/h



The Armstrong TAVB is a combination thermostatic air vent/vacuum breaker that is ideally suited for steam-filled vessels with modulating controls. The TAVB will vent air and other non-condensables from vessels such as shell and tube heat exchangers, jacketed kettles and steam coils during their operation. It will also break the vacuum that forms during steam control modulation.

This balanced pressure air vent responds to the pressure-temperature curve of steam, and the soft-seated vacuum breaker responds to 0,0051 bar of vacuum.

Features

- Maximum allowable pressure: 20 ba
- Maximum allowable temperature: 185°C
- Maximum working pressure: 10 bar
- All stainless steel welded construction
- NPT connections

Armstrong thermostatic air vents should be installed at the highest point on a steam chamber, with the air vent located above the chamber. This will minimize the possibility of any liquid carryover, and air can be vented to atmosphere without a drain line.

Table ST-195-1. TAVB Physical Data (dimensions in mm)

Model No.		TAVB-2	TAVB-3
Pipe Connections	Thermostatic Air Vent	15	20
	Vacuum Breaker	3/8"	3/8"
"A" (Diameter)		57	57
"B" (Height)		117	119
"C" (℄ Inlet to Face of Vacuum Breaker)		54	54
Weight lb (kg)		0,45	0,57
Maximum Allowable Pressure (Vessel Design)		20 bar @ 185°C	
Maximum Operating Pressure		10 bar	
Discharge Orifice Size		3/16"	

Table ST-195-2. TAVB List of Materials

Name of Part	Material
Body	304L Stainless Steel
Connections	304 Stainless Steel
Balanced Pressure Thermostatic Air Vent	Stainless steel and bronze with phosphor-bronze bellows, entire unit caged in stainless steel
Gasket	Copper clad non-asbestos
Vacuum Breaker Body	303 Stainless Steel
Valve	Stainless Steel
Spring	302 Stainless Steel
«O» Ring	EPDM
Screen	Stainless Steel

All sizes comply with the Article 4.3 of the PED (2014/68/UE).

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

TC Series Clean Steam Thermostatic Traps

Stainless Steel 316L

For Pressures to 8,3 bar...Capacities to 1 700 kg/h

Armstrong offers a complete range of T-316L stainless steel clean steam thermostatic traps to handle the special requirements of clean steam systems. Different body configurations allow for choice of piping and ease of cleaning.

The thermostatic design is free-draining and can operate close to steam temperature at any given pressure.

Features:

- Constructed of 316L stainless steel for corrosion resistance
- Highly polished for cleanability
- Self-draining to minimize contamination
- Compact and lightweight
- Easy to install
- Provide easy disassembly for cleaning

Typical Applications:

- Fermentors
- Sterilizers/autoclaves
- Process piping
- Block and bleed
- Bioreactors
- CIP/SIP systems
- Equipment sterilization
- Sterile barriers

How to Order:

Specify:

- Model number
- Pipe connection size
- End connection type

Example:
TC-C, 1/2" sanitary end connections.

Table ST-196-1. TC Series Clean Steam Traps Materials

Model	TC-C Clamp	TC-R Repairable	TC-S Sealed
Cap and body	316L stainless steel		
Bellows	316L stainless steel		
Body gasket	Viton		—
Retainer	316L Stainless steel		
Clamp	304 Stainless steel	—	—
Screws	—	304 Stainless steel	—
Polish	Grit Electro		Mechanical
Interior Finish	≤ 0,5 µm Ra		≤ 1,6 µm Ra
Exterior Finish	≤ 0,8 µm Ra outside		

All models comply with the Article 4.3 of the PED (2014/68/UE).

Table ST-196-2. TC Series Clean Steam Traps Physical Data

Model	TC-C Clamp	TC-R Repairable	TC-S Sealed
Maximum Allowable Pressure (Vessel Design)	8,3 bar		10 bar
Maximum Allowable Temperature	177°C		186°C
Maximum Operating Pressure	7 bar		8,3 bar
Weight in kg	0,57	0,68	0,34

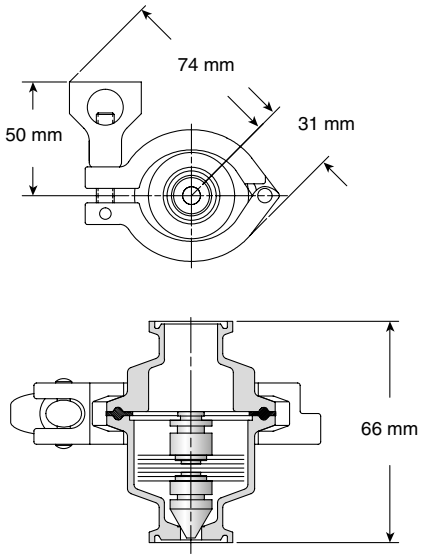
Maximum back pressure: 99% of inlet pressure

Table ST-196-3. TC Series Capacity

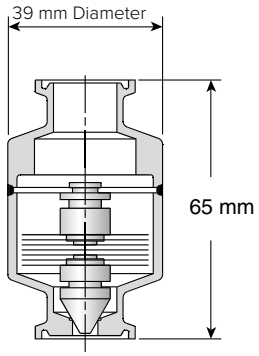
Differential Pressure* bar	5°C Subcool kg/h	11°C Subcool kg/h**
0,35	82	145
0,7	163	293
1,4	307	503
2,1	458	709
2,8	561	830
3,5	699	915
4,1	837	1 136
4,8	924	1 210
5,5	1 071	1 356
6,2	1 116	1 468
6,9	1 155	1 565
7,6	1 184	1 651
8,3	1 206	1 712

* 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.

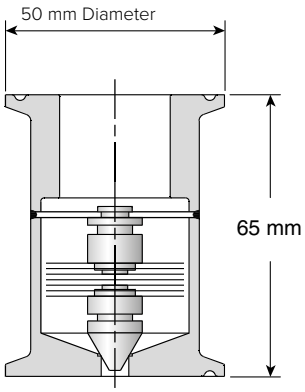
All dimensions and weights are approximate. Use certified print for exact dimensions. Design and materials are subject to change without notice.



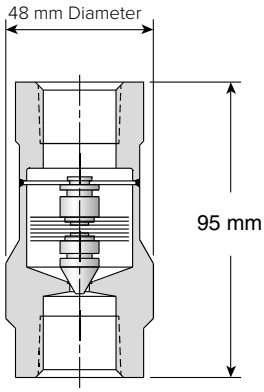
Model TC-C Clamp
With Sanitary Body Clamp
1/2", 3/4 and 1" Sanitary End Connections



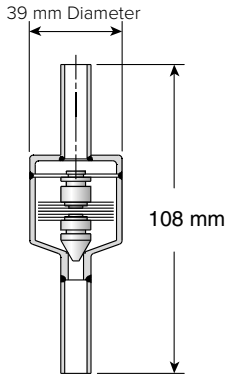
Model TC-S Sealed
1/2" and 3/4"
Sanitary End Connections



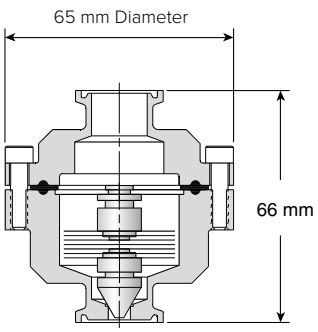
Model TC-S Sealed
1"
Sanitary End Connections



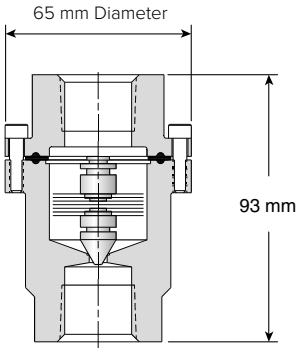
Model TC-S Sealed
1/2" and 3/4"
Threaded End Connections



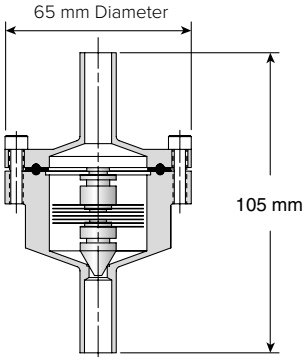
Model TC-S Sealed
1/2" and 3/4"
Tube End Connections



Model TC-R Repairable
With Bolted Body and Cap
1/2", 3/4 and 1"
Sanitary End Connections



Model TC-R Repairable
With Bolted Body and Cap
1/2" and 3/4"
Threaded End Connections



Model TC-R Repairable
With Bolted Body and Cap
1/2" and 3/4"
Tube End Connections

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

Armstrong Simplifies Your Tracing Line Systems

Designed to simplify and supply all the components (steam traps, manifolds, valves, etc.) necessary for your drip and tracer line applications, Armstrong's new Steam Distribution and Condensate Collection Manifolds bring all components together to reduce installation costs and provide a compact, easily accessible, centrally located assembly.

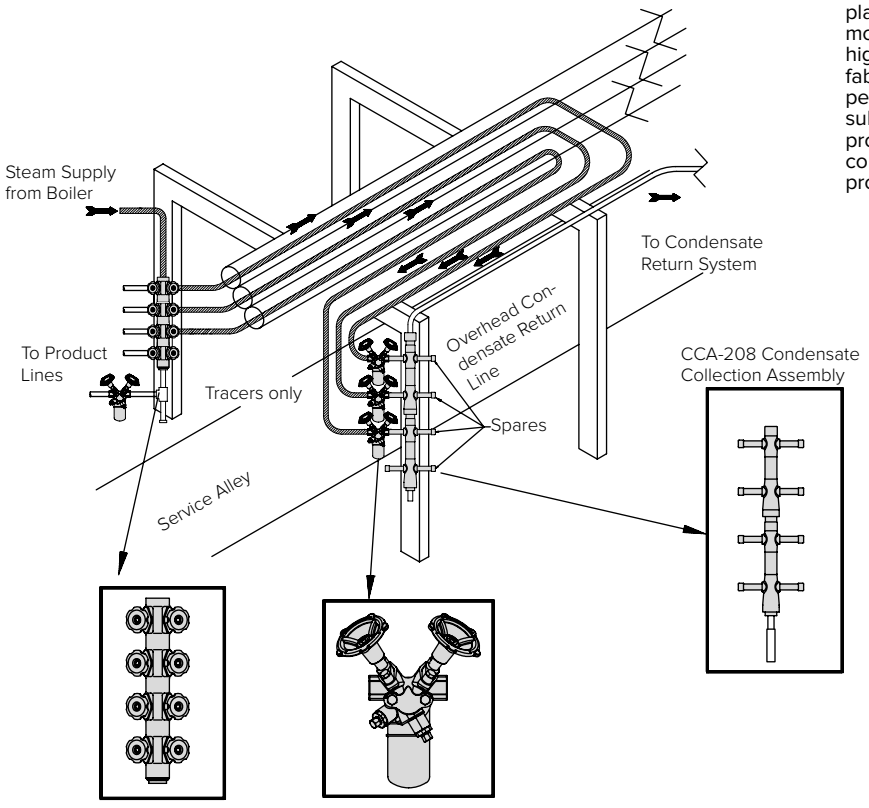
Armstrong's manifold series includes four different configurations, a Steam Distribution (MSD/SMSD), and a Condensate Collection Assembly (CCA/CCAF). As an option, the condensate manifolds can offer freeze protection.

In either case, you will save the expensive headaches of trying to fabricate in-house. What's more, your manifold will be backed by the famous Armstrong quality – and a standard three-year limited warranty.

Steam Distribution Manifolds
As a Steam Distribution Assembly (MSD/SMSD), the manifold places all steam supply valves in one location. Standardizing components and centralizing their location simplifies installation, cutting costs from the beginning. You also save because routine maintenance is faster.

Condensate Collection Manifolds
To make industry's trapping and valving more efficient, Armstrong combines its stainless steel steam trap valve stations with manifolds into a package called the Condensate Collection Assembly (CCA). This prepackaged assembly offers many great benefits – cost savings in installation, design flexibility, and reduced purchasing time. CCAF would also include syphon tube freeze protection.

Whatever your condensate collection or steam distribution needs, Armstrong has the manifold for savings over the long term.



SMSD Steam Distribution Manifold

TVS-4000 Trap Valve Station with 2000 Series Trap

Shown are typical locations for Armstrong manifolds. The many manifolds in chemical/petrochemical plants consume valuable floor space and often block movement among the units. Operating costs are high, and installation requires expensive custom fabrication on site. Clearly, a prefabricated manifold permitting standardization of components offers substantial savings over conventional units. Shaded products are available from Armstrong. Call or consult your Armstrong Representative if additional product details are required.

Armstrong International SA • Parc Industriel des Hauts-Sarts (2e Avenue) • 4040 Herstal • Belgium
Tel.: +32 (0)4 240 90 90 • Fax: +32 (0)4 240 40 33
www.**armstrong**international.eu • info@**armstrong**international.eu

Insulation Jackets for Manifolds

Manifold Type

Jacket

example

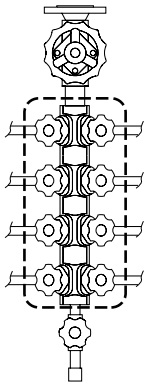
Range

MSD

Please specify: - distance between tracers 162 or 120 mm
- number of tracers 4, 8, 12

ONE PIECE

MSD-08

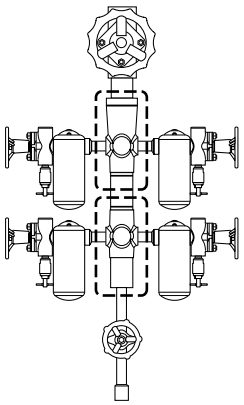


MSD-04, MSD-08, MSD-12

CCA

Please specify: - number of tracers 4, 6, 8, 10, 12

CCA-203-04



CCA-04, CCA-06, CCA-08, CCA-10, CCA-12,

A removable insulation jackets are available for all steam and condensate manifolds. This includes also the condensate return manifolds assembled with Trap Valve Stations (TVS) and steam traps.

Features

- Inexpensive
- Safe
- Quick and easy to install (no special knowledge is required)
- Removable for maintenance
- Reusable after maintenance
- Weatherproof
- Strong, durable cover increase service life

Maximum operating conditions

Maximum operating temperature:	260°C
Flame resistance:	BS 476 Part 7, Class 1

Materials

Base fabric:	Fiberglass
Weave:	Satin
Coating:	Silver silicone rubber

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

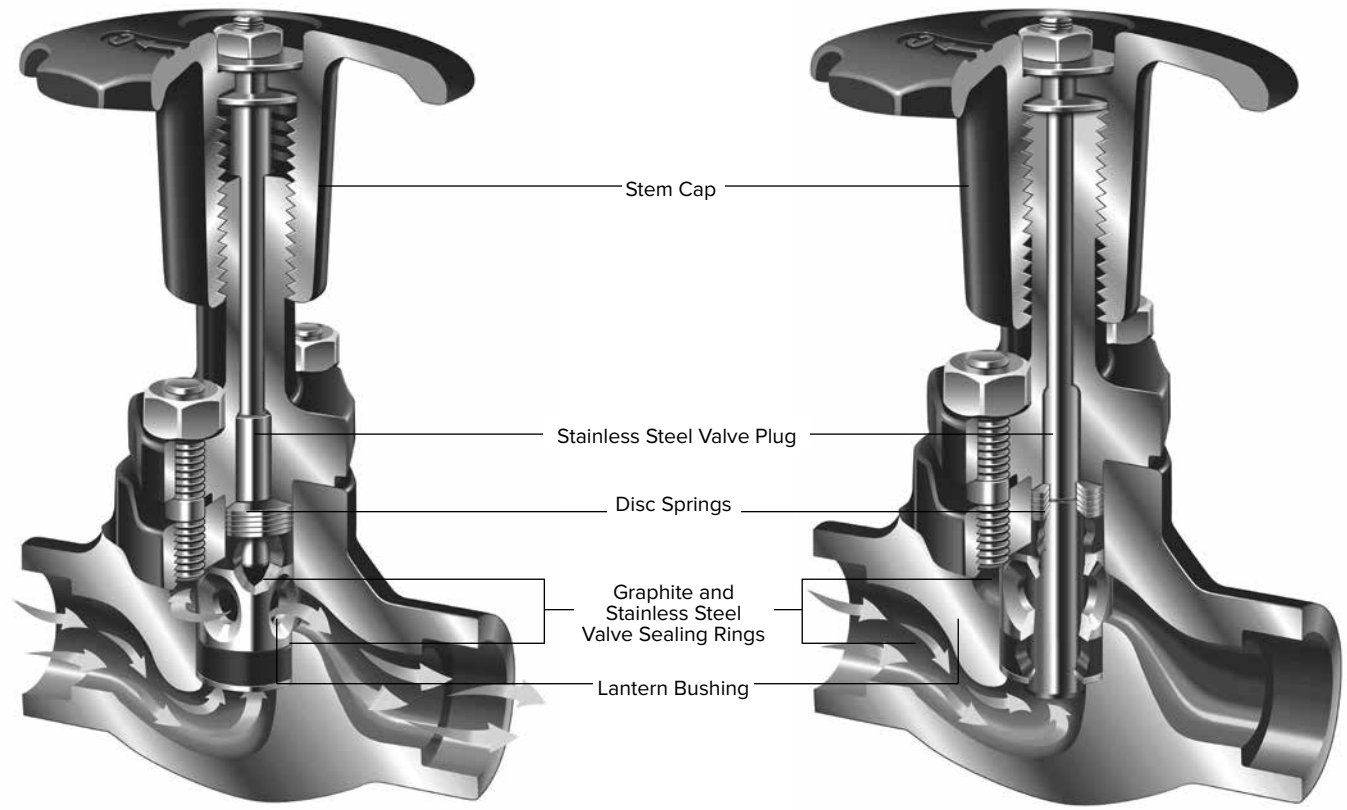
The Proof Is in the Piston

Many of Armstrong's manifolds utilize the piston valve because of its years of excellent performance in steam systems all over the world. The proof of Armstrong's long service life for manifolds...is in the piston.

All types of valves – plug valves, gate valves, piston valves and even ball valves – have been summoned for duty in steam service. Due to its excellent sealing characteristics in steam service, and because it has no gland packing, the piston valve is frequently selected for steam systems.

People who have used it over the past 90 years can testify that leakage to atmosphere is extremely rare, even without any maintenance. The elastic contact between piston and valve sealing rings provides a perfect tightness, both in-line and to atmosphere. Steam system valves, whatever their design, are used to isolate steam and condensate lines or when a faulty steam trap needs to be removed from the line. This means the valves stay in the open position for long periods and are nearly always in contact with the atmosphere. It is not surprising, therefore, that when the valves need to be closed, they can often prove difficult to operate. Our experience and the demands from end users for energy efficiency have led us to a sealing system designed especially for steam service.

The Piston Valve



Open Position

Closed Position

- **Dual sealing action.** The piston valve is a seatless valve that includes two graphite and stainless steel valve sealing rings that seal the stem and function as a seat. This combination provides long-term protection against leaks to the atmosphere and downstream piping.
- **Self-cleaning action.** Stainless steel piston slides without rotating between the two valve sealing rings, preventing dirt from damaging the surfaces.
- **Sealing integrity.** Flexible disc springs automatically provide leak tightness by exerting pressure, which keeps the upper and lower valve sealing rings compressed at all times. Sealing tightness is ensured by the compression of the sealing rings against the piston and valve body. This combination of disc springs and dual valve seal rings protects against expansion and contraction due to heating and cooling. This ensures dependable operation, even after years of service.
- **Protected valve stem.** The valve stem and sealing surfaces are completely protected from dirt and corrosion by the stem cap, whether in an open or closed position.
- **In-line repairability.** All sealing valve components may be easily replaced in-line.
- **Long-term operation.** Piston valve design ensures actuation even after many years without operation.

TCMS Piston Valve

Armstrong TCMS is a carbon steel piston valve that has been designed for and perfectly adapted to steam applications.

Features

- Rated ANSI Class 300, 41 barg @ 288°C
- Inline sealing
- External tightness
- Reduced bore
- Easy to operate and maintain
- Bonnet and internals are interchangeable with valves used on Armstrong manifolds and TVS-3150. Thus maintenance, pur chase and stock management are easier and less costly.

Connections

- 1/2" SW

Operating conditions:

Maximum Design Pressure: 50 barg
Maximum Design Temperature: 400°C
Weight: 1,2 Kg

This model complies with the Article 4.3 of the PED (2014/68/UE).

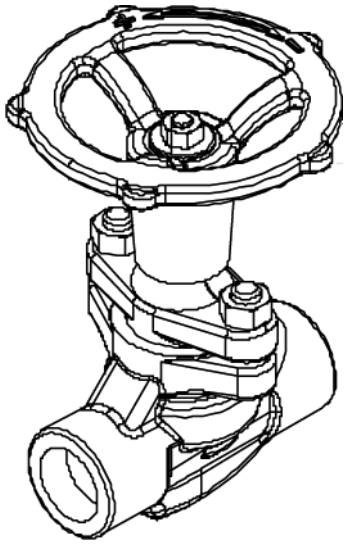
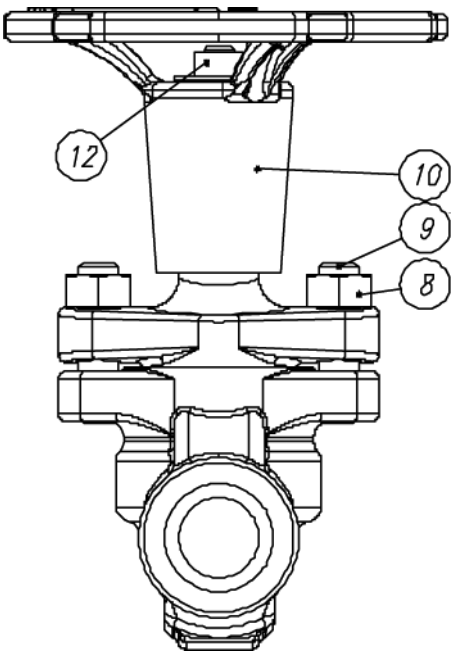
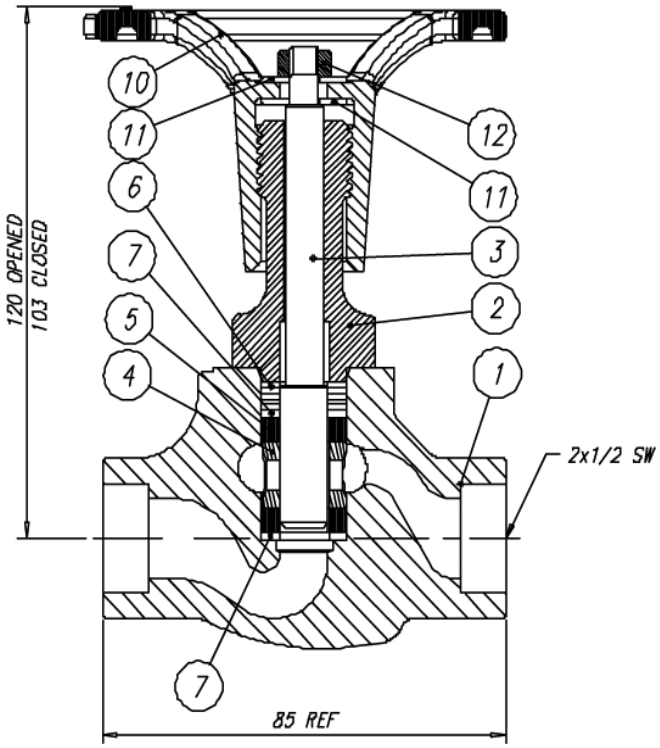


Table STE-201-1. Material Specification

Part	Description	Material
1	Body	ASTM-A216,WCB
2	Bonnet	ASTM-A105 N
3	Valve stem	Z6 CDF 18.02
4	Lantern bush	304 STN.STL
5	Valve ring	Reinforced graphite
6	Spring washer	17-4 STN.STL.
7	Washer	303 STN.STL.
8	Nuts	ASTM-A194,Gr.2H
9	Studs	ASTM-A193,Gr.B7
10	Handwheel	Ductile iron
11	Washer flat	304 STN.STL.
12	Nuts	304 STN.STL.





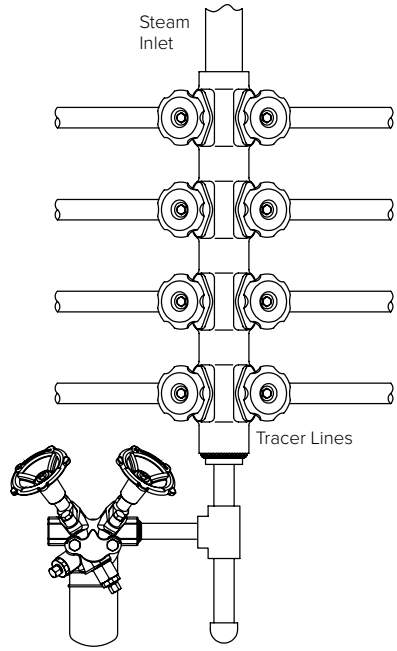
All dimensions and weights are approximate. Use certified print for exact dimensions. Design and materials are subject to change without notice.

MSD & SMSD Manifolds for Steam Distribution

As Steam Distribution Assemblies (MSD/SMSD), the manifolds place all steam supply valves in one location. Standardizing components and centralizing their location simplifies installation while providing cost savings. You also save because routine maintenance is faster. Insulation can also be provided...and can be a major savings in most installations.

Cost Savings
- Reduced design specification costs
- Prefabrication vs. field assembly for easy installation
- Reduced shipping and field handling costs
- Lower long-term maintenance and operating costs
- **3-years guarantee**

Design Flexibility
- Dimensional consistency
- Space savings
- Insulation package available



Typical SMSD steam distribution application
(shown with optional nipples and TVS-4000 Trap Valve Station with 2000 Series Inverted Bucket Trap)

MSD & SMSD Manifolds for Steam Distribution

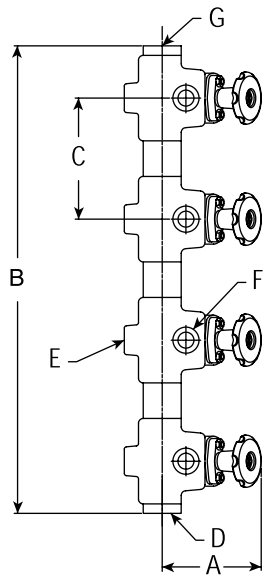


Table STE-203-2. MSD and SMSD List of Materials	
Name	**Material**
Manifold Body	ASTM A105 Forged Steel
Handwheel	Ductile Iron
Bonnet	ASTM A105 Forged Steel
Spring Washer	Stainless Steel
Bolts and Nuts	Bolts: ASTM A193 grade B7
	Nuts: ASTM A194 grade 2H
Piston & Stem	17% Chrome Stainless Steel
Valve Sealing Rings	Expanded Graphite & Stainless Steel
Bushing, Valve	Stainless Steel

Options

Top Inlet:
- Socketweld
- Flanged DIN or ANSI
- Armstrong piston valve 1 1/2" SW or Flanged

Drain:
- 1/2" or 3/4" SW reducer
- TCMS piston valve
- TVS-4000 with 2011 steam trap (horizontal or vertical piping)

Insulation:
- Armstrong Insulation Jacket
- Modular or 1 piece versions
- Insulation jackets could be installed without removing the handwheels

Table STE-203-2. MSD and SMSD Steam Distribution Manifolds (dimensions in mm)						
Model	**MSD Series**			**SMSD Series**		
	MSD-04	**MSD-08**	**MSD-12**	**SMSD-04**	**SMSD-08**	**SMSD-12**
Number of tracers	4	8	12	4	8	12
"A" Open Position	118	118	118	118	118	118
"B" Manifold Height (SW)	272	596	920	240	480	720
"C" ℄ to ℄	162	162	162	120	120	120
"D" Drain Connection	1 1/2" SW			1 1/2" SW		
"E" Number of Holes for Mounting (1/2 - 14 M)	2	4	6	2	4	6
"G" Inlet	1 1/2" SW			1 1/2" SW		
"F" Outlet to tracer	1/2" and 3/4" – Socketweld and Screwed NPT			1/2" and 3/4" – Socketweld and Screwed NPT		
Weight in kg (SW)	10	21	30	9	18	27
Maximum Operating Pressure	32 bar @ 400°C					

All MSD and SMSD models are CE Marked according to the PED (2014/68/UE). For TVS and traps, please check the specific page.

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

MCC-160 Manifold Condensate Collection with TVS-5111

Armstrong combines its Trap Valve Stations (TVS) concept with MSD manifolds into a package called the MCC-160 Condensate Collection Assembly. This prepackaged assembly offers many great benefits – cost savings in assembly, design flexibility and reduced purchasing and design time. The MCC-160 with TVS-5111 and 2000 Series Inverted Bucket Traps is **guaranteed for 3 years.**

Cost Savings

This preassembled concept offers tremendous savings by reducing multiple component purchases that cause additional purchase order monitoring and shipping costs. Other savings include far less labor time required for field assembly.

This modular forged steel body design provides quick assembly/ delivery, reducing overall project costs.

- Eliminates multiple component purchases
- Reduced design specification costs
- Prefabrication vs. field assembly for easy installation
- Reduced shipping and field handling costs
- Lower long-term maintenance and operating costs
- 3-years guarantee

TVS-5111 Concept

Armstrong Traps Valve Stations (TVS) concept gives compact alternative to traditional trap installations including 4 valves and a strainer. The universal connector allows easy installation and replacement of traps using any of the existing operating principles. Armstrong TVS-5111 includes:

- Upstream isolating piston valve
- Blowdown valve
- Test valve

System Design Flexibility

Armstrong can meet virtually any design parameter with your choice of socketweld or threaded connections. Inverted bucket, bimetallic, thermostatic bellow, thermostatic wafer or disc steam traps can be provided. If you require a specific piping arrangement, Armstrong can offer the flexibility to meet your specifications.

- All existing steam trap types could be used
- Dimensional consistency
- Space savings
- Insulation jacket available

Table STE-204-1. MCC-160 List of Materials

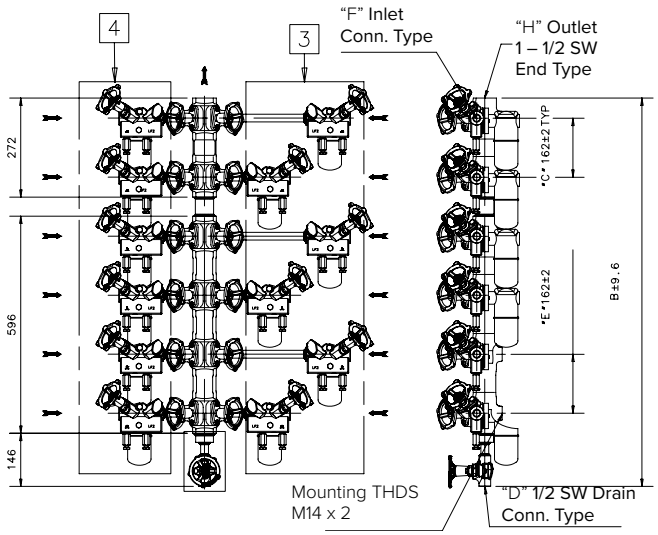
Name	Material
Manifold Body	ASTM A105 Forged Steel
Handwheel	Ductile Iron
Bonnet	ASTM A105 Forged Steel
Spring Washer	Stainless Steel
Bolts and Nuts	Bolts: ASTM A193 grade B7
	Nuts: ASTM A194 grade 2H
Piston & Stem	17% Chrome Stainless Steel
Valve Sealing Rings	Expanded Graphite & Stainless Steel
Bushing, Valve	Stainless Steel

Removable Insulation Jackets

A removable insulation jackets are available for all steam and condensate manifolds.

- Inexpensive
- Quick to install
- Removable for maintenance
- Reusable after maintenance
- Weatherproof
- Formed to cover all manifold elements
- Strong, durable cover
- Available to fit all manifold sizes

MCC-160 Manifold Condensate Collection with TVS-5111



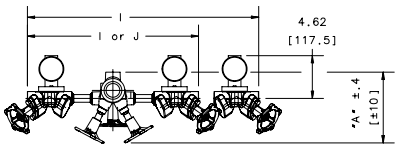


Table STE-205-1. MCC-160 with TVS-5111 (dimensions in mm)

Model	MCC-160-04	MCC-160-08	MCC-160-12
Number of tracers	4	8	12
"A" Valve, Open Position	195	195	195
"B" Height	418	742	1 065
"C" ℄ Inlet to Outlet	162	162	162
"D" Connection, Blowdown	1/2" SW		
"E" ℄ to ℄	2	4	6
"F" Connection Size	1/2" and 3/4" – SW and Screwed NPT		
"H" Outlet Connection	1 1/2" SW		
"I" Face to Face [3] (with 2011 steam trap configuration)	800 - 470		
"J" Face to Face [4]	470	470	470
Weight in Kg (without traps)	24	46	68
Maximum Operating Pressure	28 bar @ 399 °C		

All MCC-160 models are CE Marked according to the PED (2014/68/UE).
For traps, please check the specific page.

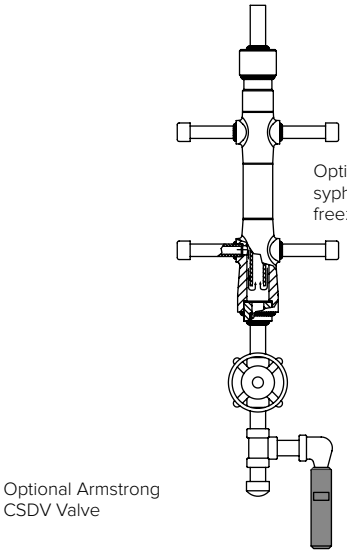
Options

Top Outlet:
- Socketweld
- Flanged DIN or ANSI
- Armstrong piston valve 1 1/2" SW or Flanged

Drain:
- 1/2" or 3/4" SW reducer
- TCMS piston valve

Insulation:
- Armstrong Insulation Jacket
- Modular or 1 piece versions
- Insulation jackets could be installed without removing the handwheels

CCA-203 Condensate Collection Assembly with TVS



CCA-203-04 with TVS-4000
(shown with optional nipples, drain valve and TVS-4000 with 2000 Series Inverted Bucket all stainless steel steam traps)

Armstrong combines its Trap Valve Stations (TVS) with manifolds into a package called the CCA-203 Condensate Collection Assembly. This prepackaged assembly offers many great benefits – cost savings in assembly, design flexibility and reduced purchasing and design time. The CCA-203 with TVS-4000 or TVS-5000 **guaranteed for 3 years.**

Cost Savings

This preassembled concept offers tremendous savings by reducing multiple component purchases that cause additional purchase order monitoring and shipping costs. Other savings include far less labor time required for field assembly.

This modular forged steel body design provides quick assembly/ delivery, reducing overall project costs.

- Eliminates multiple component purchases
- Reduced design specification costs
- Prefabrication vs. field assembly for easy installation
- Reduced shipping and field handling costs
- Lower long-term maintenance and operating costs
- 3-years guarantee

Design Flexibility

Armstrong can meet virtually any design parameter with your choice of socketweld or threaded connections. Inverted bucket, bimetallic, thermostatic bellow, thermostatic wafer or disc steam traps can be provided. If you require a specific piping arrangement, Armstrong can offer the flexibility to meet your specifications.

- All existing steam trap types could be used
- Dimensional consistency
- Space savings
- Freeze protection option
- Insulation jacket available

Materials

Manifold body: ASTM A105 forged steel
All Stainless Steel 304L available on request

Freeze Protection Package (CCAF) – Optional

A manifold assembly for more efficient condensate return has another benefit – freeze protection. Armstrong's innovative manifold design actually serves as a heat station, heating one or more traps if the steam supply is interrupted or shut off to the traps. The protection is accomplished as long as one trap continues to discharge into the manifold. The manifold's internal syphon tube creates a water seal, which contains the flash steam from the discharge of the live trap. This allows radiant heat to protect shut-off traps from freezing.

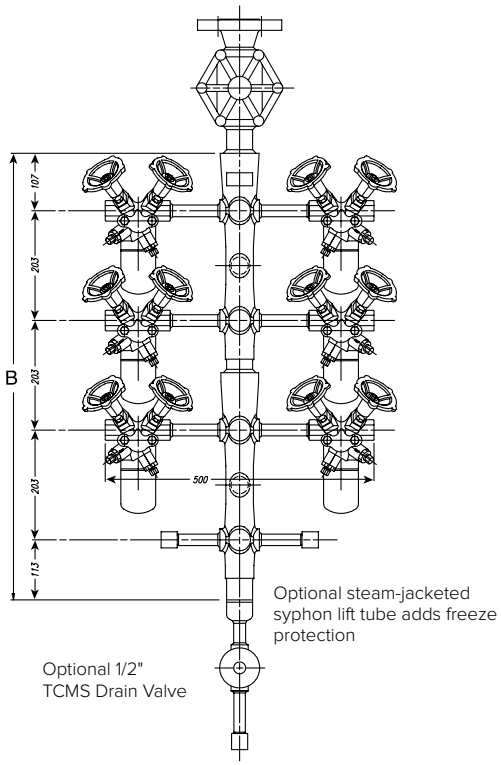
An optional freeze protection valve package senses condensate temperature. When this device opens, it drains condensate from the manifold assembly, thus providing further freeze protection.

Removable Insulation Jackets

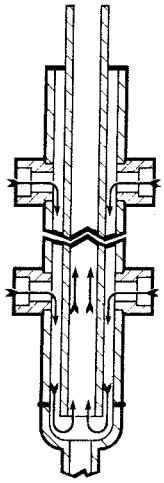
A removable insulation jackets are available for all steam and condensate manifolds.

- Inexpensive
- Quick to install
- Removable for maintenance
- Reusable after maintenance
- Weatherproof
- Formed to cover all manifold elements
- Strong, durable cover
- Available to fit all manifold sizes

CCA-203 Condensate Collection Assembly with TVS



CCA-203-08 with 6 x TVS-4000 Trap Valve Station with 2000 Series Inverted Bucket Traps



Optional Freeze Protection Improves condensate flow inside of the manifold's body, thus giving better protection against freezing.

Table STE-207-1. CCA-203 Condensate Collection Assembly (dimensions in mm)

Model	CCA-203-04	CCA-203-06	CCA-203-08	CCA-203-10	CCA-203-12
Number of tracers	4	6	8	10	12
"B" Manifold Height (SW)	423	626	829	1 032	1 235
Drain Connection	1 1/2" SW				
Manifold Outlet	1 1/2" SW				
TVS Connection	1/2" and 3/4" – Socketweld and Screwed NPT				
Weight in kg (manifold only)	20	30	40	50	60
Maximum Allowable Pressure	42 bar @ 427°C				

All CCA-203 models are CE Marked according to the PED (2014/68/UE). TVS-4000 complies with the Article 4.3 of the same directive. For traps, please check the specific page.

Options

Top Outlet:
- Socketweld
- Flanged DIN or ANSI
- Armstrong piston valve 1 1/2" SW or Flanged

Drain:
- 1/2" or 3/4" SW reducer
- TCMS piston valve

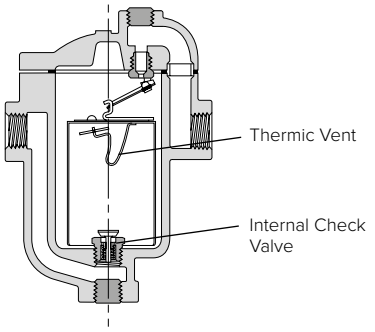
Insulation:
- Armstrong Insulation Jacket
- Modular or 1 piece versions
- Insulation jackets could be installed without removing the hand wheels

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

Steam Trap Options and Connectors

Thermic Vent Buckets

Whenever steam is turned on and off, air will accumulate in the piping and steam equipment. A trap equipped with a thermic bucket will discharge this air 50 to 100 times faster than a standard bucket, reducing warm-up time. Thermic vent buckets are suitable for pressures up to 130 psig (9 bar). A large vent hole in the bucket can also solve air venting problems upon start-up.

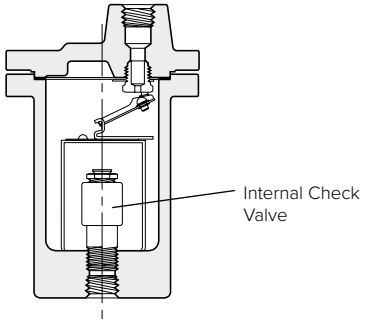


Internal Check Valves—1/2" Thru 2" NPT

Almost all Armstrong inverted bucket steam traps can be equipped with internal check valves. A check valve is needed between the trap and the equipment being drained in the following cases:

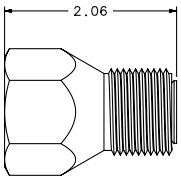
- When the trap is installed above the unit drained
- When sudden pressure drops may occur in the steam supply to the unit
- Whenever a back pressure exists in the condensate return line

Armstrong spring-loaded, stainless-steel internal check valves can be screwed directly into the trap inlet or into an extended inlet tube having a pipe coupling at the top.



"In-Line" Check Valve—1/2" and 3/4" NPT

On 1800 and 2000 Series stainless-steel traps, an internal check valve cannot be installed. Armstrong's CVI "in-line" check valve will solve the problem.

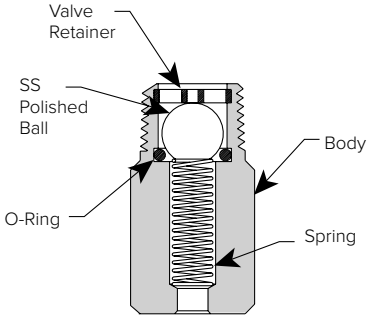


Pop Drain for Freeze Protection

In general, a properly selected and installed Armstrong trap will not freeze as long as steam is coming to the trap. If the steam supply is shut off, a pop drain should be used to automatically drain the trap.

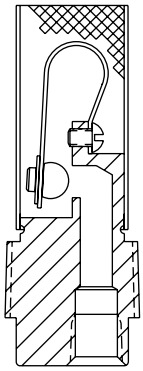
Maximum Operating Conditions

Pressure:	41 bar
Temperature:	177°C

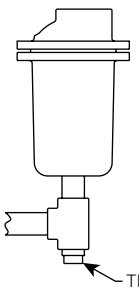


Thermo Drains

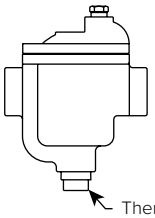
Thermo Drains are installed in a Tee ahead of 200 Series traps or replace the drain plug directly in the body of specially machined
800 Series traps. **Inlet tubes are removed.** When steam supply is shut off and temperature drops to 74°C, the thermal element opens the drain valve and empties the trap body. Not recommended for service above 1 bar.



Thermo Drain for 1 bar service



200 Series Trap with Thermo Drain in tee ahead of trap
Trap inlet tube must be removed



Specially machined 800 Series Trap with Thermo Drain
Trap inlet tube cannot be used

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

Steam Trap Options and Connectors

Vacuum Breaker – 3/8" and 1/2" NPT

Many times, condensate will be retained ahead of steam traps because of the presence of a vacuum. To break a vacuum, air must be introduced into the system by means of a vacuum breaker.

For maximum protection against freezing and water hammer in heating coils under modulated control, for example, vacuum breakers are recommended in conjunction with freeze protection devices.

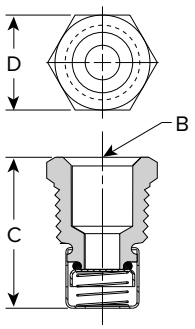
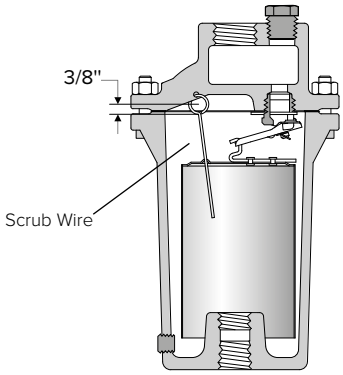


Table ST-209-1. Vacuum Breaker		
Size	**1/2" NPT**	**3/8" NPT**
"B" Pipe Connections	3/8"	1/4"
"C" Height	30	28
"D" Width	22 Hex	17 Hex

Dirt Problems

Whenever dirt plugs the bucket vent, Armstrong recommends the use of a scrubbing wire which, on each cycle, keeps the bucket vent hole open.

In normal conditions, the inverted bucket trap is not sensitive to dirt problems (because of its orifice at the top of the trap), unlike most other traps, which should be installed normally with a strainer.



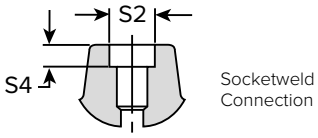


Table ST-209-2. Socketweld Dimensions		
Pipe Size	**S-2**	**S-4 Min.**
in	**mm**	**mm**
1/2"	22	10
3/4"	27	13
1"	34	13
1 1/4"	43	13
1 1/2"	49	13
2"	61	16
2 1/2"	74	16
3"	90	16

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

Notes

Notes