Inverted Bucket Steam Traps

for efficient condensate drainage of industrial and HVAC equipment

spirax sarco®

Inverted Bucket steam traps

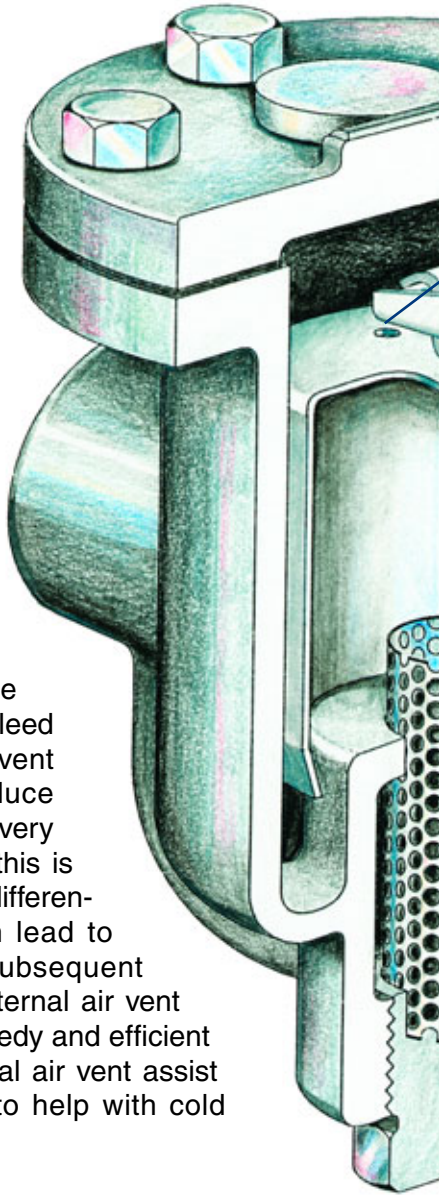
The proper drainage of condensate is essential to efficient steam system operation. Condensate, if allowed to collect in the steam system, creates several problems:

- Build-up of condensate in steam mains and headers can eventually lead to water hammer which can seriously damage the steam system and create safety problems.
- Condensate which is not removed may eventually back up into the steam space of process equipment, consequently reducing efficiency.

Inverted Bucket steam traps rely on the difference in density between steam and condensate to drain condensate as it forms. This keeps the steam space free of condensate to provide maximum system efficiency.

These durable traps are designed to withstand corrosion, dirt, and water hammer to provide long lasting service. On applications where air and non-condensible gases are present, an external air vent can be fitted to assist the normal operation.

Spirax Sarco offers a full range of Inverted Bucket steam traps to handle steam pressures up to 900 psig.



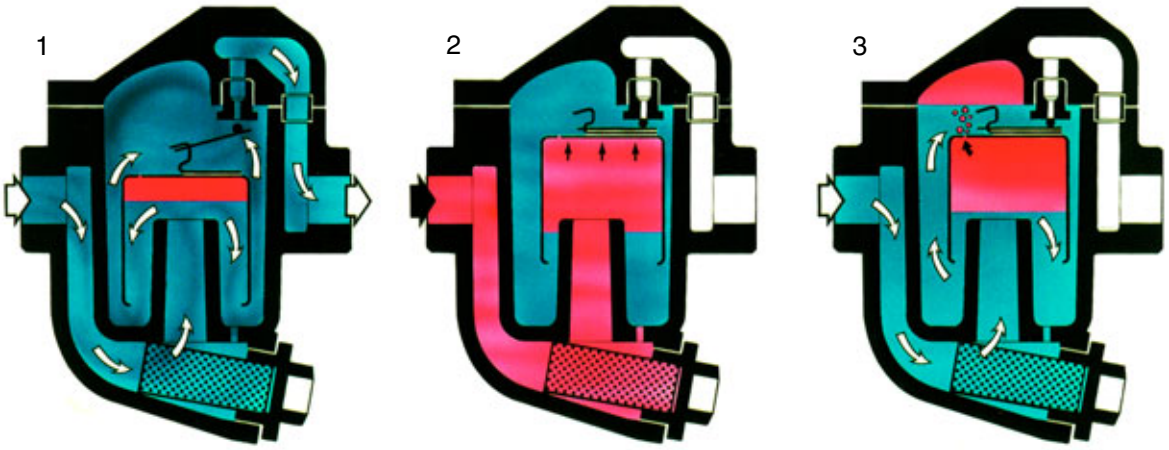
How it works

As condensate reaches the trap, it forms a water seal inside the body. The weight of the bucket keeps the valve off its seat so condensate can flow around the bottom of the bucket and out of the trap. Under low load or superheat conditions, the trap may need to be “primed” with water before system startup (1).

When steam enters the underside of the bucket, the bucket becomes buoyant and rises. This positions the lever mechanism such that the main valve “snaps” shut (2).

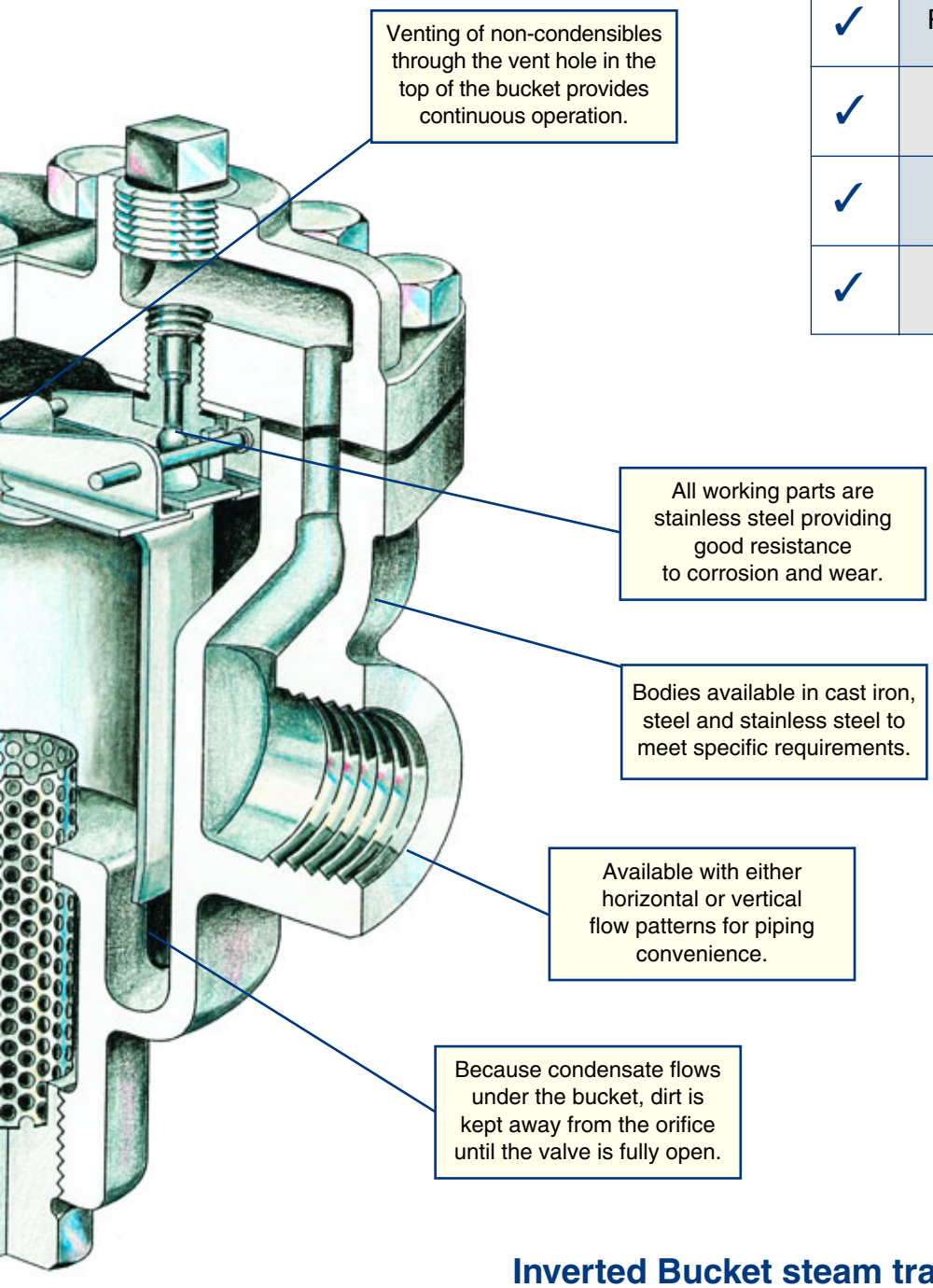
The bucket will lose its buoyancy as the enclosed steam condenses due to radiation losses, and steam escapes through the vent hole. Once this happens, the weight of the bucket will pull the valve off its seat and the cycle is then repeated (3).

Any air reaching the trap will also give the bucket buoyancy and close the valve, preventing condensate flow. The small vent hole in the bucket will bleed air into the top of the trap. The vent hole is of small diameter to reduce steam loss and thus will vent air very slowly. Under startup conditions, this is further compounded by the low differential pressures present. This can lead to waterlogging of the plant and subsequent poor heat transfer. A separate external air vent is normally required to ensure speedy and efficient startup of a steam plant. A bimetal air vent assist can be added to some models to help with cold startup air.



User benefits

✓	Resists water hammer with durable design.
✓	Flexible choice of connections: screwed, socket weld or flanged.
✓	Simple installation and maintenance with in-line horizontal piping connections.
✓	Compatible with a wide array of systems with pressure ranges up to 900 psig.



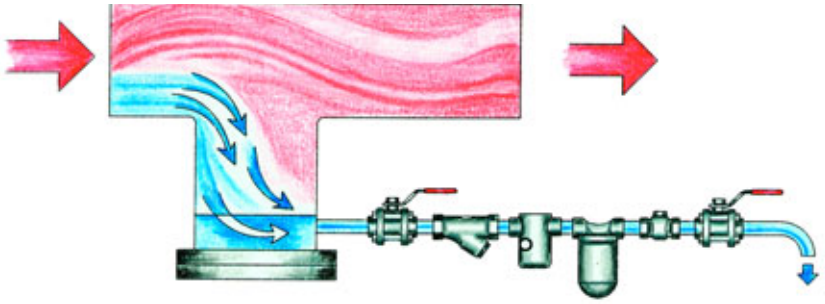
Inverted Bucket steam trap overview

Model	Sizes (inches)						Connections			Pipe Configuration		Body Material			Options			TIS #
	1/2	3/4	1	1-1/4	1-1/2	2	NPT	SW	FLG	In-line Horiz.	Vert.	Cast Iron	Cast Steel	Stn. Steel	Strainer	Air Vent	Check Valve	
B Series	x	x	x	x		x	x			x		x			Optional	Optional		2.407
200 Series	x	x	x		x	x	x				x	x						2.401
HM34	x	x	x				x	x		x			x		Standard			2.404
600 Series	x	x	x		x	x			x		x		x				Standard	2.402
900 Series	x	x	x		x	x			x		x		x				Standard	2.403
SIB30	x	x					x	x		x				x				2.410
SIB45		x	x				x	x		x				x			Standard	2.411
UIB30	x	x	x				x	x		Swivel Connector				x				2.412

Typical applications for Inverted Bucket steam traps

High Pressure Steam Mains

Instant removal of condensate prevents water hammer and improves steam quality.

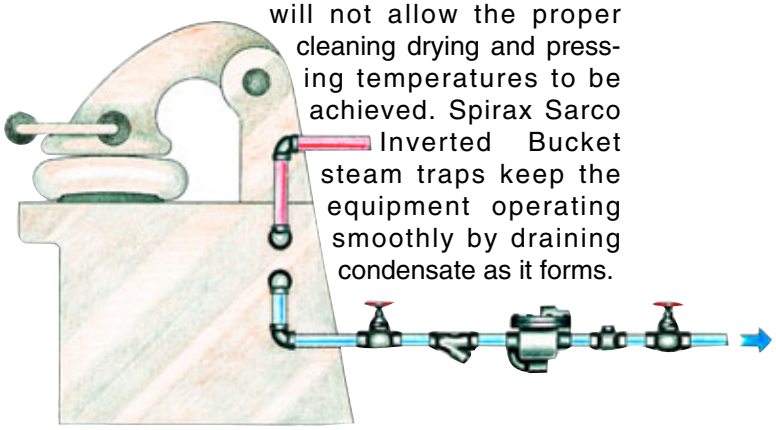


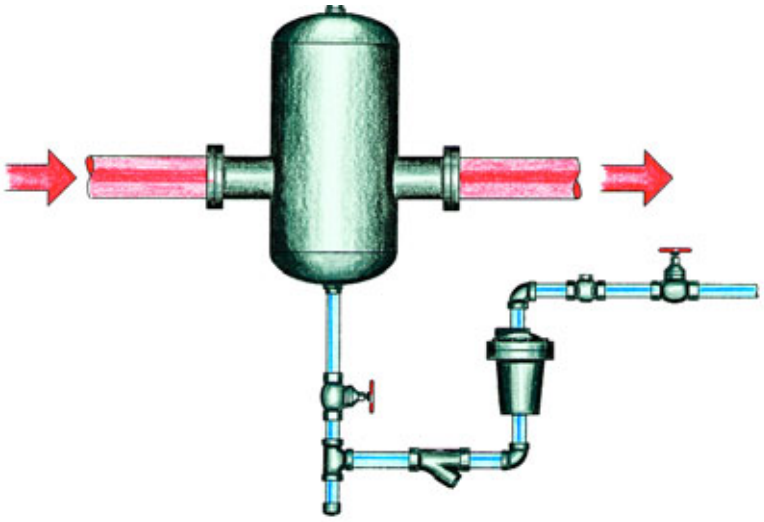
Steam Separator

"Wet" steam can damage equipment and reduce process efficiency. A Spirax Sarco separator efficiently "knocks out" condensate droplets in the steam flow. This condensate must be continuously drained from the separator to prevent it from becoming re-entrained in the steam flow. Spirax Sarco Inverted Bucket steam traps discharge condensate as it forms to prevent this from happening.

Laundry Equipment

Laundry equipment uses steam for cleaning and pressing garments. Inefficient condensate drainage will not allow the proper cleaning drying and pressing temperatures to be achieved. Spirax Sarco Inverted Bucket steam traps keep the equipment operating smoothly by draining condensate as it forms.





Steam trap selection and sizing

Need to know

1. The steam pressure at the trap after any pressure drop through the control valve or equipment.
2. The distance the condensate must be lifted after the trap.
   Rule of thumb: 2 feet of lift equals 1 psi back pressure (approximately).
3. Any other possible sources of back pressure in the condensate return system. For example:
   - Condensate taken to a pressurized deaerator tank or flash recovery vessel.
   - Local back pressure due to discharge of numerous traps close together into an undersized return.
4. Quantity of condensate handled. Obtained from:
   - Measurement
   - Calculation
   - Manufacturer's data
5. Safety Factor that is dependent upon particular application, typical examples as follows:

Steam Mains	2:1
Tracers	2:1
Non-Modulating	2:1
Modulating over 30 psi	3:1
Modulating under 30 psi	Size trap at full load and 1/2 psi differential

Rule of thumb: Use a factor of 2 on everything except Temperature Controlled Air Heater Coils and Converters, and Siphon Applications

How to size

The difference between the steam pressure at the trap inlet and the total back pressure, including that due to lift after the trap, is the differential pressure. The quantity of condensate should be multiplied by the appropriate safety factor to produce the sizing load. The trap may now be selected using the differential pressure and the sizing load.

Note: The inlet pressure to the steam trap should never exceed the Maximum Operating Pressure (PMO) of the selected trap, regardless of differential pressure.

Example

A steam trap is required to drain 2,000 lb/h of condensate from a Unit Heater receiving steam at 100 psig.

There is a lift after the trap of 10 ft.

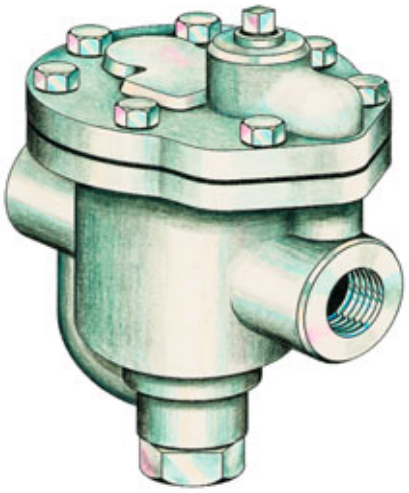
Inlet Pressure	100 psig
Lift	10 ft. = 5 psi (approximately)
Therefore, Differential Pressure	100 psi - 5 psi = 95 psi
Quantity	2,000 lb/h
Safety Factor	2:1
Sizing Load	4,000 lb/h

A 1-1/4" B4-125 will handle 7,590 lb/h at 95 psi differential pressure.

Inverted Bucket steam trap range

B Series

The B Series Inverted Bucket steam traps are traditional cast iron, horizontal flow products. The stainless steel bucket and valve are resistant to corrosion and water hammer. Operating pressures are available up to 250 psig with capacities to 20,000 lb/hr.



200 Series

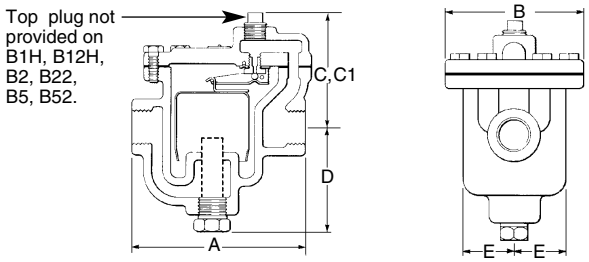
Another traditional cast iron product, the 200 Series utilizes the popular bottom in/top out flow pattern. The stainless steel bucket and valve are resistant to corrosion and water hammer. Operating pressures are available up to 250 psig with capacities to 20,000 lb/hr.

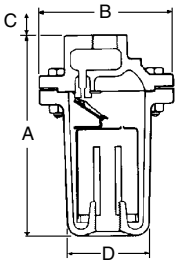
B Series

Model	B1H	B2	B3	B4	B5
Size	1/2", 3/4"	3/4"	1"	1-1/4"	2"
Body Material	Cast Iron				
Connections	NPT				
Piping Configuration	In-Line Horizontal				
Options	Strainer, Air Vent				
TIS#	2.407				
Maximum Operating Pressure (PMO)	250 psig				

200 Series

Model	211	212	213	215	216
Size	1/2"	3/4"	1"	1-1/2"	2"
Body Material	Cast Iron				
Connections	NPT				
Piping Configuration	In-Line Vertical				
Options	N/A				
TIS#	2.401				
Maximum Operating Pressure (PMO)	250 psig				





200 Series Dimensions (nominal) in inches

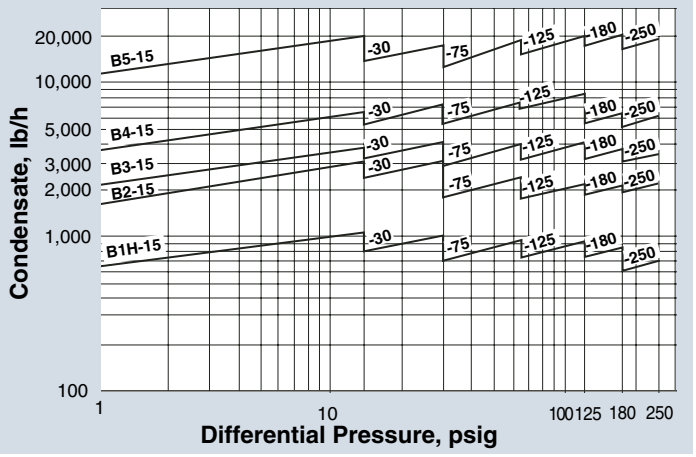
Size	A	B	C	D	Weight
1/2"	6.4	4.3	7.0	2.6	6.25 lb
3/4"	7.9	5.3	9.0	3.7	11.5 lb
1"	10.6	7.4	11.0	4.5	27.0 lb
1-1/2"	14.4	9.4	15.0	5.5	59.0 lb
2"	17.0	11.3	18.5	7.2	96.0 lb

B Series Dimensions (nominal) in inches

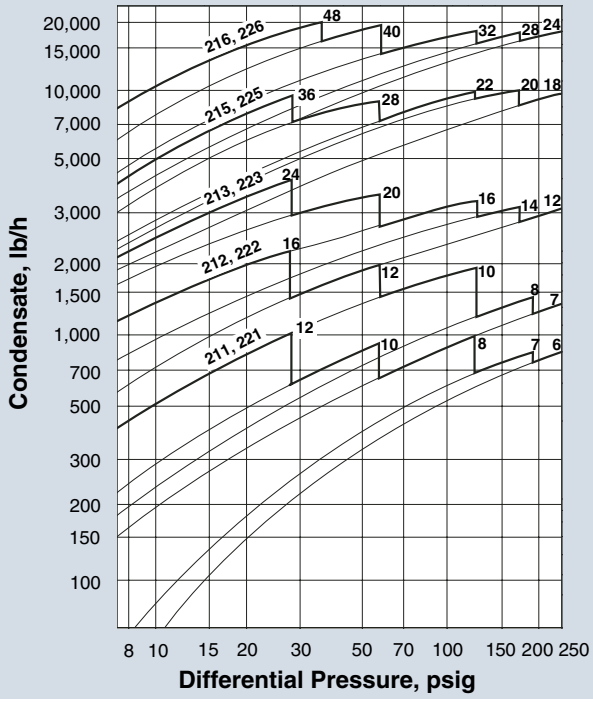
Size	Type	A	B	C	C1*	D	E	Weight
1/2", 3/4"	B1H	5	4	3.3	3.8	3	1.4	6.2 lb
3/4"	B2	6.6	5.3	3.5	4.0	4.1	1.9	12.5 lb
1"	B3	7.9	5.9	4.4	4.4	4.8	2.2	19.5 lb
1-1/4"	B4	9.3	7	5.6	5.4	7.4	2.3	40 lb
2"	B5	11.2	8.8	6.3	6.6	10.7	3.4	75 lb

*C1 Dimension for traps supplied with bi-metal air vents (B12H, B22, B32, B42, B52)

B Series Capacities

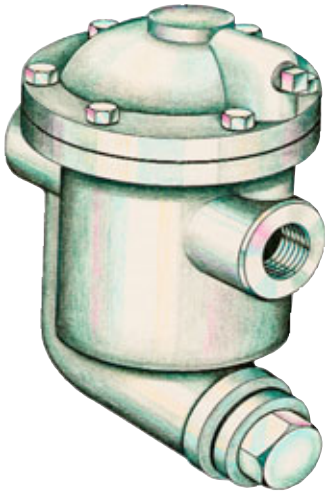


200 Series Capacities



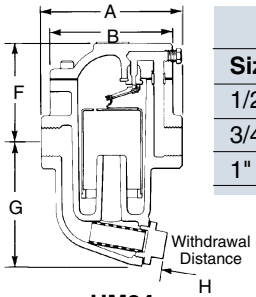
HM34

The steel construction of the HM34 makes it a logical choice for systems up to 465 psig. Available in 1/2" through 1" with threaded or socket weld connections. The stainless steel bucket and valve are resistant to corrosion and water hammer.



HM34

Size	1/2", 3/4", 1"
Body Material	Steel
Connections	NPT, SW
Piping Configuration	In-Line Horizontal
Options	Strainer is Standard
TIS#	2.404
Maximum Operating Pressure (PMO)	464 psig

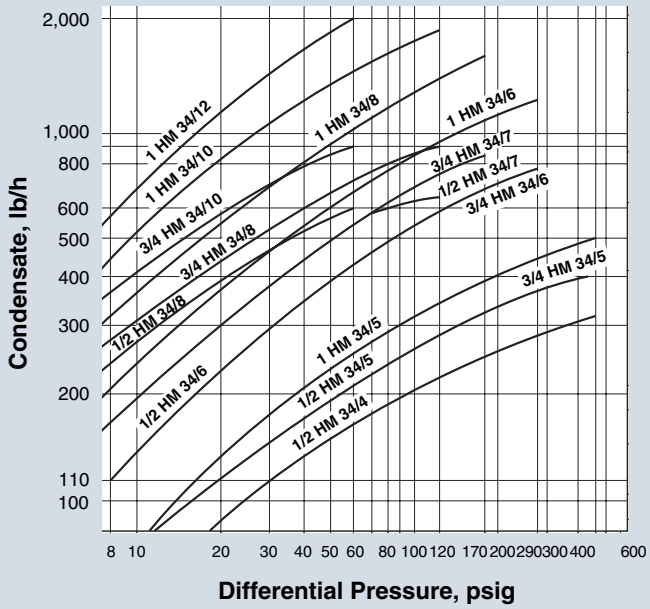


HM34

HM34 Dimensions (nominal) in inches

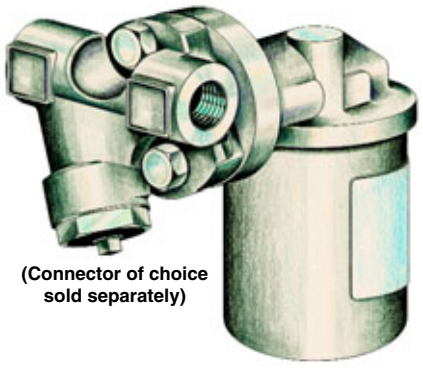
Size	A	B	C	F	G	H	Weight
1/2"	4.7	4.1	4.0	2.6	3.5	2.6	5.8 lb
3/4"	4.7	4.1	4.0	3.5	4.2	2.6	8.9 lb
1"	7.1	6.3	6.3	5.7	4.7	3.4	22.9lb

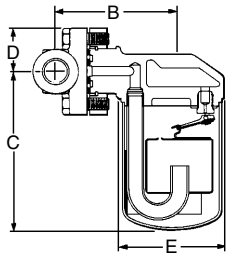
HM34 Capacities

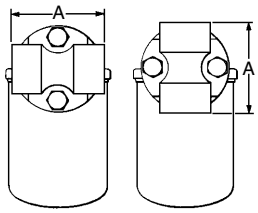


UIB30/UIB30H

The UIB30 is a sealed inverted bucket steam trap complete with Spirax Sarco's versatile swivel connector for installations requiring horizontal or vertical flow. The swivel connector is ideal for maintaining the proper trap operation. The two-bolt connector design simplifies maintenance and reduces downtime.







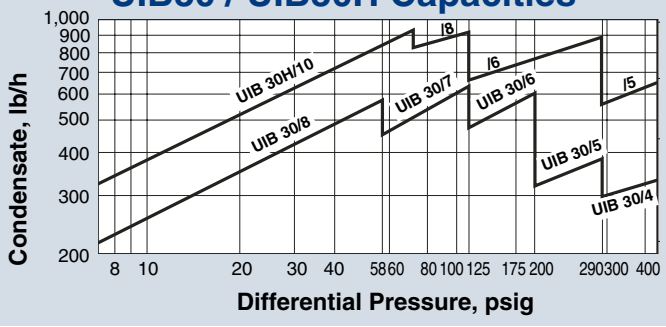
UIB30 / UIB30H Dimensions (nominal) in inches

Size	A	B	C	D	E	Weight
1/2"	2.4	3.4	4.9	1.3	3.1	4.8 lb
3/4"	2.9	3.3	4.9	1.3	3.1	4.9 lb
1"	3.5	3.4	4.9	1.3	3.1	5.2 lb

UIB30 / UIB30H

Size	1/2", 3/4", 1"				
Body Material	Stainless Steel				
Connections	NPT, SW				
Piping Configuration	In-Line , Swivel Connector				
Options	Check Valve is Standard				
TIS#	2.412				
Model	30/8	30/7	30/6	30/5	30/4
Maximum Operating Pressure (PMO)	58 psig	123 psig	174 psig	290 psig	435 psig
Model	30H/10	30H/8	30H/6	30H/5	
Maximum Operating Pressure (PMO)	58 psig	123 psig	290 psig	435 psig	

UIB30 / UIB30H Capacities



steam trap range

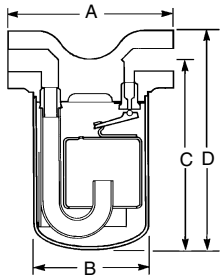
SIB30 / SIB30H / SIB45

The SIB30 and SIB45 Inverted Bucket steam traps are sealed for tamper-proof operation. The all stainless steel construction is highly resistant to corrosion and water hammer. Operating pressures up to 652 psig are available with sizes ranging from 1/2" through 1" and either threaded or socket weld end connections.

SIB30 / SIB30H / SIB45

Model	SIB30 / SIB30H	SIB45
Size	1/2", 3/4"	3/4", 1"
Body Material	Stainless Steel	
Connections	NPT, SW	
Piping Configuration	In-Line Horizontal	
Options	Check Valve is Standard (SIB45 only)	
TIS#	2.410	2.411
Maximum Operating Pressure (PMO)	435 psig	652 psig

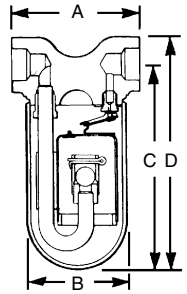
SIB30



SIB30 Dimensions (nominal) in inches					
Size	A	B	C	D	Weight
1/2"	4.3	3.0	4.9	5.6	3.3 lb
3/4"	4.3	3.0	4.9	5.6	3.3 lb

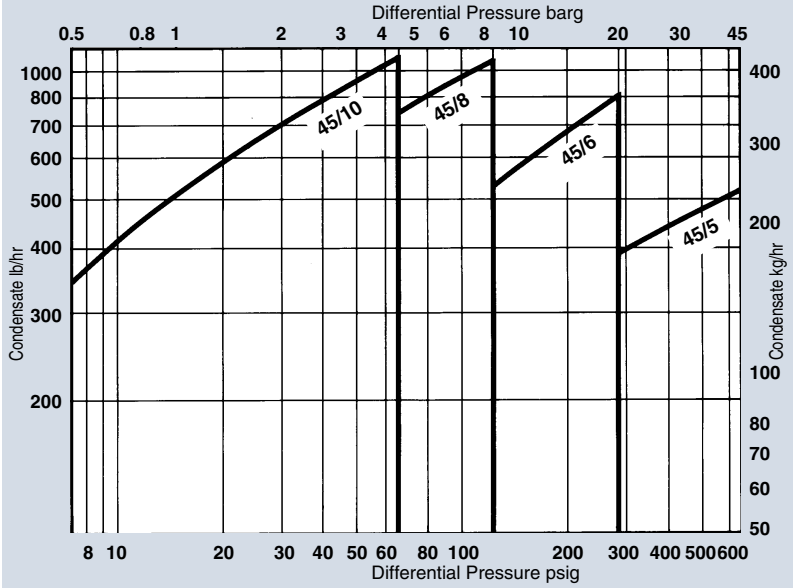
SIB30H Dimensions (nominal) in inches					
Size	A	B	C	D	Weight
1/2"	4.3	3.0	6.3	7.0	3.9 lb
3/4"	4.3	3.0	6.3	7.0	3.9 lb

SIB45

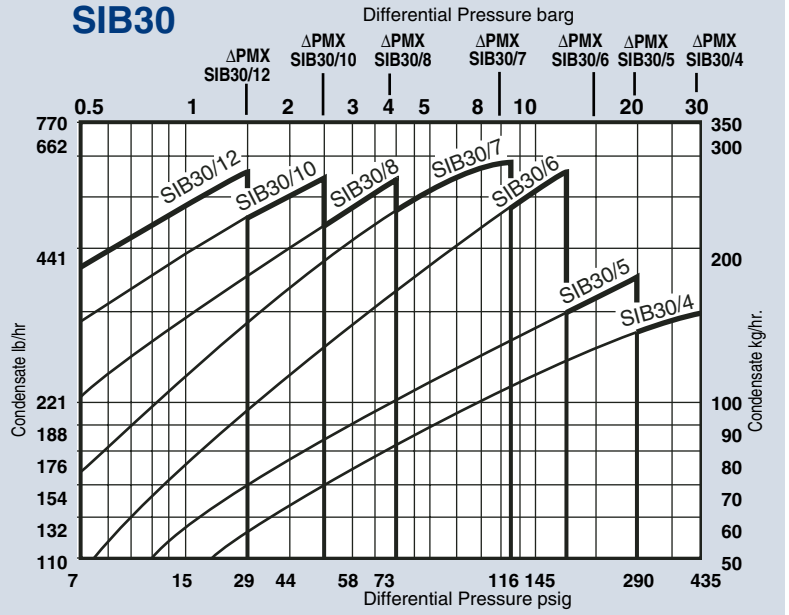


SIB45 Dimensions (nominal) in inches					
Size	A	B	C	D	Weight
3/4"	4.3	3.3	6.9	7.8	6.5 lb
1"	4.3	3.3	6.9	7.8	6.5 lb

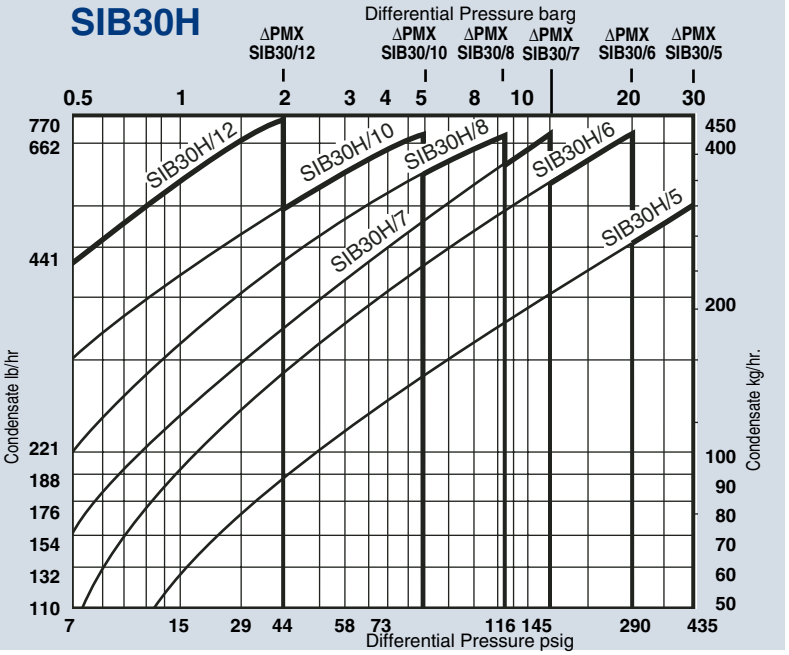
SIB45 Capacities



SIB30



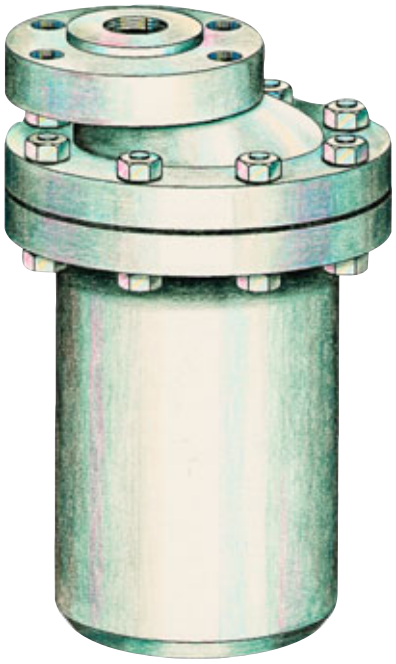
SIB30H

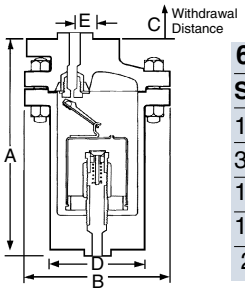


Inverted Bucket steam trap range

600/900 Series

The 600 and 900 Series of Inverted Bucket steam traps are designed for high pressure steam systems with operating pressures available up to 900 psig. The robust forged steel construction with stainless steel internals are resistant to corrosion and water hammer.

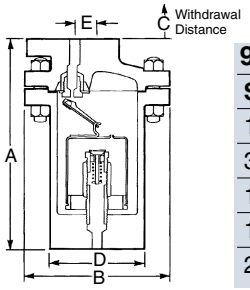




600 Series

600 Series Dimensions (nominal) in inches

Size	A	B	C	D	E	Weight
1/2"	10.6	7.3	8.0	4.7	1.1	40 lb
3/4"	10.6	7.3	8.0	4.7	1.1	40 lb
1"	12.0	8.0	9.0	5.1	1.4	65 lb
1-1/2"	15.8	9.8	12.0	6.6	1.8	110 lb
2"	17.4	11.9	13.0	8.4	2.1	175 lb



900 Series

900 Series Dimensions (nominal) in inches

Size	A	B	C	D	E	Weight
1/2"	12.1	8.0	9.0	5.1	1.4	65 lb
3/4"	12.1	8.0	9.0	5.1	1.4	65 lb
1"	16.1	9.8	12.0	6.6	1.8	110 lb
1-1/2"	16.1	9.8	12.0	6.6	1.8	110 lb
2"	17.7	11.9	13.0	8.4	2.1	175 lb

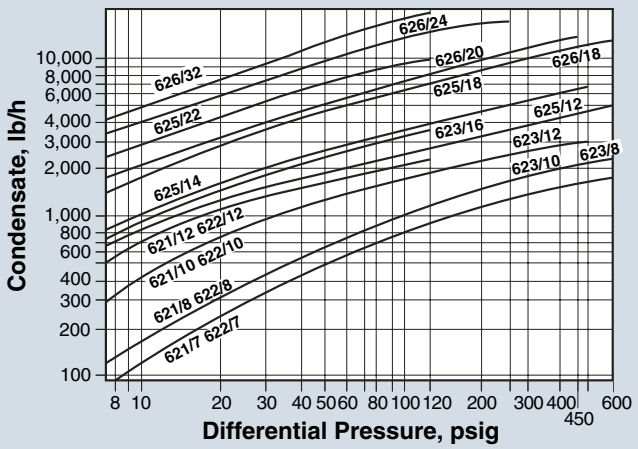
600 Series

Model	621	622	623	625	626
Size	1/2"	3/4"	1"	1-1/2"	2"
Body Material	Steel				
Connections	Flanged				
Piping Configuration	In-Line Vertical				
Options	Check Valve is Standard				
TIS#	2.402				
Maximum Operating Pressure (PMO)	600 psig				

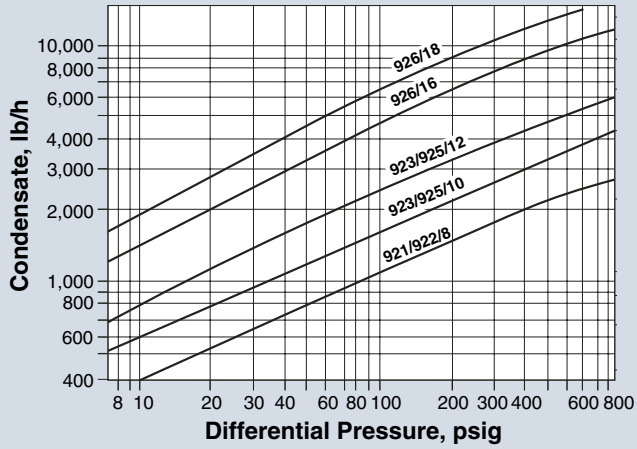
900 Series

Model	921	922	923	925	926
Size	1/2"	3/4"	1"	1-1/2"	2"
Body Material	Steel				
Connections	Flanged				
Piping Configuration	In-Line Vertical				
Options	Check Valve is Standard				
TIS#	2.403				
Maximum Operating Pressure (PMO)	900 psig				

600 Series Capacities



900 Series Capacities



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