

Inverted bucket steam traps

for pressures up to 62 bar



spirax
/sarco

Inverted bucket steam traps - just one in a range of products which provide a solution to heavy duty steam trapping.

Spirax Sarco inverted bucket steam traps employ a simple and well proven principle which relies on the difference in density between steam (a vapour) and condensate (a liquid). They have a robust design and incorporate a simple density sensitive bucket and lever mechanism.

The design means that the traps are rugged and a wide range of internals can be installed for precise matching of operating pressures and loads.

As the inverted bucket trap is sensitive to density it ensures that condensate is discharged at steam saturation temperature and there is no backing up of condensate within the system.

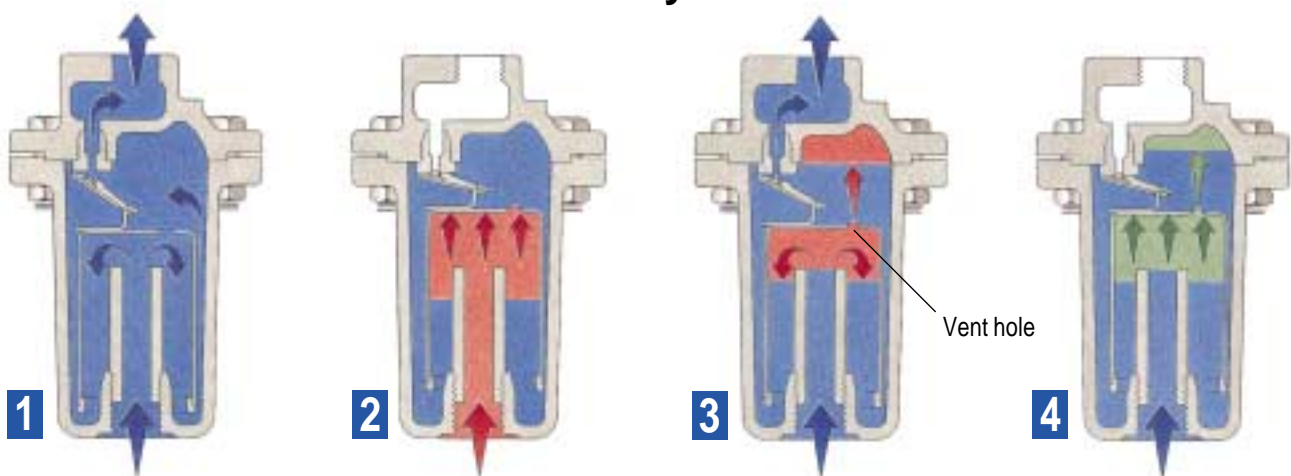
A wide range of body materials, including maintenance free models (which have stainless steel bodies and internals), make the inverted bucket design suitable for many applications.

Correct installation will give trouble free operation and ensure that the trap performs efficiently for many years.

User benefits

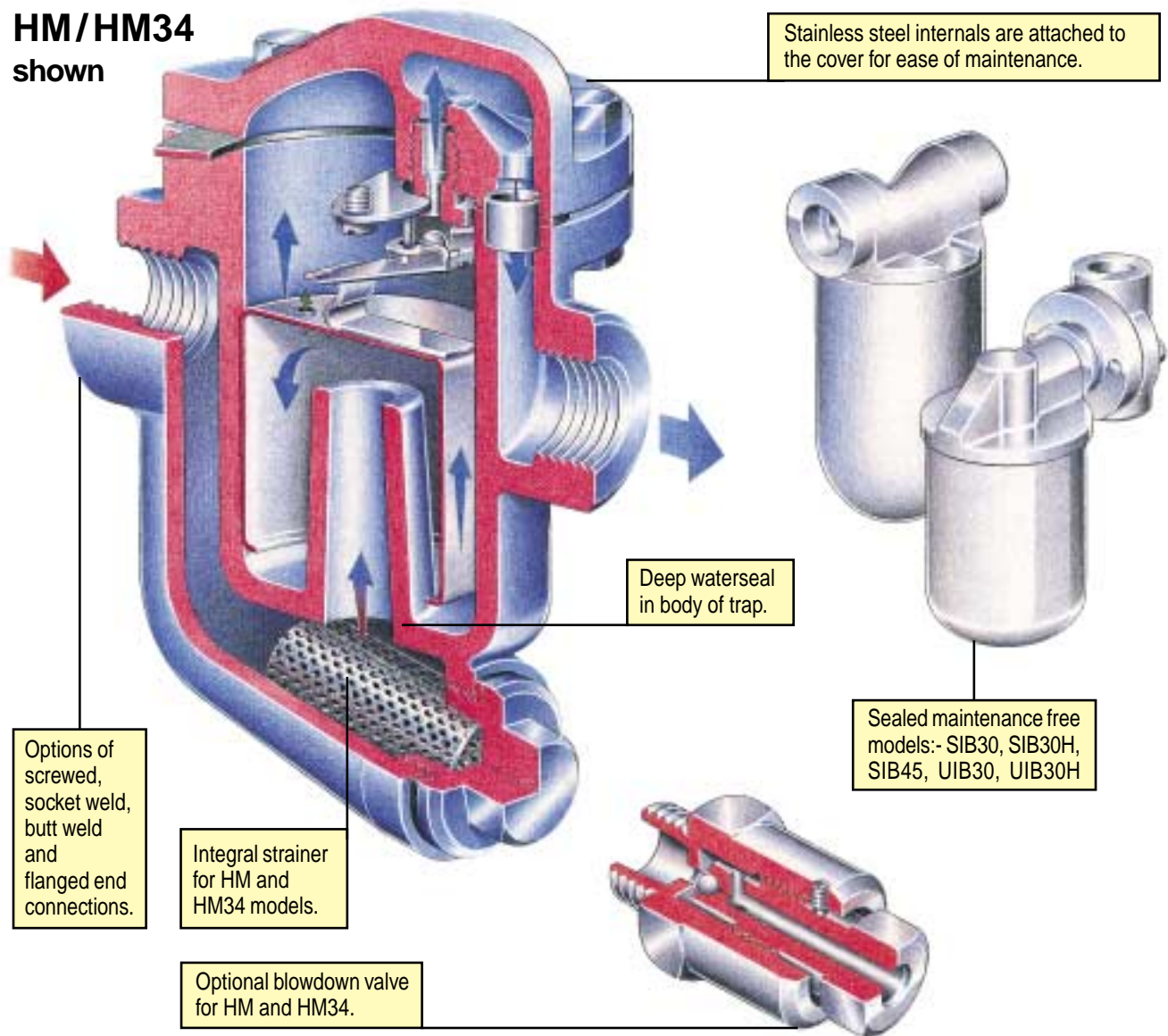
- Simple and robust mechanism for long life
- Suitable for superheat conditions when fitted with internal inlet check valve
- Choice of valve mechanisms to match precise condensate load and pressure differentials
- Deep waterseal to protect against the possibility of steam loss
- Variety of body materials and connections to suit a wide range of applications
- Sealed 'maintenance free' option in stainless steel to eliminate the possibility of gasket leaks i.e. SIB30, SIB30H, SIB45, UIB30 and UIB30H
- 'Quick-fit' option for immediate trap replacement with minimal disruption i.e. UIB30 and UIB30H (swivel connectors)

How they work



- 1** As condensate reaches the trap it forms a waterseal inside the body. The weight of the bucket keeps the valve off its seat. Condensate can then 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 start-up.
- 2** When steam enters the underside of the bucket it gives it buoyancy and the bucket rises. This positions the lever mechanism such that the main valve 'snaps' shut due to flow forces.
- 3** 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.
- 4** 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 so will vent air very slowly. Under start-up 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 start-up of steam plant.

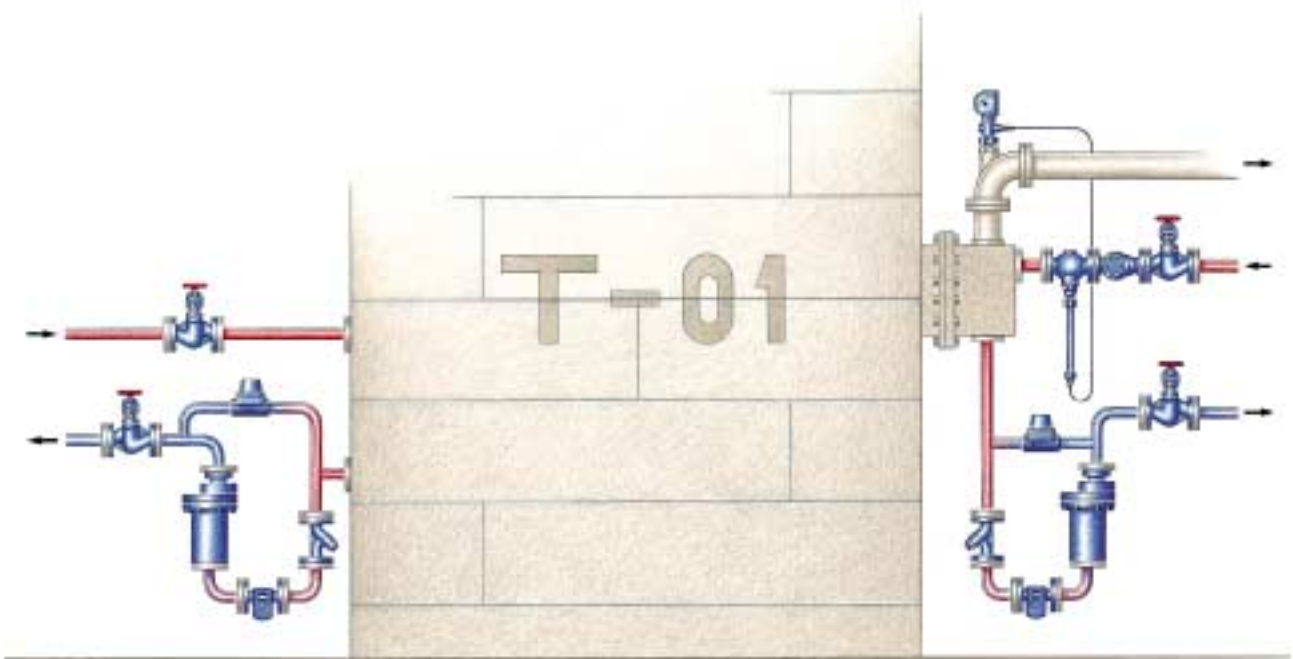
HM/HM34 shown



Range

Materials		Cast iron		Steel			Stainless steel				
Trap type		HM	200	HM34	600	900	SIB30	SIB30H	SIB45	UIB30	UIB30H
Body design rating		PN16	Exceeds PN16	PN40	Exceeds PN40	Exceeds PN63	PN50 ANSI 300	PN50 ANSI 300	ANSI 600	PN50 ANSI 300	PN50 ANSI 300
Sizes	DN15 - 1/2"	•	•	•	•	•	•	•	•	•	•
	DN20 - 3/4"	•	•	•	•	•	•	•	•	•	•
	DN25 - 1"	•	•	•	•	•	•	•	•	•	•
	DN40 - 1 1/2"	•	•	•	•	•	•	•	•	•	•
	DN50 - 2"	•	•	•	•	•	•	•	•	•	•
Connections	Screwed	•	•	•	•	•	•	•	•	•	•
	Socket weld	•	•	•	•	•	•	•	•	•	•
	Butt weld	•	•	•	•	•	•	•	•	•	•
	Flanged	•	•	•	•	•	•	•	•	•	•
Position	Horizontal	•	•	•	•	•	•	•	•	•	•
	Vertical	•	•	•	•	•	•	•	•	•	•
	Swivel	•	•	•	•	•	•	•	•	•	•
Options	Internal check valve	•	•	•	•	•	•	•	•	•	•
	Internal strainer	•	•	•	•	•	•	•	•	•	•
	Blowdown valve	•	•	•	•	•	•	•	•	•	•

Typical applications

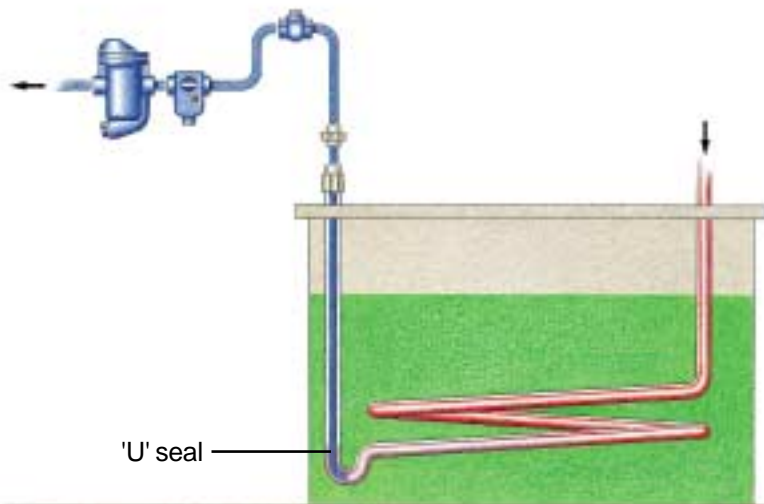
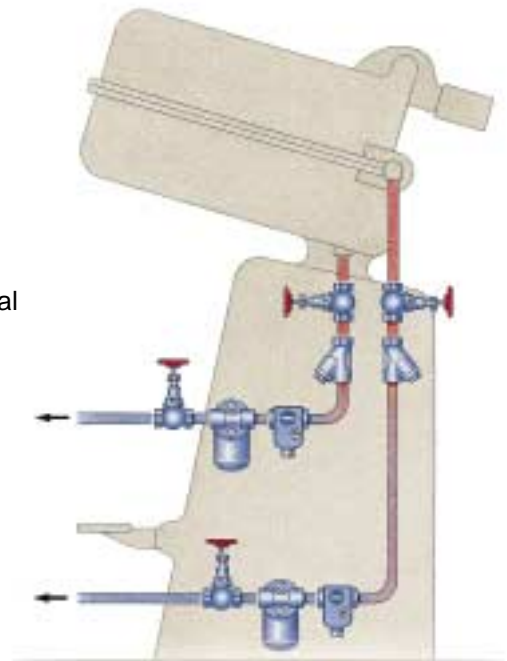


Oil storage tanks

Many storage tanks are situated in exposed conditions. Inverted bucket traps can be fitted to reduce the effects of damage due to freezing. They are suited to both coil drainage and outflow heater duties. Where traps are fitted in exposed positions they should be lagged.

Tyre presses and vulcanisers

Inverted bucket traps are suitable for tyre presses as they discharge condensate immediately to ensure the required curing temperatures. Where the equipment is inaccessible the UIB30 trap can be fitted to make trap maintenance simple and quick with minimal downtime for the process.



Drainage from low level

Inverted bucket traps can be used to drain condensate from low level providing that the riser dip pipe is of small diameter and extends into the 'U' seal on the coil. A check valve upstream of the trap will assist drainage.

HM Cast iron

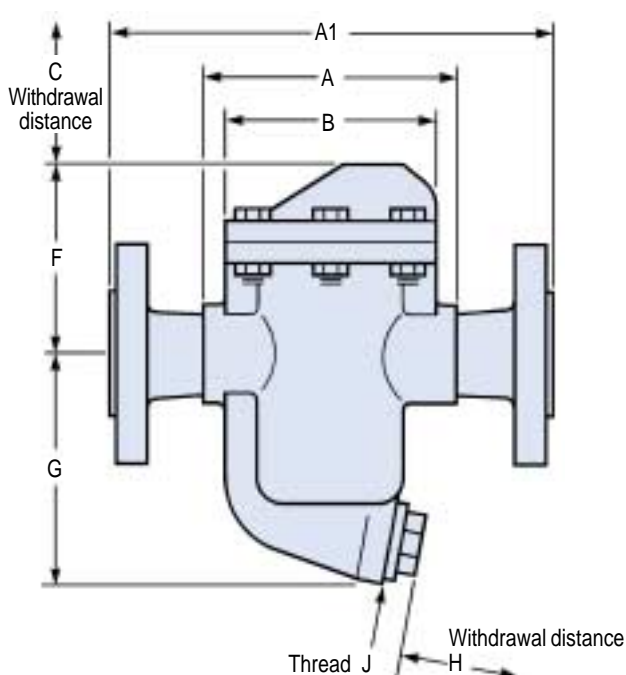
Sizes and pipe connections

½", ¾" and 1" screwed BSP or NPT
DN15, DN20 and DN25 flanged BS 4504 PN16

Materials

Cover	Cast iron	DIN 1691 GG20
Body	Cast iron	DIN 1691 GG20
Cover bolts	Steel ½", ¾"	BS 3692 Gr. 10
	Steel 1"	BS 3692 Gr. 8.8
Cover nuts	Steel ½", ¾"	BS 3692 Gr. 10.9
	Steel 1"	BS 3692 Gr. 8
Strainer	Stainless steel	ASTM A240 316L
Gasket	Reinforced exfoliated graphite	
Internals	Stainless steel	

Dimensions (approximate in millimetres)



Size	A	A1	B	C	F	G	H	J	Weight	
									Screwed	Flanged
DN15-½"	120	210	100	100	67	89	65	M28	2.6 kg	3.0 kg
DN20-¾"	120	210	100	140	88	107	65	M28	3.2 kg	5.0 kg
DN25-1"	180	230	160	160	145	120	85	M32	8.8 kg	10.0 kg

Limiting conditions

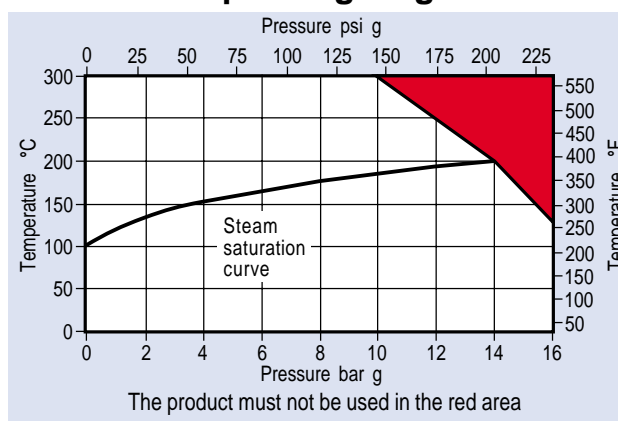
Body design conditions PN16
PMA - Maximum allowable pressure 16 bar g
TMA - Maximum allowable temperature 300°C
Cold hydraulic test pressure 24 bar g

Differential pressure limitations

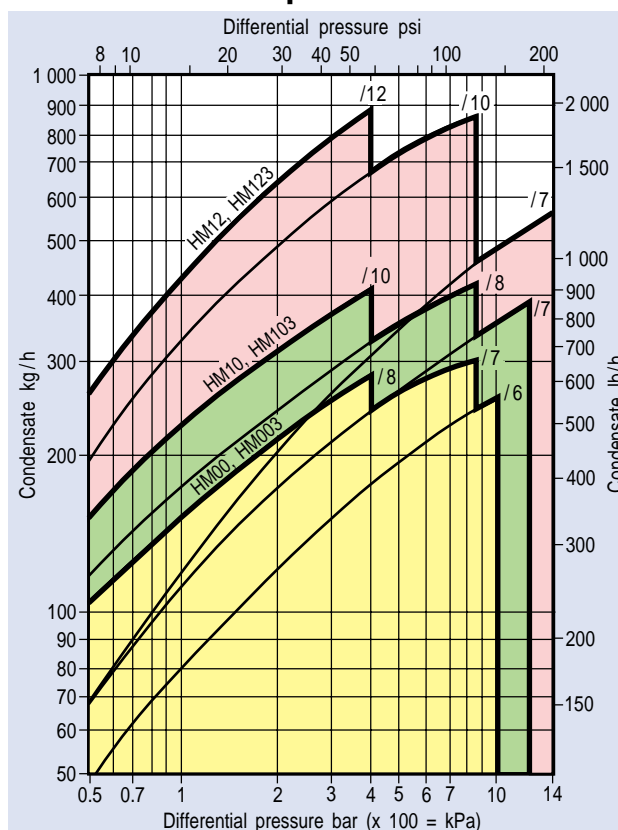
Size	ΔPMX - Maximum differential pressure bar				
	4	8.5	10	12.5	14
Screwed	½"	HM00/8	HM00/7	HM00/6	—
	¾"	HM10/10	HM10/8	—	HM10/7
	1"	HM12/12	HM12/10	—	—
Flanged	DN15	HM003/8	HM003/7	HM003/6	—
	DN20	HM103/10	HM103/8	—	HM103/7
	DN25	HM123/12	HM123/10	—	—



Operating range



Capacities



Note: Traps should be selected for the most appropriate working differential pressure and not on the basis of load.

200 Cast iron

Sizes and pipe connections

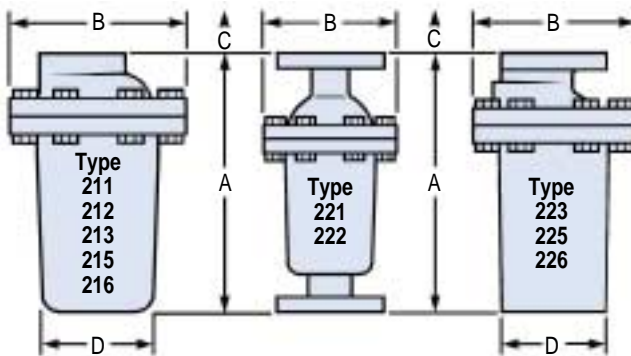
½", ¾", 1" screwed BSP or NPT
DN15 to DN50 tapped flanges to suit BS 4504 PN16
and ANSI 125

Note: ANSI 150 for ½" only

Materials

Body	Cast iron	DIN 1691 GG20
Cover	Cast iron	DIN 1691 GG20
Cover bolts	Steel	BS 3692 Gr. 8.8
Cover nuts	Steel	BS 3692 Gr. 8
Gasket	Reinforced exfoliated graphite	
Internals	Stainless steel	

Dimensions (approximate in millimetres)



	Size	A	B	C	D	Weight
Screwed	Type 211 ½"	163	108	178	67	2.8 kg
	Type 212 ¾"	200	135	229	93	5.2 kg
	Type 213 1"	269	188	280	114	12.2 kg
	Type 215 1½"	365	238	380	140	27.0 kg
	Type 216 2"	432	286	470	185	43.5 kg
Flanged	Type 221 DN15	215	108	254	—	4.9 kg
	Type 222 DN20	286	135	280	—	9.1 kg
	Type 223 DN25	305	188	305	121	16.3 kg
	Type 225 DN40	370	238	380	140	30.8 kg
	Type 226 DN50	450	286	457	165	49.4 kg

Limiting conditions

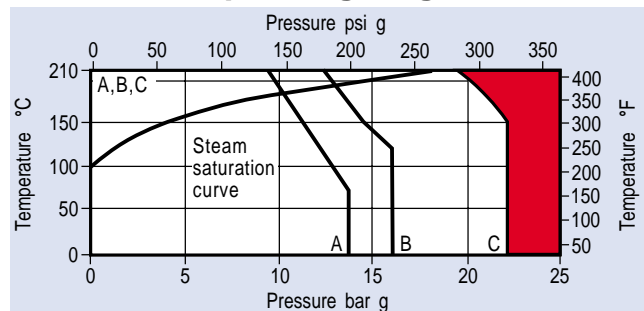
Maximum operating conditions depend upon orifice size
Body design conditions exceed PN16
PMA - Maximum allowable pressure 22 bar g
TMA - Maximum allowable temperature 210°C
Cold hydraulic test pressure 34 bar g

Differential pressure limitations

Size		ΔPMX - Maximum differential pressure bar						
		2	2.5	4	8.5	12.5	13.8	17
Screwed	½"	211/12	—	211/10	211/8	—	211/7	211/6
	¾"	212/16	—	212/12	212/10	—	212/8	212/7
	1"	213/24	—	213/20	213/16	213/14	—	213/12
	1½"	215/36	—	215/28	215/22	215/20	—	215/18
	2"	—	216/48	216/40	216/32	216/28	—	216/24
Flanged	DN15	221/12	—	221/10	221/8	—	221/7	221/6
	DN20	222/16	—	222/12	222/10	—	222/8	222/7
	DN25	223/24	—	223/20	223/16	223/14	—	223/12
	DN40	225/36	—	225/28	225/22	225/20	—	225/18
	DN50	—	226/48	226/40	226/32	226/28	—	226/24



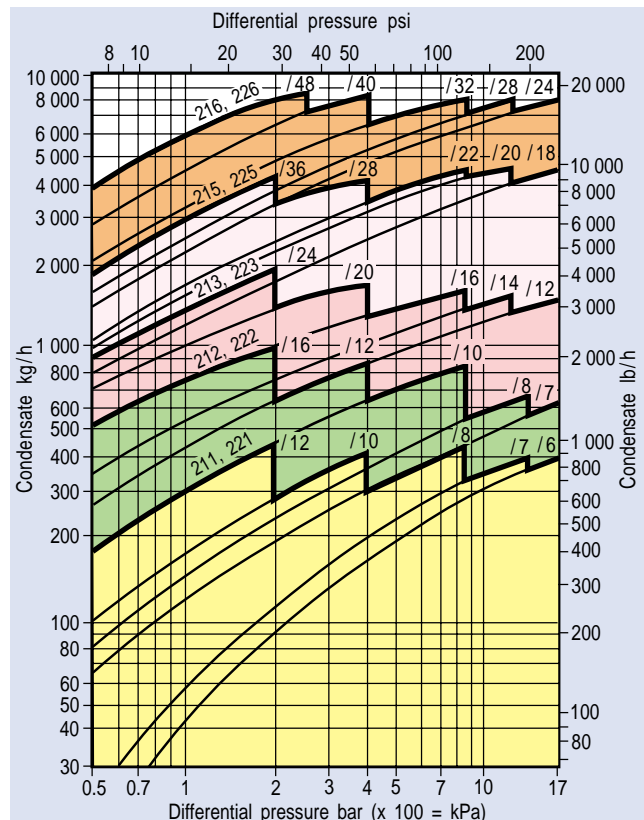
Operating range



The product must not be used in the red area

A - A Flanged ANSI 125
B - B Flanged BS 4504 PN16
C - C Screwed

Capacities



Note: Traps should be selected for the most appropriate working differential pressure and not on the basis of load.

HM34 Steel

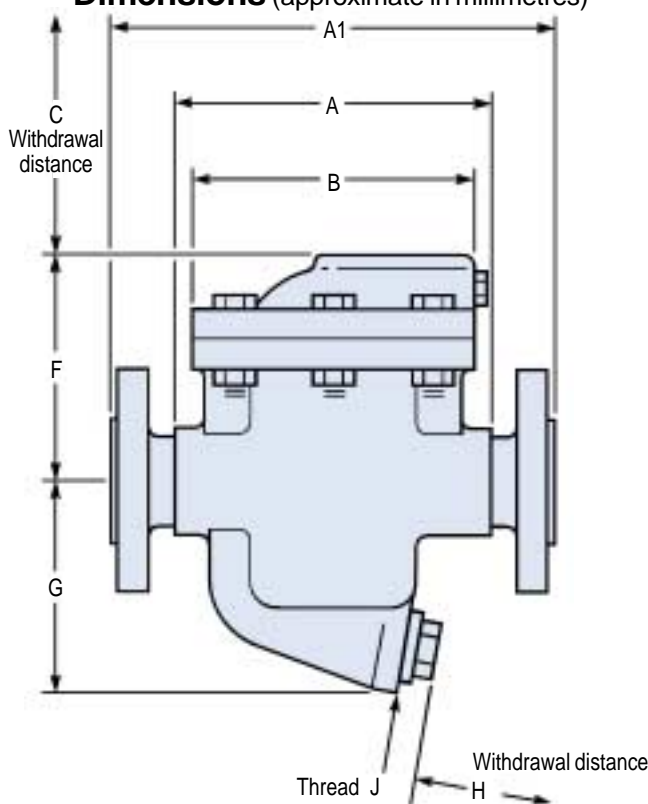
Sizes and pipe connections

½", ¾", 1" screwed BSP or NPT
 ½", ¾", 1" socket weld ends to BS 3799 Class 3000
 DN15, DN20 and DN25 flanged BS 4504 PN40
 ANSI 150 and 300

Materials

Body	Cast steel	DIN 17245 GS C25
Cover	Forged steel ½", ¾"	Mat. No. 10460 (C22.8)
	Cast steel 1"	DIN 17245 GS C25
Cover bolts	Steel	BS 3692 Gr. 8.8
Cover nuts	Steel	BS 3692 Gr. 8.8
Strainer	Stainless steel	ASTM A240 316L
Gasket	Reinforced exfoliated graphite	
Internals	Stainless steel	

Dimensions (approximate in millimetres)



Size	A	A1	B	C	F	G	H	J	Weight	
									Screwed Socket weld	Flanged
DN15-½"	120	210	105	100	67	89	65	M28	2.6 kg	4.5 kg
DN20-¾"	120	210	105	100	88	107	65	M28	4.0 kg	7.0 kg
DN25-1"	180	230	160	160	145	120	85	M32	10.4 kg	12.0 kg

Limiting conditions

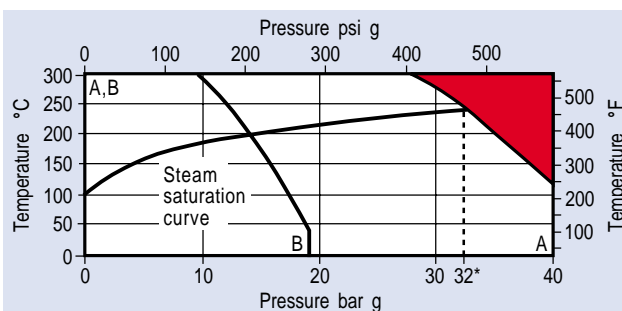
Body design conditions PN40
 PMA - Maximum allowable pressure 40 bar g
 TMA - Maximum allowable temperature 300°C
 Cold hydraulic test pressure 60 bar g

Differential pressure limitations

Size	ΔPMX - Maximum differential pressure bar				
	4	8.5	12	20	32
DN15 - ½"	HM34/8	HM34/7	HM34/6	HM34/5	HM34/4
DN20 - ¾"	HM34/10	HM34/8	HM34/7	HM34/6	HM34/5
DN25 - 1"	HM34/12	HM34/10	HM34/8	HM34/6	HM34/5

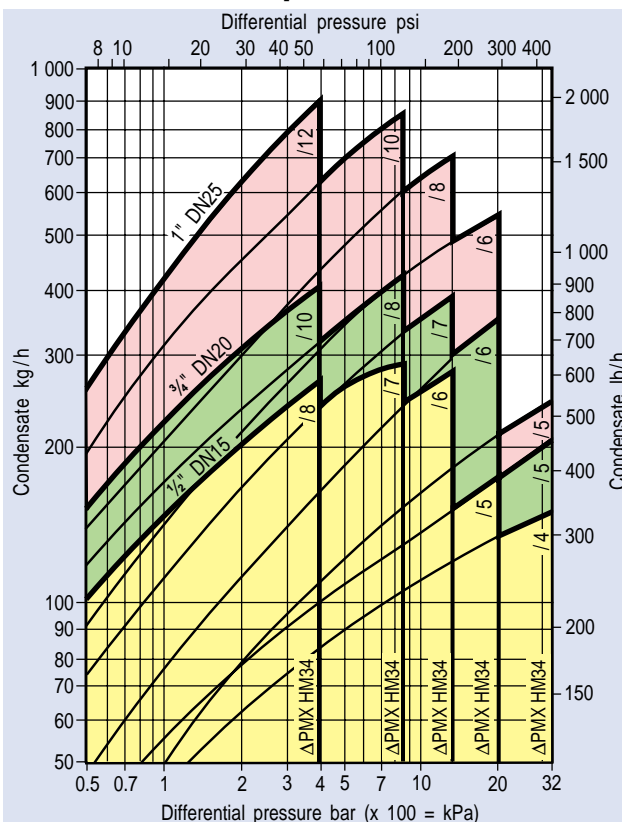


Operating range



The product must not be used in the red area
 *PMO - Maximum operating pressure
 A - A Screwed, socket weld, flanged BS 4504 PN40 and ANSI 300
 B - B Flanged ANSI 150

Capacities



Note: Traps should be selected for the most appropriate working differential pressure and not on the basis of load.

600 Steel

Sizes and pipe connections

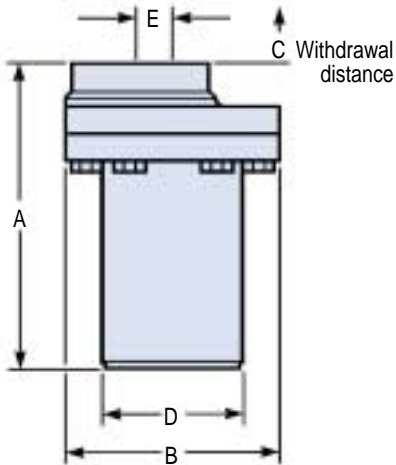
DN15, 20, 25, 40 and 50 tapped flanges to suit
BS 4504 PN25 and PN40
ANSI 150, 300 and 600

Note: BS 10 flanges can be supplied upon request

Materials

Body	Forged steel	ASTM A182 F1
Cover	Forged steel	ASTM A182 F1
Cover bolts	Steel	ASTM A193 Gr. B7
Gasket	St. St. Reinforced exfoliated graphite	
Internals	Stainless steel	

Dimensions (approximate in millimetres)



Size	A	B	C	D	E	Weight
DN15	270	185	203	121	28	18.1 kg
DN20	270	185	203	121	28	18.1 kg
DN25	299	203	229	130	36	29.5 kg
DN40	401	248	305	168	45	50.0 kg
DN50	443	301	330	213	52	79.4 kg

Limiting conditions

Maximum operating conditions depend upon orifice size
Body design conditions exceed PN40
PMA - Maximum allowable pressure 41 bar g
TMA - Maximum allowable temperature 400°C
Cold hydraulic test pressure 62 bar g

Differential pressure limitations

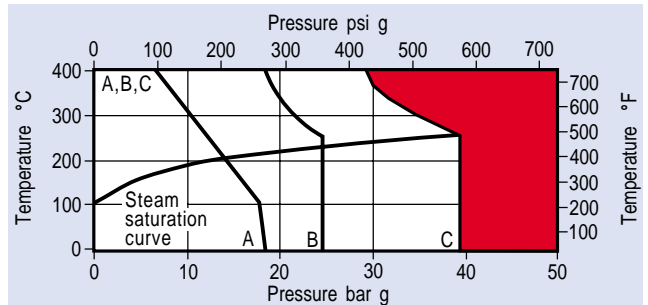
Size	ΔPMX - Maximum differential pressure bar			
	8.5	17	31	41
DN15	621/12	621/10	621/8	621/7
DN20	622/12	622/10	622/8	622/7
DN25	623/16	623/12	623/10	623/8
DN40	625/22	625/18	625/14	625/12
DN50	626/32	626/24	626/20	626/18

Note: The pressure limit on the flange specified should be greater than the pressure limit of the internal mechanism. The table below offers guidance

Flange	Pressure (at saturation)	Mechanism available
ANSI 150	13.8 bar g	8.5 bar
ANSI 300	42.0 bar g	all versions
ANSI 600	84.0 bar g	all versions
PN25	25.0 bar g	8.5, 17 bar
PN40	40.0 bar g	8.5, 17, 31 bar



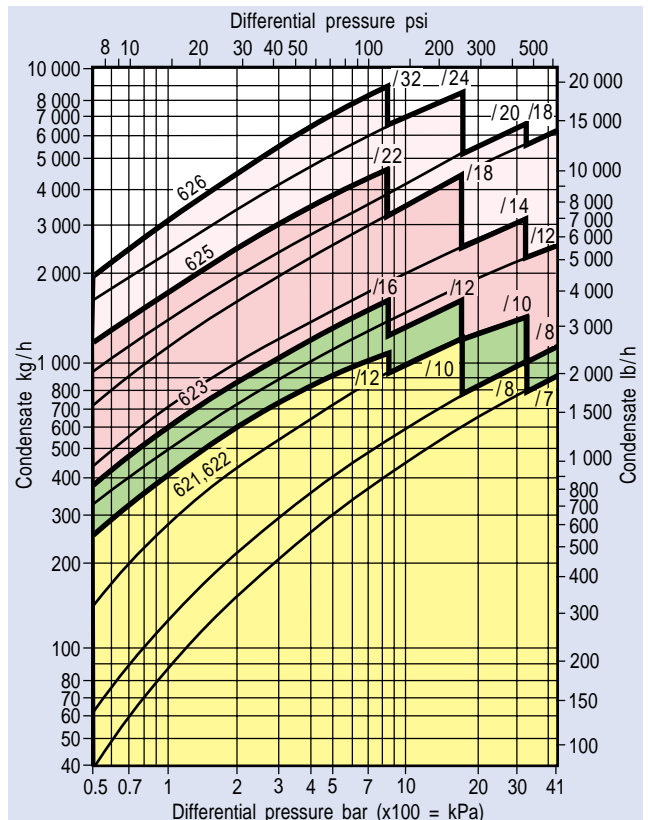
Operating range



The product must not be used in the red area
A - A Flanged ANSI 150 B - B Flanged BS 4504 PN25
C - C Flanged BS 4504 PN40, ANSI 300, ANSI 600

Note: ANSI 300 / 600 flanges used only below body design conditions

Capacities



Note: Traps should be selected for the most appropriate working differential pressure and not on the basis of load.

900 Steel

Sizes and pipe connections

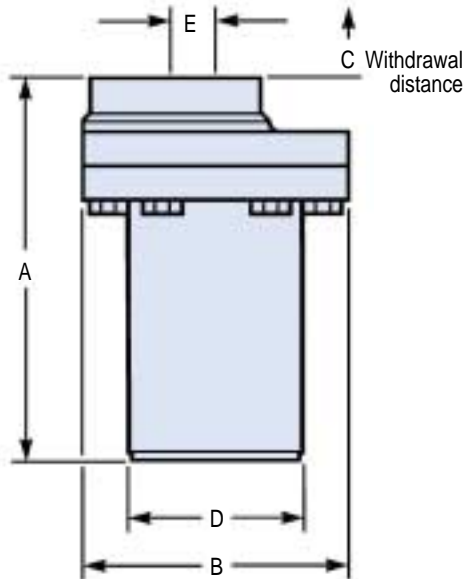
DN15, 20, 25, 40 and 50 tapped flanges to suit
BS 4504 PN64
ANSI 600

Note: BS 10 flanges can be supplied on request

Materials

Body	Forged steel	ASTM A182 F1
Cover	Forged steel	ASTM A182 F1
Cover bolts	Steel	ASTM A193 Gr. B7
Gasket	St. St. Reinforced exfoliated graphite	
Internals	Stainless steel	

Dimensions (approximate in millimetres)



Size	A	B	C	D	E	Weight
DN15	308	203	229	130	36	29.5 kg
DN20	308	203	229	130	36	29.5 kg
DN25	410	248	305	168	45	50.0 kg
DN40	410	248	305	168	45	50.0 kg
DN50	450	301	330	213	52	79.4 kg

Limiting conditions

Maximum operating conditions depend upon orifice size
Body design conditions exceed PN63
PMA - Maximum allowable pressure 63 bar g
TMA - Maximum allowable temperature 400°C
Cold hydraulic test pressure 93 bar g

Differential pressure limitations

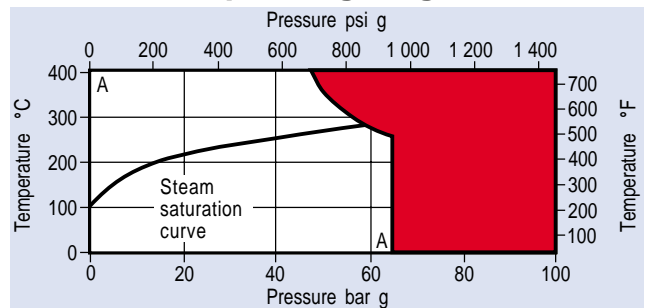
Size	ΔPMX - Maximum differential pressure bar	
	48	62
DN15	—	921/8
DN20	—	922/8
DN25	923/12	923/10
DN40	925/12	925/10
DN50	926/18	926/16

Note: The pressure limit on the flange specified should be greater than the pressure limit of the internal mechanism. The table below offers guidance

Flange	Pressure (at saturation)	Mechanism available
ANSI 600	84 bar g	all versions
PN64	60 bar g	48 bar

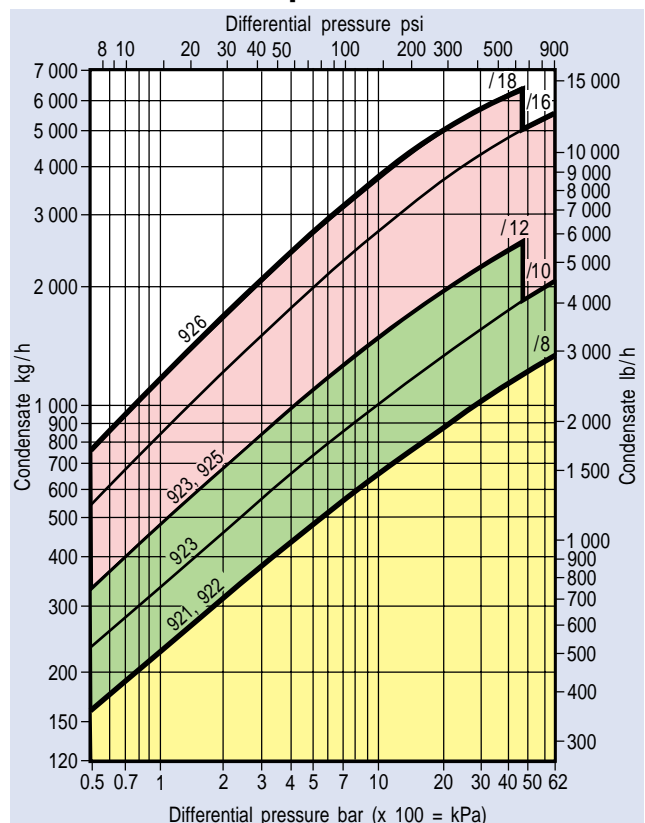


Operating range



The product must not be used in the red area
A - A Flanged BS 4504 PN64, ANSI 600
Note: ANSI 600 flanges must be used only below the body design conditions

Capacities



Note: Traps should be selected for the most appropriate working differential pressure and not on the basis of load.

SIB30, SIB30H, UIB30, UIB30H Austenitic stainless steel

Sizes and pipe connections

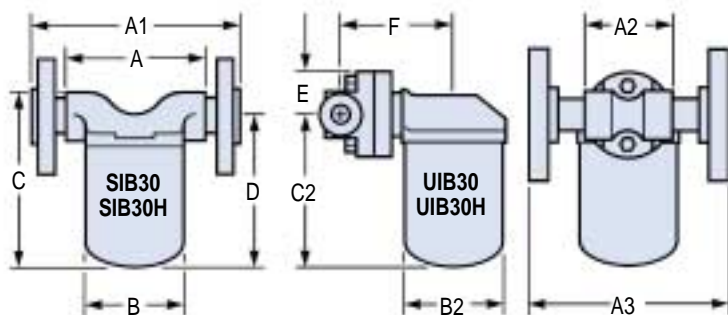
1/2", 3/4" (SIB and UIB) and 1" (UIB only) screwed BSP or NPT
 1/2", 3/4" and 1" socket weld ends to BS 3799 Class 3000
 DN15, DN20 and DN25 flanged BS 4504 PN40, ANSI 150 and 300
Note: UIB30 / UIB30H flanged options are for horizontal mounting only

Materials

Body (SIB)	Stainless steel	ASTM A314 Gr. 304
Body (UIB)	Stainless steel	ASTM A351 CF8
Cover	Stainless steel	ASTM A240 Gr. 304
Internals	Stainless steel	
Flanges	Steel or Stainless steel	
Connector screw (UIB)	Steel	ASTM A193 B7
Gaskets (UIB)	Spirally wound stainless steel	AISI 304 strip

Dimensions (approximate in millimetres)

	Size	A	A1	B	C	D	Weight	
							Screwed Socket weld	Flanged
SIB30	DN15-1/2"	110	150	76	124	143	1.50 kg	2.90 kg
	DN20-3/4"	110	150	76	124	143	1.50 kg	2.90 kg
SIB30H	DN15-1/2"	110	150	76	159	177	1.75 kg	3.15 kg
	DN20-3/4"	110	150	76	159	177	1.75 kg	3.15 kg



	Size	A2	A3	B2	C2	E	F	Weight	
								Screwed Socket weld	Flanged
UIB30	DN15-1/2"	61.5	150	76	124	33.5	86	2.19 kg	4.40 kg
	DN20-3/4"	73.5	150	76	124	33.5	84	2.22 kg	4.40 kg
	DN25-1"	90.0	160	76	124	33.5	87	2.38 kg	7.30 kg
UIB30H	DN15-1/2"	61.5	150	76	159	33.5	86	2.44 kg	4.65 kg
	DN20-3/4"	73.5	150	76	159	33.5	84	2.47 kg	4.65 kg
	DN25-1"	90.0	160	76	159	33.5	87	2.63 kg	7.65 kg

Limiting conditions

Body design conditions PN50 (ANSI 300)
 PMA - Maximum allowable pressure 50 bar g
 TMA - Maximum allowable temperature 400°C
 Cold hydraulic test pressure 75 bar g

Differential pressure limitations

SIB30 and SIB30H sealed steam traps

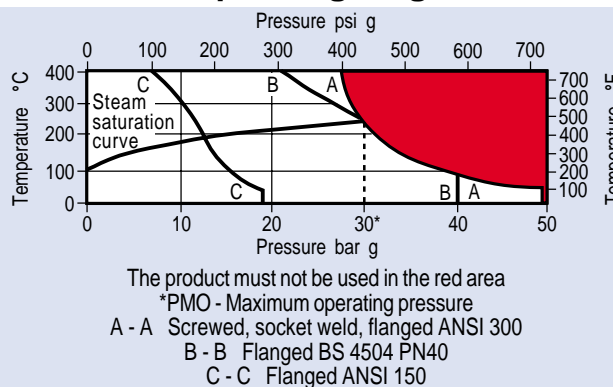
Size	ΔPMX - Maximum differential pressure bar					
	4	5	8.5	12	20	30
1/2", 3/4" DN15/20	SIB30/8	SIB30H/10	SIB30/7 SIB30H/8	SIB30/6	SIB30/5 SIB30H/6	SIB30/4 SIB30H/5

UIB30 and UIB30H sealed steam traps with swivel connectors

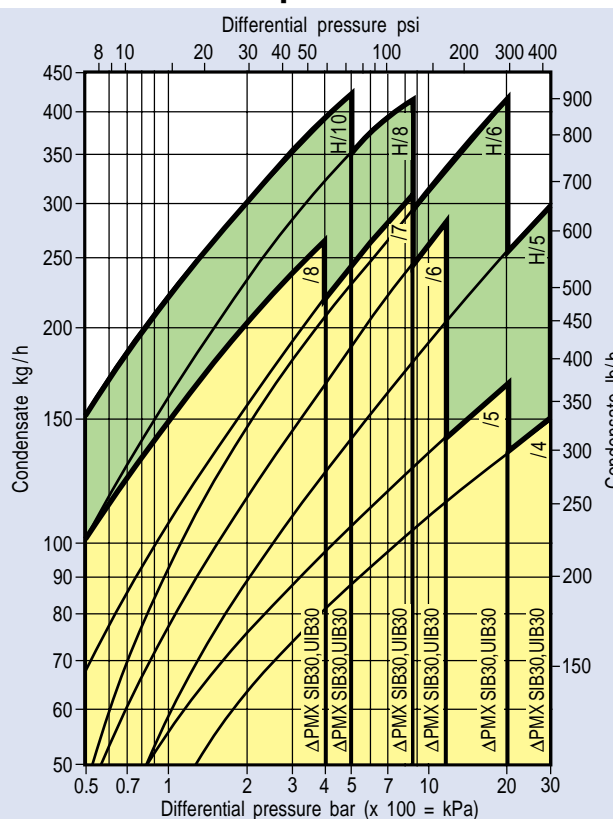
Size	ΔPMX - Maximum differential pressure bar					
	4	5	8.5	12	20	30
1/2", 3/4", 1" DN15/20 DN25	UIB30/8	UIB30H/10	UIB30/7 UIB30H/8	UIB30/6	UIB30/5 UIB30H/6	UIB30/4 UIB30H/5



Operating range



Capacities



Note: Traps should be selected for the most appropriate working differential pressure and not on the basis of load.

SIB45 Austenitic stainless steel

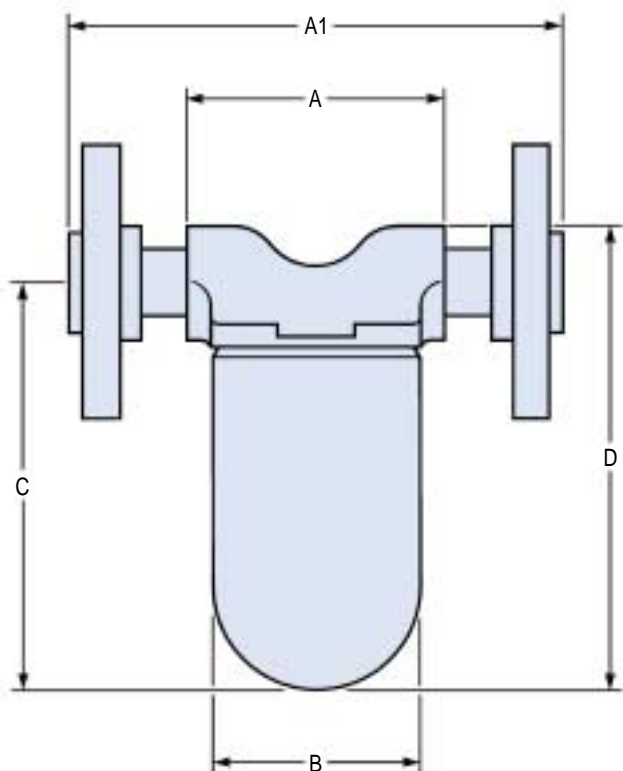
Sizes and pipe connections

¾" and 1" screwed BSP or NPT
 ¾" and 1" socket weld ends to BS 3799 Class 3000
 ¾" and 1" butt weld ends to ANSI B16.5 (ANSI B36.10 schedule 80)
 DN20 and DN25 flanged DIN 2547 PN100, ANSI 150, 300 and 600

Materials

Body	Stainless steel	ASTM A314 Gr. 304
Cover bolts	Stainless steel	ASTM A240 Gr. 304
Internals	Stainless steel	
Flanges	Stainless steel	ASTM A182 F304
Pipes	Stainless steel	ASTM A312 Gr. 304

Dimensions (approximate in millimetres)



Size	A	A1	B	C	D	Weight	
						Screwed Socket weld Butt weld	Flanged
DN20-¾"	110	230	85	175	198	3.0 kg	6.5 kg
DN25-1"	110	230	85	175	198	3.0 kg	6.5 kg

Limiting conditions

Body design conditions ANSI 600
 PMA - Maximum allowable pressure 100 bar g
 TMA - Maximum allowable temperature 450°C
 Cold hydraulic test pressure 150 bar g

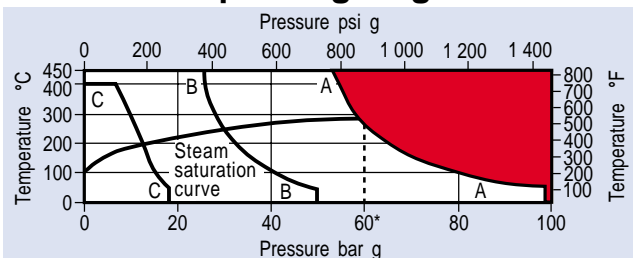
Differential pressure limitations

Size	ΔPMX - Maximum differential pressure bar			
	4.5	8.5	20	45
DN20 - ¾"	SIB45/10*	SIB45/8	SIB45/6	SIB45/5
DN25 - 1"	SIB45/10*	SIB45/8	SIB45/6	SIB45/5

*Note: screwed connections are not available for ¾" sizes.

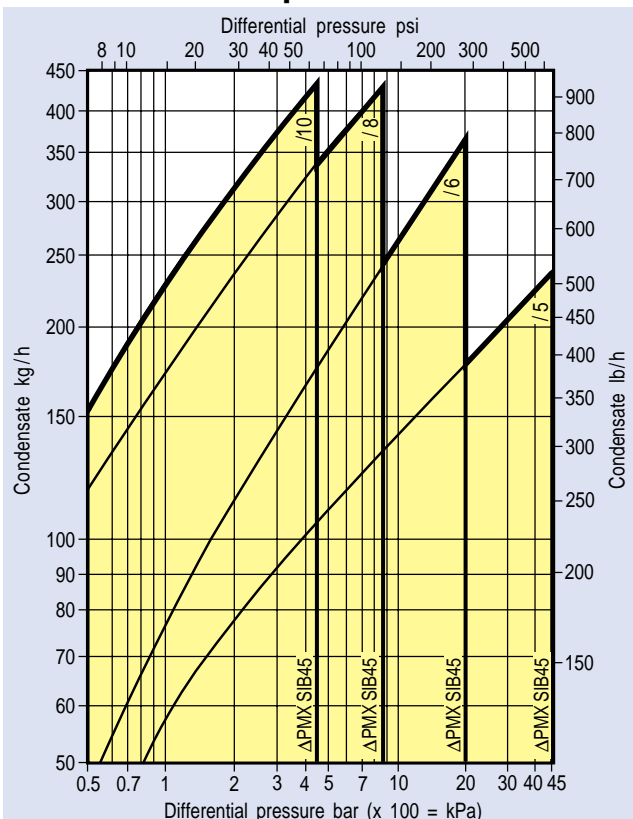


Operating range



The product must not be used in the red area
 *PMO - Maximum operating pressure
 A - A Screwed (SIB45/6, SIB45/8 and SIB45/10). Butt weld (SIB45/5).
 Socket weld (SIB45/5). Flanged DIN 2547 PN100 and ANSI 600 (SIB45/5)
 B - B Flanged ANSI 300 (SIB45/6, SIB45/8, SIB45/10)
 C - C Flanged ANSI 150 (SIB45/6, SIB45/8, SIB45/10)

Capacities



Note: Traps should be selected for the most appropriate working differential pressure and not on the basis of load.

Installation

- Ideally the trap should be fitted below the level of the equipment which it is draining to ensure that the body is always full of water.
- If the trap is at a high level then a small bore riser (with a 'U' seal at the bottom) should be fitted. A drop leg and check valve before the trap will improve operation.
- Where superheat conditions prevail then a check valve should be fitted to the trap inlet to prevent the trap from losing its waterseal. This can occur due to superheat temperatures (which can 'flash' away the waterseal) or light condensate loads. Waterseal loss can also occur due to rapid upstream pressure fluctuations. The 600 / 900 and SIB45 models all have an integral check valve for this reason. Priming of the trap with water may be required prior to turning steam on under superheat conditions.
- Inverted bucket traps do not permit rapid release of air. On process applications, in particular, this can lead to slow warm-up times and waterlogging of the steam space. An external thermostatic air vent is therefore required in parallel to vent air efficiently.
- Any bypass should be positioned above the trap. If it is below, and is leaking or left open, the waterseal could be blown away leading to steam wastage through the trap.
- Where traps are fitted in exposed conditions the possibility of freezing damage can be reduced by thermal insulation.

Optional extras

- **Integral blowdown valve:-** The HM and HM34 models can be supplied with integral blowdown valves to remove debris from the inlet strainer. For further details see the relevant technical information sheet.
- **External air vents:-** When required, inverted bucket traps can be supplied with separate thermostatic air vents to provide the efficient and quick release of air. Various models, both balanced pressure and bimetallic, are available. Details for the range up to 30 bar g are shown in the relevant sales brochure.
- **Diffusers:-** Where steam traps discharge to atmosphere a diffuser should be fitted to reduce the effect of the blast discharge. The diffuser not only reduces the risk of groundwork erosion and condensate splashback, but also reduces sound pressure levels as well. Available models are detailed in the relevant sales brochure.

Some of the products may not be available in certain markets.

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