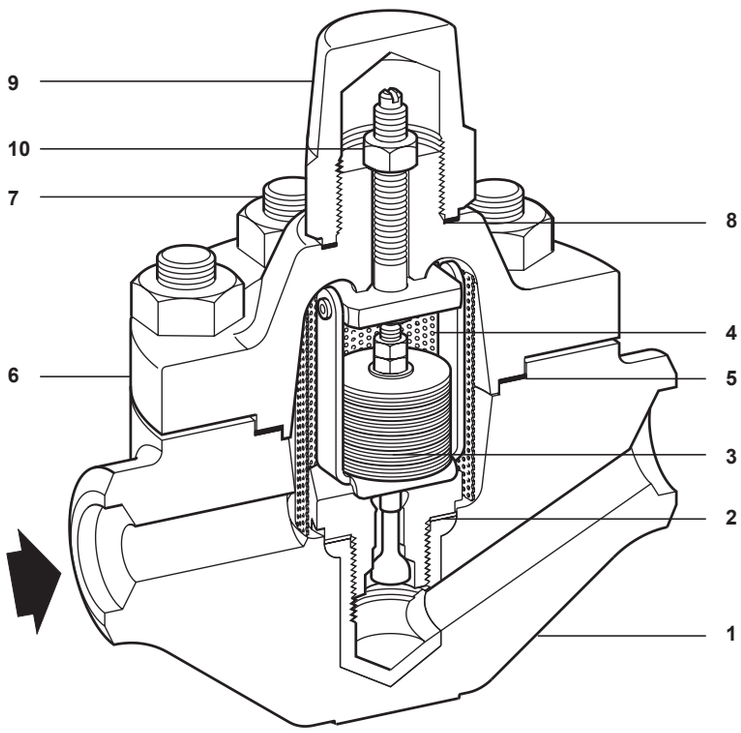
TI-P623-02
CMGT Issue 8

HP45
Bimetallic Steam Trap

Description

The Spirax Sarco HP45 bimetallic steam trap is made of forged steel, and designed for draining high pressure, high temperature steam lines and processes.
This steam trap is specially designed for HP steam and has a reinforced stainless steel insert within the body and can be repaired inline. It operates with no loss of steam, and quickly drains air, non-condensable gases and large quantities of cold water on start-up.
Normally open in the event of failure, it has a built-in strainer screen and an external device for adjusting the discharge temperature of the condensate.



Standards

This product fully complies with the requirements of the Pressure Equipment Directive (PED).

Certification

This product is available with certification to EN 10204 3.1.
Note: All certification/inspection requirements must be stated at the time of order placement.

Sizes and pipe connections

½", ¾" and 1" screwed BSP/NPT, socket weld ends to ANSI B 16.11 and butt weld ends to ANSI B 16.25.
DN15, DN20 and DN25 Flanged PN63, PN100 and ANSI 600.

Materials

No.	Part	Material	
1	Body	Steel	ASTM A105N
2	Valve seat gasket	Stainless steel	AISI 304
3	Bimetallic element	Stainless steel	
4	Strainer screen	Stainless steel	AISI 304L
5	Cover gasket	Spiral wound stainless steel and graphite (asbestos free)	
6	Cover	Steel	ASTM A105N
7	Cover stud	Steel	ASTM A193 Gr. B7
	Cover nut	Steel	ASTM A194 Gr. 2H
8	Blind nut gasket	Stainless steel tanged reinforced graphite	
9	Blind nut	Steel	ASTM A105
10	Lock-nut	Steel	

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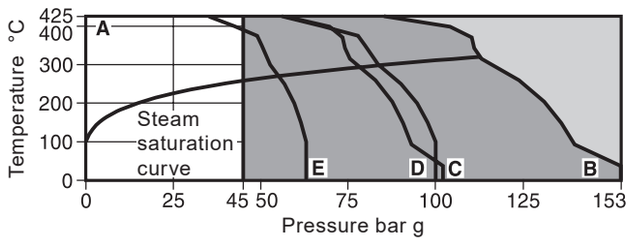
Steam traps
Bimetallic

Pressure/temperature limits



A - B Screwed BSP/NPT, socket weld and butt weld ends.

A - C Flanged ANSI 600.

A - D Flanged PN100.

A - E Flanged PN63.

The product **must not** be used in this region.

The product should not be used in this region or beyond its operating range as damage to the internals may occur.

Body design conditions	PN150, Class 900 to ANSI B 16.34
PMA Maximum allowable pressure	153 bar g @ 38 °C
TMA Maximum allowable temperature	425 °C @ 86 bar g
Minimum allowable temperature	0 °C
PMO Maximum operating pressure	45 bar g @ 425 °C
TMO Maximum operating temperature	425 °C @ 45 bar g
Minimum operating temperature **Note:** For lower temperatures consult Spirax Sarco.	0 °C
Minimum inlet pressure for satisfactory operation	15 bar g
ΔPMX The backpressure for correct operation must not exceed 90% of the upstream pressure.	
Designed for a maximum cold hydraulic test pressure of:	229 bar g

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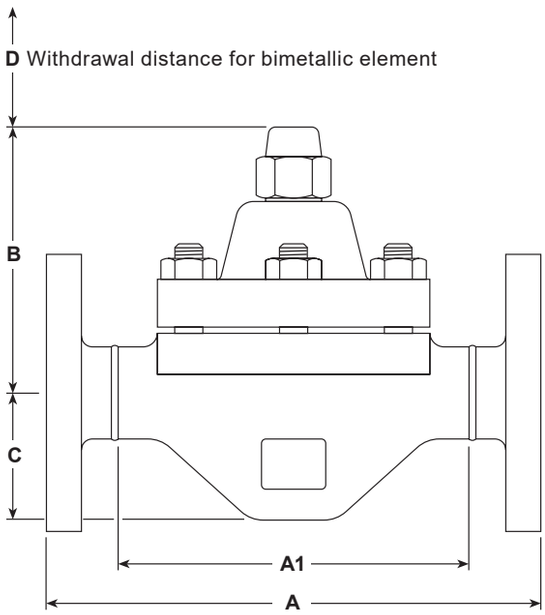
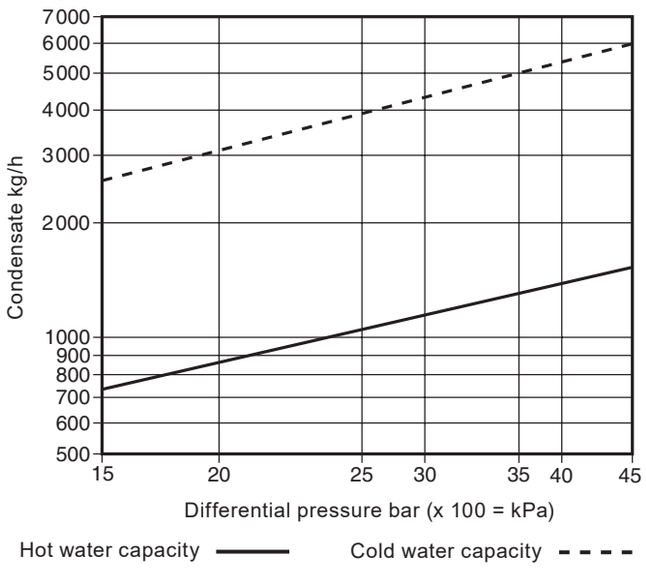
Dimensions/weights (approximate) in mm and kg

Size		A	A1	B	C	D	Weight
½" ¾" 1"		-	160	124	58	150	6.5
DN15	PN63/PN100	235	-	124	58	150	11.0
	ANSI 600	235	-	124	58	150	9.5
DN20	PN63/PN100	235	-	124	58	150	11.5
	ANSI 600	235	-	124	58	150	10.0
DN25	PN63/PN100	235	-	124	58	150	12.0
	ANSI 600	235	-	124	58	150	10.5



Capacities



Safety information, installation and maintenance

For full details see the Installation and Maintenance Instructions (IM-P623-03) supplied with the product.

Disposal

The product is recyclable. No ecological hazard is anticipated with the disposal of this product providing due care is taken.

How to order

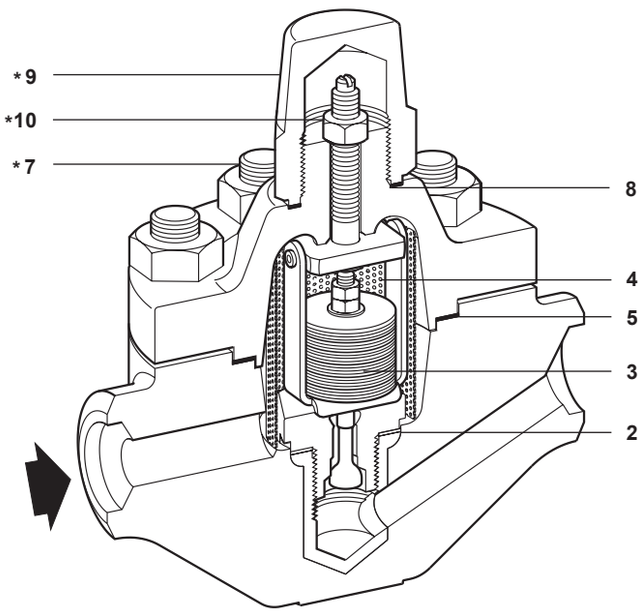
Example: 1 off Spirax Sarco ½" HP45 bimetallic steam trap with socket weld end connections.

Steam traps
Bimetallic

Spare parts
The spare parts available are detailed below. No other parts are supplied as spares.

Available spare	
Bimetallic assembly kit	**2, 3, 4, 5, 8**
Cover gasket (pack of 3)	**5**
Gasket set	**2, 5, 8**
Strainer screen	**4**

How to order spares
Always order spares by using the description given in the column headed 'Available spare' and state the size and model of the bimetallic steam trap.
Example: 1 - Bimetallic assembly kit for a Spirax Sarco 1" HP45 bimetallic steam trap.



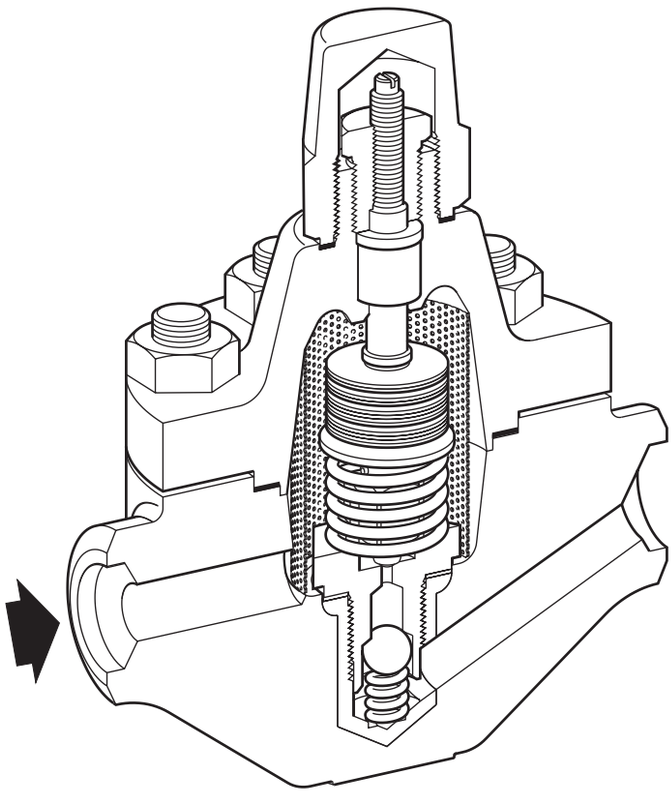
*** Items 7, 9 and 10 are not available spares.**

Recommended tightening torques

Item	or mm	N m
3	36 A/F	120 - 132
7	22 A/F	70 - 77
9	29 A/F	80 - 88
10	13 A/F	5

TI-P071-01
CMGT Issue 4

HP70 Series
Bimetallic Steam Trap



Description

The Spirax Sarco HP70 bimetallic steam trap is made of a forged alloy steel, and designed for draining high pressure, high temperature steam lines and processes. This steam trap, which is specially designed for HP steam, has a reinforced stainless steel insert within the body and can be repaired inline. It operates with no loss of steam, and quickly drain air, non-condensable gases and large quantities of cold water on start-up.
Normally open in the event of failure, it has a check valve, a built-in strainer screen and an external device for adjusting the discharge temperature of the condensate.

Standards

This product fully complies with the requirements of the Pressure Equipment Directive 2014/68/EU.

Certification

This product is available with certification to EN 10204 3.1
Note: All certification/inspection requirements must be stated at the time of order placement.

Sizes and pipe connections

½", ¾" and 1"	Socket weld to ASME B 16.11 **or** Butt weld to ASME B 16.25.

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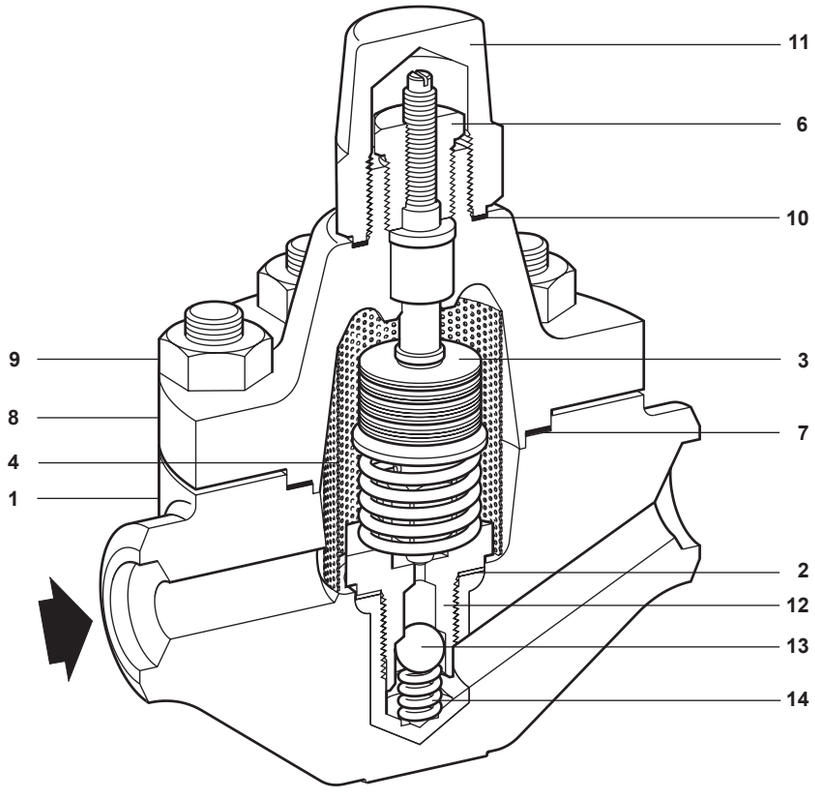
8 Steam traps
Bimetallic

Materials



No.	Part	Material	
1	Body	Alloy steel	ASTM A182 F11
2	Valve seat gasket	Stainless steel	Z6 CN 18-09
3	Bimetallic element	Stainless steel	
4	Strainer screen	Stainless steel	AISI 304L
5	Gland packing	Graphite (asbestos-free)	
6	Locking gland nut	Stainless steel	Z10 CNF 18-09
7	Cover gasket	Spiral wound stainless steel and graphite (asbestos-free)	
8	Cover	Alloy steel	ASTM A182 F11
9	Cover stud	Steel	ASTM A193 Gr. B7
	Cover nut	Steel	ASTM A194 Gr. 2H
10	Blind nut gasket	Metal, stainless steel/graphite	
11	Blind nut	Steel	ASTM A105
12	Valve seat	Stainless steel	BS.970 431 29 & ASTM A276 431
13	Check valve	Stainless steel	BS.970 304S11
14	Check valve spring	Nickel-Chromium-Cobalt	NIMONIC 90

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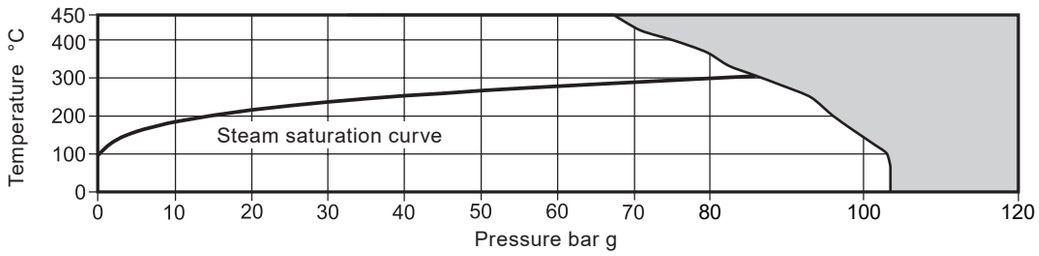
Pressure/temperature limits

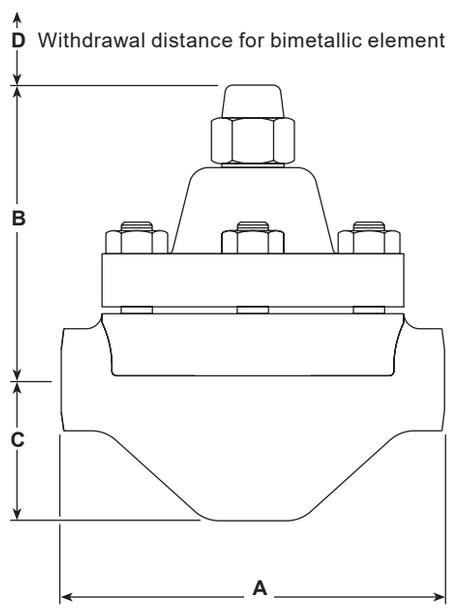


The product **must not** be used in this region.

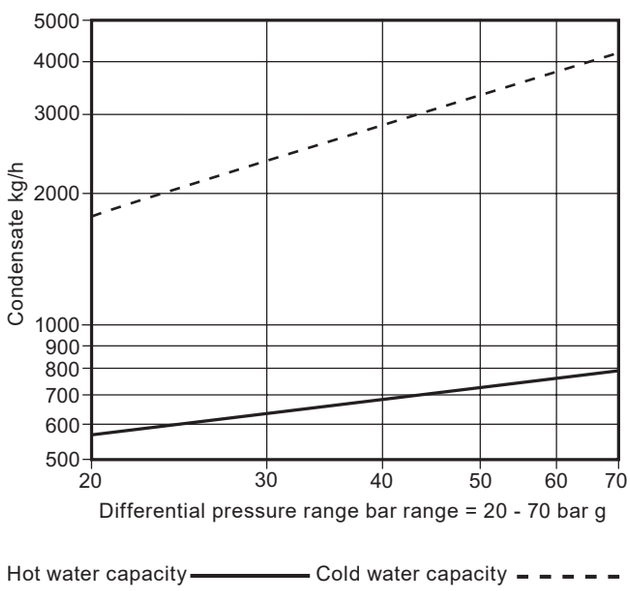
Body design condition	Class 600
PMA Maximum allowable pressure	103.4 bar g @ 50 °C
TMA Maximum allowable temperature	450 °C @ 67.7 bar g
PMO Maximum operating pressure	70 bar g @ 425 °C
TMO Maximum operating temperature	425 °C @ 70 bar g
Minimum allowable temperature	-14 °C
Minimum inlet pressure for satisfactory operation is:	20 bar g
Minimum operating temperature	0 °C
ΔPMX The backpressure for correct operation must not exceed 90% of the upstream pressure	
Designed for a maximum cold hydraulic test pressure of:	156 bar g

Dimensions/weights (approximately) in mm and kg

A	B	C	D	Weight
160	145	58	150	10.5



Capacities



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Steam traps
Bimetallic

Safety information, installation and maintenance
For full details see the Installation and Maintenance Instructions supplied with the product.

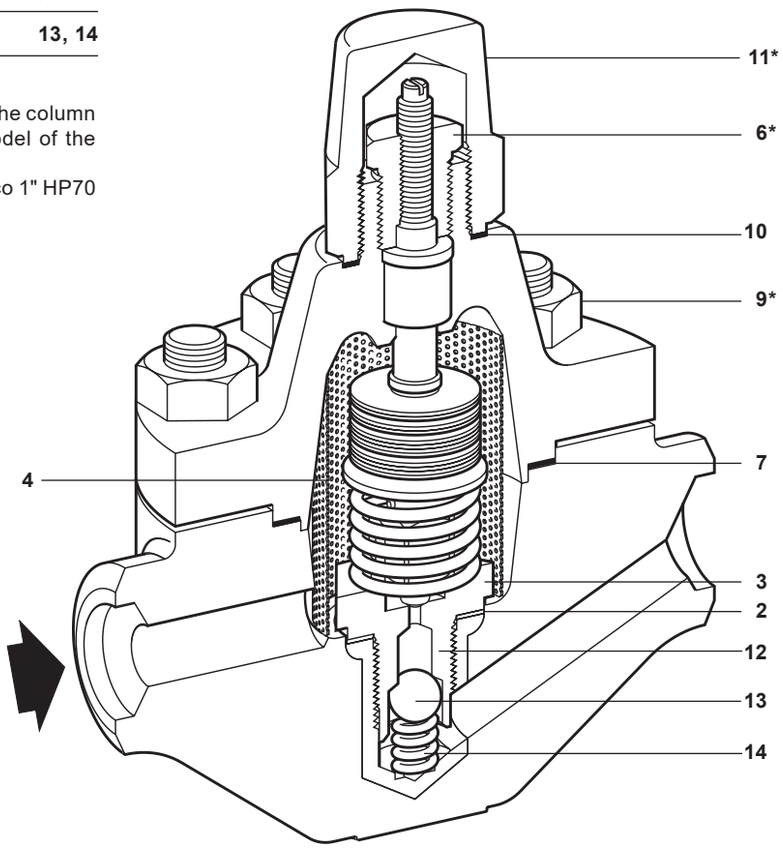
How to order
Example: 1 off Spirax Sarco ½" HP70 bimetallic steam trap with socket weld end connections.

Spare parts
The spare parts available are detailed below. No other parts are supplied as spares.

Available spares	
Bimetallic assembly kit	**2, 3, 4, 7, 10, 12**
Strainer screen	**4**
Cover gasket set (packet of 3)	**7**
Gasket set	**2, 7, 10**
Check valve assembly	**13, 14**

How to order spares
Always order spares by using the description given in the column headed 'Available spares' and state the size and model of the bimetallic steam trap.
Example: 1 - Bimetallic assembly kit for a Spirax Sarco 1" HP70 bimetallic steam trap.

* **Note:** Items **6, 9** and **11** are not available as spares



Recommended tightening torques

Item	or mm	N m
3	36 A/F	120
6	21 A/F	38
9	24 A/F	105
11	41 A/F	80

spirax sarco

TI-P624-02
ST Issue 6

SP80 and SP100
Bimetallic Steam Traps

Description

The SP80 and SP100 are pilot operated bimetallic steam traps made of cast steel. They have a built-in strainer screen to protect the pilot valve and an external device for adjusting the discharge temperature of the condensate. They are specially designed for high capacity process applications.
They are not sensitive to overheating and have a bimetallic pilot device which controls a main valve via a large diameter piston. These steam traps can be repaired inline and operate with no loss of steam. They quickly drain air, non-condensable gases and large quantities of cold water on start-up.

Available types

SP80N and SP100N	For use at low pressures
SP80E and SP100E	For use at medium pressure

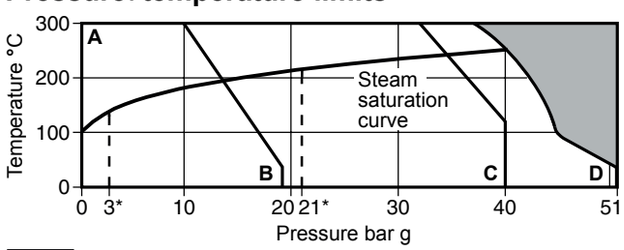
Standards
This product fully complies with the requirements of the European Pressure Equipment Directive 97 / 23 / EC.

Certification
This product is available with certification to EN 10204 3.1.
Note: All certification / inspection requirements must be stated at the time of order placement.

Sizes and pipe connections

DN80 SP80 or DN100 SP100 with
Flanged EN 1092 PN40, ASME 150 or ASME 300 connections.

Pressure / temperature limits



The product **must not** be used in this region.

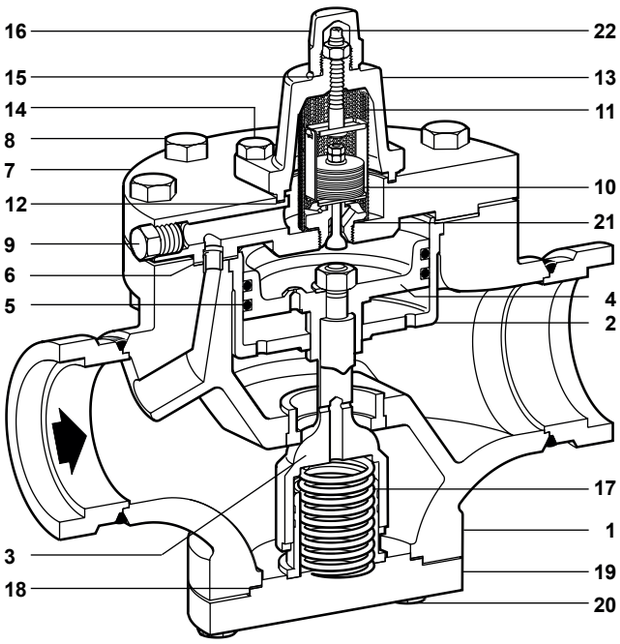
A - B Flanged ASME 150
A - C Flanged PN40
A - D Flanged ASME 300

SP80N and SP100N

Body design conditions		Class 300
* PMO	Maximum operating pressure	3 bar g
TMO	Maximum operating temperature	300°C
Minimum operating pressure		0.5 bar g
ΔPMX	The backpressure for correct operation must not exceed 90% of the upstream pressure.	
Designed for a maximum cold hydraulic test pressure of 76 bar g		

SP80E and SP100E

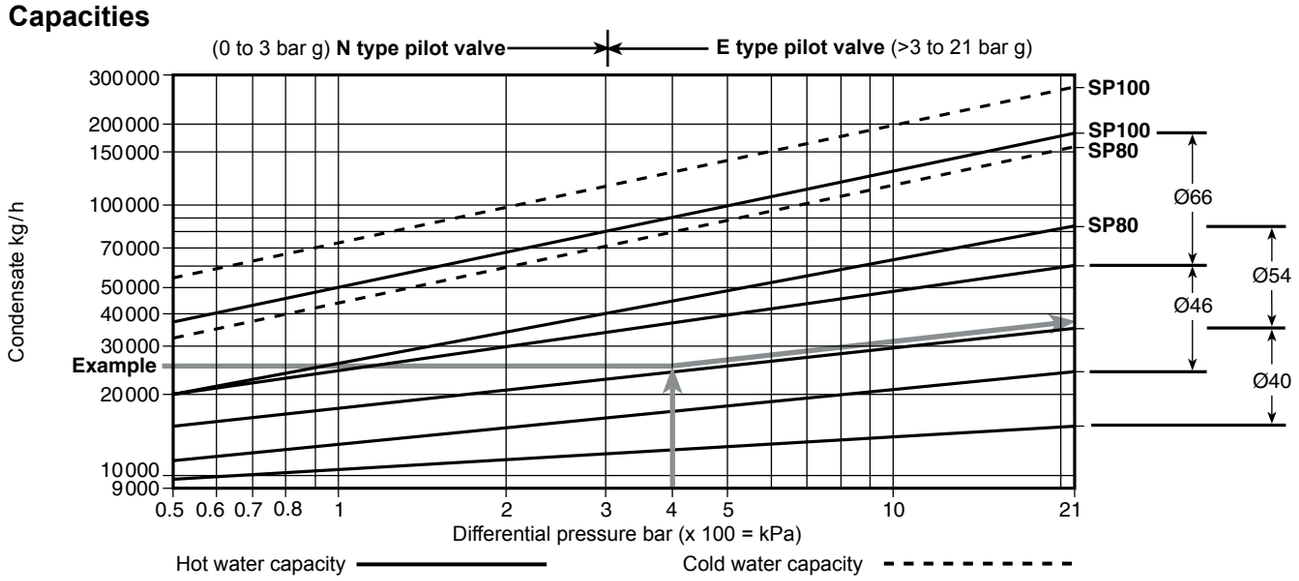
Body design conditions		Class 300
* PMO	Maximum operating pressure	21 bar g
TMO	Maximum operating temperature	300°C
Minimum operating pressure		1.5 bar g
ΔPMX	The backpressure for correct operation must not exceed 90% of the upstream pressure.	
Designed for a maximum cold hydraulic test pressure of 76 bar g		



Materials

No.	Part	Material	
1	Body sub assembly	Steel	ASTM A216 WCB4 and A105
2	Piston casing	Stainless steel	
3	Main valve	Stainless steel	AISI 304L
4	Piston	Stainless steel	
5	Piston ring	Stainless steel	
6	Upper cover gasket	Graphite (asbestos-free)	
7	Upper cover	Steel	ASTM A105N
8	Upper cover bolt and nut	Steel	ASTM A193 B7 and A194 2H
9	Plug	Steel	
10	Bimetallic pilot element	Stainless steel	
11	Strainer screen	Stainless steel	AISI 304L
12	Cap gasket	Metal - copper / graphite (asbestos-free)	
13	Cap	Steel	ASTM A105
14	Cap bolt	Steel	ASTM A193 B7
15	Blind nut gasket	Metal - copper/graphite	
16	Blind nut	Steel	ASTM A105
17	Main valve spring	Stainless steel	
18	Lower cover gasket	Graphite (asbestos-free)	
19	Lower cover	Steel	ASTM A105N
20	Lower cover bolt	Steel	ASTM A193 B7
21	Pilot device seating gasket	Stainless steel	AISI 304
22	Adjustment screw	Stainless steel	ASTM A276 316L

Capacities



How to size the SP80 and SP100

Both the SP80 and SP100 bimetallic steam traps are available with 2 different pilot valve assemblies (N type) or (E type) and 4 different seat types to achieve the rated capacities.

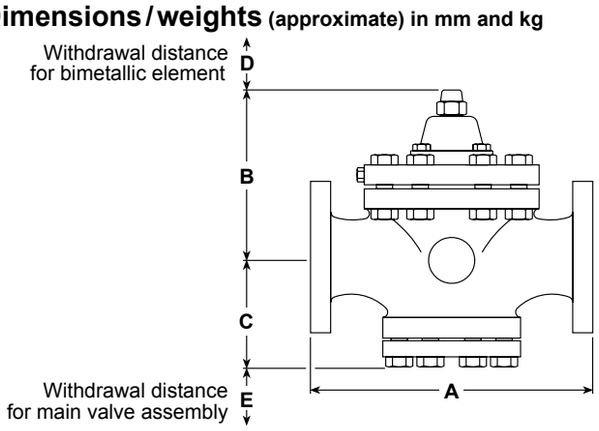
To work out the appropriate bimetallic pilot valve and seat size for your application, follow the sizing procedure listed below:

1. The trap inlet pressure must be known:
   If the inlet pressure is below 3 bar g then select an **N type** pilot valve. If the inlet pressure is above 3 bar g then select an **E type** pilot valve.
2. The outlet pressure must be known to determine the differential pressure across the trap.
3. Depending on the desired capacity and differential pressure required, use the capacity chart above to choose the seat diameter which is closest to the seat's mid range capacity.

Sizing example:

1. If the trap inlet pressure is 10 bar g - select E type pilot valve.
2. If the outlet pressure is 6 bar g then: 10 bar g (inlet pressure) - 6 bar g (outlet pressure) means 4 bar g differential pressure exists.
3. If the trap is required to drain 25 000 kg/h then select either an SP80E or SP100E with a 46 mm seat, as this is closest to the mid-range capacity for a 46 mm seat. Although the capacity is also within the lower range of a 54 mm seat, trap performance would not be optimised.

Dimensions / weights (approximate) in mm and kg



Size	A	B	C	D	E	Weight PN40 ASME 150	Weight ASME 300
DN80	350	210	132	150	100	43	48
DN100	400	210	132	150	100	52	60

Safety information, installation and maintenance

For full details see the Installation and Maintenance Instructions (IM-P624-01) supplied with the product.

How to order

Example: 1 off DN80 Spirax Sarco SP80E bimetallic steam trap with 46 mm seat and flanged EN 1092 PN40 end connections

Spare parts

The spare parts available are detailed below. No other parts are supplied as spares.

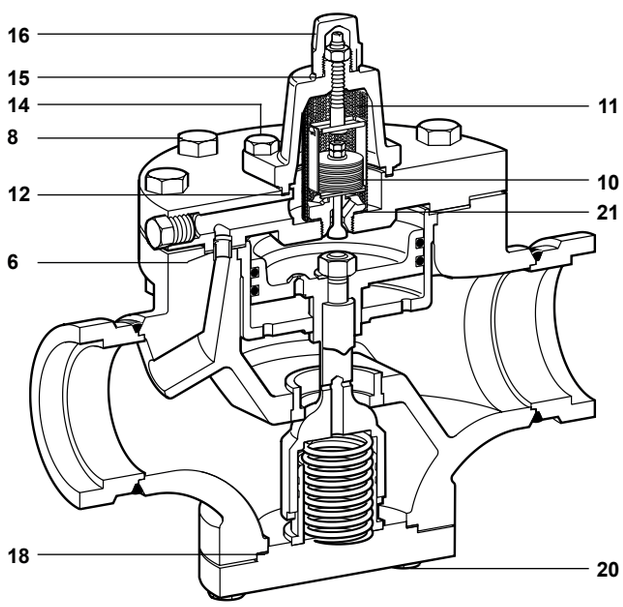
Available spares

Pilot valve assembly N type	**10, 11, 12, 15, 21**
Pilot valve assembly E type	**10, 11, 12, 15, 21**
Gasket kit	**6, 12, 15, 18, 21**

How to order spares

Always order spares by using the description given in the column headed 'Available spares' and state the size and model of the bimetallic steam trap.

Example: 1 - Gasket kit for a DN80 Spirax Sarco SP80 bimetallic steam trap.



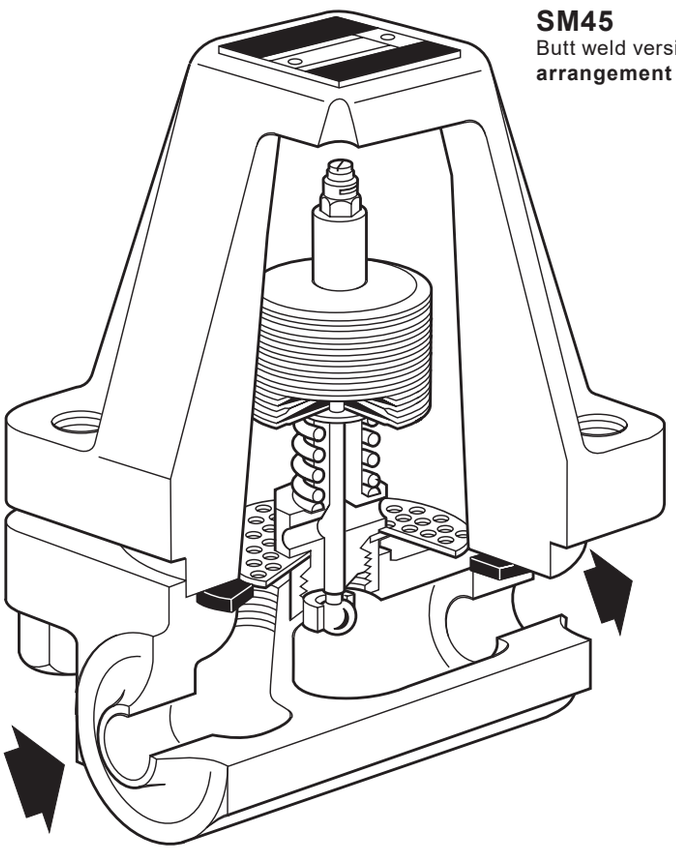
Recommended tightening torques

Item	or	N m
8	22 A/F	72 - 78
10	36 A/F	120 - 132
14	17 A/F	45 - 55
16	29 A/F	72 - 88
20	19 A/F	54 - 66

8 Steam traps
Bimetallic

TI-P025-01
CMGT Issue 10

SM45
Bimetallic Steam Trap



SM45
Butt weld version shown illustrating the **valve arrangement for the ¾" and 1"** sizes.

Description

The SM45 is a medium pressure, temperature sensitive, maintainable steam trap. The operating element comprises a stack of bimetal discs which control the flow of condensate, air and other incondensible gases at a preset temperature below steam saturation. The body and cover are forged and is available with integral flanges.

Standards

This product fully complies with the requirements of the Pressure Equipment Directive (PED) and carries the CE mark when so required.

Certification

The product is available with certification to EN 10204 3.1.
Note: All certification/inspection requirements must be stated at the time of order placement.

Sizes and pipe connections

½", ¾" and 1" screwed BSP or NPT.
½", ¾", 1" and 1½" butt weld to suit schedule 80 pipe and socket weld to BS 3799 Class 3000.
DN15, DN20, DN25 and DN40 standard flange to :
EN1092 PN64, ASME 300 and JIS/KS 30K.

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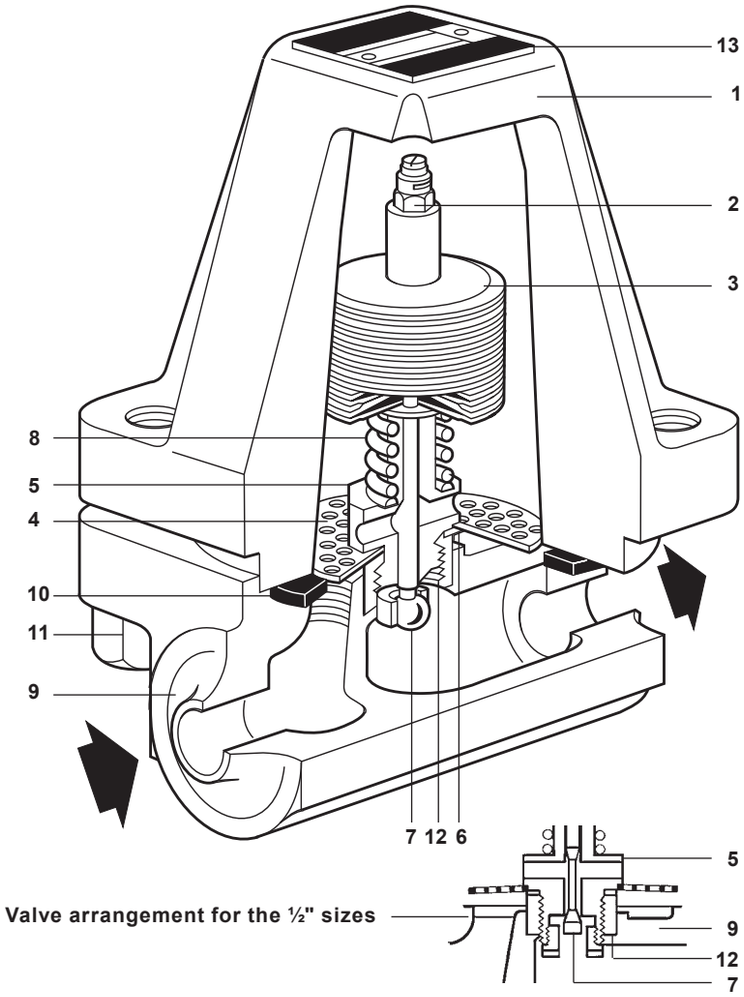
Steam traps
Bimetallic

Materials



SM45
Butt weld version shown illustrating the **valve arrangement for the ¾" and 1"** sizes.

No.	Part	Material	
1	Cover	Alloy steel	DIN 17243 13Cr Mo44 (W/S 1.7335)
2	Locking nut	Stainless steel	BS 970 303 S21
3	Thermostatic element	Corrosive resistant bimetal and stainless steel	½" - Rau Type RR
			¾" - 1" Type 100
4	Strainer screen	Stainless steel	ASTM A240 316L
5	Valve seat	Stainless steel	BS 970 431 S29
6	Valve seat gasket	Stainless steel	BS 1449 304 S12
7	Valve	Stainless steel	BS 970 431 S29
8	Spring	Stainless steel	BS 2056 302 S26
9	Body	Alloy steel	DIN 17245 CS 22 Mo4
10	Cover gasket	Spirally wound stainless steel graphite filled gasket	
	Cover stud	Alloy steel	ASTM A193 Gr. B7
11	Cover nut	Carbon steel	BS 4882 Gr. 2H
	Cover washer	Carbon steel	BS 4320 Table 1 Form A
12	Seat insert	Stainless steel	BS 970 321 S20
13	Name-plate	Stainless steel	BS 1449 304 S16

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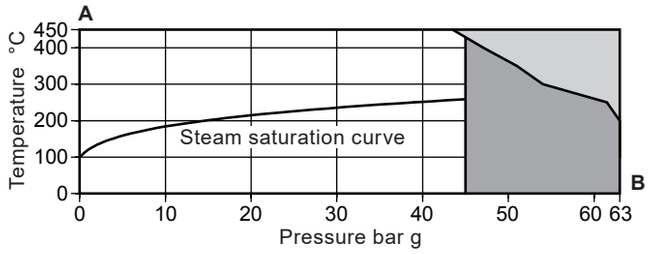
Pressure/temperature limits (ISO 6552)

Screwed
Socket weld
Butt weld
Flanged:
EN 1092 PN64



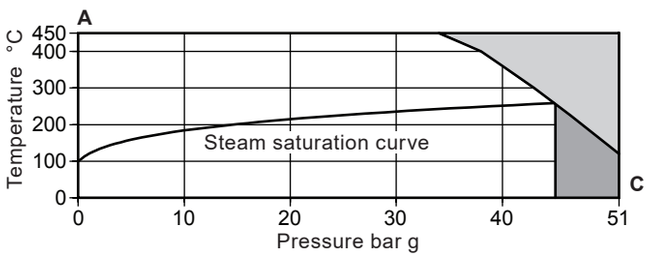
The product **must not** be used in this region or beyond the parameter of the PMA or TMA of the relative end connection.

The product should not be used in this region as damage to the internals may occur.

A - B

Body design condition	PN64
PMA Maximum allowable pressure	63 bar g @ 200 °C
TMA Maximum allowable temperature	450 °C @ 43.5 bar g
Minimum allowable temperature	-10 °C
PMO Maximum operating pressure for saturated steam service	45 bar g @ 259 °C
TMO Maximum operating temperature	450 °C @ 43.5 bar g
Minimum operating temperature	0 °C
Designed for a maximum cold hydraulic test pressure of:	95 bar g

Flanged:
ASME 300



The product **must not** be used in this region or beyond the parameter of the PMA or TMA of the relative end connection.

The product should not be used in this region as damage to the internals may occur.

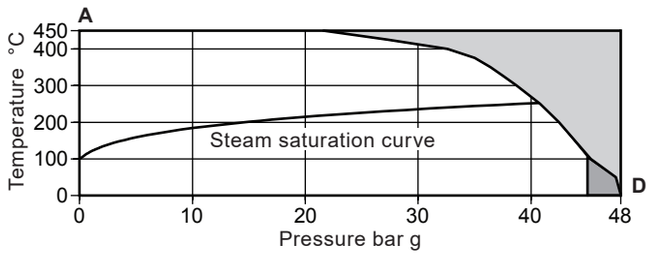
A - C

Body design condition	ASME 300
PMA Maximum allowable pressure	51 bar g @ 120 °C
TMA Maximum allowable temperature	450 °C @ 34 bar g
Minimum allowable temperature	-10 °C
PMO Maximum operating pressure for saturated steam service	45 bar g @ 259 °C
TMO Maximum operating temperature	450 °C @ 34 bar g
Minimum operating temperature	0 °C
Designed for a maximum cold hydraulic test pressure of:	72 bar g

Pressure/temperature limits continued on the next page

Pressure/temperature limits (ISO 6552) continued

Flanged:
JIS/KS 30K



The product **must not** be used in this region or beyond the parameter of the PMA or TMA of the relative end connection.

The product should not be used in this region as damage to the internals may occur.

A - D

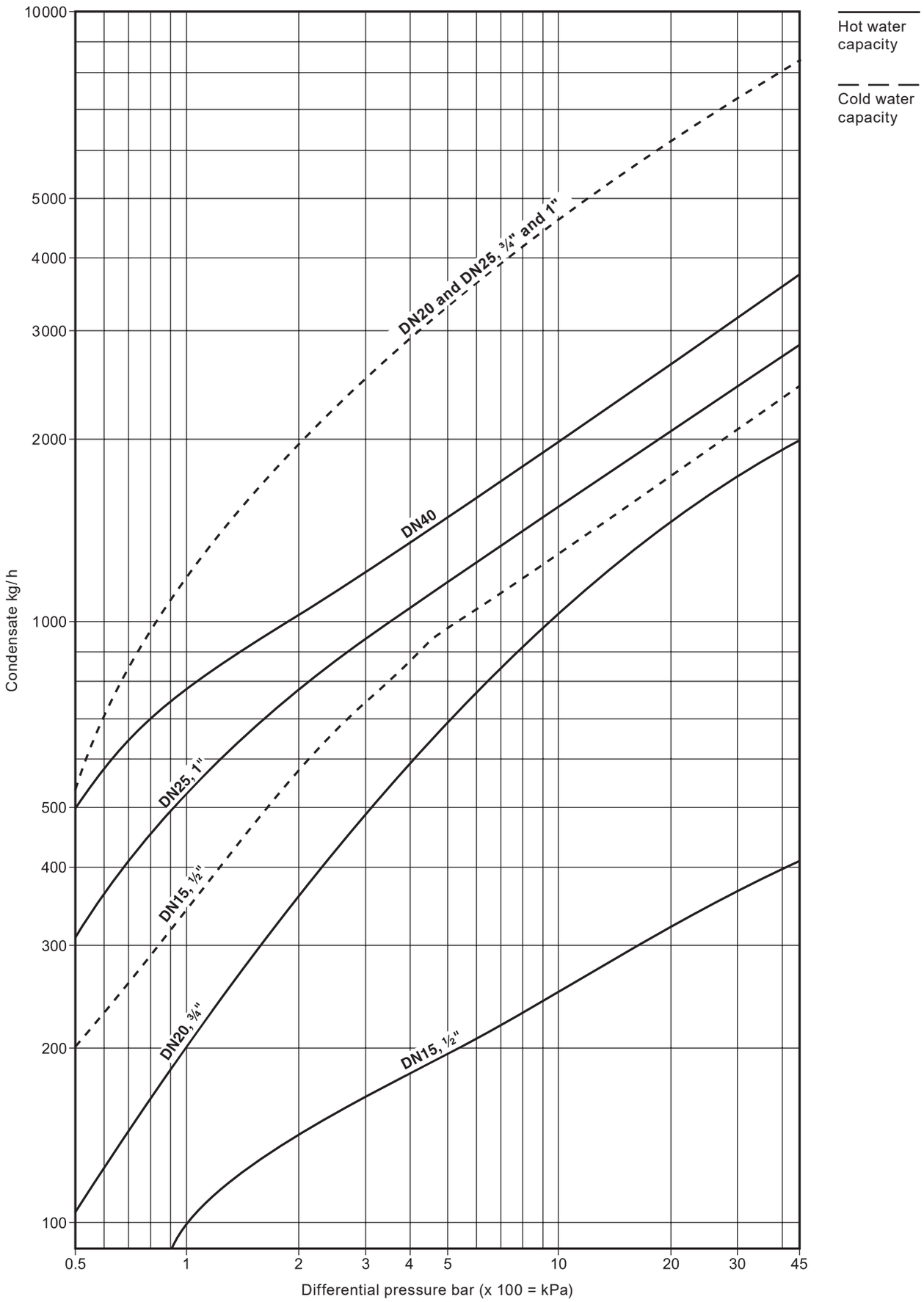
Body design condition	JIS/KS 30K
PMA Maximum allowable pressure	48 bar g @ 0 °C
TMA Maximum allowable temperature	450 °C @ 22 bar g
Minimum allowable temperature	-10 °C
PMO Maximum operating pressure for saturated steam service	45 bar g @ 100 °C
TMO Maximum operating temperature	450 °C @ 22 bar g
Minimum operating temperature	0 °C
Designed for a maximum cold hydraulic test pressure of:	77 bar g

K_v values

Size	DN15 - ½"	DN20 - ¾"	DN25 - 1"	DN40 - 1½"
K_v value	0.25	0.6	0.6	0.6

For conversion:
C_v (UK) = K_v x 0.963
C_v (US) = K_v x 1.156

Capacities



Steam traps
Bimetallic

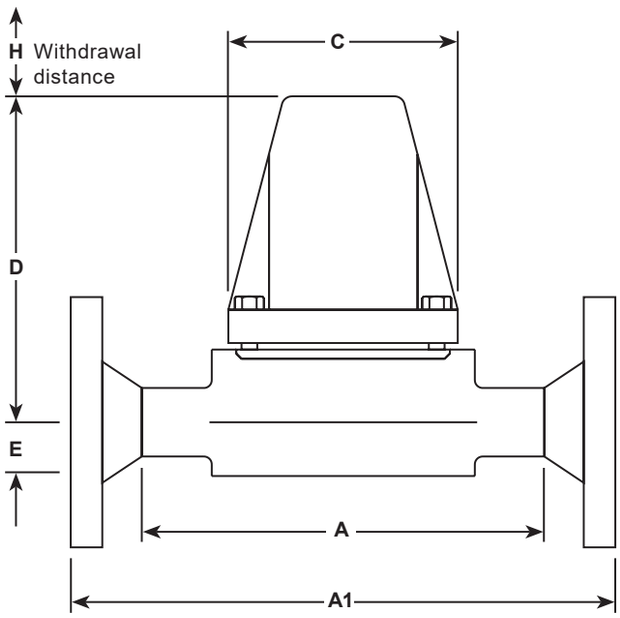
Dimensions/weights (approximate) in mm and kg

Screwed, butt weld and socket weld

Size	A	C	D	E	H	Weight
½"	130	102	138	24	108	5.4
¾"	130	102	138	24	108	5.4
1"	130	102	138	24	108	5.4

Flanged

Size	A1	C	D	E	H	Weight
DN15	210	102	138	24	108	7.2
DN20	230	102	138	24	108	8.6
DN25	230	102	138	24	108	9.5
DN40	260	102	146	30	114	13.6



Safety information, installation and maintenance
For full details see the Installation and Maintenance Instructions (IM-P025-02) supplied with the product.

Installation note:
The SM45 is designed for installation with the element in a horizontal plane with the cover at the top. When welding the the trap into the line there is no need to remove the element providing that welding is done by the electric arc method.

Disposal
The product is recyclable. No ecological hazard is anticipated with disposal of this product providing care is taken.

How to order
Example: 1 off Spirax Sarco ½" SM45 bimetallic steam trap having screwed BSP connections.

Spare parts

The spare parts available are shown in solid outline. Parts drawn in a grey line are not supplied as spares.

Available spares

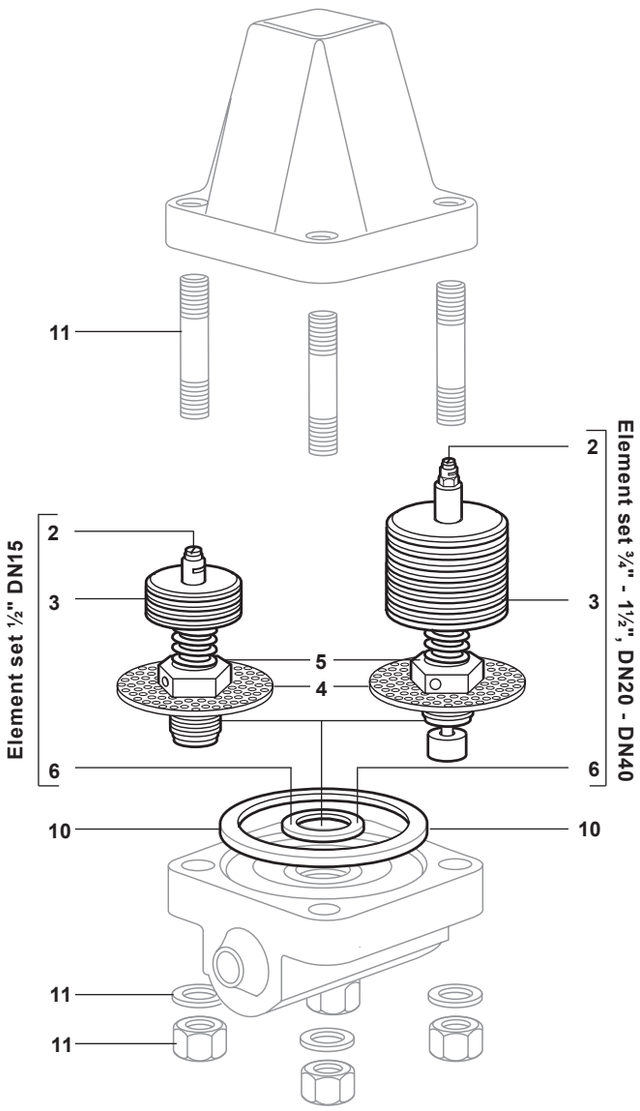
Element set	Complete with valve, valve seat and valve seat gasket	**2, 3, 6**
Strainer screen	(3 off)	**4**
Set of gaskets	(packet of 3 of each)	**6, 10**

Important note

The earlier design of the SM45 incorporated 4 off long cover studs and 8 off washers and nuts for assembling the body and cover.
The current design of the SM45 incorporates a threaded cover and 4 off shorter studs and 4 off washers and nuts.

How to order spares

Always order spares by using the description given in the column headed 'Available spares' and state the size and type of steam trap.
Example: 1 - Element set for a DN25 Spirax Sarco SM45 bimetallic steam trap.



Recommended tightening torques

Item	or mm		N m
5	27 A/F		120 - 132
11	19 A/F	M12	110 - 120