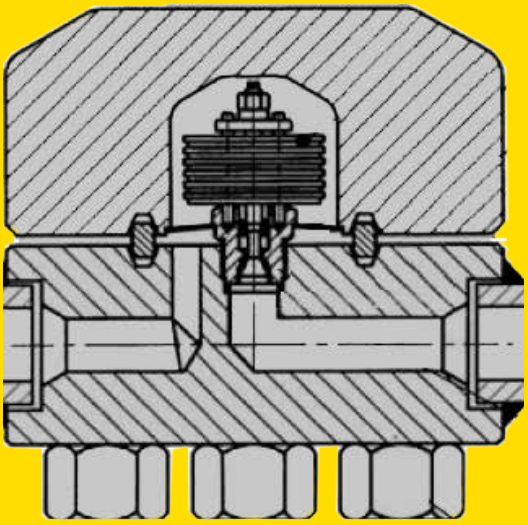
STEAM TRAPS
ALT-1



NOMINAL PRESSURE

ANSI Class 150-2500

PN 16-420

NOMINAL SIZE

1/2”-4”

DN 15-100

TYPES

THERMODYNAMIC

BIMETALLIC THERMOSTATIC

BALL FLOAT

CONNECTIONS

Screwed

Butt Weld

Socket Welding

Flanged

MATERIALS

Carbon Steel

Alloy Steel

Stainless Steel

AXELVALVES ALT-1 Steam Traps are manufactured to the highest quality and standards. Built to customer requirements for special applications and severe service conditions.

APPLICATIONS

POWER

OIL & GAS

PETROCHEMICAL

CHEMICAL

MARINE

PULP & PAPER

TYPES

THERMODYNAMIC

This type of trap is operated by the internal energy of steam. Condensate and air entering the trap raise the disc, and flow continuously throughout the discharge orifice. Steam entering the trap expands suddenly as it reaches the underside of the disc. The resulting high flow velocity causes a decrease in pressure under the disc. Steam above the disc is stationary, and therefore at higher pressure. This pressure imbalance, forces the disc onto the seat, closing the trap. When condensate appears at the trap inlet, the steam above the disc condenses releasing the pressure and allowing the discharge cycle to repeat.

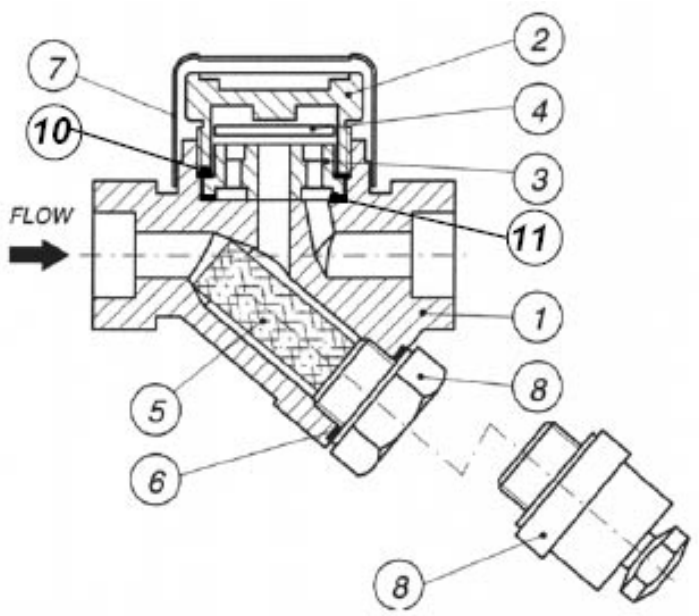
BIMETALLIC THERMOSTATIC

The operating principle is based on a balance between the steam force (pressure dependent), trying to open the discharge valve, and the opposing bi-metal force (temperature dependent), which tends to close it. The trap is adjusted so that a saturated steam temperature the bi-metal force will prevail, while with under cooled condensate and air, the force of pressure will prevail and open the valve. For a well designed trap, the required under cooling should be the minimum possible throughout the designed pressure range. Being the steam force a curve while the bimetallic force a straight line, an additional compensating spring will break the straight line to make it follow the curve of steam more closely, making field adjustment unnecessary.

BALL FLOAT

The operating principle is based on the different density between steam and condensate. The weight of the float, acting throughout the lever keeps the valve closed when the trap is empty. As the condensate enters in the trap it rises the float and opens the valve overcoming the pressure acting on it. If no more condensate reaches the trap the float descends closing the valve again. When the condensate level in the body is always above the valve creating a perfect water seal. The closed float trap is unable to discharge air therefore a small thermostatic air vent is always installed inside the body at this purpose.

THERMODYNAMIC



MATERIAL SPECIFICATION - DC50 A105 / F304

NO	PART	MATERIAL	
		DC50 A105	DC50 F304
1	Body	ASTM A105	ASTM A182 F304
2	Seat	AISI 431	AISI 303
3	Disc	AISI 413	AISI 431
4	Screen	AISI 304	AISI 304
5	Gasket	316 / Graphite	316 / Graphite
6	Insulating Cap	AISI 304	AISI 304
7	Strainer Cap	ASTM A105	ASTM A182 F304
8	Blow Off Valve	AISI 416	AISI 416
9	Flange	ASTM A105	ASTM A182 F304
10*	Cover Gasket	316 / Graphite	-
11*	Seat Gasket	Reinforced Graphite	-

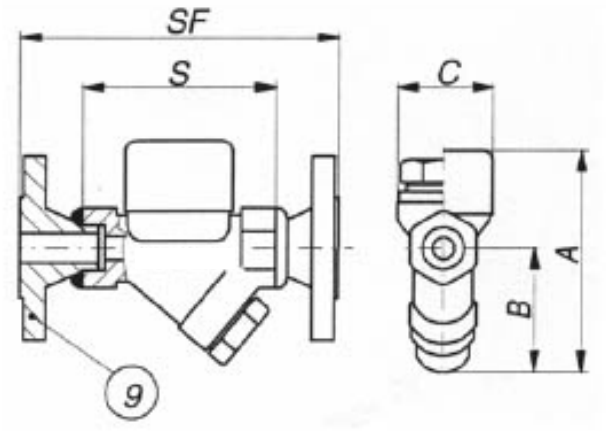
*Only DC50 A105

Other materials and material combinations available on request.

THERMODYNAMIC STEAM TRAPS

LIMITING CONDITIONS (ACCORDING TO ISO 6552)	A105	F304
Steam Trap rating	ANSI 600	ANSI 600
PMA: Max allowable pressure	100 bar	100 bar
TMA: max allowable temperature	390°C	500°C
PMO: max working pressure	50 bar	50 bar
TMO: max working temperature	350°C	425°C
Minimum Working Pressure	0.25 bar	0.25 bar
PMOB: max working back pressure	80%	80%

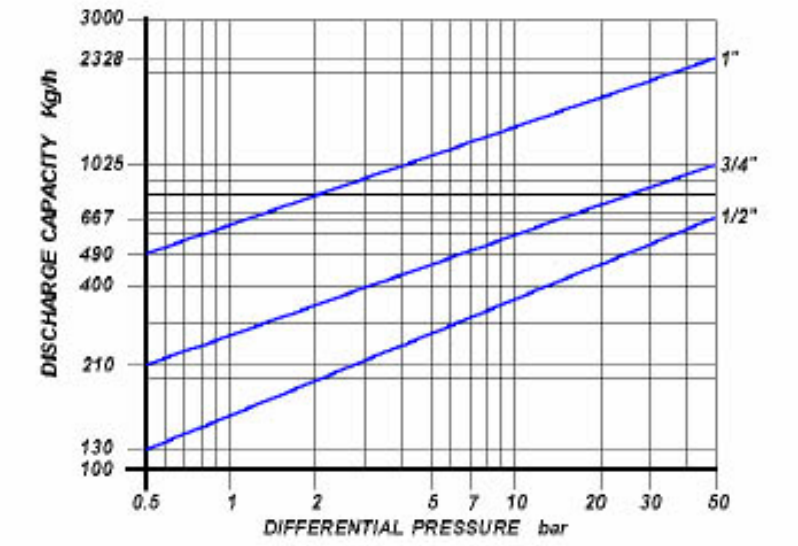
THERMODYNAMIC



Measurements in mm.

SIZE

SIZE	S	A	B	C	WEIGHT KG	UNI - DIN		ANSI 150		ANSI 300		ANSI 600	
						SF	KG	SF	KG	SF	KG	SF	KG
1/2 “	85	108	55	48	0,8	151	2,4	145	2,2	165	2,4	175	2,5
3/4”	100	120	60	54	1,3	170	3,6	170	3	190	4,1	200	4,5
1”	108	130	70	62	3,4	178	5,2	188	4,6	198	5,8	218	6,2



THERMODYNAMIC

AXELVALVES

MATERIAL SPECIFICATION - F22 / F304

NO	PART	MATERIAL	
		DK 150 F22	DK150 F304
1	Body	ASTM A182 F22	ASTM A182 F304
2	Cover	ASTM A182 F22	ASTM A182 F304
3	Seat	AISI 431	AISI 431
4	Cover Seat	AISI 431	AISI 431
5	Disc	AISI 431	AISI 431
6	Gasket	316 / Graphite	S.S 304
7	Bolts	ASTM A193 B8	ASTM A193 B8
8	Screen	AISI 304	AISI 304
9	Gasket	316 / Graphite	S.S 304
10	Strainer Cap	ASTM A182 F22	ASTM A182 F304

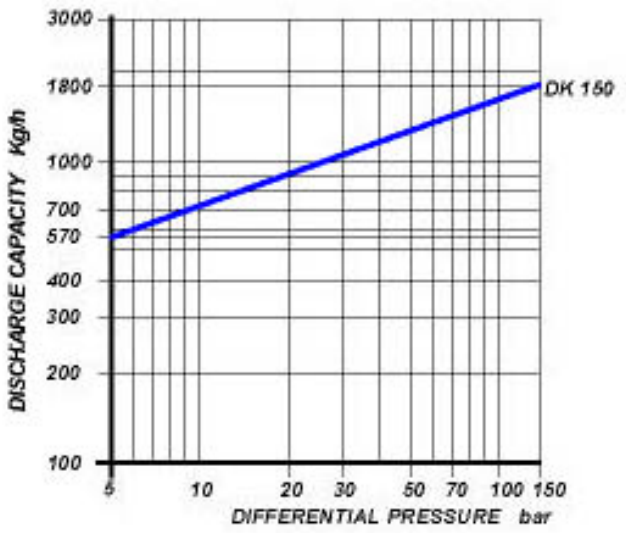
Other materials and material combinations available on request.

THERMODYNAMIC STEAM TRAPS

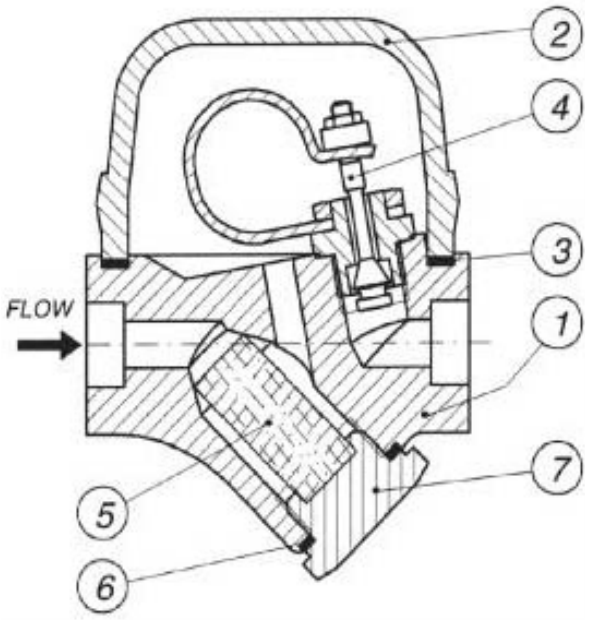
Limiting Conditions (According to ISO 6552)	DK 150 F22	DK150 F304
Steam Trap rating	ANSI 2500	ANSI 2500
PMA: Max allowable pressure	430 bar	430 bar
TMA: max allowable temperature	580°C	580°C
PMO: max working pressure	150 bar	150 bar
TMO: max working temperature	550°C	550°C
Minimum Working Pressure	5 bar	5 bar
PMOB: max working back pressure	80%	80%

SIZE

SIZE	S	A	B	C	WEIGHT KG
1/2”	170	215	72	106	9,5
3/4”	170	215	72	106	9,5
1”	170	215	72	106	9,5
1½”	170	215	72	106	9,5



BIMETALLIC THERMOSTATIC



MATERIAL SPECIFICATION - ALT-1/8, ALT1/20, ALT1/40

NO	PART	MATERIAL		
		BC8	BC20	BC40
1	Body	ASTM A105	ASTM A105	ASTM A105
2	Cover	ASTM A105	ASTM A105	ASTM A105
3	Gasket	Graphite	Graphite	316 / Graphite
4	Valve Assembly	Stainless Steel	Stainless Steel	Stainless Steel
5	Screen	AISI 304	AISI 304	AISI 304
6	Gasket	Graphite	316 / Graphite	316 / Graphite
7	Strainer Cap	ASTM A105	ASTM A105	ASTM A105
7	Blow-off Valve *	AISI 416	AISI 416	AISI 416
8	Bolts	ASTM A193 B7	ASTM A193 B7	ASTM A193 B7
9	Flange	ASTM A105	ASTM A105	ASTM A105

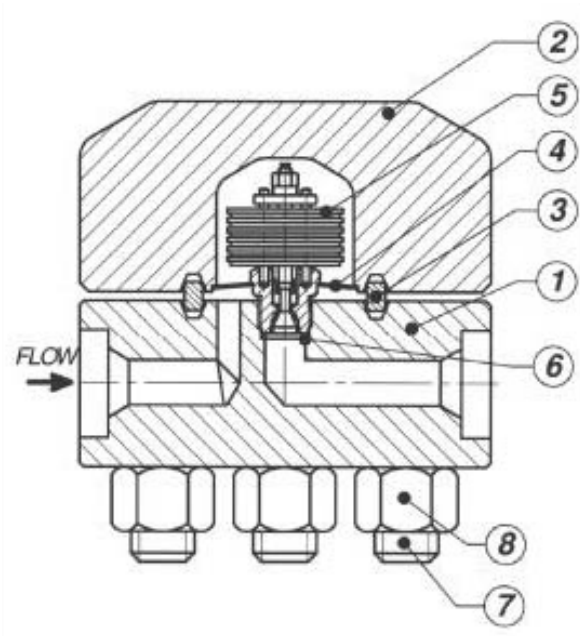
* Optional

Other materials and material combinations available on request.

BIMETALLIC THERMOSTATIC STEAM TRAPS

Limiting Conditions (According to ISO 6552)	BC8	BC20	BC40
Steam Trap rating	ANSI 300	ANSI 300	ANSI 300
PMA: Max allowable pressure	50 bar	50 bar	50 bar
TMA: max allowable temperature	390°C	390°C	390°C
PMO: max working pressure	8 bar	20 bar	40 bar
TMO: max working temperature	250°C	275°C	300°C

BIMETALLIC THERMOSTATIC



MATERIAL SPECIFICATION - ALT-1/100 F22/ALT-1/120 A105 & F22

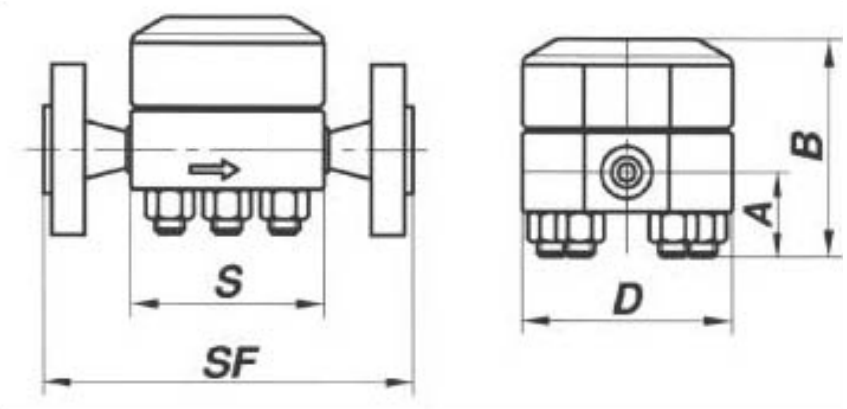
NO	PART	MATERIAL		
		BD100 F22	BD120 A105	BD120 F22
1	Body	ASTM A182 F22	ASTM A105	ASTM A182 F22
2	Cover	ASTM A182 F22	ASTM A105	ASTM A182 F22
3	Cover Gasket Rj	ASTM A182 F304	ASTM A182 F304	ASTM A182 F304
4	Screen	AISI 304	AISI 304	AISI 304
5	Seat	Nitronic 50 + Stellite	Nitronic 50 + Stellite	Nitronic 50 + Stellite
5	Valve	Nitronic 60	Nitronic 60	Nitronic 60
5	Bimetallic Element	Stainless Steel	Stainless Steel	Stainless Steel
6	Gasket Seat	ASTM A182 F316	ASTM A182 F316	ASTM A182 F316
7	Studs	ASTM A320 L7	ASTM A320	ASTM A320 L7
8	Nuts	ASTM A194 Gr. 4	ASTM A194 2H	ASTM A194 Gr. 4

Other materials and material combinations available on request.

BIMETALLIC THERMOSTATIC STEAM TRAPS

Limiting Conditions (According to ISO 6552)	BD100 F22	BD120 A105	BD120 F22
Steam Trap rating	ANSI 1500	ANSI 2500	ANSI 2500
PMA: Max allowable pressure	250 bar	425 bar	430 bar
TMA: max allowable temperature	580°C	425°C	580°C
PMO: max working pressure	110 bar	110 bar	110 bar
TMO: max working temperature	550°C	400°C	550°C

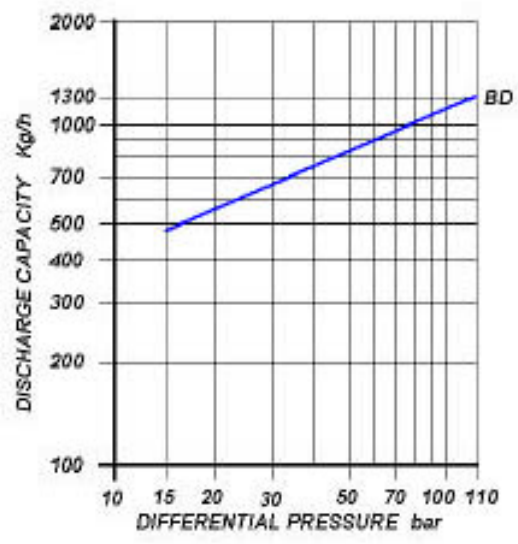
BIMETALLIC THERMOSTATIC



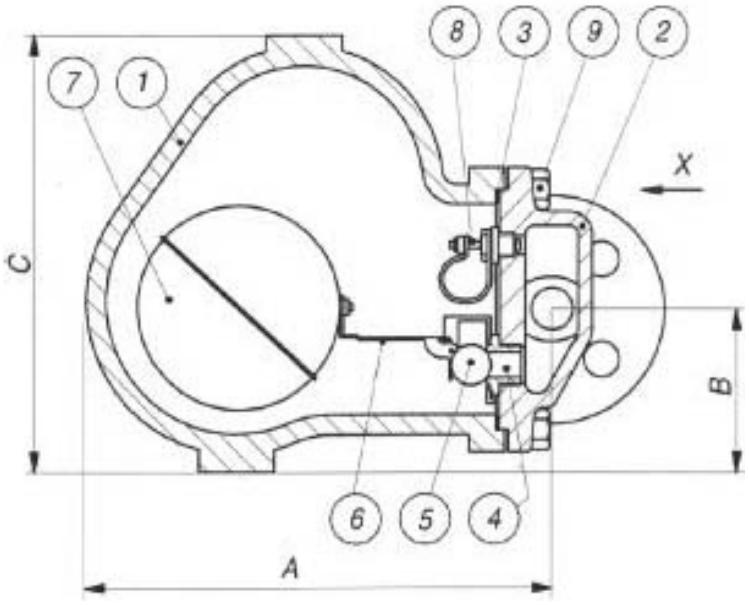
Measurements in mm.

SIZE

SIZE	S	A	B	C	WEIGHT KG	1500 RF - RJ		2500 RF		2500 RJ	
						SF	KG	SF	KG	SF	KG
1/2”	185	70	200	200	35	305	36	331	42	331	42
3/4”	185	70	200	200	35	322	40	341	44	341	44
1”	185	70	200	200	35	328	43	360	48	360	49
1½”	185	70	200	200	35	345	47	402	54	405	55



BALL FLOAT



MATERIAL SPECIFICATION - ALT-1 WCD & ALT-1 CF8M BALL FLOAT

NO	PART	MATERIAL	
		GA WCD	GA CF8M
1	Body	ASTM A216 WCB	ASTM A315 CF8M
2	Cover	ASTM A216 WCB	ASTM A315 CF8M
3	Gasket	Graphite	Graphite
4	Seat	AISI 316	AISI 316
5	Valve	AISI 316	AISI 316
6	Lever	AISI 316	AISI 316
7	Ball Float	AISI 316	AISI 316
8	Air Vent	Stainless Steel	Stainless Steel
9	Bolts	ASTM A193 B7	ASTM A193 B8

Other materials and material combinations available on request.

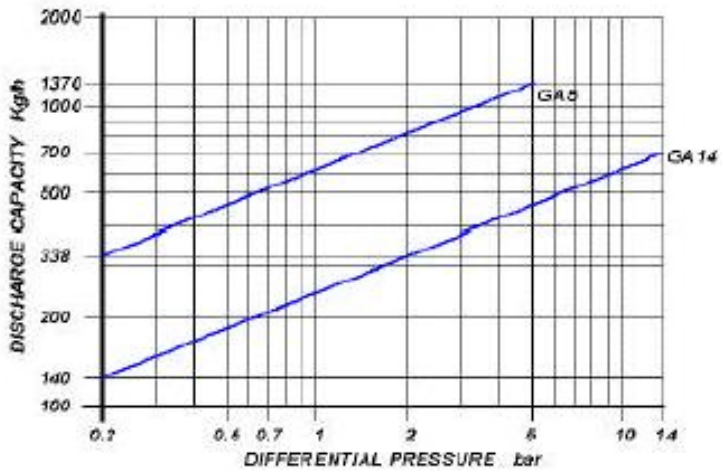
BALL FLOAT STEAM TRAPS

Limiting Conditions (According to ISO 6552)	GA WCD	GA CF8M
Steam Trap rating	ANSI 150	ANSI 150
PMA: Max allowable pressure	20 bar	20 bar
TMA: max allowable temperature	350°C	410°C
PMO: max working pressure	14 bar	14 bar
TMO: max working temperature	300°C	370°C
Max. Differential Pressure (GA 5)	5 bar	5 bar
Max. Differential Pressure (GA 14)	14 bar	14 bar

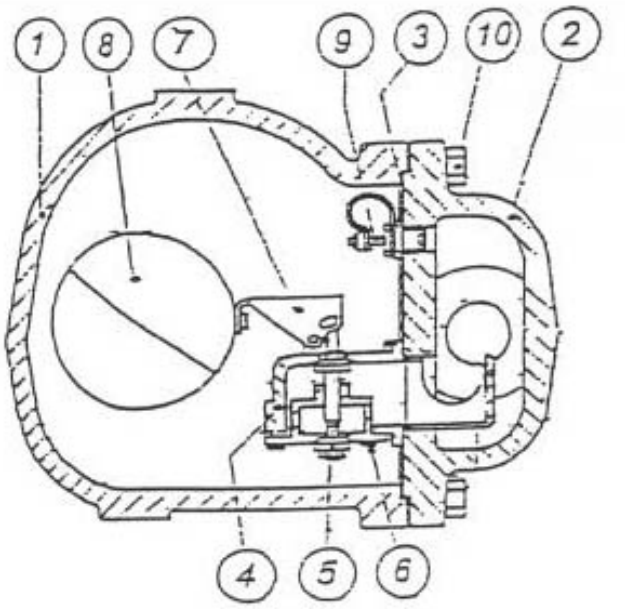
BALL FLOAT

SIZE

SIZE	S	A	B	C	WEIGHT KG	UNI-DIN		ANSI 150		ANSI 300		ANSI 600	
						SF	KG	SF	KG	SF	KG	SF	KG
1/2”	165	213	71	180	11	211	13,3	205	13,3	211	13,5	222	14
3/4”	165	213	71	180	11	215	13,7	207	13,7	211	14,6	230	15
1”	165	213	71	180	11	215	14,5	210	14,5	214	15,2	230	15,5



BALL FLOAT



MATERIAL SPECIFICATION - ALT-1 HC WCB / ALT-1 HC CF8M

NO	PART	MATERIAL	
		GE HC WCB	GE HC CF8M
1	Body	ASTM A216 WCB	ASTM A351 CF8M
2	Cover	ASTM A216 WCB	ASTM A351 CF8M
3	Gasket	316 / Graphite	316 / Graphite
4	Seat	AISI 316	AISI 316
5	Valve	AISI 316	AISI 316
6	Screws	Stainless Steel	Stainless Steel
7	Lever	AISI 316	AISI 316
8	Ball Float	AISI 316	AISI 316
9	Air Vent	Stainless Steel	Stainless Steel
10	Bolts	ASTM A193 B7	ASTM A193 B8

Other materials and material combinations available on request.

BALL FLOAT STEAM TRAPS

Limiting Conditions (According to ISO 6552)	GE HC WCD	GE HC CF8M
Steam Trap rating	ANSI 300	ANSI 300
PMA: Max allowable pressure	50 bar	50 bar
TMA: max allowable temperature	350°C	410°C
PMO: max working pressure	40 bar	40 bar
TMO: max working temperature	300°C	370°C
Max. Differential Pressure (GA 10)	10 bar	10 bar
Max. Differential Pressure (GE 20)	20 bar	20 bar
Max. Differential Pressure (GE 32)	32 bar	32 bar

SELECTION

The selection of steam traps for specific applications is made in two steps :

A. Choice of type

B. Choice of size

A. CHOICE OF TYPE

The main criteria for the selection of the type are (they cannot be listed in order of importance since it varies from application to application):

- Resistance to freezing
- Installation versatility
- Air venting
- Resistance to water hammer
- Cold condition (if water logging is not allowed the trap must be the open type)
- Type of discharge (with temperature regulating control valves , the modulating type is preferable)
- Heat exchange efficiency (traps discharging sub cooled condensate do not allow an efficient heat exchange)
- Sensitive to back pressure
- Reaction to load changes
- Pressure variations (types requiring changes of orifices for different pressure are unfit for wide variations)
- Dimension and weight

B. CHOICE OF SIZE

There are 3 parameters to take into account for a correct sizing:

1. Differential pressure

2. Condensate load to be discharged

3. Safety factor

1 – DIFFERENTIAL PRESSURE

The differential pressure is simply the difference between the pressure upstream and downstream of the trap. When a trap discharges at the atmosphere the downstream pressure is zero (we always refer to relative and not absolute pressure) and the differential pressure is the same of the line. When there is a condensate return system , there is always some pressure inside it due to friction and line lifting. The best way to know the value of downstream pressure (also called back pressure) is to install a pressure gouge just after the trap. If this is not practical one should calculate the amount of back pressure by formulas of pressure drop in water ducts adding approx. 0.1 bar for each meter of rise.

2 – CONDENSATE LOAD

This is the second parameter to be introduced into the capacity tables. For draining of steam mains the quantity of condensate is related to the size of the pipe , to the steam pressure , to the efficiency of thermal insulation , to the outside temperate , to the wind force if any and to the temperature of the line (cold start – up or running conditions). In all the other applications traps are used to drains machines utilizing steam as a heating medium. In these cases the quantity of condensate to be removed will be equal to the amount of steam used by the machines to give the desired performance .

3 – SAFETY FACTOR

For many reasons the steam trap will be not able to handle on field the condensate loads given in the capacity tables. These reasons are :

- Type of discharge (intermittent or continuous)
- How the condensate reaches the trap
- Presence of large quantities of air
- Influence of other traps discharging in the same return line

Moreover there may be incorrect assumptions in the condensate load calculation and it is necessary to take into account that at cold start – up the quantity of condensate to be discharged is a lot more than at running conditions. To summarize , the size of the trap is selected entering the capacity tables with the differential pressure and with the condensate load multiplied by the safety factor. A minimum safety factor 1.2 / 1.5 must be always taken into consideration. Higher safety factors 2 / 4 are required for certain applications .