

INTERPLANT STANDARD — STEEL INDUSTRY



SPECIFICATION FOR STEAM TRAP

IPSS : 1-06-021-86

CORRESPONDING INDIAN STANDARD DOES NOT EXIST

0. Foreword

0.1 Interplant standardization activity in steel industry is being pursued under the aegis of the Indian Standards Institution (ISI) and the Steel Authority of India Limited (SAIL). This Interplant Standard, prepared by the Subcommittee on Pipes, Fittings, Valves and Piping Layout, IPSS 1 : 6 with the active participation of the representatives of all the steel plants, and established manufacturers of steam traps, was adopted by the Approval Committee on Consumable Stores and General Equipment, IPSS 1, on 14 October 1986.

0.2 Interplant Standards for steel industry primarily aim at achieving rationalization and unification of parts and sub-assemblies used in steel plant equipment and accessories and provide guidance in indenting stores or equipment for existing or new installations by individual steel plants. For exercising effective control on the inventories, it is advisable to select a fewer number of sizes (or types) from among the products mentioned in this standard for the purpose of company standards of individual steel plants. It is not desirable to make deviations in technical requirements.

1. Scope — This Interplant Standard covers the requirement of steam traps used in steel industry.

2. Types — The steam traps shall be of following types:

- a) *Type A* — Cast steel float traps (up to 31 kg/cm²) pressure, 425°C temperature with IBR approval);
- b) *Type B* — Cast iron float traps (up to 14 kg/cm²) at 200°C without IBR certificate and for applications where CI material is acceptable;
- c) *Type C* — Thermo dynamic steam traps;
- d) *Type D* — Thermo static balanced pressure type steam traps (up to 17 kg/cm²); and
- e) *Type E* — Inverted buckets type steam trap (pressure-temperature rating : 11.25 kg/cm²-204.4°C).

3. Material

3.1 Material of Construction for Steam Traps, Type A

Sl No.	Part	Material
i)	Body	Cast steel
ii)	Cover gasket	Compressed asbestos fibre
iii)	Cover bolt and nuts	Steel
iv)	Cover	Cast steel
v)	Valve seat	Stainless steel (SS)
vi)	Valve seat gasket	Mild steel (MS)
vii)	Pivot frame assembly set screw	SS
viii)	Ball float and lever	SS
ix)	Air vent	SS
x)	Air vent seat gasket	MS
xi)	Steam lock release (SLR) unit	SS
xii)	SLR unit gasket	MS

Amendments Issued (to be filled up by the user department):

No.	Date of Issue	No.	Date of Issue
1		3	
2		4	

UDC 621.186.6

<i>Sl No.</i>	<i>Part</i>	<i>Material</i>
xiii)	SLR seat	SS
xiv)	SLR seat gasket	MS
xv)	Support frame	SS
xvi)	Pivot frame	SS

3.2 Material of Construction for Steam Traps, Type B

<i>Sl No.</i>	<i>Part</i>	<i>Material</i>
i)	Cover	Cast iron IS : 210 Gr 20
ii)	Cover bolts	Steel M10 × 30 mm
iii)	Cover gasket	Compressed asbestos fibre
iv)	Body	Cast iron IS : 210 Gr 20
v)	Valve seat	Stainless steel (SS 304)
vi)	Valve seat gasket	Mild steel
vii)	Pivot frame assembly set—set screws	Stainless steel MS × 20 mm
viii)	Ball float and lever	Stainless steel (SS 304)
ix)	Air vent	Brass and stainless steel
x)	Air vent seat gasket	Mild steel
xi)	SLR unit	Stainless steel (SS 304) (brass cap)
xii)	SLR unit gasket	Mild steel
xiii)	SLR seat	Stainless steel 304
xiv)	SLR seat gasket	Mild steel 304
xv)	Support frame	Stainless steel 304
xvi)	Pivot frame	Stainless steel

3.3 Material of Construction for Steam Traps, Type C

<i>Sl No.</i>	<i>Part</i>	<i>Material</i>
i)	Body/cap	Cast stainless steel (up to 41 kg/cm ² and 425°C) alloy steel/forged steel
ii)	Strainer screen	Stainless steel SS 304
iii)	Disc/Seat	Stainless steel SS 304 hardened (mw 40/45 Rc) ground and lapped

3.4 Material of Construction for Steam Traps, Type D

<i>Sl No.</i>	<i>Part</i>	<i>Material</i>
i)	Cover	Carbon steel
ii)	Element	Stainless steel 304
iii)	Valve and seat assembly	Stainless steel 304
iv)	Valve seat gasket	Mild steel
v)	Strainer screen	Stainless steel
vi)	Cover gasket	Compressed asbestos fibre
vii)	Body	Carbon steel

3.5 Material of Construction for Steam Traps, Type E

<i>Sl No.</i>	<i>Part</i>	<i>Material</i>
i)	Body and cover	Cast iron IS : 210 Gr 14
ii)	Valve	Chrome steel (Cr 16-18 percent) hardness RC 52-55
iii)	Valve seat	Chrome steel (Cr 16-18 percent)
iv)	Valve retainer	304 stainless steel 18/8
v)	Valve lever	304 stainless steel 18/8
vi)	Guide pin	304 stainless steel 18/8
vii)	Bucket	304 stainless steel 18/8

4. Overall Face to Face (Flange to Flange) Dimension

4.1 Overall Face to Face (Flange to Flange) Dimension for Steam Traps, Type A

Size	Length (mm)
15 NB	218
20 NB	218
25 NB	231
40 NB	338
50 NB	325

4.2 Overall Face to Face Length for Steam Traps, Type B

Size	Length (mm)
15 NB	120
20 NB	120
25 NB	120
40 NB	270
50 NB	300

4.3 Overall Dimension (End to End) for Steam Traps, Type C

Size	Length (mm)
15 NB	84.1
20 NB	85.7

4.4 Overall Dimension (End to End) for Steam Traps, Type D

Size	Length (mm)
NB 15 mm	76.2

4.5 Overall Dimension for Steam Traps, Type E — Flange to flange dimensions:

Size	Length (mm)
NB 15 mm	168.3
NB 20 mm	190.5

5. Technical Requirements

5.1 Special Requirements for Steam Traps, Type A

- i) Traps shall be provided with inbuilt strainer;
- ii) Traps shall have high air venting capacity through auxiliary balanced pressure air-vent, which is self adjusting for varying steam pressure;
- iii) Traps shall have high thermal efficiency at both light and heavy loads:
All end connections are screwed B.S.P.T;
- iv) Continuous modulating discharge should not create pressure disturbances;
- v) Traps shall have steam lock release facility;
- vi) Traps should have fair resistance to pulsating loads, water hammer and vibrations;
- vii) Traps shall have blast discharge and clean cut off;
- viii) Traps should be unaffected by change in inlet press; and
- ix) I.B.R. approval test certificate is essential.

5.2 Special Requirements for Steam Traps, Type B

Same as cast steel float traps, that is, Type A, except the requirement given in 5.1(ix).

5.3 Special Requirements for Steam Traps, Type C

- a) Condensate entry under the disc should be concentric to ensure even wear on trim, and
- b) Other conditions are same as float traps.

5.4 Special Requirements for Steam Traps, Type D — Same as float traps of Types A and B given in 5.1 and 5.2.

6. Hydrostatic Test

6.1 Hydrostatic test pressure for body should be twice the maximum working pressure in the case of steam traps Types A and B.

6.2 Hydrostatic test pressure should be $1\frac{1}{2}$ to 2 times the maximum working pressure in case of steam traps Types C and D.

7. Discharge capacities of steam traps Types A, B, C, D and E are given in Tables 1, 2, 3, 4 and 5 respectively.

8. The information required when specifying a steam traps shall include full identification as follows:

- i) Type of trap;
- ii) Figure or other identifying number;
- iii) Service (steam/condensate);
- iv) Application;
- v) Capacity (condensate) kg/hr (*Max/Min/normal*);
- vi) Differential pressure (kg/cm²);
- vii) Operating temperature, °C;
- viii) Size;
- ix) End connections; and
- x) IBR certificate required or not.

TABLE 1 DISCHARGE CAPACITIES IN kg/h AT DIFFERENTIAL PRESSURE (CAST STEEL FLOAT STEAM TRAPS, TYPE A)

(Clause 7)

Trap Size, mm	Maximum Working Differential Pressure kg/cm ²	Pressure Differential (kg/cm ²)										
		0.2	0.4	0.6	0.8	1.0	2.0	4.0	6.0	10.0	20	30
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
15/20	4.5	150	200	250	300	320	450	500	—	—	—	—
15/20	10	95	125	150	175	200	230	350	450	600	—	—
15/20	14	70	100	125	145	155	220	300	350	450	—	—
15/20	21	38	52	65	72	80	120	152	175	240	300	—
15/20	32	22	32	40	45	50	70	95	110	140	175	200
25	4.5	550	800	850	1 025	1 200	1 600	2 200	—	—	—	—
25	10	300	400	475	550	600	850	1 200	1 400	1 800	—	—
25	14	210	300	350	400	450	600	850	1 100	1 250	—	—
25	21	150	210	250	280	320	450	600	700	950	1 200	—
40	4.5	1 800	2 500	3 000	3 500	4 000	5 500	8 000	—	—	—	—
40	10	900	1 200	1 600	1 800	2 200	2 700	3 800	4 500	6 000	—	—
40	21	600	850	1 000	1 200	1 400	1 800	2 500	3 000	4 000	5 900	—
50	4.5	6 500	9 000	1 100	12 500	14 000	18 000	25 000	—	—	—	—
50	10	3 200	3 500	4 000	5 000	6 000	7 800	10 000	12 500	15 000	—	—
50	21	1 250	1 600	2 000	2 250	2 700	3 500	5 000	6 000	8 000	12 000	—

TABLE 2 DISCHARGE CAPACITIES IN kg/h AT DIFFERENT DIFFERENTIAL PRESSURE (C. I. FLOAT TRAPS, TYPE B)
(Clause 7)

Traps Size, mm	Maximum Working Differential Pressure (kg/cm ²)	Pressure Differential (kg/cm ²)															
		1'0	2'0	3'0	4'0	5'0	6'0	7'0	8'0	9'0	10'0	11'0	12'0	13'0	14'0		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)		
15/20	4.5	175	415	525	600	—	—	—	—	—	—	—	—	—	—	—	—
15/20	10	140	200	250	290	325	360	390	410	430	450	—	—	—	—	—	—
15/20	14	50	100	145	160	180	200	215	225	230	240	250	250	250	250	250	250
25	4.5	1 200	1 700	2 100	2 300	—	—	—	—	—	—	—	—	—	—	—	—
25	10	500	700	800	1 000	1 100	1 200	1 300	1 375	1 440	1 500	—	—	—	—	—	—
25	14	250	400	500	550	600	650	700	750	800	850	900	950	1 000	1 000	1 000	1 000
		Pressure Differential (kg/cm ²)															
		0'1	0'2	0'4	0'6	1	2	3	4	5	6	7	8	10	14		
40	4.5	1 400	1 800	2 500	3 000	3 500	5 000	7 000	8 000	—	—	—	—	—	—	—	—
40	10	650	950	1 400	1 500	2 000	2 500	3 200	4 000	4 500	5 000	5 300	5 600	6 000	—	—	—
40	14	450	600	800	1 000	1 300	1 600	2 000	2 400	2 700	3 000	3 300	3 600	3 900	4 400	—	—
50	4.5	4 500	7 000	9 000	10 000	13 000	16 000	20 000	25 000	—	—	—	—	—	—	—	—
50	10	1 800	2 500	4 000	4 500	5 000	7 000	9 000	10 000	10 200	10 400	10 500	10 600	10 700	—	—	—
50	14	800	1 200	1 700	2 000	2 500	3 500	4 000	4 500	5 000	5 500	6 000	6 500	7 000	8 000	—	—

TABLE 3 DISCHARGE CAPACITIES IN kg/h FOR STEAM TRAPS, TYPE C

(Clause 7)

Inlet Steam Pressure Gauge	Discharges	
	NB 15 mm	NB 20 mm
(1)	(2)	(3)
0.70	210	455
1.06	235	490
1.41	260	520
1.76	275	580
3.52	355	690
5.27	410	795
7.03	470	860
10.55	580	995
14.06	665	1 090
17.58	725	1 135
21.09	725	1 135
24.61	810	1 245
28.12	850	1 315
31.64	895	1 335
35.15	930	1 360
42.18	985	1 380

TABLE 4 DISCHARGE CAPACITIES IN kg/h AT DIFFERENT DIFFERENTIAL PRESSURE FOR STEAM TRAPS, TYPE D

(Clause 7)

Differential Pressure kg/cm ²	Discharge kg/h
1	300
2	500
3	800
4	950
5	1 050
6	1 175
7	1 250
8	1 325
9	1 400
10	1 450
11	1 500
12	1 559
13	1 600
14	1 650
15	1 700
16	1 750
17	1 800

TABLE 5 DISCHARGE CAPACITIES IN kg/h AT DIFFERENT DIFFERENTIAL PRESSURE FOR STEAM TRAPS, TYPE E

(Clause 7)

Trap Size mm	Pressure Differential in kg/cm²															
	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	
(1)	0.35	0.70	1.06	1.41	1.76	2.11	2.82	3.52	4.22	4.92	5.62	7.03	8.79	10.55	11.25	
15	195	255	290	315	240	265	295	265	280	300	315	290	310	260	265	
20	375	445	480	400	430	455	350	380	410	430	365	390	430	365	375	