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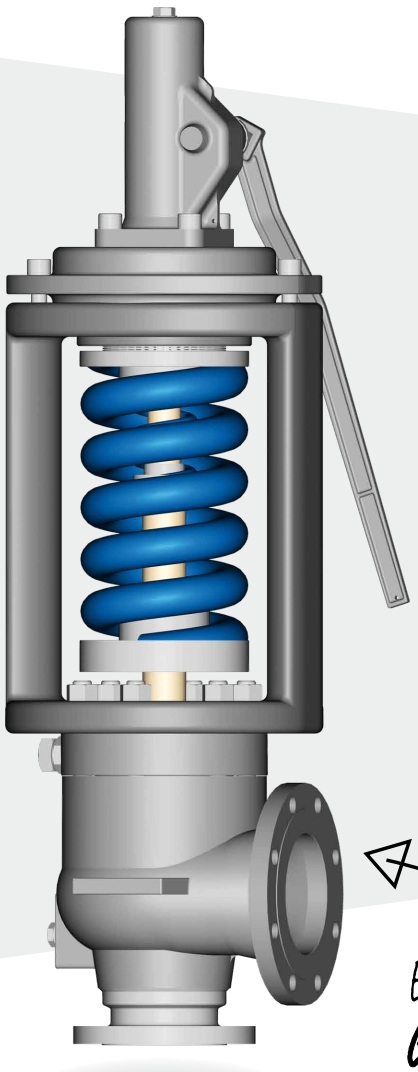
IMI BOPP & REUTHER

Si 910



Engineering GREAT Solutions

Safety Valves acc. to ASME Sec. I, Sec. III and Sec. VIII

IMI Critical Engineering

Si 910

Features

IMI Bopp & Reuther steam safety valve acc. to ASME Sec. I

- > High capacity
- > Fixed overpressure and blowdown acc. ASME Sec. I with no rings hence no requirement for adjustment
- > Stable position at full lift by mechanical lift stop
- > Full nozzle design
- > Nozzle and disc seat hard faced is standard
- > Special disk spring design for high pressures and large sizes ensures optimum operation

Inlet sizes
NPS 1.5 to NPS 12

Inlet pressure rating
ASME Cl 150 to Cl 2500

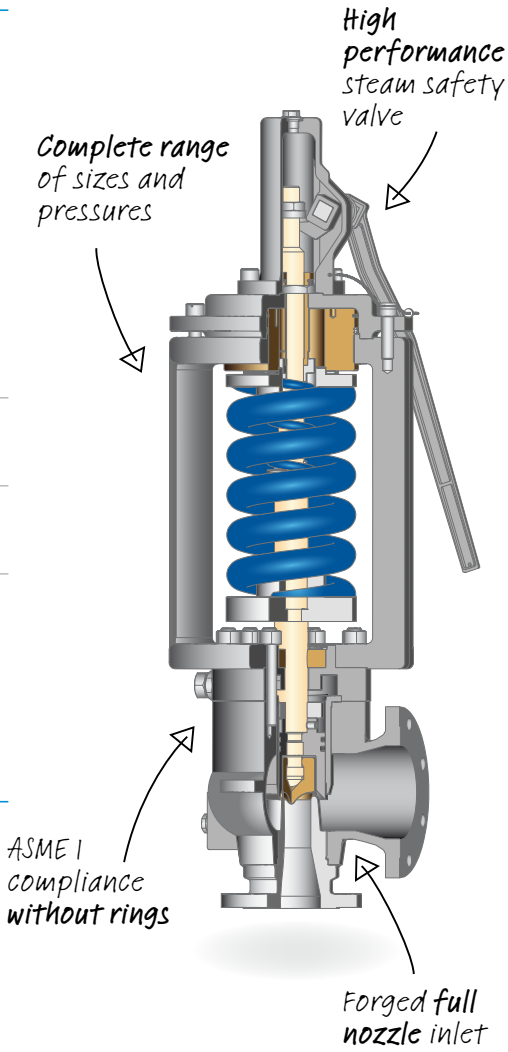
Set pressures
3 bar g to 330 bar g
44 psig to 4785 psig

Temperature range
650 °C / 1202 °F

Overpressure
3%

Blow down
4%-7%

Allowable built-up back pressure
25% of the set pressure



Applications

- > Steam boiler
- > Superheater
- > Power plants
- > Industrial steam generation
- > Process steam systems

Approvals and standards

ASME capacity certification

- ASME Boiler & Pressure Vessel Code Section I and VIII
- ASME Boiler & Pressure Vessel Code Section I, restricted lift
- ASME Boiler & Pressure Vessel Code Section III
- Capacity certification by The National Board of Boiler and Pressure Vessel Inspectors

EC type examination

- Pressure Equipment Directive 97/23/EC
- DIN EN ISO 4126-1
- AD 2000-Merkblatt A2
- VdTÜV Merkblatt “Sicherheitsventil 100”

The design, manufacture, testing and labelling meet the requirements of DIN EN ISO 4126-7, DIN EN 12266-1/-2 (insofar as applicable to safety valves), DIN EN 1092 parts I and II Flanges, AD 2000-Merkblatt A4, AD 2000-Merkblatt HP0, technical rules for steam boiler TRD 110, TRD 421

Si 910

Type code

Type code				Order example
1	**Series**	Si 9	Steam safety valve acc. ASME Sec. I	Si 9
2	**Design**	1	Conventional, open bonnet	1
3	**Characteristic**	0	High capacity “High Flow”	0
4	**Pressure class**	1	ASME class 150 x 150	5
		2	ASME class 300 x 150	
		3	ASME class 600 x 150	
		4	ASME class 900 x 300	
		5	ASME class 1500 x 300	
		6	ASME class 2500 x 600 up to orifice P ASME class 1500 x 600 from orifice P2	
		7	ASME class 2500 x 600 up to orifice P ASME class 1500 x 600 from orifice P2	
5	**Cap**	AB	Lifting lever with test gag	AB
		AK	Pneumatic actuator	
6	**Material code**	00	SA-216 WCB up to 800 °F/427 °C	00
		11 [1]	SA-217 WC9 up to 1094 °F/590 °C	
		21	SA-217 C12A up to 1202 °F/650 °C	
7	**Options**	.09	Locking sleeve (government ring)	.59.60
		.14a	Lift indication with inductive proximity switch in the cap	
		.14b	Lift indication with inductive proximity switch in the auxiliary housing	
		.14c	Lift indication with inductive proximity switch for exposed spindle with actuator AK	
		.22a	Weld end inlet	
		.22b	Weld end outlet	
		.25	Block body design	
		.35	Lift restriction ring	
		.59 [2]	Stellited disc	
		.60 [2]	Stellited seat	
		.83a [3]	Yoke column and coil spring	
		.83b [3]	Yoke column and disc spring	

[1] The standard materials of the material code 11 can be modified by selecting the trim code T1. The trim code T1 increases the temperature application range of the selected safety valve and therewith enable its use in high operating and discharge temperatures. Please see “IMI Bopp & Reuther High Flow Safety Valves” page 44 for information. on our trim code T1.

[2] Stellited disc and stellited seat is a standard for Si 910 valves.

[3] Design options .83a for yoke column design and .83b for yoke column with disk spring are dedicated for high pressures and large sizes. The IMI Bopp & Reuther sizing software Si-Tech 4 automatically uses these option codes.

Type ►	**Si 9105 AB 00.59.60**
Please state ►	
Set pressure	12.0 MPa g
Relief temp.	410 °C
Fluid and state	Steam Superheated
Inlet	NPS 2, Cl. 2500 RF
Outlet	NPS 3, Cl. 300 RF
Flow diameter	40 mm / J2
Approval	ASME I (V)

Si 910

Coefficient of discharge and capacity calculation

Orifice designator	Flow area [in²]	Flow area [mm²]	Orifice diameter [in]	Orifice diameter [mm]	Full rated lift [mm]
F	0.487	314	0.787	20	6.0
G	0.761	491	0.984	25	7.5
H	1.247	804	1.260	32	9.6
J	1.577	1018	1.417	36	10.8
J2	1.949	1257	1.575	40	12.0
K	2.467	1590	1.772	45	13.5
K2	3.291	2124	2.047	52	15.6
L	4.094	2642	2.283	58	17.4
M	4.831	3117	2.480	63	18.9
N	5.629	3632	2.677	68	20.4
N2	6.488	4185	2.874	73	21.9
P	7.597	4902	3.110	79	23.7
P2	9.005	5809	3.386	86	25.8
P3	10.99	7088	3.740	95	28.5
Q	13.42	8659	4.134	105	31.5
Q2	15.27	9852	4.409	112	33.6
Q3	17.53	11310	4.724	120	36.0
R	21.21	13685	5.197	132	39.6
R2	25.60	16513	5.709	145	43.5
T	30.39	19607	6.220	158	47.4
T2	35.18	22698	6.693	170	51.0
T3	40.77	26302	7.205	183	54.9
V	47.25	30481	7.756	197	59.1
W	57.86	37325	8.583	218	65.4
W2	67.23	43374	9.252	235	70.5

The certified coefficient of discharge acc. to ASME Section I and VIII is K = 0.826. The coefficient applies for the orifice sizes given above and set pressure ranges starting 3.0 bar g / 44 psig up to the maximum set pressures detailed on page 10.

The same certified coefficient of discharge K = 0.826 and design limits apply for the PED approval.

Steam capacity calculation acc. ASME Sec. I

Capacity formula for Si units:

W_C = certified flow capacity [kg/hr]

$$W_C = K \times 5.25 \times A \times P \times K_N \times K_{SC} \times K_{SH}$$

A = flow area [mm²]

P = (1.03 × set pressure + 0.101) MPa or (set pressure + 0.014 + 0.101) MPa, whichever is greater

K = coefficient of discharge

K_N = Correction factor for the Napier equitation for pressures over 10.3 MPa g and up to 22.1 MPa g, which shall be used only if it is 1.0 or greater.

$$K_N = \frac{27.6\ P - 1000}{33.2\ P - 1061}$$

K_{SH} = Superheat correction factor, from ASME Sec. I Table PG-68.7M

K_{SC} = Supercritical correction factor, from ASME Sec. I Table PG-69.2.3M

Capacity formula for USCS Units:

W_C = certified flow capacity [lb/hr]

$$W_C = K \times 51.5 \times A \times P \times K_N \times K_{SC} \times K_{SH}$$

A = flow area [in²]

P = (1.03 × set pressure + 14.7) psia or (set pressure + 2 + 14.7) psia, whichever is greater

K = coefficient of discharge

K_N = Correction factor for the Napier equitation for pressures over 1500 psig and up to 3200 psig, which shall be used only if it is 1.0 or greater.

$$K_N = \frac{0.1906\ P - 1000}{0.2292\ P - 1061}$$

K_{SH} = Superheat correction factor, from ASME Sec. I Table PG-68.7

K_{SC} = Supercritical correction factor, from ASME Sec. I Table PG-69.2.3

Formula for restricted lift calculation

$W_{RL} = W_C \times L_{RL} / L_{FR}$
(acc. to ASME Sec. I, PG-73.2.10 (f))

→ $L_{RL} = W_{RL} / W_C \times L_{FR}$

$L_{RL} > L_{FR} \times 0.3$ or $L_{RL} > 0.08$ in or 2 mm

W_{RL} = restricted relieving capacity [kg/hr] or [lb/hr]

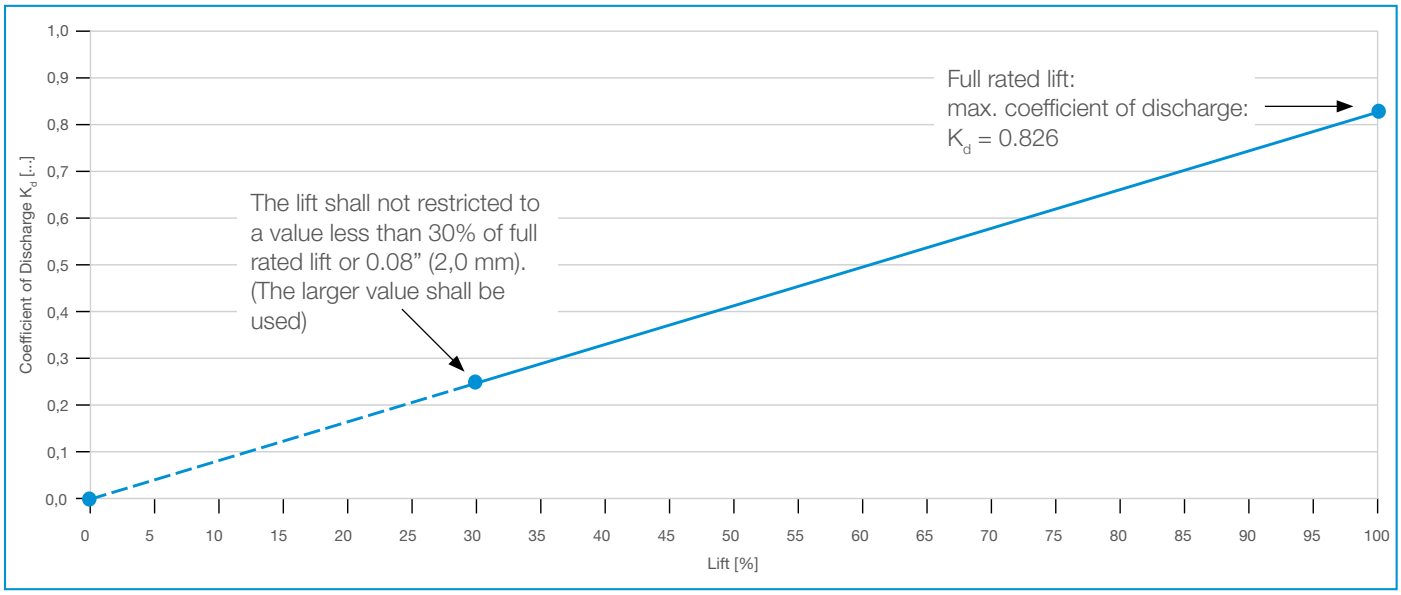
L_{RL} = restricted lift [mm] or [in]

L_{FR} = full rated lift [mm] or [in]

Si 910

Restricted lift

The lift of a valve may be restricted to prevent oversizing. Oversizing may cause valve chattering. IMI Bopp & Reuther recommends a lift restriction, if the relieving capacity is more than 15% above the required capacity. The restricted capacity can also be beneficial for silencer sizing. Valves shall not have their lifts restricted to a value less than 30% of the full rated lift, but limited to a minimum lift of 0.08 in or 2 mm.



Sample size calculation acc. to ASME Sec. I

Fluid
Saturated steam

Set pressure
10.0 MPa g

Relieving pressure P at 3% accumulation
(10.0 x 1.03)+0.101 = 10.401 MPa a

Required capacity
46000 kg/hr

For saturated steam K_{SC} and K_{SH} are not applicable and not K_N with the given set pressure.

$$A_{required} = W_C / (K \times 51.5 \times P) = 46000 / (0.826 \times 51.5 \times 10.401) = 1020 \text{ mm}^2$$

The nearest suitable Si 9 series flow area is 1257 mm² and the possible valve selection:

Si 9104 A 00.59.60

NPS 2 Cl. 900 x NPS 3 Cl. 300

Orifice J2

The certified flow capacity for this valve is 56696 kg/hr.

In order to limit the 23% overcapacity a lift restriction is recommended.

L_{FR} = 12.0 mm for the selected valve

L_{RL} = $W_{RL} / W_C \times L_{FR}$

L_{RL} = 46000 kg/hr / 56696 kg/hr x 12 mm

L_{RL} = 9.74 mm → L_{RL} = 10.0 mm

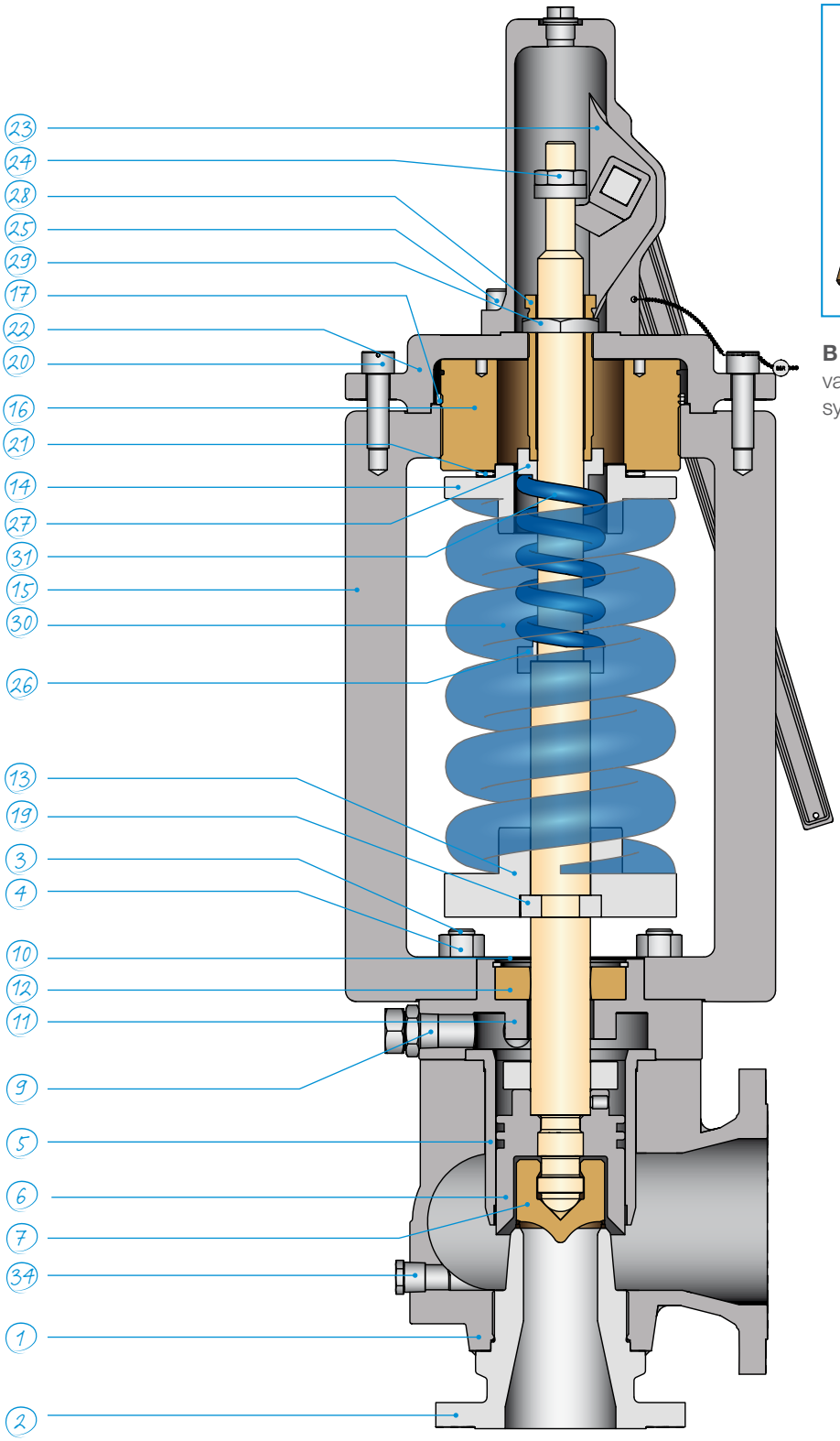
$L_{RL} > L_{FR} \times 0.3$ ✔

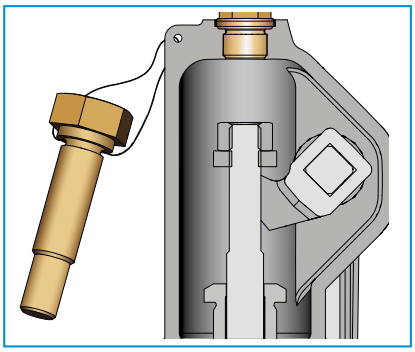
$L_{RL} > 2$ mm ✔

→ The Lift of the valve may be restricted to 10.0 mm to better meet the required capacity. The restricted capacity W_{RL} = 47247 kg/hr.

Si 910

Material code





B Test gag: Blocking of the safety valve for pressure testing the pressure system.

Si 910

Material code			00	11	21
Temperature application range			800 °F /427 °C	1094 °F /590 °C	1202 °F /620 °C
Part	**Name**	**Spare part**	**Material**	**Material**	**Material**
1	Body		Carbon steel SA-216 WCB	Alloy steel SA-217 WC9	Alloy steel SA-217 C12A
2	Inlet nozzle flanged		Carbon steel SA-105 [1)]	Alloy steel SA-182 F22 Cl.3 [1)]	Alloy steel SA-182 F91 [1)]
3	Stud		Alloy steel SA-193 Gr. B7	Alloy steel SA-193 Gr. B16	Alloy steel SA-193 Gr. B16
4	Hexagonal nut		Steel SA-194 Gr. 2H	Steel SA-194 Gr. 2H	Steel SA-194 Gr. 2H
5	Guide bushing	*1	Stainless steel	Stainless steel	Stainless steel
6	Lift collar	*3	Stainless steel	Stainless steel	Stainless steel
7	Disc	*2	Stainless steel [1)]	Alloy steel SA-182 F22 Cl.3 [1)]	Alloy steel SA-182 F91 [1)]
9	Vent plug		Stainless steel	Stainless steel	Stainless steel
10	Circlip		Spring steel	Spring steel	Spring steel
11	Intermediate piece		Carbon steel SA-105	Alloy steel SA-182 F2203	Alloy steel SA-182 F91
12	Sliding bushing	*1	Stainless steel	Stainless steel	Stainless steel
13	Spring washer, bottom		Carbon steel	Carbon steel	Carbon steel
14	Spring washer, top		Carbon steel	Carbon steel	Carbon steel
15	Yoke		Carbon steel SA-216 WCB	Carbon steel SA-216 WCB	Carbon steel SA-216 WCB
16	Adjusting screw		Carbon Steel	Carbon Steel	Carbon Steel
17	Adjusting screw nut		Steel	Steel	Steel
18	Spindle	*3	Stainless steel	Stainless steel	Stainless steel
19	Holding ring		Stainless steel	Stainless steel	Stainless steel
20	Cylinder screw		Steel	Steel	Steel
21	Thrust bearing		Steel	Steel	Steel
22	Guiding cap		Carbon steel SA-216 WCB	Carbon steel SA-216 WCB	Carbon steel SA-216 WCB
23	Lifting lever (cap)		Carbon steel SA-216 WCB	Carbon steel SA-216 WCB	Carbon steel SA-216 WCB
24	Lifting nut		Steel	Steel	Steel
25	Cylinder screw		Steel	Steel	Steel
26	Trim spring washer, bottom		Carbon steel	Carbon steel	Carbon steel
27	Trim spring washer, top		Carbon steel	Carbon steel	Carbon steel
28	Adjusting screw		Stainless steel	Stainless steel	Stainless steel
29	Adjusting screw nut		Stainless steel	Stainless steel	Stainless steel
30	Spring	*3	Alloy steel Corrosion resist. coating	Alloy steel Corrosion resist. coating	Alloy steel Corrosion resist. coating
31	Trim spring	*3	Alloy steel Corrosion resist. coating	Alloy steel Corrosion resist. coating	Alloy steel Corrosion resist. coating
34	Drain plug		Stainless steel	Stainless steel	Stainless steel

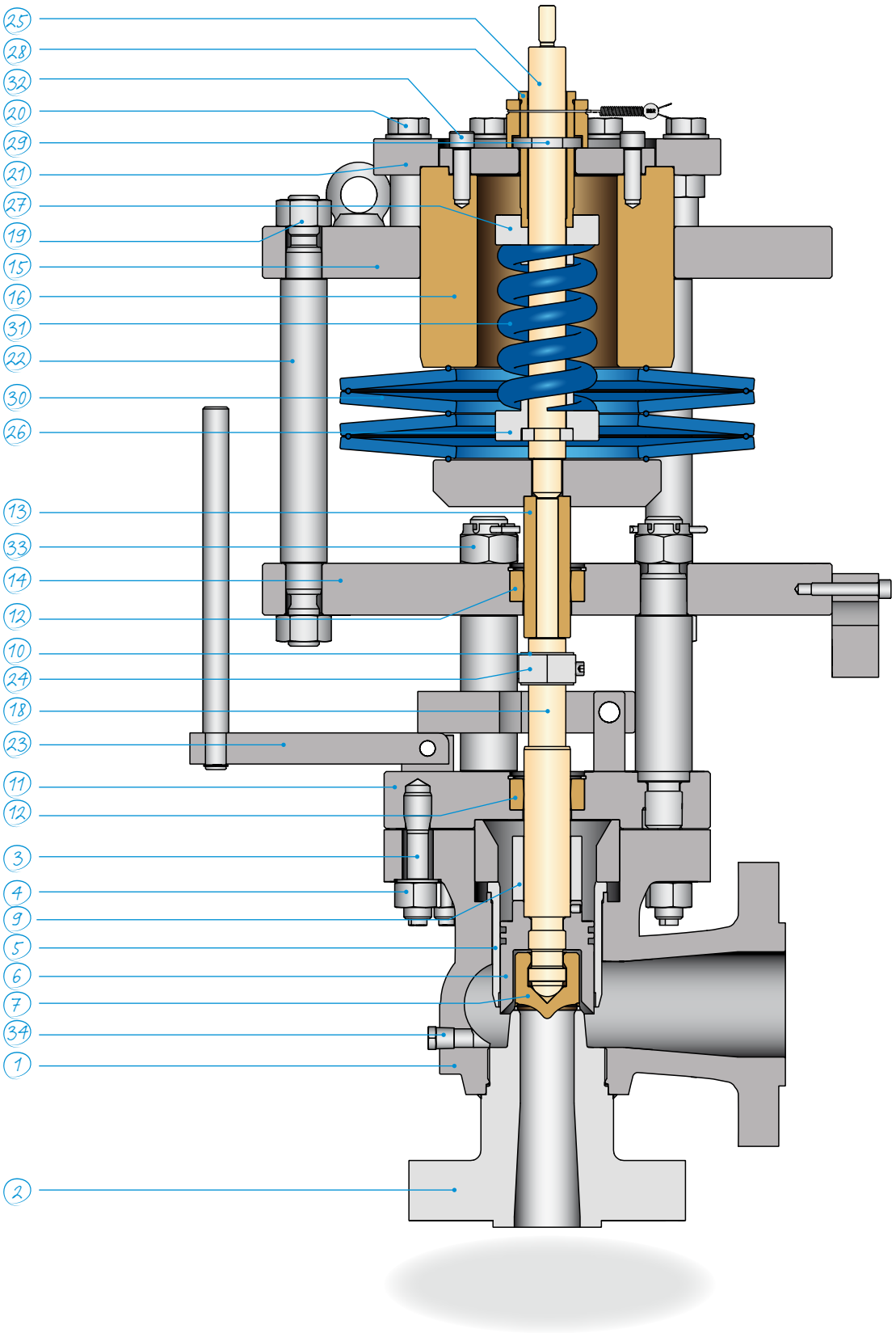
Notes:
[1)] Part is hardfaced

Spare Parts:
*1 Expendable parts, should be replaced as part of any revision if a damage is visible.
*2 Rework spare parts, should be replaced if a rework is no longer possible.
*3 Long life spare parts, replacement may be required after several years of operation.

IMI Bopp & Reuther reserve the right to technical changes or application of higher quality materials without prior notice. The material design can be tailored to customer specifications at any time upon request.

Si 910x.83b

Material code



Si 910x.83b

Material code			00	11	21
Temperature application range			800 °F /427 °C	1094 °F /590 °C	1202 °F /620 °C
Part	**Name**	**Spare part**	**Material**	**Material**	**Material**
1	Body		Carbon steel SA-216 WCB	Alloy steel SA-217 WC9	Alloy steel SA-217 C12A
2	Inlet nozzle flanged		Carbon steel SA-105 [1)]	Alloy steel SA-182 F22 Cl.3 [1)]	Alloy steel SA-182 F91 [1)]
3	Stud		Alloy steel SA-193 Gr. B7	Alloy steel SA-193 Gr. B16	Alloy steel SA-193 Gr. B16
4	Hexagonal nut		Steel SA-194 Gr. 2H	Steel SA-194 Gr. 2H	Steel SA-194 Gr. 2H
5	Guide bushing	*1	Stainless steel	Stainless steel	Stainless steel
6	Lift collar	*3	Stainless steel	Stainless steel	Stainless steel
7	Disc	*2	Stainless steel [1)]	Alloy steel SA-182 F22 Cl.3 [1)]	Alloy steel SA-182 F91 [1)]
9	Lift stop		Stainless steel	Stainless steel	Stainless steel
10	Circlip		Spring steel	Spring steel	Spring steel
11	Intermediate piece		Carbon steel SA-105	Alloy steel SA-182 F2203	Alloy steel SA-182 F91
12	Sliding bushing	*1	Stainless steel	Stainless steel	Stainless steel
13	Guide bushing	*1	Stainless steel	Stainless steel	Stainless steel
14	Intermediate bottom plate		Carbon steel SA-105	Alloy steel SA-182 F2203	Alloy steel SA-182 F91
15	Intermediate top plate		Carbon steel SA-105	Carbon steel SA-105	Alloy steel SA-182 F91
16	Pressure ring		Steel	Steel	Steel
18	Spindle	*3	Stainless steel	Stainless steel	Stainless steel
19	Hexagonal nut		Steel SA-194 Gr. 2H	Steel SA-194 Gr. 2H	Steel SA-194 Gr. 2H
20	Adjusting screw		Steel	Steel	Steel
21	Top plate		Carbon steel SA-105	Carbon steel SA-106	Carbon steel SA-107
22	Intermediate column		Carbon steel SA-105	Carbon steel SA-106	Carbon steel SA-107
23	Lifting lever		Carbon steel	Carbon steel	Carbon steel
24	Lifting nut		Steel	Steel	Steel
25	Rod		Stainless steel	Stainless steel	Stainless steel
26	Trim spring washer, bottom		Carbon steel	Carbon steel	Carbon steel
27	Trim spring washer, top		Carbon steel	Carbon steel	Carbon steel
28	Adjusting screw		Steel	Steel	Steel
29	Adjusting screw nut		Steel	Steel	Steel
30	Spring	*3	Alloy steel Corrosion resist. coating	Alloy steel Corrosion resist. coating	Alloy steel Corrosion resist. coating
31	Trim spring	*3	Alloy steel Corrosion resist. coating	Alloy steel Corrosion resist. coating	Alloy steel Corrosion resist. coating
32	Cylinder screw		Steel	Steel	Steel
33	Hexagonal nut		Steel	Steel	Steel
34	Drain plug		Stainless steel	Stainless steel	Stainless steel

Notes:
[1)] Part is hardfaced.

Spare Parts:
*1 Expendable parts, should be replaced as part of any revision if a damage is visible.
*2 Rework spare parts, should be replaced if a rework is no longer possible.
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Si 910

Valve data: Maximum set pressure

Inlet size	Orifice designator	Outlet size	Maximum Set Pressure [bar g] Inlet class							Maximum Set Pressure [psig] Inlet class						
NPS	d_0	NPS	01	02	03	04	05	06	07	01	02	03	04	05	06	07
1.5	F	2.5	20	50	90	130	180	300	-	290	725	1305	1885	2610	4351	-
1.5	F	3.0	20	50	90	130	180	300	-	290	725	1305	1885	2610	4351	-
1.5	G	2.5	20	50	90	130	180	300	-	290	725	1305	1885	2610	4351	-
1.5	G	3.0	20	50	90	130	180	300	-	290	725	1305	1885	2610	4351	-
1.5	H	2.5	20	50	90	130	160	300	-	290	725	1305	1885	2320	4351	-
1.5	H	3.0	20	50	90	130	160	300	-	290	725	1305	1885	2320	4351	-
2.0	J	3.0	20	50	90	120	150	250	-	290	725	1305	1740	2175	3625	-
2.0	J2	3.0	20	50	90	120	150	250	-	290	725	1305	1740	2175	3625	-
2.5	K	4.0	20	50	90	110	130	200	330	290	725	1305	1595	1885	2900	4786
3.0	K	4.0	20	50	90	110	130	200	330	290	725	1305	1595	1885	2900	4786
2.5	K2	4.0	20	50	90	100	110	200	330	290	725	1305	1450	1595	2900	4786
3.0	K2	4.0	20	50	90	100	110	200	330	290	725	1305	1450	1595	2900	4786
3.0	L	6.0	20	50	85	100	110	180	270	290	725	1232	1450	1595	2610	3916
3.0	M	6.0	20	50	85	100	110	180	270	290	725	1232	1450	1595	2610	3916
4.0	N	6.0	20	50	85	100	110	160	250	290	725	1232	1450	1595	2320	3625
4.0	N2	6.0	20	50	85	100	110	160	250	290	725	1232	1450	1595	2320	3625
4.0	P	6.0	20	50	85	100	110	160	250	290	725	1232	1450	1595	2320	3625
6.0	P2	8.0	15	50	60	70	80	140	180	217	725	870	1015	1160	2030	2610
6.0	P3	8.0	15	50	60	70	80	140	180	217	725	870	1015	1160	2030	2610
6.0	Q	8.0	15	50	60	70	80	140	180	217	725	870	1015	1160	2030	2610
6.0	Q2	10.0	15	40	50	60	70	100	150	217	580	725	870	1015	1450	2175
6.0	Q3	10.0	15	40	50	60	70	100	150	217	580	725	870	1015	1450	2175
8.0	R	12.0	-	-	30	40	60	90	-	-	-	435	580	870	1305	-
8.0	R3	12.0	-	-	30	40	60	90	-	-	-	435	580	870	1305	-
8.0	T	12.0	-	-	30	40	60	90	-	-	-	435	580	870	1305	-
10.0	T2	16.0	-	-	-	30	60	-	-	-	-	-	435	870	-	-
10.0	T3	16.0	-	-	-	30	60	-	-	-	-	-	435	870	-	-
10.0	V	16.0	-	-	-	30	60	-	-	-	-	-	435	870	-	-
12.0	W	20.0	-	-	-	20	50	-	-	-	-	-	290	725	-	-
12.0	W2	20.0	-	-	-	20	50	-	-	-	-	-	290	725	-	-

Valve data: Flange pressure rating

Inlet size	Orifice designator	Outlet size	ASME Inlet class							ASME Outlet class						
NPS	d_0	NPS	01	02	03	04	05	06	07	01	02	03	04	05	06	07
1.5	F	2.5	150	300	600	900	1500	2500	-	150	150	150	300	300	600	600
1.5	F	3.0	150	300	600	900	1500	2500	-	150	150	150	300	300	600	600
1.5	G	2.5	150	300	600	900	1500	2500	-	150	150	150	300	300	600	600
1.5	G	3.0	150	300	600	900	1500	2500	-	150	150	150	300	300	600	600
1.5	H	2.5	150	300	600	900	1500	2500	-	150	150	150	300	300	600	600
1.5	H	3.0	150	300	600	900	1500	2500	-	150	150	150	300	300	600	600
2.0	J	3.0	150	300	600	900	1500	2500	-	150	150	150	300	300	600	600
2.0	J2	3.0	150	300	600	900	1500	2500	-	150	150	150	300	300	600	600
2.5	K	4.0	150	300	600	900	1500	2500	2500	150	150	150	300	300	600	600
3.0	K	4.0	150	300	600	900	1500	2500	2500	150	150	150	300	300	600	600
2.5	K2	4.0	150	300	600	900	1500	2500	2500	150	150	150	300	300	600	600
3.0	K2	4.0	150	300	600	900	1500	2500	2500	150	150	150	300	300	600	600
3.0	L	6.0	150	300	600	900	1500	2500	2500	150	150	150	300	300	600	600
3.0	M	6.0	150	300	600	900	1500	2500	2500	150	150	150	300	300	600	600
4.0	N	6.0	150	300	600	900	1500	2500	2500	150	150	150	300	300	600	600
4.0	N2	6.0	150	300	600	900	1500	2500	2500	150	150	150	300	300	600	600
4.0	P	6.0	150	300	600	900	1500	2500	2500	150	150	150	300	300	600	600
6.0	P2	8.0	150	300	600	900	1500	1500	1500	150	150	150	300	300	300	300
6.0	P3	8.0	150	300	600	900	1500	1500	1500	150	150	150	300	300	300	300
6.0	Q	8.0	150	300	600	900	1500	1500	1500	150	150	150	300	300	300	300
6.0	Q2	10.0	150	300	600	900	1500	1500	1500	150	150	150	300	300	300	300
6.0	Q3	10.0	150	300	600	900	1500	1500	1500	150	150	150	300	300	300	300
8.0	R	12.0	-	-	600	900	1500	1500	-	-	-	150	300	300	300	-
8.0	R3	12.0	-	-	600	900	1500	1500	-	-	-	150	300	300	300	-
8.0	T	12.0	-	-	600	900	1500	1500	-	-	-	150	300	300	300	-
10.0	T2	16.0	-	-	-	900	1500	-	-	-	-	-	300	300	-	-
10.0	T3	16.0	-	-	-	900	1500	-	-	-	-	-	300	300	-	-
10.0	V	16.0	-	-	-	900	1500	-	-	-	-	-	300	300	-	-
12.0	W	20.0	-	-	-	900	1500	-	-	-	-	-	300	300	-	-
12.0	W2	20.0	-	-	-	900	1500	-	-	-	-	-	300	300	-	-

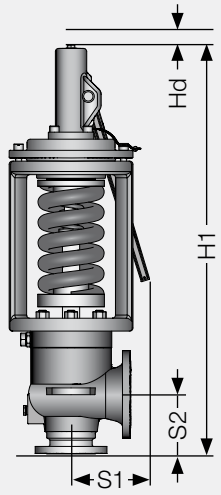
Si 910

Valve data

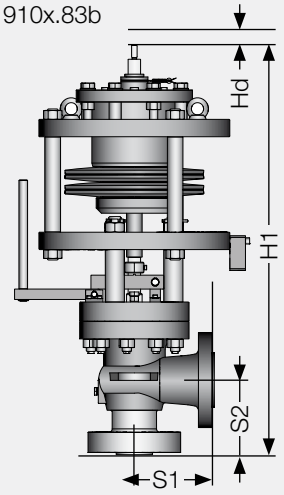
Inlet size	Orifice designator	Outlet size	Center to face dimension							Height							Dismantling height							Weight						
			S2 × S1 [mm] [in]							H [mm] [in]							Hd [mm] [in]							[kg] [lb_m]						
			Inlet class																											
NPS	d_0	NPS	01	02	03	04	05	06	07	01	02	03	04	05	06	07	01	02	03	04	05	06	07	01	02	03	04	05	06	07
1.5	F	2.5	130 × 120 5.12 × 4.72			145 × 140 5.71 × 5.51		155 × 170 6.10 × 6.69		730 28.74			735 28.94		920 36.22		120 4.72					130 5.12		55 121			60 132		140 309	
1.5	F	3.0																												
1.5	G	2.5																												
1.5	G	3.0																												
1.5	H	2.5																												
1.5	H	3.0																												
2.0	J	3.0	130 × 125 5.12 × 4.92			155 × 160 6.10 × 6.30		160 × 180 6.30 × 7.09		790 31.10			815 32.09		960 37.8		140 5.51					160 6.30		80 176			90 198		160 353	
2.0	J2	3.0																												
2.5	K	4.0	155 × 160 6.10 × 6.30			185 × 185 7.28 × 7.28		215 × 230 8.47 × 9.06		1005 39.567			1035 40.75		1300 51.18		160 6.30					190 7.48		160 353			175 386		440 970	
3.0	K	4.0																												
2.5	K2	4.0																												
3.0	K2	4.0																												
3.0	L	6.0	190 × 190 7.48 × 7.48			225 × 215 8.86 × 8.47		265 × 270 10.43 × 10.63		1300 51.18			1330 52.36		1450 57.09		200 7.87					260 10.24		340 750			365 805		600 1323	
3.0	M	6.0																												
4.0	N	6.0																												
4.0	N2	6.0																												
4.0	P	6.0																												
6.0	P2	8.0	240 × 240 9.45 × 9.45			285 × 290 11.22 × 11.42		285 × 290 11.22 × 11.42		1420 55.91			1465 57.68		1400 55.12		250 9.84					290 19.42		480 1058			540 1190		840 1852	
6.0	P3	8.0																												
6.0	Q	8.0																												
6.0	Q2	10.0	295 × 280 11.61 × 11.02			315 × 295 12.40 × 11.61		315 × 325 12.40 × 12.80		1545 60.83			1565 61.61		1480 58.27		265 10.43					350 13.78		595 1312			655 1444		920 2028	
6.0	Q3	10.0																												
8.0	R	12.0	375 × 390 14.76 × 15.35			375 × 390 14.76 × 15.35		375 × 390 14.76 × 15.35		1620 63.78			1620 63.78		1620 63.78		390 15.35					380 14.96		1310 2888			1350 2976		1310 2888	
8.0	R3	12.0																												
8.0	T	12.0																												
10.0	T2	16.0	-			460 × 470 18.11 × 18.50		-		-			*1		-		*1					-		-			*1		-	
10.0	T3	16.0																												
10.0	V	16.0																												
12.0	W	20.0	-			530 × 550 20.87 × 21.65		-		-			3400 133.86		-		*1					-		-			3596 7928		-	
12.0	W2	20.0																												

*1 subject to detail engineering

Si 910



Si 910x.83b



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