JOHN FIG 71

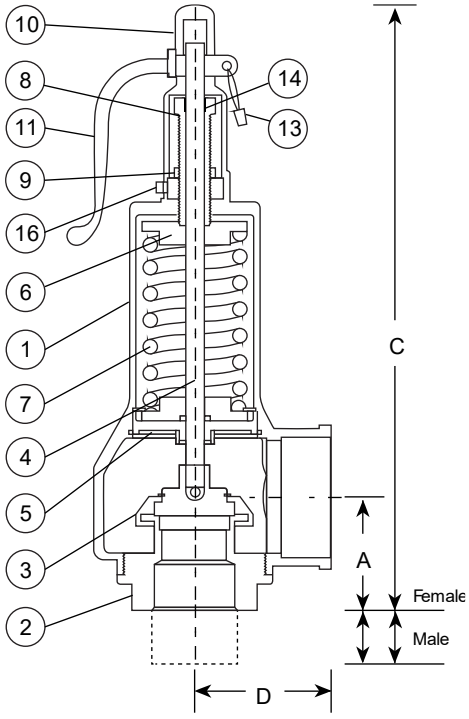
Safety & Relief Valve

The John Fig 71 Safety Relief valve encompasses a top-guided unobstructed seat bore with the competence to provide full lift for maximum discharge capability. Precision lapping of Stainless-Steel trim gives Positive Reseating for steam applications at higher temperatures. Freely pivoting Viton discs allow to achieve positive reseating for gas, hot water, and numerous other liquid applications up to 150°C. For inline safety checks a fitted test lever is provided, or for the service conditions requiring a pressure-tight seal on the discharge side e.g., liquid service, an alternative sealed dome is provided.

Body	Bronze
Trim	Stainless Steel/EPDM Stainless Steel
Sizes	15, 20, 25, 32, 40, 50
Pressure Rating	PN24
Temperature	Stainless Steel / EPDM (-20°C – 95°C) Stainless Steel (-20°C - 244°C)
Connections	BSP (FEMALE) X BSP (FEMALE)
Pressure Range	Variable on size and medium
Standards	AS 1271, Class A; BS6759 Pt 1,2,3; ASME- Boiler and Pressure Vessel Code, Section VIII

Dimensions

Type	Size	Inlet	Outlet	A (mm)	C (mm)	D (mm)	Kg
MALE X FEMALE	DN15	1/2"	3/4"	58	192.5	40	1
	DN20	3/4"	1-1/4"	63	252	55	1.6
	DN25	1"	1-1/2"	70	280	60	2.1
	DN32	1-1/4"	2"	80	351	70	4
	DN40	1-1/2"	2-1/2"	91	405.5	81	7
	DN50	2"	3"	110	465.5	96	10
FEMALE X FEMALE	DN15	1/2"	3/4"	40	178	40	1
	DN20	3/4"	1-1/4"	44	232	55	1.6
	DN25	1"	1-1/2"	48	258	60	2.1
	DN32	1-1/4"	2"	58	328	70	4
	DN40	1-1/2"	2-1/2"	67	380	81	7
	DN50	2"	3"	80	424	96	10



Materials of Construction

ID	Part	Material	Specification
1	Body	Bronze	
2	Seat	Bronze	
3	Disc	Various	
4	Spindle	Brass	
5	Guide	Bronze	
6	Top Spring Cap	Brass	
7	Spring	Chrome Vanadium	
8	Adjusting Screw	Brass	
9	Lock Nut	Brass	
10	Dome	Nylon	
11	Lever	Brass	
12	Ball	SS	
13	Padlock	Brass	
14	BUSH	PTFE	
15	Bottom Spring Cap	Brass	
16	Pinning Screw	Brass	

* Recommended spares; available from John Valves
+ Synthetic dome should not be adjacent to external heat source
Flanged drilling options: BS10 Table E, F&H, BS 4504 PN16/25, ANSI 1250, AS2129

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Size Range (Max pressure (Barg)					
Size	Orifice mm2	Min (Barg) Pressure	O&SS All Media	Gas & Liquid	Steam
DN15 (1/2")	109	0.35	12.5	32	22
DN20 (3/4")	314	0.35	12.5	24.5	22
DN25 (1")	415	0.35	12.5	20.5	20
DN32 (1-1/2")	660	0.35	12.5	18	18
DN40 (1-1/2")	1075	0.35	12.5	18	18
DN50 (2")	1662	0.35	12.5	18	18

Performance		
Size	Over Pressure	Blow Down
Steam	0.05	15%*
Air/Gas	0.1	10%*
Liquid	0.1	20%†

* Or 0.3 Barg min † or 0.6 Barg min ‡ above 100°C

Maximum Back Pressure	
Barg	5.5
Constant	80%
Built-up	10%
Variable	0%

Figure Numbering

END CONNECTION	OPERATOR	BODY MATERIAL	TRIM	PAINTING	BOLTING	TESTING/ INSPECTION	SPECIAL FEATURES
B	**V**	**4**	**2**	**0**	**0**	**1**	**0**
UNDRILLED	SAFETY LEVER, SAFETY VALVE	Bronze	STAINLESS STEEL			MILL& HYDRO	
	D						
	DOME CAP RELIEF VALVE						

AIR CAPACITY CHART [L/S] AT 0.3 BARG OR 10% OVERPRESSURE AND 15°C						
Set Pressure	**DN 15**	**DN 20**	**DN 25**	**DN 32**	**DN 40**	**DN 50**
0.35	18.2	43.8	68.3	112	175	273
1.0	31	89.3	118	188	306	472
2.0	47.1	136	180	286	465	719
3.0	63.3	183	241	384	625	966
4.0	79.5	229	303	482	784	1212
5.0	95.7	276	365	580	944	1459
6.0	112	322	426	678	1103	1705
7.0	128	369	488	776	1263	1952
8.0	144	416	550	874	1422	2199
9.0	160	462	611	972	1582	2445
10.0	177	509	673	1070	1742	2692
12.0	209	602	796	1266	2061	3185
12.5	217	625	827	1315	2140	3308
14.0	241	695	920	1462	2380	3678
16.0	274	789	1043	1658	2699	4172
18.0	306	882	1166	1854	3018	4665
20.0	338	975	1290			
22.0	371	1068				
24.0	403	1162				
26.0	435					
28.0	468					
30.0	500					
32.0	532					

Other Gases

For application of the valve for other compatible gases, the sizing details above can be used. The valve capacity will change depending on the specific gravity of gas. To calculate the gas capacity, multiply the valve air capacity by $1/\sqrt{SG}$.

SG = specific gravity (relative to gas = 1).

Useful Conversions

Nm^3/h = 1/sec X 3.60

SCFM = 1/sec X 2.12

*Minimum Overpressure = 0.07 Barg at set pressure less than 1.0 Barg

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SATURATED STEAM CAPACITY CHART [kg/h]						
Set Pressure	**DN 15**	**DN 20**	**DN 25**	**DN 32**	**DN 40**	**DN 50**
0.35	35	102	135	214	349	539
1.0	70	203	268	427	694	1073
2.0	124	358	474	754	1227	1896
3.0	166	480	634	1008	1642	2537
4.0	208	601	795	1263	2056	3178
5.0	250	722	955	1518	2471	3819
6.0	293	843	1115	1773	2886	4460
7.0	335	964	1275	2027	3300	5101
8.0	377	1085	1436	2282	3715	5742
9.0	419	1207	1596	2537	4130	6383
10.0	461	1328	1756	2792	4544	7024
12.0	545	1570	2077	3301	5374	8306
12.5	566	1631	2157	3429	5581	8627
14.0	629	1812	2397	3811	6203	9588
16.0	713	2055	2717	4320	7033	10870
18.0	797	2297	3038	4830	7862	12152
20.0	881	2539	3358			
22.0	965	2782				

Other Temperatures
The above steam table is based on saturated steam. For steam systems operating at higher temperatures, the above capacities will need to be derated by using the super heat correction factor.

Useful Conversions
lbs/h = kg/h X 2.2046

Minimum overpressure = 0.07 Barg at set pressure less than 0.7 Barg.

Minimum overpressure = 0.07 Barg at set pressure less than 1.0 Barg.

WATER CAPACITY CHART [l/min] AT 10% OVERPRESSURE AT 20°C						
Set Pressure	**DN 15**	**DN 20**	**DN 25**	**DN 32**	**DN 40**	**DN 50**
0.35	28	82	109	173	281	434
1.0	48	139	183	292	475	734
2.0	68	196	259	412	671	1038
3.0	83	240	318	505	822	1271
4.0	96	277	367	583	950	1468
5.0	108	310	410	652	1062	1641
6.0	118	340	449	714	1163	1798
7.0	127	367	485	772	1256	1942
8.0	136	392	519	825	1343	2076
9.0	144	416	550	875	1424	2202
10.0	152	439	580	922	1501	2321
12.0	167	481	636	1010	1645	2542
12.5	170	490	649	1031	1679	2595
14.0	180	519	686	1091	1776	2746
16.0	193	555	734	1167	1899	2935
18.0	204	589	778	1237	2014	3114
20.0	215	620	820			
22.0	226	651				
24.0	236	680				
26.0	245					
28.0	255					
30.0	264					
32.0	272					

Other Temperatures
For application of the valve for other compatible liquids, the sizing details above can be used. The valve capacity will change depending on the specific gravity of liquid. To calculate the liquid capacity, multiply the valve water capacity by $1/\sqrt{SG}$.

SG = specific gravity (relative to water = 1).

Useful Conversions
lgpm = 1/min x 0.22
m^3/min = 1/min x 0.001

Minimum overpressure = 0.07 Barg at set pressure less than 0.7 Barg.

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INSTALLATION

Safety Relief Valves should always be installed in an upright position with their spring chamber vertical. All packing materials should be removed from the valve connections before installation.

Pressure Vessels

When fitting a Safety Relief Valve onto pressure vessels, the inlet connection pipe should be as short as possible, and the bore should be at least equivalent to the nominal bore size of the valve. The pressure drop between the vessel and the valve should be no more than 3% at rated capacity. A pressure-tight dome should be specified when:

- A back pressure must be contained within the relieving system.
- A head of liquid is built up within the valve body and consequently needs to be contained.
- The relieving medium is toxic, corrosive, or environmentally unfriendly.

Pipelines

When fitting a Safety Relief Valve into a pipeline, the inlet connecting pipe leading from the main pipeline to the Safety Relief Valve should be as short as possible, so that the inlet pressure drop is no more than 3% of rated capacity.

In addition, it is advised that the Safety Relief Valve is placed a sufficient distance downstream of the pressure source. This will protect the valve from the adverse effects of pressure pulsations.

Discharge Pipelines

These should be equal to or larger than the valve outlet, with adequate supports, minimum number of bends, and overall length. Unless balanced bellows valves are installed, the maximum built-up backpressure should not exceed 10% of the set pressure.

Steam service valves should be adequately drained. Alignment of the discharge or drain should present no risk to persons or property. Protection from the collection of rainwater or condensation in the discharge pipe is advisable.

System Cleansing

It is essential that new installations are fully flushed, and all debris removed before installing the valve as serious damage can be caused to valve seats, resulting in subsequent leakage.

Pressure Adjustment

Every valve is fitted with a suitable spring and tested before leaving the factory. Valves can be pre-set on request but to alter the set pressure, the adjusting screw, when viewed from the top, should be screwed downwards in a clockwise direction to increase the set pressure and upwards in an anti-clockwise direction to decrease it.

Set pressure adjustment must be carried out by experienced and approved personnel. Any change in set pressure must be within the range of the existing spring, if it exceeds the range, a new spring will be required. The cap lead seal must be re-made after any adjustment to the set pressure.

Cold Differential Test Pressure

When setting a valve intended for use at high temperatures on a test rig using a test fluid at ambient temperatures, it is necessary to set the valve at a slightly higher pressure, so that it will open at the correct set pressure under operating conditions. The necessary allowance is shown in the following table:

OPERATING TEMPERATURE

OPERATING TEMPERATURE	INCREASE IN SET PRESSURE AT AMBIENT TEMPERATURE
UP TO 121°C	None
122°C TO 316°C	1%
317°C TO 427°C	2%

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