



BOMAF[®]
Special Valve Solutions

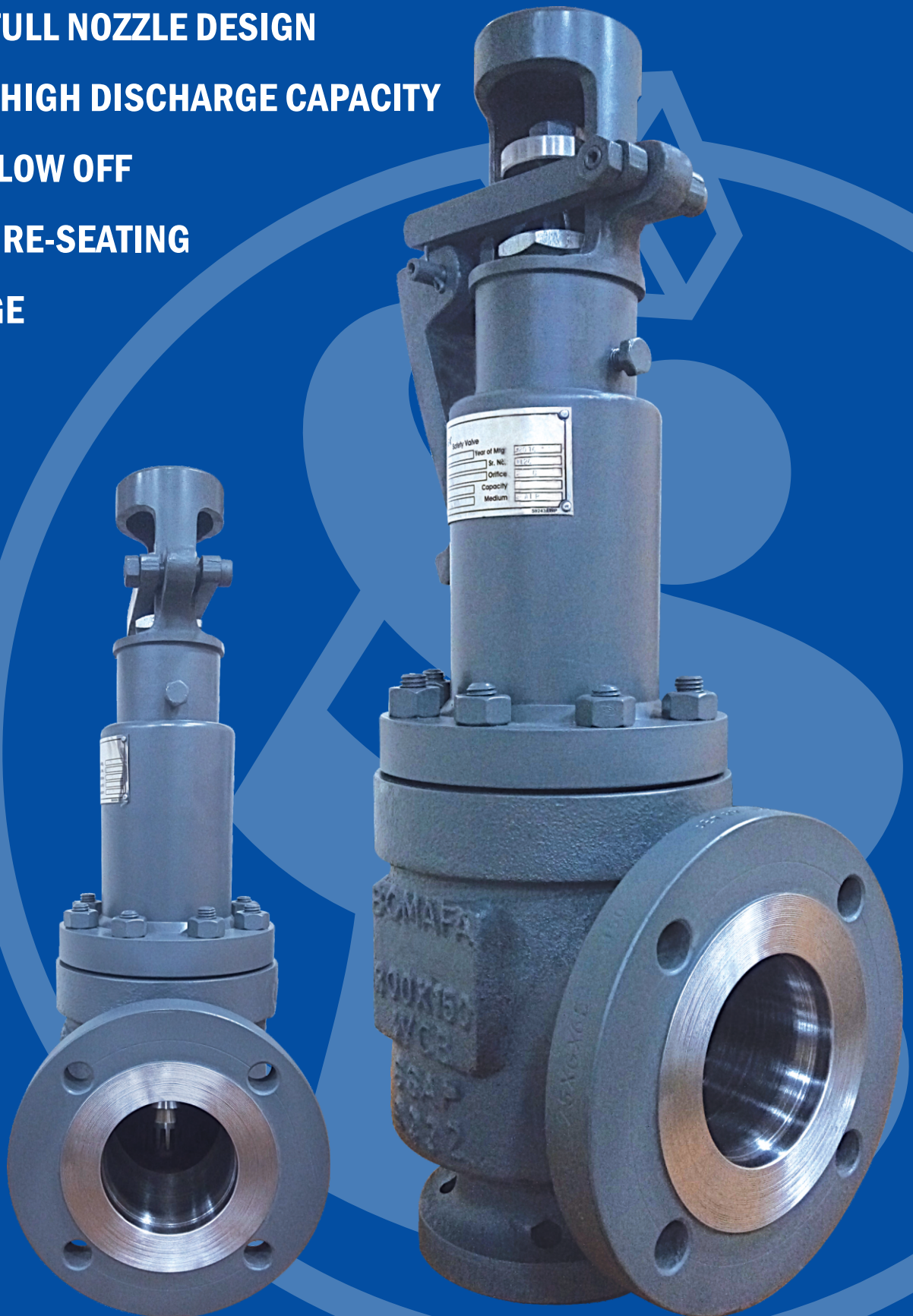
FULL LIFT FULL NOZZLE DESIGN

CERTIFIED HIGH DISCHARGE CAPACITY

PRECISE BLOW OFF

ACCURATE RE-SEATING

NO LEAKAGE



● General Information

Safety valves are pressure relieving device to release the excess pressure built up during the operation of the equipment on which they are mounted. They protect the equipment that can be destroyed by the excess pressure built up by rapidly releasing the unwanted excess pressure.

The Bomafa safety valves offer the reliable and proven protection against over pressure in any applications of steam, gas or liquid service.

● Construction

In normal operation of the equipment, safety valves mounted are closed by seat tightness according to API 527 achieved from the external forces provided by the spring mounted in the bonnet. The seat tightness achieved over a long period of operation in Bomafa safety valves is by the special design of free floating disc mounted in the disc guide that is guided in the guide with precise tolerances. The nozzle is either screwed in the body in flanged safety valves and screwed and welded construction in butt weld and safety valves. In the safety valves with single blowdown ring the adjustment of blowdown is carried out by adjusting ring which is provided at the upper end of the nozzle. In case of safety valves with double blowdown ring, the upper ring is used to fine adjust the blow down Petrochemical Industry and the lower ring is used to assist the pop action. The back pressure can be adjusted by the back pressure adjustment needle mounted in the back pressure housing. The springs are either coil spring or Belleville - disc spring mounted in the open or close bonnet construction to achieve the required opening pressure.

● Design

The safety valves are designed according to API 526 from inlet sizes 1" to 8" and the orifice designation from D to T. The safety valves are designed to meet the maximum over pressure of 10% in case of compressible fluids and 25% in case of non compressible fluids. The safety valves have a maximum blowdown of 5% in case of steam and gas. The maximum blow down for liquid service is 25%. Major body and bonnet materials include ASTM SA 216 GR WCB, ASTM SA 217 GR WC6, ASTM SA 217 GR WC9, ASTM SA 217 GR WC9, C12A, austenitic as well as low temperature material grades.

● Highlights

- One design for steam, gas and liquid makes it easy for the replacements.
- Flanged as well as butt weld designs available as per customer requirements.
- Plasma nitride guiding parts for high temperature service insures the required hardness of 600 V to 700 V for tight seating surfaces and free moment of sliding parts to have excellent repeatability and reliability. Hard faced trim with stellite also available on request.
- Soft seat construction available on request. Closed or open bonnet with packed or conventional lifting lever.
- Test gag optional on request.
- Heavy duty spindle and guide for accurate and consistent operation at all pressure and temperature.
- Flanged and butt weld end connections to meet all national and international standards for mounting and installation.
- Drain point at the lowest section of body to eliminate and drain the liquid and or residue that may be accumulated over time.
- Balanced bellow design available for compensating the back pressure.

● Application

Process Industry

Power

Chemical Industry

Petrochemical Industry

Storage vessel Piping

Sugar

Pulp & Paper

Nuclear

Pharmaceutical

TERMS & DEFINITIONS

● **Safety Valve**

A spring loaded pressure relief valve actuated by the static pressure upstream of the valve and characterised by rapid opening or pop action. A safety valve is normally used with compressible fluids.

● **Safety relief valve**

A spring loaded pressure relief valve that may be used as either a safety or relief valve depending on the application.

● **Relief valve**

A spring loaded pressure relief valve actuated by the static pressure upstream of the valve. The valve opens normally in proportion to the pressure increase over the opening pressure. The relief valve is use primarily with incompressible fluid.

● **Simmer**

The audible or visible escape of compressible fluid between the seat and disc of a pressure relief valve that may occur at an inlet static pressure below the set pressure prior to opening.

● **Opening pressure**

The value of increasing static pressure at which there is a measurable lift of the disc or at which discharge of the fluid becomes continuous, as determined by seeing, feeling or hearing.

● **Set Pressure**

The inlet gauge pressure at which the pressure relief device is set to open under service conditions.

● **Over pressure**

The pressure increase over the set pressure of the relieving device. Over pressure is expressed in pressure units or as a percentage of set pressure. Over pressure is the same as accumulation only when the relieving device is set to open at the MAWP of the vessel.

● **Accumulation**

The pressure increase over the MAWP of the vessel, expressed in pressure units or as a percentage of the MAWP or design pressure.

● **Blow down**

The difference between the set pressure and the closing pressure of a pressure relief valve, expressed as a percentage of the set pressure or in pressure units.

● **Closing pressure**

The value of decreasing inlet static pressure at which the valve disc re-establishes contact with the seat or at which lift becomes zero as determined by seeing, feeling or hearing.

● **Effective discharge area / Effective orifice area**

A nominal area used with an effective discharge coefficient to calculate the relieving capacity of a pressure relief valve per preliminary sizing equations.

● **Lift**

The actual travel of the disc from the closed position when a valve is relieving.

● **Maximum allowable working pressure (MAWP)**

The maximum gauge pressure permissible at the top of a completed vessel in its normal operating position at the designated coincident temperature specified for that pressure.

The MAWP is the basis for the pressure setting of the pressure relief devices that protect the vessel. The MAWP is normally greater than the design pressure but can be equal to the design pressure when the design rules used only to calculate the minimum thickness for each element and the calculations are not made to determine the value of MAWP.

● **Leak test pressure**

The specified inlet static pressure at which a seat leak test is performed.

● **Flutter**

The abnormal, rapid reciprocating motion of the movable parts of the pressure relief valve. During the fluttering, the disc does not contact the seat or the upper stop.

● **Chatter**

The opening and closing of pressure relief valve at a very high frequency (on the order of natural frequency of the valves spring mass system).

● **Effective coefficient of discharge**

A nominal value used with an effective discharge area to calculate the relieving capacity of a pressure relief valve per the preliminary sizing equation.

● **Coefficient of discharge**

The ratio of the mass flow rate in a valve to that of an ideal nozzle. The coefficient of discharge is used for calculating flow thru a pressure relief device.

● **Capacity**

The rated capacity of steam, air, gas or water as required by applicable code.

● **Curtain area**

The area of the cylindrical or conical discharge opening between the seating surfaces above the nozzle seat created by the lift of the disc.

● **Huddling Chamber**

An annular chamber located at the down stream of the seat of a pressure relief valve for the purpose of assisting the valve to achieve lift.

● **Cold differential test pressure (CDTP)**

The pressure at which a pressure relief valve is adjusted to open on the test stand. The CDTP includes corrections for the service conditions of back pressure or temperature or both.

● **Back pressure**

The pressure that exists at the outlet of a pressure relief device as result of the pressure in the discharge system. Back pressure is the sum of superimposed and built up back pressures.

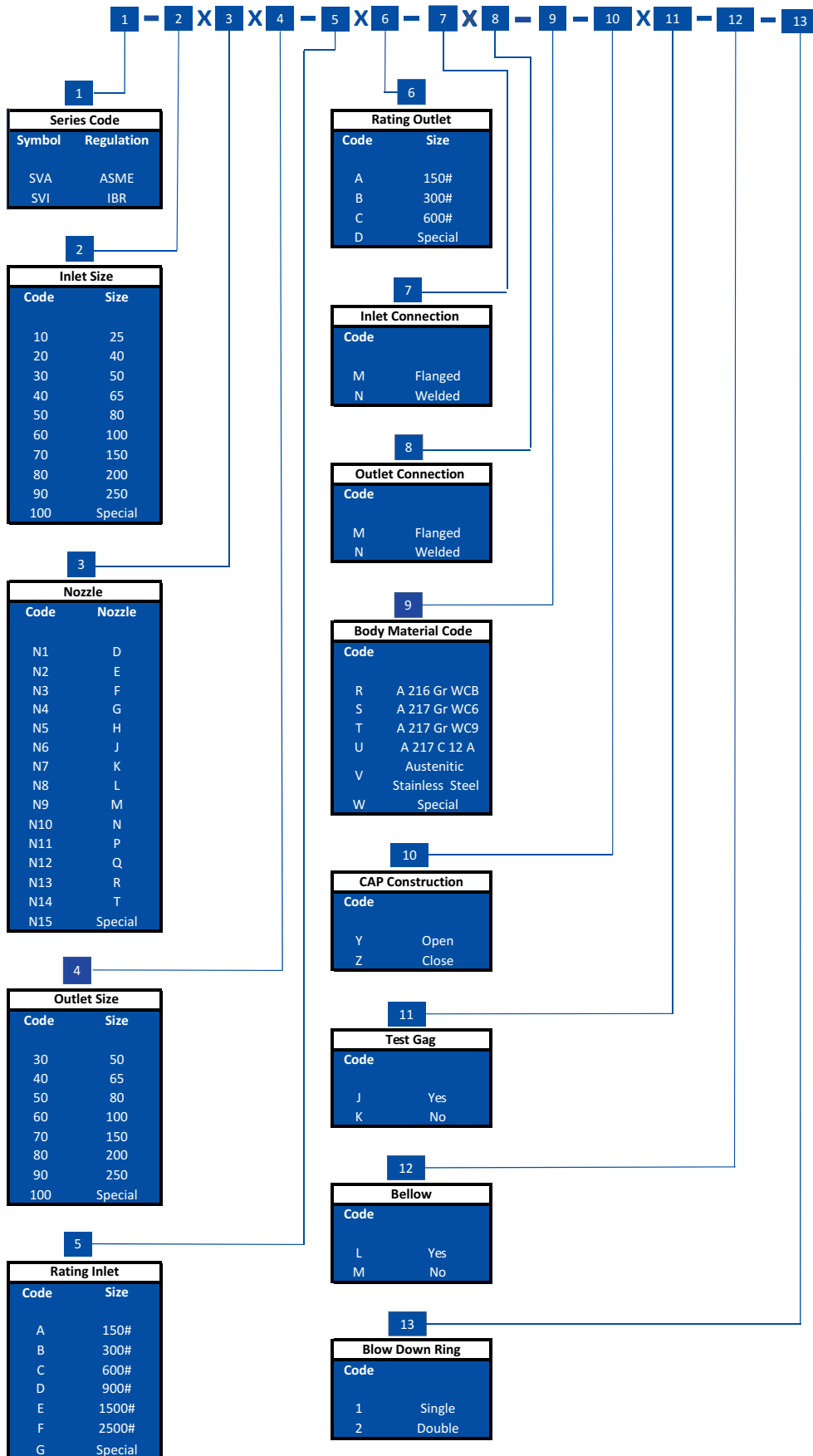
● **Built up back pressure**

The increase in pressure at the outlet of the pressure relief device that develops as a result of flow after the pressure relief device opens.

● **Superimposed back pressure**

The static pressure that exists at the outlet of a pressure relief device at the time the device is required to operate. Superimposed back pressure is the result of pressure in the discharge system coming from other sources and may be constant or variable..

SAFETY VALVE CODE SYSTEM

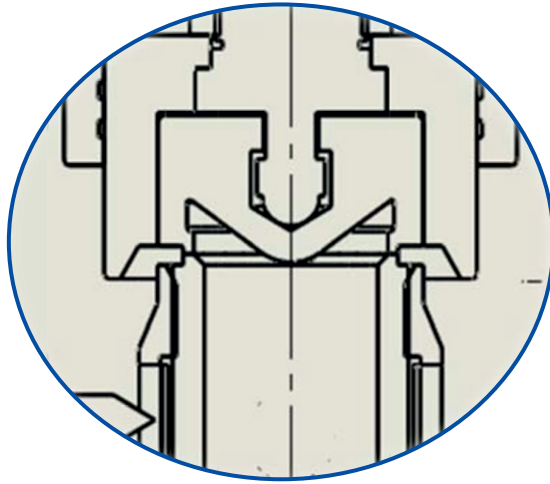


Example:-

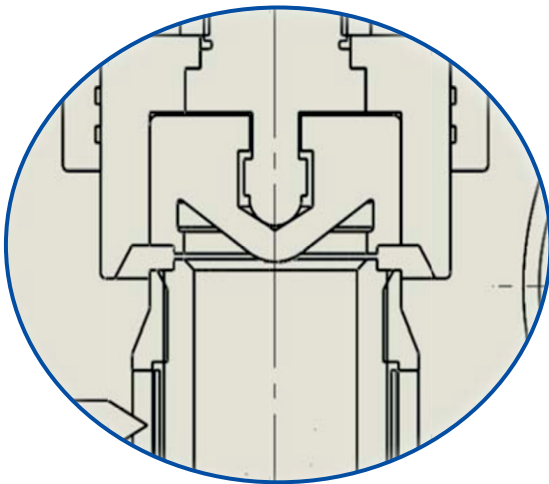
SVA - 30 X N6 X 50 - B X A - M X N - R - Y X K - M - 2

ASME - 50 X J X 80 - 300# X 150# - Flanged X Flanged - A 216 Gr WCB - Open Cap X No Test Gag - No Bellow - Double Blow Down Ring

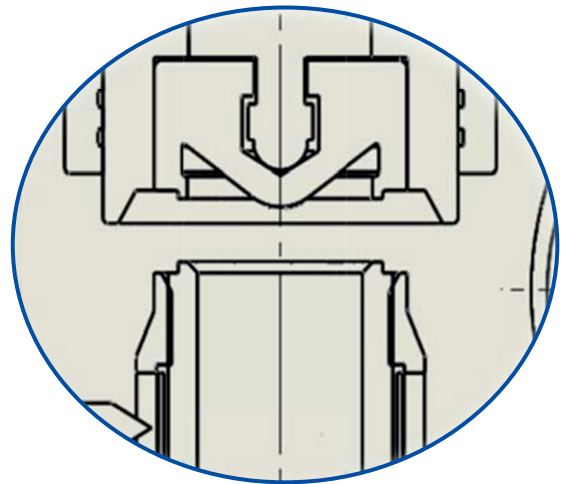
SAFETY VALVE OPENING PATTERN



FULLY CLOSE

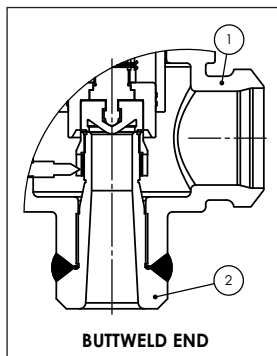
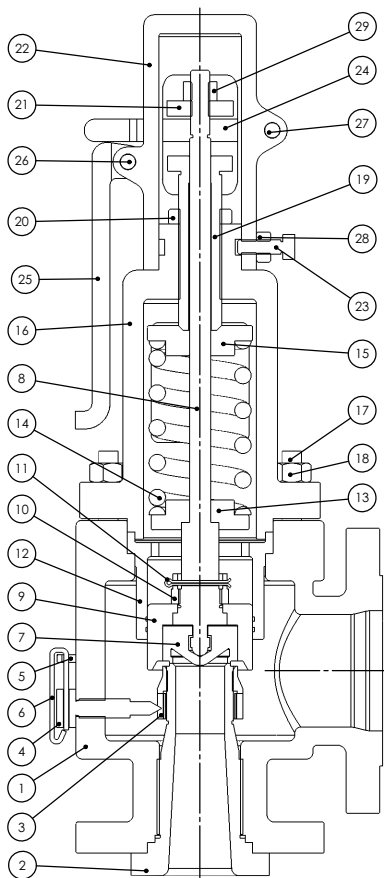


WARN PRESSURE



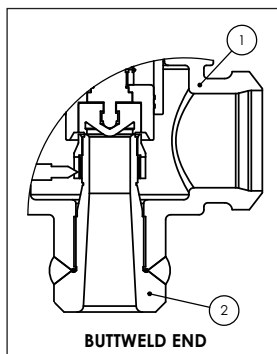
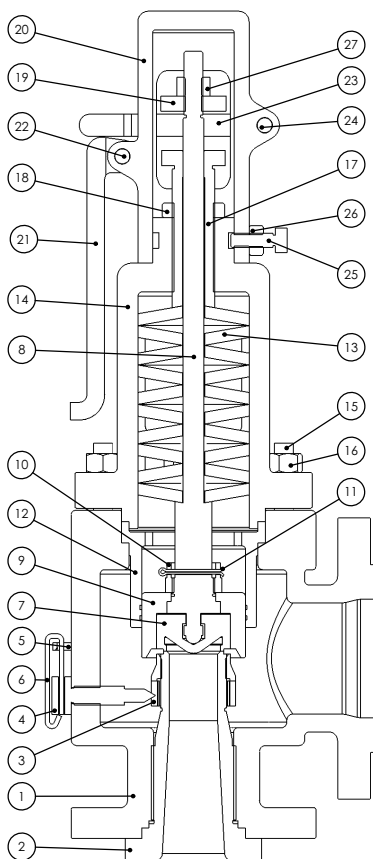
FULLY OPEN

SAFETY VALVE WITH COIL SPRING AND SINGLE BLOW DOWN RING



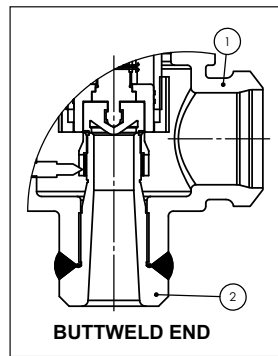
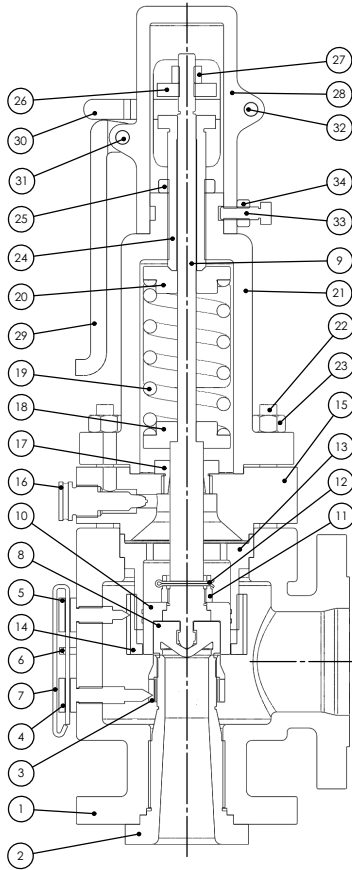
ITEM NO.	DESIGNATION
1	BODY
2	NOZZLE
3	BLOW DOWN RING
4	BLOW DOWN RING PIN
5	LOCK
6	SEAL
7	DISC
8	SPINDLE
9	DISC GUIDE
10	SPINDLE LOCK NUT
11	SPINDLE PIN
12	GUIDE
13	LOWER SPRING BUTTON
14	SPRING
15	UPPER SPRING BUTTON
16	BONNET
17	BODY STUD BOLT
18	BODY NUT
19	SET SCREW
20	SET SCREW NUT
21	SPINDLE NUT
22	CAP
23	CAP PIN
24	LEVER PLATE
25	HANDLE
26	PIN-1
27	PIN-2
28	CAP PIN NUT
29	NUT

SAFETY VALVE WITH DISC SPRING AND SINGLE BLOW DOWN RING



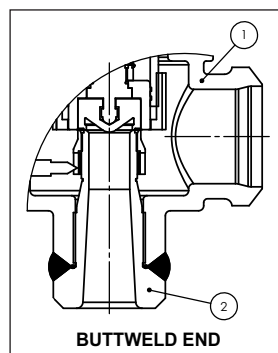
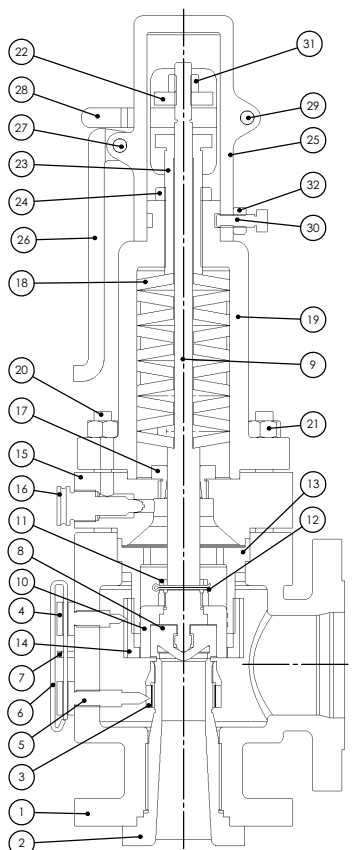
ITEM NO.	DESIGNATION
1	BODY
2	NOZZLE
3	BLOW DOWN RING
4	BLOW DOWN RING PIN
5	LOCK
6	SEAL
7	DISC
8	SPINDLE
9	DISC GUIDE
10	SPINDLE LOCK NUT
11	SPINDLE PIN
12	GUIDE
13	DISC SPRING
14	BONNET
15	BODY STUD BOLT
16	BODY NUT
17	SET SCREW
18	SET SCREW NUT
19	SPINDLE NUT
20	CAP
21	HANDLE
22	PIN-1
23	LEVER PLATE
24	PIN-2
25	CAP PIN
26	CAP PIN NUT
27	NUT

SAFETY VALVE WITH COIL SPRING WITH DOUBLE BLOW DOWN RING & BACK PRESSURE ADJUSTMENT



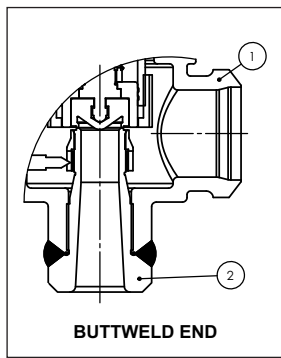
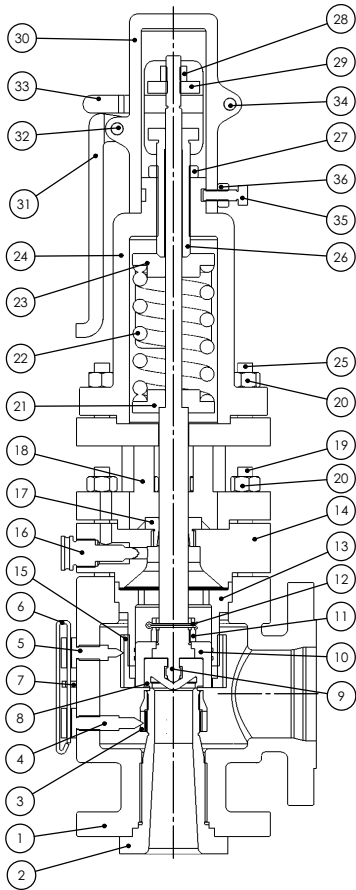
ITEM NO.	DESIGNATION
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2	NOZZLE
3	BLOW DOWN RING
4	BLOW DOWN RING PIN
5	BLOW DOWN RING PIN -2
6	LOCK
7	SEAL
8	DISC
9	SPINDLE
10	DISC GUIDE
11	SPINDLE LOCK NUT
12	SPINDLE PIN
13	GUIDE
14	BLOW DOWN RING-2
15	HOUSING
16	REGULATING PIN
17	SPINDLE GUIDE
18	LOWER SPRING BUTTON
19	SPRING
20	UPPER SPRING BUTTON
21	BONNET
22	BODY STUD BOLT
23	BODY NUT
24	SET SCREW
25	SET SCREW NUT
26	SPINDLE NUT
27	NUT
28	CAP
29	HANDLE
30	LEVER PLATE
31	PIN-1
32	PIN-2
33	CAP PIN
34	CAP NUT

SAFETY VALVE WITH DISC SPRING WITH DOUBLE BLOW DOWN RING & BACK PRESSURE ADJUSTMENT



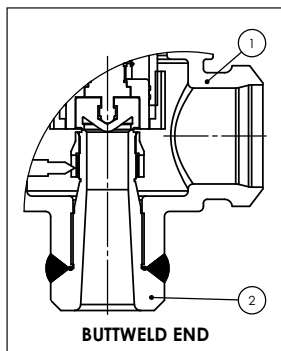
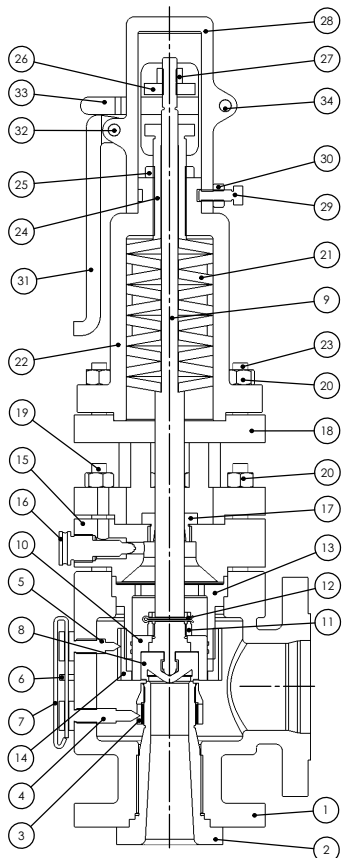
ITEM NO.	DESIGNATION
1	BODY
2	NOZZLE
3	BLOW DOWN RING
4	BLOW DOWN RING PIN -2
5	BLOW DOWN RING PIN
6	SEAL
7	LOCK
8	DISC
9	SPINDLE
10	DISC GUIDE
11	SPINDLE LOCK NUT
12	SPINDLE PIN
13	GUIDE
14	BLOW DOWN RING-2
15	HOUSING
16	REGULATING PIN
17	SPINDLE GUIDE
18	DISC SPRING
19	BONNET
20	BODY STUD BOLT
21	BODY NUT
22	SPINDLE NUT
23	SET SCREW
24	SET SCREW NUT
25	CAP
26	HANDLE
27	PIN-1
28	LEVER PLATE
29	PIN-2
30	CAP PIN
31	NUT
32	CAP NUT

SAFETY VALVE OPERATING ABOVE 400°C WITH COIL SPRING & COOLING WITH DOUBLE BLOW DOWN RING & BACK PRESSURE ADJUSTMENT



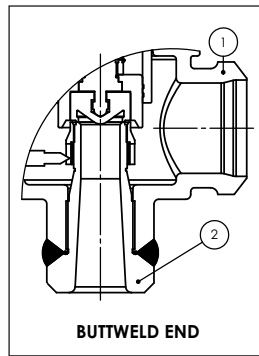
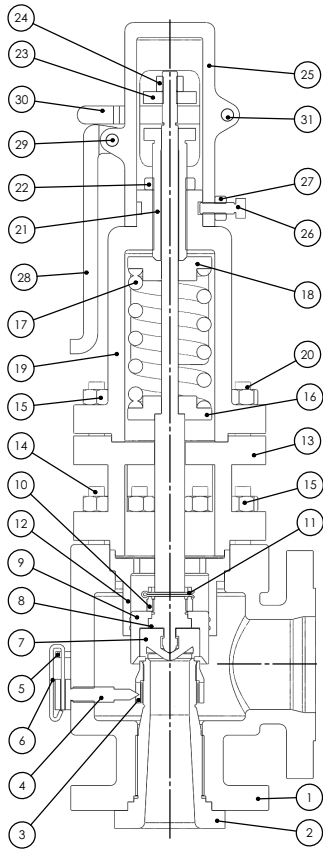
ITEM NO.	DESIGNATION
1	BODY
2	NOZZLE
3	BLOW DOWN RING
4	BLOW DOWN RING PIN
5	BLOW DOWN RING PIN -2
6	SEAL
7	LOCK
8	DISC
9	SPINDLE
10	DISC GUIDE
11	SPINDLE LOCK NUT
12	SPINDLE PIN
13	GUIDE
14	HOUSING
15	BLOW DOWN RING-2
16	REGULATING PIN
17	SPINDLE GUIDE
18	COOLING
19	BODY STUD BOLT
20	BODY & BONNET NUT
21	LOWER SPRING BUTTON
22	SPRING
23	UPPER SPRING BUTTON
24	BONNET
25	BONNET STUD BOLT
26	SET SCREW
27	SET SCREW NUT
28	NUT
29	SPINDLE NUT
30	CAP
31	HANDLE
32	PIN-1
33	LEVER PLATE
34	PIN-2
35	CAP PIN
36	NUT

SAFETY VALVE OPERATING ABOVE 400°C WITH DISC SPRING & COOLING WITH DOUBLE BLOW DOWN RING & BACK PRESSURE ADJUSTMENT



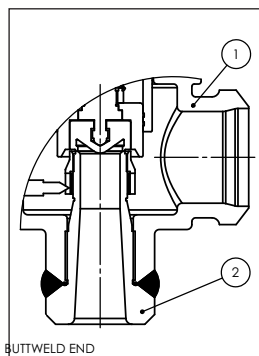
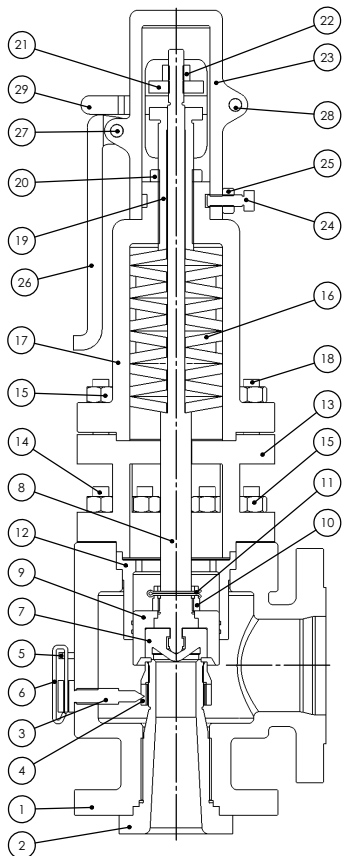
ITEM NO.	DESIGNATION
1	BODY
2	NOZZLE
3	BLOW DOWN RING
4	BLOW DOWN RING PIN
5	BLOW DOWN RING PIN -2
6	LOCK
7	SEAL
8	DISC
9	SPINDLE
10	DISC GUIDE
11	SPINDLE LOCK NUT
12	SPINDLE PIN
13	GUIDE
14	BLOW DOWN RING-2
15	HOUSING
16	REGULATING PIN
17	SPINDLE GUIDE
18	COOLING
19	BODY STUD BOLT
20	BODY/BONNET NUT
21	DISC SPRING
22	BONNET
23	BONNET STUD BOLT
24	SET SCREW
25	SET SCREW NUT
26	SPINDLE NUT
27	NUT
28	CAP
29	CAP PIN
30	CAP NUT
31	HANDLE
32	PIN-1
33	LEVER PLATE
34	PIN-2

SAFETY VALVE OPERATING ABOVE 400°C WITH COIL SPRING & COOLING WITH SINGLE BLOW DOWN RING



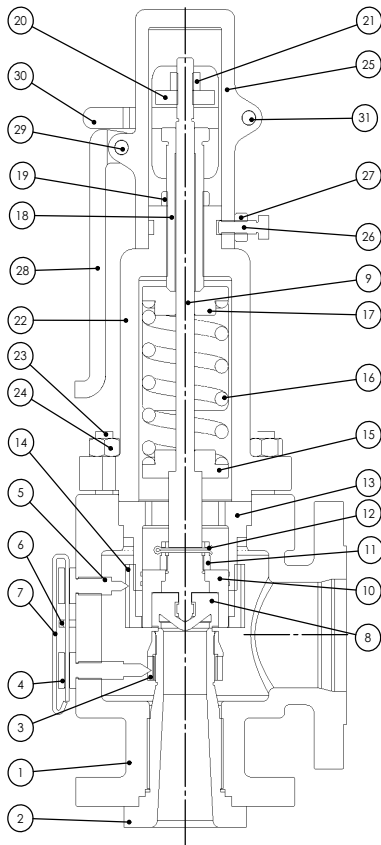
ITEM NO.	DESIGNATION
1	BODY
2	NOZZLE
3	BLOW DOWN RING PIN
4	BLOW DOWN RING
5	LOCK
6	SEAL
7	DISC
8	SPINDLE
9	DISC GUIDE
10	SPINDLE LOCK NUT
11	SPINDLE PIN
12	GUIDE
13	COOLING
14	BODY STUD BOLT
15	BODY & BONNET NUT
16	LOWER SPRING BUTTON
17	SPRING
18	UPPER SPRING BUTTON
19	BONNET
20	BONNET STUD BOLT
21	SET SCREW
22	SET SCREW NUT
23	SPINDLE NUT
24	NUT
25	CAP
26	CAP PIN
27	CAP NUT
28	HANDLE
29	PIN-1
30	LEVER PLATE
31	PIN-2

SAFETY VALVE OPERATING ABOVE 400°C WITH DISC SPRING & COOLING WITH SINGLE BLOW DOWN RING



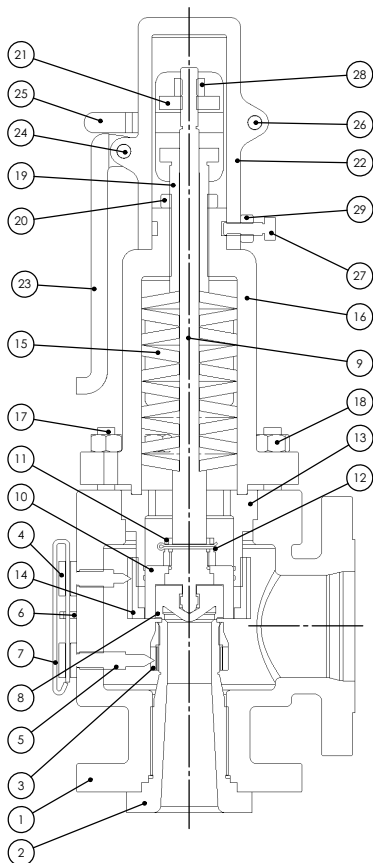
ITEM NO.	DESIGNATION
1	BODY
2	NOZZLE
3	BLOW DOWN RING PIN
4	BLOW DOWN RING
5	LOCK
6	SEAL
7	DISC
8	SPINDLE
9	DISC GUIDE
10	SPINDLE LOCK NUT
11	SPINDLE PIN
12	GUIDE
13	COOLING
14	BODY STUD BOLT
15	BODY/BONNET NUT
16	DISC SPRING
17	BONNET
18	BONNET STUD BOLT
19	SET SCREW
20	SET SCREW NUT
21	SPINDLE NUT
22	NUT
23	CAP
24	CAP PIN
25	CAP PIN NUT
26	HANDLE
27	PIN-1
28	PIN-2
29	LEVER PLATE

SAFETY VALVE WITH COIL SPRING WITH DOUBLE BLOW DOWN RING



ITEM NO.	DESIGNATION
1	BODY
2	NOZZLE
3	BLOW DOWN RING
4	BLOW DOWN RING PIN
5	BLOW DOWN RING PIN -2
6	LOCK
7	SEAL
8	DISC
9	SPINDLE
10	DISC GUIDE
11	SPINDLE LOCK NUT
12	SPINDLE PIN
13	GUIDE
14	BLOW DOWN RING-2
15	LOWER SPRING BUTTON
16	SPRING
17	UPPER SPRING BUTTON
18	SET SCREW
19	SET SCREW NUT
20	SPINDLE NUT
21	NUT
22	BONNET
23	BODY STUD BOLT
24	BODY NUT
25	CAP
26	CAP PIN
27	CAP NUT
28	HANDLE
29	PIN-1
30	LEVER PLATE
31	PIN-2

SAFETY VALVE WITH DISC SPRING WITH DOUBLE BLOW DOWN RING



ITEM NO.	DESIGNATION
1	BODY
2	NOZZLE
3	BLOW DOWN RING
4	BLOW DOWN RING PIN -2
5	BLOW DOWN RING PIN
6	LOCK
7	SEAL
8	DISC
9	SPINDLE
10	DISC GUIDE
11	SPINDLE LOCK NUT
12	SPINDLE PIN
13	GUIDE
14	BLOW DOWN RING-2
15	DISC SPRING
16	BONNET
17	BODY STUD BOLT
18	BODY NUT
19	SET SCREW
20	SET SCREW NUT
21	SPINDLE NUT
22	CAP
23	HANDLE
24	PIN-1
25	LEVER PLATE
26	PIN-2
27	CAP PIN
28	NUT
29	CAP NUT

MATERIAL CHART

TEMPERTURE MAXIMUM. °C	400	510	550
MAIN COMPONENTS	MATERIALS		
BODY	SA 216 GR WCB	SA 217 GR WC6	SA 217 GR WC9
BONNET	SA 216 GR WCB	SA 217 GR WC6	SA 217 GR WC9
COOLING PIECE		SA 217 GR WC6	SA 217 GR WC9
CAP	SA 216 GR WCB	SA 216 GR WCB	SA 216 GR WCB
LEVER	SA 216 GR WCB	SA 216 GR WCB	SA 216 GR WCB
SPINDLE	SS 410	DIN 1.4923 PL NT*	DIN 1.4923 PL NT*
DISC	SS 410	DIN 1.4923 PL NT*	DIN 1.4923 PL NT*
DISC GUIDE	SS 410	DIN 1.4923 PL NT*	DIN 1.4923 PL NT*
NOZZLE	SS 410	SA 182 F 11 PL NT*	SA 182 F 22 PL NT*
BLOW DOWN RING	SS 316	DIN 1.4923 PL NT*	DIN 1.4923 PL NT*
SET SCREW	SS 410	SS 410	SS 410
UPPER SPRING BUTTON	SS 410 CAD PLATED	SS 410 CAD PLATED	SS 410 CAD PLATED
LOWER SPRING BUTTON	SS 410 CAD PLATED	SS 410 CAD PLATED	SS 410 CAD PLATED
SPINDLE NUT	SS 410	SS 410	SS 410
SPINDLE LOCK NUT	SS 410	SS 410	SS 410
SPRING	SPRING STEEL	NIMONIC STEEL	NIMONIC STEEL
STUDS	SA 193 GR B7	SS 193 GR B16	SS 193 GR B16
NUTS	SA 194 GR 2H	SS 194 GR 16	SS 194 GR 16

- A. Hard facing : Stellite available on request.
- B. For any other material contact factory.
- C. Bellow material as per requirement.
- D. Cooling material as per requirement.
- E. For temperature above 500°C contact factory.
- F. * Plasma Nitrided.

"D" ORIFICE (EFFECTIVE ORIFICE AREA = 0.110 SQ. IN.)

Materials	Valve	ASME Flange		Maximum Inlet Flange (Set) Pressure Limit						Center-to-Face	
	Size	Class		kg cm ² (g)						Dimensions	
Body/ Bonnet	Inlet by Orifice by Outlet	I N L E T	O U T L E T	conventional and Balanced Bellows Valve						(in)	
				-267.7° C to -59.4° C	-59.4° C to -29.4° C	-28.8° C to -73.3° C	232.2° C	426.6° C	537.7° C	I N L E T	O U T L E T
Temperature Range Inclusive - 28.8 °C to 426.6 °C											
Carbon Steel	1D2	150	150			20.03	13	5.62		4-1/8	4-1/2
	1D2	300	150			52.02	43.24	28.83		4-1/8	4-1/2
	1D2	600	150			104.05	86.83	58		4-1/8	4-1/2
Temperature Range Inclusive - 462.7 °C to 537.7 °C											
Chrome Molybdenum Steel	1D2	300	150					35.86	15.11	4-1/8	4-1/2
	1D2	600	150					71.36	30.23	4-1/8	4-1/2
Temperature Range Inclusive - 267.7 °C to 537.7 °C											
Austenitic Stainless Steel	1D2	150	150	19.33	19.33	19.33	12.66	5.62	1.41	4-1/8	4-1/2
	1D2	300	150	50.62	50.62	50.62	34.8	29.53	24.61	4-1/8	4-1/2
	1D2	600	150	101.24	101.24	101.24	68.55	59.41	49.21	4-1/8	4-1/2

"E" ORIFICE (EFFECTIVE ORIFICE AREA = 0.196 SQ. IN.)

Materials	Valve	ASME Flange		Maximum Inlet Flange (Set) Pressure Limit						Center-to-Face	
	Size	Class		kg cm ² (g)						Dimensions	
Body/ Bonnet	Inlet by Orifice by Outlet	I N L E T	O U T L E T	conventional and Balanced Bellows Valve						(in)	
				-267.7° C to -59.4° C	-59.4° C to -29.4° C	-28.8° C to -73.3° C	232.2° C	426.6° C	537.7° C	I N L E T	O U T L E T
Temperature Range Inclusive - 28.8 °C to 426.6 °C											
Carbon Steel	1E2	150	150			20.03	13	5.62		4-1/8	4-1/2
	1E2	300	150			52.02	43.24	28.83		4-1/8	4-1/2
	1E2	600	150			104.05	86.83	58		4-1/8	4-1/2
Temperature Range Inclusive - 462.7 °C to 537.7 °C											
Chrome Molybdenum Steel	1E2	300	150					35.86	15.11	4-1/8	4-1/2
	1E2	600	150					71.36	30.23	4-1/8	4-1/2
Temperature Range Inclusive - 267.7 °C to 537.7 °C											
Austenitic Stainless Steel	1E2	150	150	19.33	19.33	19.33	12.66	5.62	1.41	4-1/8	4-1/2
	1E2	300	150	50.62	50.62	50.62	34.8	29.53	24.61	4-1/8	4-1/2
	1E2	600	150	101.24	101.24	101.24	68.55	59.41	49.21	4-1/8	4-1/2

"F" ORIFICE (EFFECTIVE ORIFICE AREA = 0.307 SQ. IN.)

Materials	Valve	ASME Flange		Maximum Inlet Flange (Set) Pressure Limit						Center-to-Face	
	Size	Class		kg cm ² (g)						Dimensions	
Body/ Bonnet	Inlet by Orifice by Outlet	I N L E T	O U T L E T	conventional and Balanced Bellows Valve						(in)	
				-267.7° C to -60° C	-59.4° C to -29.4° C	-28.8° C to -73.3° C	232.2° C	426.6° C	537.7° C	I N L E T	O U T L E T
Temperature Range Inclusive - 28.8°C to 426.6°C											
Carbon Steel	1- 1/2F2	150	150			20.03	13	5.62		4-7/8	4-3/4
	1-1/2F2	300	150			52.02	43.24	28.83		4-7/8	6
	1-1/2F2	600	150			104.05	86.83	58		4-7/8	6
Temperature Range Inclusive - 462.7°C to 537.7°C											
Chrome Molybdenum Steel	1-1/2F2	300	150					35.86	15.11	4-7/8	6
	1-1/2F2	600	150					71.36	30.23	4-7/8	6
Temperature Range Inclusive - 267.7°C to 537.7°C											
Austenitic Stainless Steel	1-1/2F2	150	150	19.33	19.33	19.33	12.66	5.62	1.41	4-7/8	4-3/4
	1-1/2F2	300	150	50.62	50.62	50.62	34.8	29.53	24.61	4-7/8	6
	1-1/2F2	600	150	101.24	101.24	101.24	68.55	59.41	49.21	4-7/8	6

"G" ORIFICE (EFFECTIVE ORIFICE AREA = 0.503 SQ. IN.)

Materials	Valve	ASME Flange		Maximum Inlet Flange (Set) Pressure Limit						Center-to-Face	
	Size	Class		kg cm ² (g)						Dimensions	
Body/ Bonnet	Inlet by Orifice by Outlet	I N L E T	O U T L E T	conventional and Balanced Bellows Valve						(in)	
				-267.7° C to -60° C	-59.4° C to -29.4° C	-28.8° C to -73.3° C	232.2° C	426.6° C	537.7° C	I N L E T	O U T L E T
Temperature Range Inclusive - 28.8°C to 426.6°C											
Carbon Steel	1- 1/2G3	150	150			20.03	13	5.62		4-7/8	4-3/4
	1-1/2G3	300	150			52.02	43.24	28.83		4-7/8	6
	1-1/2G3	600	150			104.05	86.83	58		4-7/8	6
Temperature Range Inclusive - 462.7°C to 537.7°C											
Chrome Molybdenum Steel	1-1/2G3	300	150					35.86	15.11	4-7/8	6
	1-1/2G3	600	150					71.36	30.23	4-7/8	6
Temperature Range Inclusive - 267.7°C to 537.7°C											
Austenitic Stainless Steel	1-1/2G3	150	150	19.33	19.33	19.33	12.66	5.62	1.41	4-7/8	4-3/4
	1-1/2G3	300	150	50.62	50.62	50.62	34.8	29.53	24.61	4-7/8	6
	1-1/2G3	600	150	101.24	101.24	101.24	68.55	59.41	49.21	4-7/8	6

"H" ORIFICE (EFFECTIVE ORIFICE AREA = 0.785 SQ. IN.)

Materials	Valve	ASME Flange		Maximum Inlet Flange (Set) Pressure Limit						Center-to-Face			
	Size	Class		kg cm ² (g)						Dimensions			
Body/ Bonnet	Inlet by Orifice by Outlet	I N L E T	O U T L E T	conventional and Balanced Bellows Valve						(in)			
												I N L E T	O U T L E T
				-267.7° C to -60° C	-59.4° C to -29.4° C	-28.8° C to -73.3° C	232.2° C	426.6° C	537.7° C				
Temperature Range Inclusive - 28.8° C to 426.6° C													
Carbon Steel	1- 1/2H3	150	150			20.03	13	5.62		5-1/8	4-7/8		
	2H3	300	150			52.02	43.24	28.83		5-1/8	4-7/8		
	2H3	600	150			104.05	86.83	58		6-1/16	6-3/8		
Temperature Range Inclusive - 462.7° C to 537.7° C													
Chrome Molybdenum Steel	2H3	300	150					35.86	15.11	5-1/8	4-7/8		
	2H3	600	150					71.36	30.23	5-1/8	4-7/8		
Temperature Range Inclusive - 267.7° C to 537.7° C													
Austenitic Stainless Steel	1-1/2H3	150	150	19.33	19.33	19.33	12.66	5.62	1.41	5-1/8	4-7/8		
	2H3	300	150	50.62	50.62	50.62	34.8	29.53	24.61	5-1/8	4-7/8		
	2H3	600	150	101.24	101.24	101.24	68.55	59.41	49.21	6-1/16	6-3/8		

"J" ORIFICE (EFFECTIVE ORIFICE AREA = 1.287 SQ. IN.)

Materials	Valve	ASME Flange		Maximum Inlet Flange (Set) Pressure Limit						Center-to-Face			
	Size	Class		kg cm ² (g)						Dimensions			
Body/ Bonnet	Inlet by Orifice by Outlet	I N L E T	O U T L E T	conventional and Balanced Bellows Valve						(in)			
												I N L E T	O U T L E T
				-267.7° C to -60° C	-59.4° C to -29.4	-28.8° C to -73.3° C	232.2° C	426.6° C	537.7° C				
Temperature Range Inclusive - 28.8° C to 426.6° C													
Carbon Steel	2J3	150	150			20.03	13	5.62		5-3/8	5-7/8		
	3J4	300	150			52.02	43.24	28.83		7-1/4	7-1/8		
	3J4	600	150			104.05	86.83	58		7-1/4	7-1/8		
Temperature Range Inclusive - 462.7° C to 537.7° C													
Chrome Molybdenum Steel	3J4	300	150					35.86	15.11	7-1/4	7-1/8		
	3J4	600	150					71.36	30.23	7-1/4	7-1/8		
Temperature Range Inclusive - 267.7° C to 537.7° C													
Austenitic Stainless Steel	2J3	150	150	19.33	19.33	19.33	12.66	5.62	1.41	5-3/8	5-7/8		
	3J4	300	150	(35.15)	50.62	50.62	34.8	29.53	24.61	7-1/4	7-1/8		
	3J4	600	150	(43.94)	101.24	101.24	68.55	59.41	49.21	7-1/4	7-1/8		

"K" ORIFICE (EFFECTIVE ORIFICE AREA = 1.838 SQ. IN.)

Materials	Valve	ASME Flange		Maximum Inlet Flange (Set) Pressure Limit						Center-to-Face	
	Size	Class		kg cm ² (g)						Dimensions	
Body/ Bonnet	Inlet by Orifice by Outlet	I N L E T	O U T L E T	conventional and Balanced Bellows Valve						(in)	
				-267.7° C to -60° C	-59.4° C to -29.4° C	-28.8° C to -73.3° C	232.2° C	426.6° C	537.7° C	I N L E T	O U T L E T
Temperature Range Inclusive - 28.8 °C to 426.6 °C											
Carbon Steel	3K4	150	150			20.03	13	5.62		6-1/8	6-3/8
	3K4	300	150			52.02	43.24	28.83		6-1/8	6-3/8
	3K4	600	150			104.05	86.83	58		7-1/4	7-1/8
Temperature Range Inclusive - 462.7 °C to 537.7 °C											
Chrome Molybdenum Steel	3K4	300	150					35.86	15.11	6-1/8	6-3/8
	3K4	600	150					71.36	30.23	7-1/4	7-1/8
Temperature Range Inclusive - 267.7 °C to 537.7 °C											
Austenitic Stainless Steel	3K4	150	150	19.33	19.33	19.33	12.66	5.62	1.41	6-1/8	6-3/8
	3K4	300	150	(36.91)	50.62	50.62	34.8	29.53	24.61	6-1/8	6-3/8
	3K4	600	150	(42.18)	101.24	101.24	68.55	59.41	49.21	7-1/4	7-1/8

"L" ORIFICE (EFFECTIVE ORIFICE AREA = 2.853 SQ. IN.)

Materials	Valve	ASME Flange		Maximum Inlet Flange (Set) Pressure Limit						Center-to-Face	
	Size	Class		kg cm ² (g)						Dimensions	
Body/ Bonnet	Inlet by Orifice by Outlet	I N L E T	O U T L E T	conventional and Balanced Bellows Valve						(in)	
				-267.7° C to -60° C	-59.4° C to -29.4	-28.8° C to -73.3° C	232.2° C	426.6° C	537.7° C	I N L E T	O U T L E T
Temperature Range Inclusive - 28.8 °C to 426.6 °C											
Carbon Steel	3L4	150	150			20.03	13	5.62		6-1/8	6-1/2
	4L6	300	150			52.02	43.24	28.83		7-1/16	7-1/8
	4L6	600	150			(70.31)	(70.31)	58		7-1/16	8
Temperature Range Inclusive - 462.7 °C to 537.7 °C											
Chrome Molybdenum Steel	4L6	300	150					35.86	15.11	7-1/16	7-1/8
	4L6	600	150					(70.31)	30.23	7-1/16	8
Temperature Range Inclusive - 267.7 °C to 537.7 °C											
Austenitic Stainless Steel	3L4	150	150	19.33	19.33	19.33	12.66	5.62	1.41	6-1/8	6-1/2
	4L6	300	150	(37.61)	50.62	50.62	34.8	29.53	24.61	7-1/16	7-1/8
	4L6	600	150	(37.61)	(70.31)	(70.31)	68.55	49.21	49.21	7-1/16	8

"M" ORIFICE (EFFECTIVE ORIFICE AREA = 3.60 SQ. IN.)

Materials	Valve	ASME Flange		Maximum Inlet Flange (Set) Pressure Limit						Center-to-Face	
	Size	Class		kg cm ² (g)						Dimensions	
Body/ Bonnet	Inlet by Orifice by Outlet	I N L E T	O U T L E T	conventional and Balanced Bellows Valve						I N L E T	O U T L E T
				-267.7° C to -60° C	-59.4° C to -29.4° C	-28.8° C to -73.3° C	232.2° C	426.6° C	537.7° C		
Temperature Range Inclusive - 28.8 °C to 426.6 °C											
Carbon Steel	4M6	150	150			20.03	13	5.62		7	7-1/4
	4M6	300	150			52.02	43.24	28.83		7	7-1/4
	4M6	600	150			(77.34)	(77.34)	58		7	8
Temperature Range Inclusive - 462.7 °C to 537.7 °C											
Chrome Molybdenum Steel	4M6	300	150					35.86	15.11	7	7-1/4
	4M6	600	150					(70.31)	30.23	7	8
Temperature Range Inclusive - 267.7 °C to 537.7 °C											
Austenitic Stainless Steel	4M6	150	150	19.33	19.33	19.33	12.66	5.62	1.41	7	7-1/4
	4M6	300	150	(36.61)	50.62	50.62	34.8	29.53	24.61	7	7-1/4
	4M6	600	150	(42.18)	(77.34)	(77.34)	68.55	59.41	49.21	7	8

"N" ORIFICE (EFFECTIVE ORIFICE AREA = 4.34 SQ. IN.)

Materials	Valve	ASME Flange		Maximum Inlet Flange (Set) Pressure Limit						Center-to-Face	
	Size	Class		kg cm ² (g)						Dimensions	
Body/ Bonnet	Inlet by Orifice by Outlet	I N L E T	O U T L E T	conventional and Balanced Bellows Valve						(in)	
				-267.7° C to -60° C	-59.4° C to -29.4° C	-28.8° C to -73.3° C	232.2° C	426.6° C	537.7° C	I N L E T	O U T L E T
Temperature Range Inclusive - 28.8 °C to 426.6 °C											
Carbon Steel	4N6	150	150			20.03	13	5.62		7-3/4	8-1/4
	4N6	300	150			52.02	43.24	28.83		7-3/4	8-1/4
	4N6	600	150			(70.31)	(70.31)	58		7-3/4	8-1/4
Temperature Range Inclusive - 462.7 °C to 537.7 °C											
Chrome Molybdenum Steel	4N6	300	150					35.86	15.11	7-3/4	8-1/4
	4N6	600	150					(70.31)	30.23	7-3/4	8-1/4
Temperature Range Inclusive - 267.7 °C to 537.7 °C											
Austenitic Stainless Steel	4N6	150	150	19.33	19.33	19.33	12.66	5.62	1.41	7-3/4	8-1/4
	4N6	300	150	(31.64)	50.62	50.62	34.8	29.53	24.61	7-3/4	8-1/4
	4N6	600	150	(35.15)	(70.31)	(70.31)	68.55	59.41	49.21	7-3/4	8-1/4

"P" ORIFICE (EFFECTIVE ORIFICE AREA = 6.38 SQ. IN.)

Materials	Valve	ASME Flange		Maximum Inlet Flange (Set) Pressure Limit						Center-to-Face	
	Size	Class		kg cm ² (g)						Dimensions	
Body/ Bonnet	Inlet by Orifice by Outlet	I N L E T	O U T L E T	conventional and Balanced Bellows Valve						I N L E T	O U T L E T
				-267.7° C to -60° C	-59.4° C to -29.4° C	-28.8° C to -73.3° C	232.2° C	426.6° C	537.7° C		
Temperature Range Inclusive - 28.8° C to 426.6° C											
Carbon Steel	4P6	150	150			20.03	13	5.62		7-1/8	9
	4P6	300	150			(36.91)	(36.91)	28.83		8-7/8	10
	4P6	600	150			(70.31)	(70.31)	58		8-7/8	10
Temperature Range Inclusive - 462.7° C to 537.7° C											
Chrome Molybdenum Steel	4P6	300	150					35.86	15.11	8-7/8	10
	4P6	600	150					(70.31)	30.23	8-7/8	10
Temperature Range Inclusive - 267.7° C to 537.7° C											
Austenitic Stainless Steel	4P6	150	150	(12.3)	19.33	19.33	12.66	5.62	1.41	7-1/8	9
	4P6	300	150	(21.09)	(36.91)	(36.91)	34.8	29.53	24.61	8-7/8	10
	4P6	600	150	(33.75)	(70.31)	(70.31)	68.55	59.41	49.21	8-7/8	10

"Q" ORIFICE (EFFECTIVE ORIFICE AREA = 11.05 SQ. IN.)

Materials	Valve	ASME Flange		Maximum Inlet Flange (Set) Pressure Limit						Center-to-Face	
	Size	Class		kg cm ² (g)						Dimensions	
Body/ Bonnet	Inlet by Orifice by Outlet	I N L E T	O U T L E T	conventional and Balanced Bellows Valve						(in)	
				-267.7° C to -60° C	-59.4° C to -29.4° C	-28.8° C to -73.3° C	232.2° C	426.6° C	537.7° C	I N L E T	O U T L E T
Temperature Range Inclusive - 28.8° C to 426.6° C											
Carbon Steel	6Q8	150	150			(11.60)	(11.60)	5.62		9-7/16	9-1/2
	6Q8	300	150			(21.09)	(21.09)	(21.09)		9-7/16	9-1/2
	6Q8	600	150			(42.18)	(42.18)	(42.18)		9-7/16	9-1/2
Temperature Range Inclusive - 462.7° C to 537.7° C											
Chrome Molybdenum Steel	6Q8	300	150					(11.60)	(11.60)	9-7/16	9-1/2
	6Q8	600	150					(42.18)	30.23	9-7/16	9-1/2
Temperature Range Inclusive - 267.7° C to 537.7° C											
Austenitic Stainless Steel	6Q8	150	150	(11.60)	(11.60)	(11.60)	(11.60)	5.62	1.41	9-7/16	9-1/2
	6Q8	300	150	(17.58)	(21.09)	(21.09)	(21.09)	(21.09)	(21.09)	9-7/16	9-1/2
	6Q8	600	150	(21.09)	(42.18)	(42.18)	(42.18)	(42.18)	(42.18)	9-7/16	9-1/2

"R" ORIFICE (EFFECTIVE ORIFICE AREA = 16.00 SQ. IN.)

Materials	Valve	ASME Flange		Maximum Inlet Flange (Set) Pressure Limit						Center-to-Face	
	Size	Class		kg cm ² (g)						Dimensions	
Body/ Bonnet	Inlet by Orifice by Outlet	I N L E T	O U T L E T	conventional and Balanced Bellows Valve						(in)	
				-267.7° C to -60° C	-59.4° C to -29.4° C	-28.8° C to -73.3° C	232.2° C	426.6° C	537.7° C	I N L E T	O U T L E T
Temperature Range Inclusive - 28.8° C to 426.6° C											
Carbon Steel	6R8	150	150			(7.03)	(7.03)	5.62		9-7/16	9-1/2
	6R10	300	150			(16.17)	(16.17)	(16.17)		9-7/16	10-1/2
	6R10	600	150			(21.09)	(21.09)	(21.09)		9-7/16	10-1/2
Temperature Range Inclusive - 462.7° C to 537.7° C											
Chrome Molybdenum Steel	6R8	300	150					(7.03)	(7.03)	9-7/16	9-1/2
	6R10	600	150					(21.09)	(21.09)	9-7/16	10-1/2
Temperature Range Inclusive - 267.7° C to 537.7° C											
Austenitic Stainless Steel	6R8	150	150	(3.87)	(7.03)	(7.03)	(7.03)	5.62	1.41	9-7/16	9-1/2
	6R10	300	150	(10.55)	(16.17)	(16.17)	(16.17)	(16.17)	(16.17)	9-7/16	10-1/2
	6R10	600	150	(14.06)	(21.09)	(21.09)	(21.09)	(21.09)	(21.09)	9-7/16	10-1/2

"T" ORIFICE (EFFECTIVE ORIFICE AREA = 26.00 SQ. IN.)

Materials	Valve	ASME Flange		Maximum Inlet Flange (Set) Pressure Limit						Center-to-Face	
	Size	Class		kg cm ² (g)						Dimensions	
Body/ Bonnet	Inlet by Orifice by Outlet	I N L E T	O U T L E T	conventional and Balanced Bellows Valve						(in)	
				-267.7° C to -60° C	-59.4° C to -29.4° C	-28.8° C to -73.3° C	232.2° C	426.6° C	537.7° C	I N L E T	O U T L E T
Temperature Range Inclusive - 28.8° C to 426.6° C											
Carbon Steel	8T10	150	150			(4.57)	(4.57)	(4.57)		10-7/8	11
	8T10	300	150			(8.44)	(8.44)	(8.44)		10-7/8	11
	8T10	300	150			(21.09)	(21.09)	(21.09)		10-7/8	11
Temperature Range Inclusive - 462.7° C to 537.7° C											
Chrome Molybdenum Steel	8T10	300	150					(8.44)	7.03	10-7/8	11
	8T10	300	150					(21.09)	(15.12)	10-7/8	11
Temperature Range Inclusive - 267.7° C to 537.7° C											
Austenitic Stainless Steel	8T10	150	150	(3.52)	(7.03)	(7.03)	(7.03)	(7.03)	1.41	10-7/8	11
	8T10	300	150	(3.52)	(7.03)	(7.03)	(7.03)	(7.03)	(7.03)	10-7/8	11

TABLE OF ORIFICE VS AREA

Orifice	D	E	F	G	H	J	K	L
Area inch²	0.110	0.196	0.307	0.503	0.785	1.287	1.838	2.853
Orifice	M	N	P	Q	R	T		
Area inch²	3.60	4.34	6.38	11.05	16.00	26.00		

ORIFICE AREA CALCULATION

Fluid: Gas or Vapor
Code / Standard: API 520

Formula:
$$A = \frac{W \cdot T \cdot Z}{C \cdot K_d \cdot P_1 \cdot K_b \cdot K_c \cdot M}$$

Nomenclature:

- A Required effective discharge area in inch²
- W Required flow through the device lb/hr
- P_s Set pressure * 1.1 plus atmospheric pressure psia
- K_b Capacity correction factor due to back pressure
- M Molecular weight of the gas or vapor lb/lb-mole
- K_d Effective discharge coefficient
- K_c Rupture disc correction factor
- T Relieving temperature of inlet gas or vapor R
- Z Compressibility factor
- C Function of the ratio of ideal gas specific heats (k = Cp / CV) of the gas or vapor at inlet condition

Fluid: Steam
Code / Standard: API 520

Formula:
$$A = \frac{W}{51.5 \cdot P_1 \cdot K_d \cdot K_b \cdot K_c \cdot K_N \cdot K_{SH}}$$

Nomenclature:

- A Required effective discharge area in inch²
- W Required flow rate lb/hr
- P₁ Set pressure * 1.1 plus atmospheric pressure psia
- K_d Effective discharge coefficient
- K_b Capacity correction factor due to back pressure
- K_c Rupture disc correction factor
- K_N Correction factor for the Napier equation.
- K_{SH} Superheat correction factor

Fluid: Steam
Code / Standard: IBR

Formula:
$$A = \frac{E}{C \cdot P}$$

Nomenclature:

- A Required effective discharge area in mm²
- E Required flow rate Kg/hr
- C Effective discharge coefficient
- P Set pressure * over pressure plus atmospheric pressure Bar A

For Subcritical flow sizing contact factory.

TABLE OF ORIFICE VS AREA

Orifice	D	E	F	G	H	J	K	L
Area inch ²	0.110	0.196	0.307	0.503	0.785	1.287	1.838	2.853
Orifice	M	N	P	Q	R	T		
Area inch ²	3.60	4.34	6.38	11.05	16.00	26.00		

ORIFICE AREA CALCULATION

Fluid: Liquid
 Code / Standard: API 520

Formula:
$$A = \frac{Q}{38 * K_d * K_w * K_c * K_v * K^p} \sqrt{\frac{G}{1.25 * P_s - P_2}}$$

Nomenclature:

- A Required effective discharge area in inch²
- Q Required flow through the device US gal / min
- KD Effective discharge coefficient
- K_w Correction factor due to back pressure
- K_c Rupture disc correction factor
- K_v Correction factor due to viscosity
- K_p Correction factor due to over pressure
- G Specific gravity of liquid at temperature
- P_s Set pressure in psig
- P₂ Total back pressure in psig

FIGURE 2 - CAPACITY CORRECTION FACTOR K_v DUE TO VISCOSITY

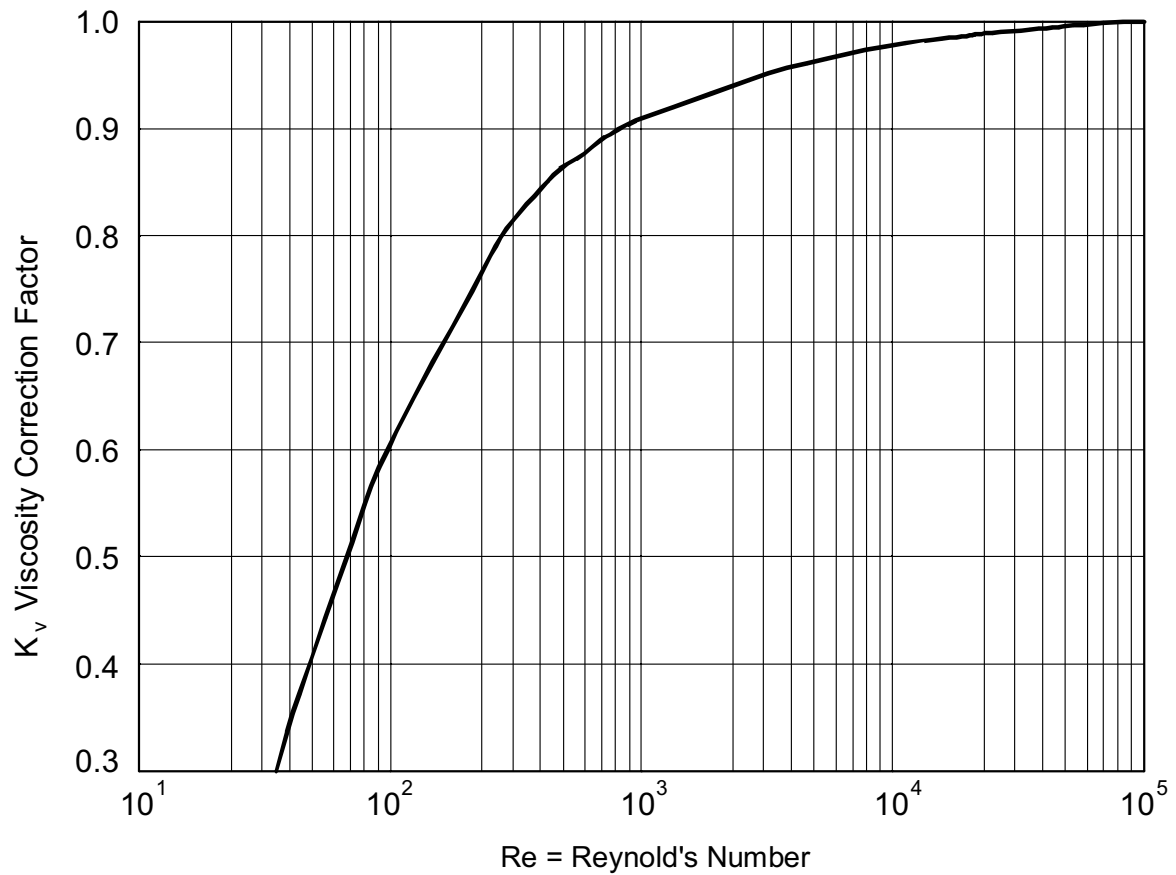
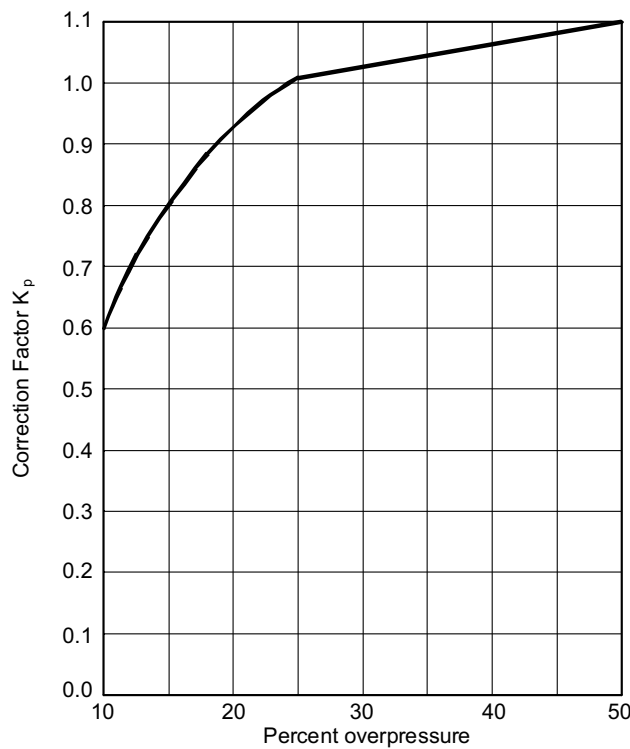


FIGURE 4 - CAPACITY CORRECTION FACTORS DUE TO OVER PRESSURE FOR NON CERTIFIED PRVS IN SERVICE



NOTE The curve above shows that up to and including 25% overpressure, capacity is affected by the change in lift, the change in the orifice discharge coefficient, and the change in overpressure. Above 25%, capacity is affected only by the change in overpressure. Noncertified valves operating at low overpressure tend to chatter; therefore, overpressure of less than 10% should be avoided.

TABLE 1 - SUPERHEAT CORRECTION FACTORS, K_{SH}

Set Pressure psig (kPag)	Temperature °F (°C)									
	300 (149)	400 (204)	500 (260)	600 (316)	700 (371)	800 (427)	900 (482)	1000 (538)	1100 (593)	1200 (649)
15 (103)	1	0.98	0.93	0.88	0.84	0.8	0.77	0.74	0.72	0.7
20 (138)	1	0.98	0.93	0.88	0.84	0.8	0.77	0.74	0.72	0.7
40 (276)	1	0.99	0.93	0.88	0.84	0.81	0.77	0.74	0.72	0.7
60 (414)	1	0.99	0.93	0.88	0.84	0.81	0.77	0.75	0.72	0.7
80 (551)	1	0.99	0.93	0.88	0.84	0.81	0.77	0.75	0.72	0.7
100 (689)	1	0.99	0.94	0.89	0.84	0.81	0.77	0.75	0.72	0.7
120 (827)	1	0.99	0.94	0.89	0.84	0.81	0.78	0.75	0.72	0.7
140 (965)	1	0.99	0.94	0.89	0.85	0.81	0.78	0.75	0.72	0.7
160 (1103)	1	0.99	0.94	0.89	0.85	0.81	0.78	0.75	0.72	0.7
180 (1241)	1	0.99	0.94	0.89	0.85	0.81	0.78	0.75	0.72	0.7
200 (1379)	1	0.99	0.95	0.89	0.85	0.81	0.78	0.75	0.72	0.7
220 (1516)	1	0.99	0.95	0.89	0.85	0.81	0.78	0.75	0.72	0.7
240 (1654)	—	1	0.95	0.9	0.85	0.81	0.78	0.75	0.72	0.7
260 (1792)	—	1	0.95	0.9	0.85	0.81	0.78	0.75	0.72	0.7
280 (1930)	—	1	0.96	0.9	0.85	0.81	0.78	0.75	0.72	0.7
300 (2068)	—	1	0.96	0.9	0.85	0.81	0.78	0.75	0.72	0.7
350 (2413)	—	1	0.96	0.9	0.86	0.82	0.78	0.75	0.72	0.7
400 (2757)	—	1	0.96	0.91	0.86	0.82	0.78	0.75	0.72	0.7
500 (3446)	—	1	0.96	0.92	0.86	0.82	0.78	0.75	0.73	0.7
600 (4136)	—	1	0.97	0.92	0.87	0.82	0.79	0.75	0.73	0.7
800 (5514)	—	—	1	0.95	0.88	0.83	0.79	0.76	0.73	0.7
1000 (6893)	—	—	1	0.96	0.89	0.84	0.78	0.76	0.73	0.71
1250 (8616)	—	—	1	0.97	0.91	0.85	0.8	0.77	0.74	0.71
1500 (10339)	—	—	—	1	0.93	0.86	0.81	0.77	0.74	0.71
1750 (12063)	—	—	—	1	0.94	0.86	0.81	0.77	0.73	0.7
2000 (13786)	—	—	—	1	0.95	0.86	0.8	0.76	0.72	0.69
2500 (17232)	—	—	—	1	0.95	0.85	0.78	0.73	0.69	0.66
3000 (20679)	—	—	—	—	1	0.82	0.74	0.69	0.65	0.62

TABLE 2 - PROPERTIES OF GASES

Gas	Molecular Weight	Ideal Gas Specific Heat Ratio ($k = C_p / C_v$) at 60 °F and one Atmosphere	Ideal Gas Critical Flow Pressure Ratio at 60°F and one Atmosphere	Ideal Gas Specific Gravity at 60°F and One Atmosphere	Critical Constants		Condensation Temperature One Atmosphere °F (°C)	Flammability Limits (volume % in air mixture)
					Pressure psia (kPa)	Temperature °F (°C)		
Methane ^a	16.04	1.31	0.54	0.554	673 (4640)	-116 (-82)	-259 (-162)	5.0 - 15.0
Ethane ^a	30.07	1.19	0.57	1.058	718 (4950)	90 (32)	-128 (-89)	2.9 - 13.8
Ethylene ^a	28.03	1.24	0.57	0.969	742 (5116)	50 (10)	-155 (-104)	2.7 - 34.8
Propane ^a	44.09	1.13	0.58	1.522	617 (4254)	206 (97)	-44 (-42)	2.1 - 9.5
Propylene ^a	42.08	1.15	0.58	1.453	667 (4599)	197 (92)	-54 (-48)	2.8 - 10.8
Isobutane ^a	58.12	1.1	0.59	2.007	529 (3647)	273 (134)	11 (-12)	1.8 - 8.4
n-Butene ^a	58.12	1.09	0.59	2.007	551 (3799)	304 (151)	31 (-1)	1.9 - 8.4
1-Butene	56.1	1.11	0.59	1.937	586 (4040)	296 (147)	21 (-6)	1.4 - 9.3
Isopentane ^a	72.15	1.08	0.59	2.491	483 (3330)	369 (187)	82 (28)	1.4 - 8.3
n-Pentane ^a	72.15	1.08	0.59	2.491	490 (3378)	386 (197)	97 (36)	1.4 - 7.8
1-Pentene ^a	70.13	1.08	0.59	2.421	510 (3930)	377 (192)	86 (30)	1.4 - 8.7
n-Hexane ^a	86.18	1.06	0.59	2.973	437 (3013)	454 (234)	156 (69)	1.2 - 7.7
Benzene	78.11	1.12	0.58	2.697	714 (4923)	552 (289)	176 (80)	1.3 - 7.9
n-Heptane ^a	100.2	1.05	0.6	3.459	397 (2737)	513 (267)	209 (98)	1.0 - 7.0
Toluene	92.13	1.09	0.59	3.181	590 (4068)	604 (318)	231 (111)	1.2 - 7.1
n-Octane ^a	114.22	1.05	0.6	3.944	362 (2496)	564 (296)	258 (126)	0.96 - 6.7
n-Nonane	128.23	1.04	0.6	4.428	332 (2289)	610 (321)	303 (151)	0.87 - 2.9
n-Decane	142.28	1.03	0.6	4.912	304 (2096)	632 (333)	345 (174)	0.78 - 2.6
Air	28.96	1.4	0.53	1	547 (3771)	-221 (-141)	-313 (-192)	—
Ammonia	17.03	1.3	0.53	0.588	1636 (11280)	270 (132)	-28 (-33)	15.5 - 27.0
Carbon Dioxide	44.01	1.29	0.55	1.519	1071 (7384)	88 (31)	-109 (-78)	—
Hydrogen	2.02	1.41	0.52	0.0696	188 (1296)	-400 (-240)	-423 (-253)	4.0 - 74.2
Hydrogen Sulfide	34.08	1.32	0.53	1.176	1306 (9005)	213 (101)	-77 (-61)	4.3 - 45.5
Sulfur Dioxide	64.04	1.27	0.55	2.212	1143 (7881)	316 (158)	14 (-10)	—
Steam	18.01	1.33	0.54	0.622	3206 (22104)	706 (374)	212 (100)	—

^a Estimated.

CURVE FOR EVALUATING COEFFICIENT C

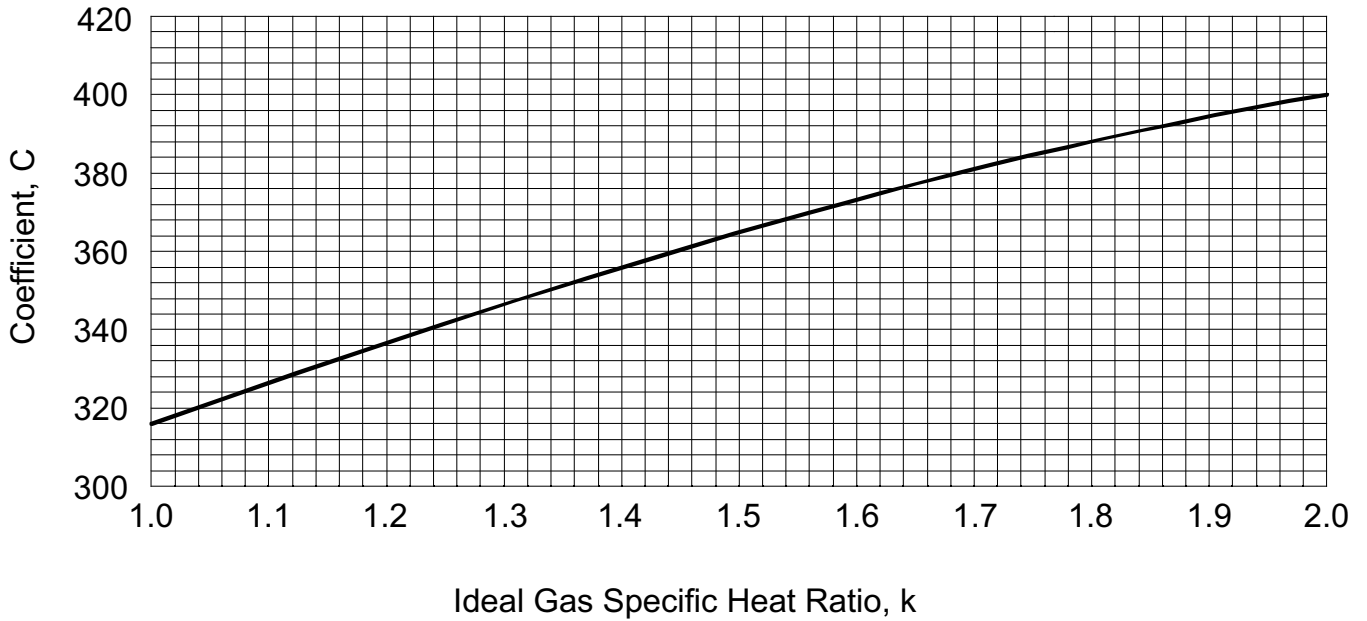
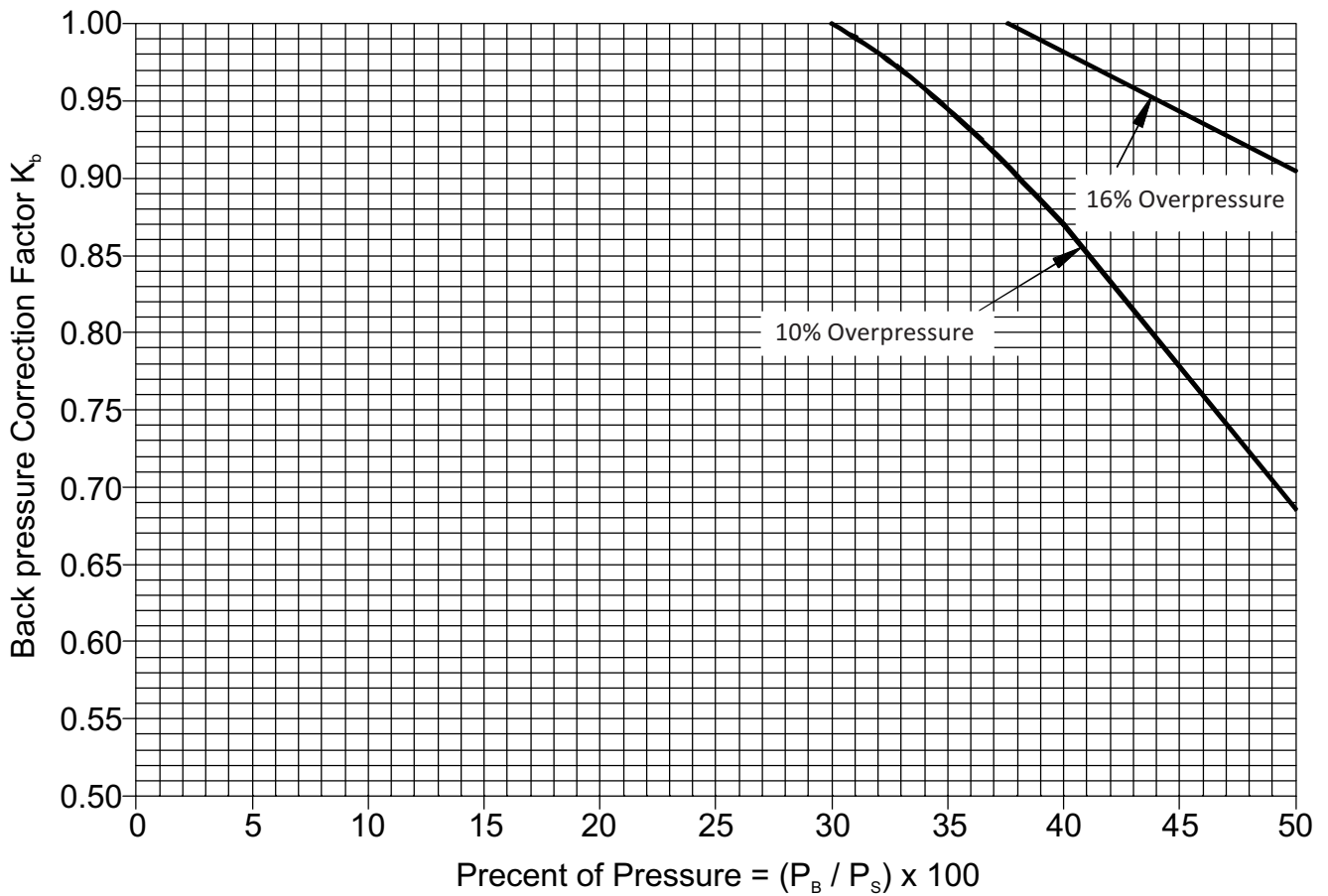


FIGURE 1 - BACK PRESSURE CORRECTION FACTOR, K_B , FOR BALANCE SPRING-LOADED PRV



P_B = backpressure. in psig

P_S = set pressure. in psig

For Set pressure above 50 psig.

For 21% overpressure, $K_b=1$ up to $P_B/P_S=50\%$.

SAFETY VALVE DISCHARGE CAPACITY SATURATED STEAM

Orifice D : 0.110 inch² : 70.96 mm²			
Pressure	Capacity	Pressure	Capacity
Bar A	kg / hr	Bar A	kg / hr
1.5	51.09	41	1396.49
2	68.12	42	1430.55
3	102.18	43	1464.61
4	136.24	44	1498.68
5	170.30	45	1532.74
6	204.36	16	544.74
7	238.43	17	579.03
8	272.49	18	613.09
9	306.55	19	647.16
10	340.61	50	1703.04
11	374.67	51	1737.10
12	408.73	52	1771.16
13	442.79	53	1805.22
14	476.85	54	1839.28
15	510.91	55	1873.34
16	544.97	56	1907.40
17	579.03	57	1941.47
18	613.09	58	1975.53
19	647.16	59	2009.59
20	681.22	60	2043.65
21	715.28	61	2077.71
22	749.34	62	2111.77
23	783.40	63	2145.83
24	817.46	64	2179.89
25	851.52	65	2213.95
26	885.58	66	2248.01
27	919.64	67	2282.07
28	953.70	68	2316.13
29	987.76	69	2350.20
30	1021.82	70	2384.26
31	1055.88	71	2418.32
32	1089.95	72	2452.38
33	1124.01	73	2486.44
34	1158.07	74	2520.50
35	1192.17	75	2554.56
36	1226.19	76	2588.62
37	1260.25	77	2622.68
38	1294.31	78	2656.74
39	1328.37	79	2690.80
40	1362.43	80	2724.86

Orifice E : 0.196 inch² : 126.45 mm²			
Pressure	Capacity	Pressure	Capacity
Bar A	kg / hr	Bar A	kg / hr
1.5	91.04	41	2488.54
2	121.39	42	2549.23
3	182.09	43	2609.93
4	242.78	44	2670.62
5	303.48	45	2731.32
6	364.18	16	971.14
7	424.87	17	1031.83
8	485.57	18	1092.53
9	546.26	19	1153.22
10	606.96	50	3034.80
11	667.66	51	3095.50
12	728.35	52	3156.19
13	789.05	53	3216.89
14	849.74	54	3277.58
15	910.44	55	3328.28
16	971.14	56	3398.98
17	1031.83	57	3459.67
18	1092.53	58	3520.37
19	1153.22	59	3581.06
20	1213.92	60	3641.76
21	1274.62	61	3702.46
22	1335.31	62	3763.15
23	1396.01	63	3823.85
24	1456.70	64	3884.54
25	1517.40	65	3945.24
26	1578.10	66	4005.94
27	1638.79	67	4066.63
28	1699.49	68	4127.33
29	1760.18	69	4188.02
30	1820.88	70	4248.72
31	1881.58	71	4309.42
32	1942.27	72	4370.11
33	2002.97	73	4430.81
34	2063.66	74	4491.50
35	2124.36	75	4552.20
36	2185.06	76	4612.90
37	2245.75	77	4673.59
38	2306.45	78	4734.29
39	2367.14	79	4794.98
40	2427.84	80	4855.68

SAFETY VALVE DISCHARGE CAPACITY SATURATED STEAM

Orifice F : 0.307 inch² : 198.06 mm²			
Pressure	Capacity	Pressure	Capacity
Bar A	kg / hr	Bar A	kg / hr
1.5	142.60	41	3897.82
2	190.14	42	3992.89
3	285.21	43	4087.96
4	380.28	44	4183.03
5	475.34	45	4278.10
6	570.41	16	1521.10
7	665.48	17	1616.17
8	760.55	18	1711.24
9	855.62	19	1806.31
10	950.69	50	4753.44
11	1045.76	51	4848.51
12	1140.83	52	4943.58
13	1235.89	53	5038.65
14	1330.96	54	5133.72
15	1426.03	55	5228.78
16	1521.10	56	5323.85
17	1616.17	57	5418.927
18	1711.24	58	5513.99
19	1806.31	59	5609.06
20	1901.38	60	5704.13
21	1986.44	61	5799.20
22	2091.51	62	5894.27
23	2186.58	63	5989.33
24	2281.65	64	6084.40
25	2376.72	65	6179.47
26	2471.79	66	6274.54
27	2566.86	67	6369.61
28	2661.93	68	6464.68
29	2557.00	69	6559.75
30	2852.06	70	6654.82
31	2947.13	71	6749.88
32	3042.20	72	6844.95
33	3137.27	73	6940.02
34	3232.34	74	7035.09
35	3227.41	75	7130.16
36	3422.41	76	7225.23
37	351755	77	7320.30
38	3612.61	78	7415.37
39	3707.68	79	7510.44
40	3802.75	80	7605.50

Orifice G : 0.503inch² : 324.51 mm²			
Pressure	Capacity	Pressure	Capacity
Bar A	kg / hr	Bar A	kg / hr
1.5	233.65	41	6386.36
2	311.53	42	6542.12
3	467.53	43	6697.89
4	623.06	44	6856.65
5	778.82	45	7009.42
6	934.59	46	2792.24
7	1090.35	47	2648.00
8	1246.12	48	2803.77
9	1401.88	49	2959.53
10	1557.65	50	7788.24
11	1713.41	51	7944.00
12	1869.18	52	8099.77
13	2024.94	53	8255.53
14	2180.71	54	8411.30
15	2336.47	55	8567.06
16	2492.24	56	8722.83
17	2648.00	57	8878.59
18	2803.77	58	9034.36
19	2959.53	59	9190.12
20	3115.30	60	9345.89
21	3271.06	61	9501.65
22	3426.83	62	9657.42
23	3582.59	63	9813.18
24	3738.36	64	9968.95
25	3894.12	65	10124.71
26	4049.88	66	10280.48
27	4205.65	67	10436.24
28	4361.41	68	10592.01
29	4517.18	69	10747.77
30	4672.94	70	10903.54
31	4828.71	71	11059.30
32	4984.47	72	11215.07
33	5140.24	73	11370.83
34	5296.00	74	11526.60
35	5451.77	75	11682.36
36	5607.53	76	11838.12
37	5763.30	77	11993.89
38	5919.06	78	12149.65
39	6074.83	79	12305.42
40	6230.59	80	12461.18

SAFETY VALVE DISCHARGE CAPACITY SATURATED STEAM

Orifice H : 0.785 inch² : 506.45 mm²			
Pressure	Capacity	Pressure	Capacity
Bar A	kg / hr	Bar A	kg / hr
1.5	364.64	41	9966.94
2	486.19	42	10210.03
3	729.29	43	10453.13
4	972.38	44	10696.22
5	1215.48	45	10939.32
6	1458.58	46	3889.54
7	1701.67	47	4132.63
8	1944.77	48	4375.73
9	2187.86	49	4618.82
10	2430.96	50	12154.80
11	2674.06	51	12397.90
12	2917.15	52	12640.99
13	3160.25	53	12884.09
14	3403.34	54	13127.18
15	3646.44	55	13370.28
16	3889.54	56	13613.38
17	4132.63	57	13856.47
18	4375.73	58	14099.57
19	4618.82	59	14342.66
20	4861.92	60	14585.76
21	5105.02	61	14828.86
22	5348.11	62	15071.95
23	5591.21	63	15315.05
24	5834.30	64	15558.14
25	6077.40	65	15801.24
26	6320.50	66	16044.34
27	6563.59	67	16287.43
28	6806.69	68	16530.53
29	7049.78	69	16773.62
30	7292.88	70	17016.72
31	7535.98	71	17259.82
32	7779.07	72	17502.91
33	8022.17	73	17746.01
34	8265.26	74	17989.10
35	8508.36	75	18232.20
36	8751.46	76	18475.30
37	8994.55	77	18718.39
38	9237.65	78	18961.49
39	9480.74	79	19204.58
40	9723.84	80	19447.68

Orifice J : 1.287 inch² : 830.323 mm²			
Pressure	Capacity	Pressure	Capacity
Bar A	kg / hr	Bar A	kg / hr
1.5	597.83	41	16340.70
2	797.11	42	16739.25
3	1195.66	43	17137.80
4	1594.21	44	17536.36
5	1992.77	45	17934.91
6	2391.32	46	6376.86
7	2789.88	47	6775.41
8	3188.43	48	7173.96
9	3586.98	49	7572.52
10	3985.54	50	19927.68
11	4384.09	51	20326.23
12	4782.64	52	20724.79
13	5181.20	53	21123.34
14	5579.75	54	21521.89
15	5978.30	55	21920.45
16	6376.86	56	22319.00
17	6775.41	57	22717.56
18	7173.96	58	23116.11
19	7572.52	59	23514.66
20	7971.07	60	23913.22
21	8369.63	61	24311.77
22	8768.18	62	24710.32
23	9166.73	63	25108.88
24	9565.29	64	25507.43
25	9963.84	65	25905.98
26	10362.39	66	26304.54
27	10760.95	67	26703.09
28	11159.50	68	27101.64
29	11558.05	69	27500.20
30	11956.61	70	27898.75
31	12355.16	71	28297.31
32	12753.72	72	28695.86
33	13152.27	73	29094.41
34	13550.82	74	29492.97
35	13949.38	75	29891.52
36	14347.93	76	30290.07
37	14746.48	77	30688.63
38	15145.04	78	31087.18
39	15543.59	79	31485.73
40	15942.14	80	31884.29



SAFETY VALVE DISCHARGE CAPACITY SATURATED STEAM

Orifice K : 1.838 inch² : 1185.80 mm²			
Pressure	Capacity	Pressure	Capacity
Bar A	kg / hr	Bar A	kg / hr
1.5	853.78	41	23336.54
2	1138.37	42	23905.73
3	1707.55	43	24474.91
4	2276.74	44	25044.10
5	2845.92	45	25613.28
6	3415.10	46	9106.94
7	3984.29	47	9676.13
8	4553.47	48	10245.31
9	5122.66	49	10814.50
10	5691.84	50	28459.20
11	6261.02	51	29028.38
12	6830.21	52	29597.57
13	7399.39	53	30166.75
14	7968.58	54	30735.94
15	8537.76	55	31305.12
16	9106.94	56	31874.30
17	9676.13	57	32443.49
18	10245.31	58	33012.67
19	10814.50	59	33581.86
20	11383.68	60	34151.04
21	11952.86	61	34720.22
22	12522.05	62	35289.41
23	13091.23	63	35858.59
24	13660.42	64	36427.78
25	14229.60	65	36996.96
26	14798.78	66	37566.14
27	15367.97	67	38135.33
28	15937.15	68	38704.51
29	16506.34	69	39273.70
30	17075.52	70	39842.88
31	17644.70	71	40412.06
32	18213.89	72	40981.25
33	18783.07	73	41550.43
34	19352.26	74	42119.62
35	19921.44	75	42688.80
36	20490.62	76	43257.98
37	21059.81	77	43827.17
38	21628.99	78	44396.35
39	22198.18	79	44965.54
40	22767.36	80	45534.72

Orifice L : 2.853 inch² : 1840.63 mm²			
Pressure	Capacity	Pressure	Capacity
Bar A	kg / hr	Bar A	kg / hr
1.5	1325.25	41	36223.60
2	1467.00	42	37107.10
3	2650.51	43	37990.60
4	3534.01	44	38874.11
5	4417.51	45	39757.61
6	5301.01	46	14136.04
7	6184.52	47	15019.54
8	7068.02	48	15903.04
9	7951.52	49	16786.55
10	8835.02	50	44175.12
11	9718.53	51	45058.62
12	10602.03	52	45942.12
13	11485.53	53	46825.63
14	12369.03	54	47709.13
15	13252.54	55	48592.63
16	14136.04	56	49476.13
17	15019.54	57	50359.64
18	15903.04	58	51243.14
19	16786.55	59	52126.64
20	17670.05	60	53010.14
21	18553.55	61	53893.65
22	19437.05	62	54777.15
23	20320.56	63	55660.65
24	21204.06	64	56544.15
25	22087.56	65	57427.66
26	22971.06	66	58311.16
27	23854.56	67	59194.66
28	24738.07	68	60078.16
29	25621.57	69	60961.67
30	26505.07	70	61845.17
31	27388.57	71	62728.67
32	28272.08	72	63612.14
33	29155.58	73	64495.68
34	30039.08	74	65379.18
35	30922.58	75	66262.68
36	31806.09	76	67146.18
37	32689.59	77	68029.68
38	33573.09	78	68913.19
39	34456.59	79	69796.69
40	35340.10	80	70680.19

SAFETY VALVE DISCHARGE CAPACITY SATURATED STEAM

Orifice M: 3.60 inch²: 2322.57 mm²			
Pressure	Capacity	Pressure	Capacity
Bar A	kg / hr	Bar A	kg / hr
1.5	1672.25	41	45708.18
2	2229.67	42	46823.01
3	3344.50	43	47937.84
4	4459.33	44	49052.68
5	5574.17	45	50167.51
6	6689.00	46	17837.34
7	7803.84	47	18952.17
8	8918.67	48	20067.00
9	10033.50	49	21181.84
10	11148.34	50	55741.68
11	12263.17	51	56856.51
12	13378.00	52	57971.35
13	14492.84	53	59086.18
14	15607.67	54	60201.01
15	16722.50	55	61315.85
16	17837.34	56	62430.68
17	18952.17	57	63545.52
18	20067.00	58	64660.35
19	21181.84	59	65775.18
20	22296.67	60	66890.02
21	23411.51	61	68004.85
22	25526.34	62	69119.68
23	25641.17	63	70234.52
24	26759.01	64	71349.35
25	27870.84	65	72464.18
26	28985.67	66	73579.02
27	30100.51	67	74693.85
28	31215.34	68	75808.68
29	32330.17	69	76923.52
30	33445.01	70	78038.35
31	34559.84	71	79153.19
32	35674.68	72	80268.02
33	36789.51	73	81382.85
34	37004.34	74	82497.69
35	39019.18	75	83612.52
36	40134.01	76	84727.35
37	41248.84		
38	42363.68		
39	43478.51		
40	44593.34		

Orifice N : 4.34 inch²: 2799.99 mm²			
Pressure	Capacity	Pressure	Capacity
Bar A	kg / hr	Bar A	kg / hr
1.5	2015.99	41	55103.80
2	2687.99	42	56447.80
3	4031.99	43	57791.79
4	5375.98	44	59135.79
5	6719.98	45	60479.78
6	8063.97	46	21503.92
7	9407.97	47	22847.92
8	10751.96	48	24191.91
9	12095.96	49	25535.91
10	13439.95	50	67199.76
11	14783.95	51	68543.76
12	16127.94	52	69887.75
13	17471.94	53	71231.75
14	18815.93	54	72575.74
15	20159.93	55	73919.74
16	21503.92	56	75263.73
17	22847.92	57	76607.73
18	24191.91	58	77951.72
19	25535.91	59	79295.72
20	26879.90	60	80639.71
21	28223.90	61	81983.71
22	29567.89	62	83327.70
23	30911.89	63	84671.70
24	32255.88	64	86015.69
25	33599.88	65	87359.69
26	34943.88	66	88703.68
27	36287.87	67	90047.68
28	37631.87	68	91391.67
29	38975.86	69	92735.67
30	40319.86	70	94079.66
31	41663.85		
32	43007.85		
33	44351.84		
34	45695.84		
35	47039.83		
36	48383.83		
37	49727.82		
38	51071.82		
39	52415.81		
40	53759.81		

SAFETY VALVE DISCHARGE CAPACITY SATURATED STEAM

Orifice P: 6.38 inch² : 4116.11 mm²			
Pressure	Capacity	Pressure	Capacity
Bar A	kg / hr	Bar A	kg / hr
1.5	2963.60	41	81005.04
2	3951.47	42	82980.78
3	5927.20	43	84956.51
4	7902.93	44	86932.24
5	9878.66	45	88907.98
6	11857.40	46	31611.72
7	13830.13	47	35587.46
8	15805.86	48	35563.19
9	17781.60	49	37538.92
10	19757.33	50	98786.64
11	21733.06	51	100762.37
12	23708.79	52	102738.11
13	25684.53	53	104713.84
14	27660.26	54	106689.57
15	29635.99	55	108665.30
16	31611.72	56	110641.04
17	33587.46	57	112616.77
18	35563.19	58	114592.50
19	37538.92	59	116568.24
20	39514.66	60	118543.97
21	41490.39	61	120519.70
22	43466.12	62	122495.43
23	45441.85	63	124471.17
24	47417.59	64	126446.90
25	49393.32	65	128422.63
26	51369.05	66	130398.36
27	53344.79	67	132374.10
28	55320.52	68	134349.83
29	57296.25	69	136325.56
30	59271.89	70	138301.30
31	61247.72		
32	63223.45		
33	65199.18		
34	67174.92		
35	69150.65		
36	71126.38		
37	73102.11		
38	75077.85		
39	77053.58		
40	79029.31		

Orifice Q: 11.05 inch² : 7129.01 mm²			
Pressure	Capacity	Pressure	Capacity
Bar A	kg / hr	Bar A	kg / hr
1.5	5132.89	41	140298.92
2	6843.85	42	143720.84
3	10265.77		
4	13687.70		
5	17109.62		
6	20531.55		
7	23953.47		
8	27375.40		
9	30797.32		
10	34219.25		
11	37641.17		
12	41063.10		
13	44485.02		
14	47906.95		
15	51328.87		
16	54750.80		
17	58172.72		
18	61594.65		
19	65016.57		
20	68438.50		
21	71860.42		
22	75282.35		
23	78704.27		
24	82126.20		
25	85548.12		
26	88970.04		
27	92391.97		
28	95813.89		
29	99235.82		
30	102657.74		
31	106079.67		
32	109501.59		
33	112923.52		
34	116345.44		
35	119768.37		
36	123189.29		
37	126611.22		
38	130033.14		
39	133455.07		
40	136876.99		

SAFETY VALVE DISCHARGE CAPACITY SATURATED STEAM

Orifice D: 0.110 inch² : 70.96 mm²			
Pressure	Capacity	Pressure	Capacity
psia	lb / hr	psia	lb / hr
10	78	720	5608
20	156	740	5764
30	234	760	5920
40	312	780	6076
50	389	800	6232
60	467	820	6387
70	545	840	6543
80	623	860	6699
90	701	880	6855
100	779	900	7011
120	935	920	7166
140	1091	940	7322
160	1246	960	7478
180	1402	980	7634
200	1558	1000	7790
220	1714	1020	7945
240	1869	1040	8101
260	2025	1060	8257
280	2181	1080	8413
300	2337	1100	8569
320	2493	1120	8725
340	2648	1140	8880
360	2804	1160	9036
380	2960	1180	9192
400	3116	1200	9347
420	3272	1220	9503
440	3427	1240	9659
460	3583	1260	9815
480	3739	1280	9971
500	3895	1300	10126
520	4051	1320	10282
540	4206	1340	10438
560	4362	1360	10594
580	4518	1380	10750
600	4674	1400	10905
620	4830	1420	11061
640	4985	1440	11217
660	5141	1460	11373
680	5297	1480	11529
700	5453	1500	11684

Orifice E: 0.196 inch² : 126.45 mm²			
Pressure	Capacity	Pressure	Capacity
psia	lb / hr	psia	lb / hr
10	139	720	9993
20	278	740	10271
30	416	760	10548
40	555	780	10826
50	694	800	11104
60	833	820	11381
70	972	840	11659
80	1110	860	11936
90	1249	880	12214
100	1388	900	12492
120	1666	920	12769
140	1943	940	13047
160	2221	960	13324
180	2498	980	13602
200	2776	1000	13880
220	3054	1020	14157
240	3331	1040	14435
260	3609	1060	14712
280	3886	1080	14990
300	4161	1100	15268
320	4441	1120	15545
340	4719	1140	15823
360	4997	1160	16100
380	5274	1180	16378
400	5552	1200	16655
420	8529	1220	16933
440	6107	1240	17211
460	6385	1260	17488
480	6662	1280	17766
500	6940	1300	18043
520	7217	1320	18321
540	7495	1340	18599
560	7773	1360	18876
580	8050	1380	19154
600	8328	1400	19431
620	8605	1420	19709
640	8883	1440	19987
660	9161	1460	20264
680	9438	1480	20542
700	9716	1500	20819

SAFETY VALVE DISCHARGE CAPACITY AIR AT 30°C

Orifice F: 0.307 inch² : 198.06 mm²			
Pressure	Capacity	Pressure	Capacity
psia	lb / hr	psia	lb / hr
10	217	720	15635
20	435	740	16088
30	652	760	16522
40	870	780	16957
50	1087	800	17392
60	1304	820	17827
70	1522	840	18262
80	1739	860	18696
90	1957	880	19131
100	2174	900	1956
120	2609	920	20001
140	3044	940	20436
160	3478	960	20870
180	3913	980	21305
200	4348	1000	21740
220	4783	1020	22175
240	5218	1040	22610
260	5652	1060	23044
280	6087	1080	23479
300	6522	1100	23914
320	6957	1120	24349
340	392	1140	24784
360	7826	1160	25218
380	8261	1180	25653
400	8696	1200	26088
420	9131	1220	26523
440	9566	1240	26958
460	10000	1260	27392
480	10435	1280	27827
500	10870	1300	28262
520	11305	1320	28697
540	11740	1340	29132
560	12174	1360	29566
580	12609	1380	30001
600	13044	1400	30436
620	13479	1420	30871
640	13914	1440	31306
660	14348	1460	31740
680	14783	1480	32175
700	15218	1500	32610

Orifice G: 0.503 inch² : 324.51 mm²			
Pressure	Capacity	Pressure	Capacity
psia	lb / hr	psia	lb / hr
10	356	720	25646
20	712	740	2658
30	1069	760	27071
40	1425	780	27783
50	1781	800	28496
60	2137	820	29208
70	2493	840	29920
80	2850	860	30633
90	3206	880	31345
100	3562	900	32058
120	4274	920	32770
140	4987	940	33482
160	5699	960	34195
180	6412	980	34907
200	7124	1000	35620
220	7836	1020	36332
240	8549	1040	37044
260	9261	1060	37757
280	9973	1080	38469
300	10686	1100	39181
320	11398	1120	39894
340	12111	1140	40606
360	12823	1160	41319
380	13535	1180	42031
400	14248	1200	42743
420	14960	1220	43456
440	15673	1240	44168
460	16385	1260	44881
480	17097	1280	45593
500	17810	1300	46305
520	18522	1320	47018
540	19235	1340	47730
560	19947	1360	48443
580	20659	1380	49155
600	21372	1400	49867
620	22084	1420	50580
640	22796	1440	51292
660	23509	1460	52004
680	24221	1480	52717
700	24934	1500	53429

SAFETY VALVE DISCHARGE CAPACITY AIR AT 30°C

Orifice H: 0.785 inch² : 506.45 mm²			
Pressure	Capacity	Pressure	Capacity
psia	lb / hr	psia	lb / hr
10	556	720	40024
20	1112	740	41136
30	1668	760	42248
40	2224	780	43359
50	2779	800	44471
60	3335	820	45583
70	3891	840	46695
80	4447	860	47807
90	5003	880	48918
100	5559	900	50030
120	6671	920	51142
140	7782	940	52254
160	8894	960	53366
180	10006	980	54477
200	11118	1000	55589
220	12230	1020	56701
240	13341	1040	57813
260	14453	1060	58924
280	15565	1080	60036
300	16677	1100	61148
320	17789	1120	62260
340	18900	1140	63372
360	20012	1160	64483
380	21124	1180	65595
400	22236	1200	66707
420	23347	1220	67819
440	24459	1240	68930
460	25571	1260	70042
480	26683	1280	71154
500	27795	1300	72266
520	28905	1320	73378
540	30018	1340	74489
560	31130	1360	75601
580	32242	1380	76713
600	33353	1400	77825
620	34465	1420	78936
640	35577	1440	80048
660	36689	1460	81160
680	37801	1480	82272

Orifice J: 1.287 inch² : 830.32 mm²			
Pressure	Capacity	Pressure	Capacity
psia	lb / hr	psia	lb / hr
10	911	720	65619
20	1823	740	67442
30	2734	760	69265
40	3646	780	71087
50	4557	800	72910
60	5468	820	74733
70	6380	840	76556
80	7291	860	78378
90	8202	880	80201
100	9114	900	82024
120	10937	920	83847
140	12759	940	85670
160	14582	960	87492
180	16405	980	89315
200	18228	1000	91138
220	20050	1020	92961
240	21873	1040	94783
260	23696	1060	96606
280	25519	1080	98429
300	27341	1100	100252
320	29164	1120	102074
340	30987	1140	103897
360	32810	1160	105720
380	34632	1180	107543
400	36455	1200	109365
420	38278	1220	111188
440	40101	1240	113011
460	41923	1260	114834
480	43746	1280	116656
500	45569	1300	118479
520	47392	1320	120302
540	49214	1340	122125
560	51037	1360	123947
580	52860	1380	125770
600	54683	1400	127593
620	56505	1420	129416
640	58328	1440	131238
660	60151	1460	133061
680	61974	1480	134884

SAFETY VALVE DISCHARGE CAPACITY AIR AT 30°C

Orifice K: 1.838 inch²: 1185.805 mm²			
Pressure	Capacity	Pressure	Capacity
psia	lb / hr	psia	lb / hr
10	1302	720	93713
20	2603	740	96316
30	3905	760	98919
40	5206	780	101522
50	6508	800	104125
60	7809	820	106728
70	9111	840	109331
80	10413	860	111934
90	11714	880	114538
100	13016	900	117141
120	15619	920	119744
140	18222	940	122347
160	20825	960	124950
180	23428	980	127553
200	26031	1000	130156
220	28634	1020	132759
240	31238	1040	135363
260	33841	1060	137966
280	36444	1080	140569
300	39047	1100	143172
320	41650	1120	145775
340	44253	1140	148378
360	46856	1160	150981
380	49459	1180	153584
400	52063	1200	156188
420	54666	1220	158791
440	57269	1240	161394
460	59872	1260	163997
480	62475	1280	166600
500	65078	1300	169203
520	67681	1320	171806
540	70284	1340	174410
560	72888	1360	177013
580	75491	1380	179616
600	78094	1400	182219
620	80697	1420	184822
640	83300	1440	187425
660	85903	1460	190028
680	88506	1480	192631
700	91109	1500	195235

Orifice L: 2.853 inch²: 1840.63 mm²			
Pressure	Capacity	Pressure	Capacity
psia	lb / hr	psia	lb / hr
10	2020	720	145464
20	4041	740	149504
30	6061	760	153545
40	8081	780	157585
50	10102	800	161626
60	12122	820	165667
70	14142	840	169707
80	16163	860	173748
90	18183	880	177789
100	20203	900	181829
120	24244	920	185870
140	28285	940	189911
160	32325	960	193951
180	36366	980	197992
200	40407	1000	202033
220	4447	1020	20673
240	48488	1040	210114
260	52528	1060	214155
280	56569	1080	218195
300	60610	1100	222236
320	6465	1120	226277
340	68691	1140	230317
360	72732	1160	234358
380	76772	1180	238399
400	80813	1200	242439
420	84854	1220	246480
440	88894	1240	250521
460	92935	1260	254561
480	96976	1280	258602
500	101016	1300	262642
520	105057	1320	266683
540	109098	1340	270724
560	113138	1360	274764
580	117179	1380	278805
600	121220	1400	282846
620	125260	1420	286886
640	129301	1440	290927
660	133342	1460	294968
680	137382	1480	299008
700	141423	1500	303049

SAFETY VALVE DISCHARGE CAPACITY AIR AT 30°C

Orifice M: 3.60 inch ² : 2322.57 mm ²			
Pressure	Capacity	Pressure	Capacity
psia	lb / hr	psia	lb / hr
10	2549	720	183550
20	5099	740	188349
30	7648	760	193747
40	10197	780	198846
50	12747	800	203945
60	15296	820	209043
70	17845	840	214142
80	20394	860	219241
90	22944	880	224339
100	25493	900	229438
120	30592	920	234536
140	35690	940	239635
160	40789	960	244734
180	45888	980	249832
200	50986	1000	254931
220	56085	1020	260029
240	61183	1040	265128
260	66282	1060	270227
280	71381	1080	275325
300	76479	1100	280424
320	81578		
340	86676		
360	91775		
380	96874		
400	101922		
420	107071		
440	112170		
460	117268		
480	122367		
500	127465		
520	132564		
540	137633		
560	142761		
580	147860		
600	152958		
620	158057		
640	163156		
660	168254		
680	173353		
700	178452		

Orifice N: 4.34 inch ² : 2799.993 mm ²			
Pressure	Capacity	Pressure	Capacity
psia	lb / hr	psia	lb / hr
10	3073	720	221280
20	6147	740	227427
30	9220	760	233573
40	12293	780	239720
50	15367	800	245867
60	18440	820	252013
70	21513	840	258160
80	24587	860	264307
90	27660	880	270453
100	30733	900	276600
120	36880	920	282747
140	43027	940	288893
160	49173	960	295040
180	55320	980	301187
200	61467	1000	307333
220	67613		
240	73760		
260	79907		
280	86053		
300	92200		
320	98347		
340	104493		
360	110640		
380	116787		
400	122933		
420	129080		
440	135227		
460	141273		
480	177520		
500	153667		
520	159813		
540	165960		
560	172107		
580	178253		
600	184400		
620	190547		
640	196693		
660	202840		
680	208987		
700	215133		



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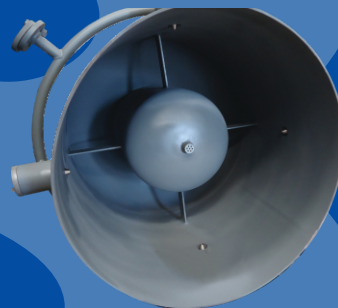
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