Ellem'S

SAFETY RELIEF VALVES

SERIES 6000

FLUID CONTROL VALVES & COMPONENTS

(A UNIT OF ELLEM ENGINEERING)

General Information

FCV Works on its 26 years of pioneering effort to sustain leadership in the valve components marketplace. Owing to the vast experience in this field, we enjoy a remarkable reputation in the industry and are considered amongst the market leaders. These products are manufactured using advanced technology and latest machinery. Our product range includes various metal components and steel studs that find their application in various industries.

We adhere to string quality control measures in order to enable standardized output. Our remarkable reputation can be reflected in our impressive clientele. Our infrastructure is equipped with all the facilities and amenities that are required for a smooth production process, quality testing or research and development. We believe in effective and timely delivery of our products. Our clientele is dispersed across the globe due to our quality products.

Our Quality Policy

- To be a world class manufacturing production plant able produced highly quality components at affordable cost
- To deliver the other plants in India & abroad on time
- To produce high precision aluminium machined components to major customers in India
- To accelerate development of existing suppliers in order to improve profitability
- To accelerate cost reduction on key account customers.
- To build a strong industrial unit for larger productions at lower cost.

Reference standards

Standard	Title	Scope
ASME Section VIII, Division 1	Boiler and Pressure Vessel Code – Pressure Vessels	Design and installation rules for pressure vessels, including PRVs (UG-125 to UG-137).
ASME Section I	Power Boilers	Safety valve requirements for steam boiler systems.
ASME Section XIII	Rules for Overpressure Protection	Rules for pressure relief devices across pressure equipment.
API 526	Flanged Steel Pressure Relief Valves	Standard dimensions, orifice sizes, and ratings.
API 520 Part I	Sizing and Selection	Guidelines for sizing and selecting pressure-relieving devices.
API 520 Part II	Installation	Installation best practices for PRVs.
API 521	Pressure-Relieving and Depressuring Systems	System design to manage overpressure and depressurization.
ISO 4126 Series	Safety Devices for Protection Against Excessive Pressure	International series of standards covering design, testing, and application.

Applications

FCV Safety Valves offer ultimate protection against unallowable overpressures in all applications for steam, gases and liquids where smaller capacities are required.
Typical applications for FCV Safety Valves are:

- air/gas compressors and pumps
- technical gases and CO_2 plants
- cylinder filling stations
- chemical equipment and piping
- pressure vessels and piping systems containing gas, air, liquid or steam
- LPG / LNG terminals, carriers etc.
- cryogenic systems and oxygen applications
- thermal relief
- high pressure extraction plants

Ordering information

Please specify the following so that we may process your order as quickly as possible.

1. Quantity.
2. Inlet and outlet sizes.
3. FCV type number.
4. Inlet and outlet connections: MNPT, FNPT, Flanged.
5. Materials of construction if other than standard.
6. Set pressure.
7. Operating and relieving temperatures.
8. Allowable overpressure.
9. Fluid and fluid state.
10. Backpressure, superimposed constant and/or variable, and built-up.
11. Required capacity.
12. Accessories: open or packed lever if required, test gag.
13. Code requirements, if any.

Numbering system:

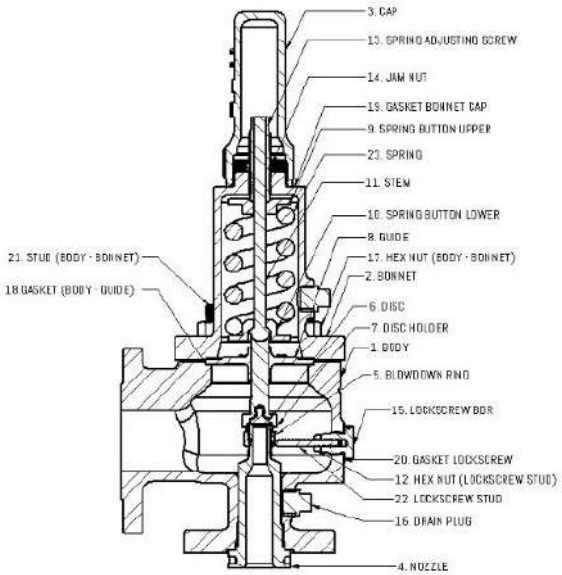
Selecting and specifying FCV pressure relief valve is simple using the numbering system that follows. Each digit of the part number has a distinct significance. The digits describe the basic valve series, orifice, seat design, inlet temperature range, body, bonnet and spring material, inlet type pressure rating.

Model Codification

Example: VALVE MODEL NUMBER: 6DAM00301P00

6	D	A	M	0	0	3	0	1	P	0	0
Series	Orifice	Construction type	Seating construction	Inlet size	Inlet class	Outlet size	Outlet class	Outlet rate	Inlet facing	Temperature & Material	Cap construction
6000	D	A – Conventional	M – METAL SEAT	0 – 0.5"	0 – 150#	1 – 1.0"	0 – 150#	1 – RAISED FACE ANSI STD (125 TO 160 AARH)	P – PLAIN	0 – NO GAG	SEE ' - MATERIALS FOR CORROSIVE SERVICE' - REF. CATALOGUE OR CONTACT FACTORY
	E	B – Bellow valve	R – RESILIENT SEAT	1 – 1.0"	1 – 300# L.WT.	2 – 1.5"	1 – 300# L.WT.	2 - LARGE FEMALE ANSI STD	C – PACKED LEVER	1 – GAG	
	F		P – PTFE	2 – 1.5"	2 – 300# STD	3 – 2.0"	2 – 300# STD	3 - SMALL MALE ANSI STD	L – OPEN LEVER		
	G		E – CUSTOMISED	3 – 2.0"	3 – 600#	4 – 2.5"	3 – 600#	4 - SMALL FEMALE			
	H			4 – 2.5"	4 – 900#	5 – 3.0"		5 - LARGE TONGUE			
	J			5 – 3.0"	5 – 1500#	6 – 4.0"		6 - LARGE GROOVE			
	K			6 – 4.0"	6 – 2500#	7 – 6.0"		7 - SMALL TONGUE			
	L			7 – 6.0"		8 – 8.0"		8 - SMALL GROOVE			
	M			8 – 8.0"		9 – 9.0"		9 – RING JOINT TYPE			
	N			9 – 9.0"		10 – 10.0"		H – 63 – 83 AARH SMOOTH FINISH RF			
	P			10 – 10.0"							
	Q										
	R										
	T										

Designs



Material

SL NO.	COMPONENT	MATERIAL
1	BODY	SA 216 GR.WCB
2	BONNET	SA 216 GR.WCB
3	CAP	SA 216 GR.WCB
4	NOZZLE	316 SS
5	BD RING	316 SS
6	DISC	316 SS
7	DISC HOLDER	316 SS
8	GUIDE	316 SS
9	SPRING BUTTON UPPER	416 SS
10	SPRING BUTTON LOWER	416 SS
11	STEM	316 SS
12	HEX NUT (LOCKSCREW STUD)	316 SS
13	SPRING ADJUSTING SCREW	SS
14	JAM NUT	316 SS
15	LOCK SCREW BDR	316 SS
16	DRAIN PLUG	416 SS
17	HEX NUT (BODY-BONNET)	ASME SA 194 GR. 2H ALLOY St.
18	GASKET (BODY-GUIDE)	316 SS
19	GASKET (BONNET-CAP)	316 SS
20	GASKET LOCKSCREW	316 SS
21	STUD (BODY-BONNET)	ASME SA 193 GR. 2H ALLOY St.
22	LOCKSCREW STUD	316 SS
23	SPRING	316 SS

Nozzle Design

The FCV pressure relief valve nozzle design (Fig 1) incorporates a nozzle shape to provide:

1. A high stable flow coefficient.

2. Greater strength to resist possible discharge piping strains.

3. Wrenching provisions on raised face nozzles where they will not interfere with the flow path.

The superior design allows easy maintenance by simplifying nozzle removal and assembly.

Figure 1

Disc Design

In the FCV valve, the thickness of the self aligning disc (Fig 1) is no greater than necessary; however, the same thickness is maintained for all catalogue materials. For purposes of strength, the disc is strong enough in bending moment for all materials shown in the catalogue. Valves constructed with hardened discs are exceptional in withstanding the effects of impact, an advantage where installation or process conditions may cause chatter.

Seating design

self-aligning disc, positive alignment of internal parts is achieved. Misalignment is avoided, improving tightness and eliminating other undesirable effects such as long blowdown.

Stem Construction

The FCV pressure relief valve design features an all stainless steel stem (Fig 2). This construction cost-effectively eliminates dangerous sticking due to galvanic corrosion at the upper guiding point in the spring adjusting screw. The careful design of this upper bearing also ensures proper alignment and optimum freedom from galling and erratic popping.

Figure 2

Seating design

The FCV design incorporates a positive connection between the valve stem and the stem retainer as well as between the disc and disc holder (Fig 2). These connections are made with a male threaded head which threads into a portion of a female socket through which it drops free into an undercut chamber to make bearing contact on a spherical surface. This allows complete freedom of action for alignment purposes while retaining the positive connection of the threads. It also eliminates the need to use snap ring connections which, in some cases, are not sufficiently positive during valve operations and may be inadvertently left out during maintenance.

Positive Connection of Parts

The FCV design incorporates a positive connection between the valve stem and the stem retainer as well as between the disc and disc holder (Fig 2). These connections are made with a male head which into a portion of a female socket through which it drops free into an undercut chamber to make bearing contact on a spherical surface. This allows complete freedom of action for alignment purposes while retaining the positive connection of the threads. It also eliminates the need to use snap ring connections which, in some cases, are not sufficiently positive during valve operations and may be inadvertently left out during maintenance.

Materials for Corrosive Service

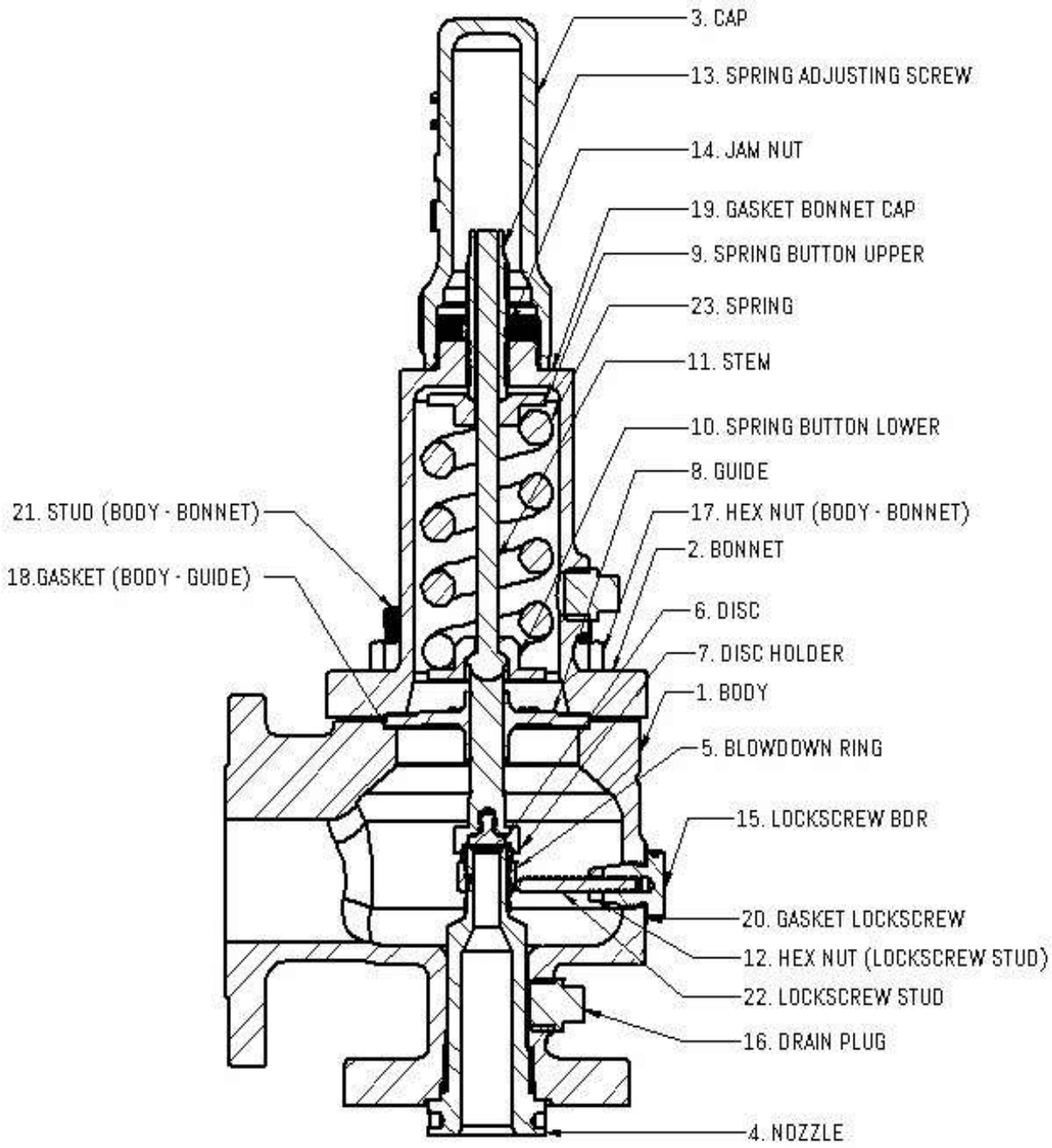
Materials for Corrosive Service

Designation	Special Material Description			
	Body Bonnet, Cap	Internal Parts		
		Nozzle & Disc	Other	Springs & Buttons
S1	Standard	316	316[4]	Chrome Alloy Spring, 316 Buttons
S3	316	316	316	Chrome Alloy Nickel Plated Spring, 316 Buttons
S4	316	316	316	316
H1	Standard	Hastelloy C	Standard	Standard
H2	Standard	Hastelloy C	Hastelloy C & Monel	Chrome Alloy Nickel Plated Spring, 316 Buttons
H3	Hastelloy C®	Hastelloy C	Hastelloy C	Chrome Alloy Nickel Plated Spring, 316 Buttons
H4	Hastelloy C	Hastelloy C	Hastelloy C	Hastelloy C
M1	Standard	Monel	Standard	Standard
M2	Standard	Monel	Monel	Chrome Alloy Nickel Plated Spring, 316 Buttons
M3	Monel	Monel	Monel	Chrome Alloy Nickel Plated Spring, 316 Buttons
M4	Monel	Monel	Monel	Inconel Spring, Monel Buttons
N1	Carbon Steel (NACE)	316 (NACE)	316[4]	Inconel Spring, 316 Buttons
LB	SA-352 Gr. LCB (Cap - 316)	316	316	Standard
LC	SA-352 Gr. LCC (Cap - 316)	316	316	Standard
N4	316 (NACE)	316 (NACE)	316	Inconel Spring, 316 Buttons

General Notes:

1. Specials trim or connection types not covered by other type number designations require "SP" added to the type number. Example: 6DAM130011P0SP.
2. Special inlet facings not covered by other inlet facing designations such as lens joint inlet or non-standard nozzle finishes.
3. Designates welded inlet connections including butt-weld, socket weld and high pressure Greylock (hub style) connections. Greylock is a registered trademark of Oceaneering International Inc.
4. Spring adjusting screw is supplied in standard precipitation hardened (17-4 Ph) stainless steel. Note: S1 Stem Retainer changes from 17-4 Ph to 316 stainless steels.
5. For special non stainless trim in compliance with NACE Standards add "N" to the material suffix. Example: 6DAM130011P0M4N.
6. Duplex stainless trim options available on application in standard and super duplex alloys. Consult the factory.

Sectional view



D Orifice

U.S. Customary Units, API Area: 0.110 sq. in., Actual Area: 0.150 sq. in.

Type number	Valve size	ASME Flange class		Maximum Set Pressure, psig						Back Pressure Limit Psi @ 100°F	Material		Inlet Temp. Range
Conventional	Inlet Outlet	Inlet RF	Outlet RF	-450°F -75°F	-75°F -21°F	-20°F +100°F	450°F	800°F	1000°F	Conventional Type	Body & Bonnet	Spring	
6DAM01	1 x 2	150#	150#			285	185	80		285	Carbon Steel	Chrome Alloy	-20°F to 800°F
6DAM11	1 x 2	300#	150#			285	285	285		285			
6DAM21	1 x 2	300#	150#			740	620	410		285			
6DAM31	1 x 2	600#	150#			1480	1235	825		285			
6DAM41	1 1/2 x 2	900#	300#			2220	1855	1235		600			
6DAM51	1 1/2 x 2	1500#	300#			3705	3090	2055		600			
6DAM61A	1 1/2 x 3	2500#	300#			6170	5150	3430		740			
6DAM23	1 x 2	300#	150#					510	215	285	Chrome Moly Steel	High Temp. Alloy	801°F to 1000°F
6DAM33	1 x 2	600#	150#					1015	430	285			
6DAM43	1 1/2 x 2	900#	300#					1525	650	600			
6DAM53	1 1/2 x 2	1500#	300#					2540	1080	600			
6DAM63A	1 1/2 x 3	2500#	300#					4230	1800	740			
6DAM01/S3	1 x 2	150#	150#		275					275	316 St. St.	Chrome Alloy Nickel Plated	-21°F to -75°F
6DAM11/S3	1 x 2	300#	150#		275					275			
6DAM21/S3	1 x 2	300#	150#		720					275			
6DAM31/S3	1 x 2	600#	150#		1440					275			
6DAM41/S3	1 1/2 x 2	900#	300#		2160					600			
6DAM51/S3	1 1/2 x 2	1500#	300#		3600					600			
6DAM61A/S3	1 1/2 x 3	2500#	300#		6000					720			
6DAM01/S4	1 x 2	150#	150#	275						275	316 St. St.	316 St. St.	-76°F to -450°F
6DAM11/S4	1 x 2	300#	150#	275						275			
6DAM21/S4	1 x 2	300#	150#	720						275			
6DAM31/S4	1 x 2	600#	150#	1440						275			
6DAM41/S4	1 1/2 x 2	900#	300#	2160						600			
6DAM51/S4	1 1/2 x 2	1500#	300#	3600						600			
6DAM61A/S4	1 1/2 x 3	2500#	300#	4000						720			

E Orifice

U.S. Customary Units, API Area: 0.196 sq. in., Actual Area: 0.225 sq. in.

Type number	Valve size	ASME Flange class		Maximum Set Pressure, psig						Back Pressure Limit Psi @ 100°F	Material		Inlet Temp. Range
Conventional	Inlet Outlet	Inlet RF	Outlet RF	-450°F -75°F	-75°F -21°F	-20°F +100°F	450°F	800°F	1000°F	Conventional Type	Body & Bonnet	Spring	
6EAM01	1 x 2	150#	150#			285	185	80		285	Carbon Steel	Chrome Alloy	-20°F to 800°F
6EAM11	1 x 2	300#	150#			285	285	285		285			
6EAM21	1 x 2	300#	150#			740	620	410		285			
6EAM31	1 x 2	600#	150#			1480	1235	825		285			
6EAM41	1 1/2 x 2	900#	300#			2220	1855	1235		600			
6EAM51	1 1/2 x 2	1500#	300#			3705	3090	2055		600			
6EAM61A	1 1/2 x 3	2500#	300#			6170	5150	3430		740			
6EAM23	1 x 2	300#	150#					510	215	285	Chrome Moly Steel	High Temp. Alloy	801°F to 1000°F
6EAM33	1 x 2	600#	150#					1015	430	285			
6EAM43	1 1/2 x 2	900#	300#					1525	650	600			
6EAM53	1 1/2 x 2	1500#	300#					2540	1080	600			
6EAM63A	1 1/2 x 3	2500#	300#					4230	1800	740			
6EAM01/S3	1 x 2	150#	150#		275					275	316 St. St.	Chrome Alloy Nickel Plated	-21°F to -75°F
6EAM11/S3	1 x 2	300#	150#		275					275			
6EAM21/S3	1 x 2	300#	150#		720					275			
6EAM31/S3	1 x 2	600#	150#		1440					275			
6EAM41/S3	1 1/2 x 2	900#	300#		2160					600			
6EAM51/S3	1 1/2 x 2	1500#	300#		3600					600			
6EAM61A/S3	1 1/2 x 3	2500#	300#		6000					720			
6EAM01/S4	1 x 2	150#	150#	275						275	316 St. St.	316 St. St.	-76°F to -450°F
6EAM11/S4	1 x 2	300#	150#	275						275			
6EAM21/S4	1 x 2	300#	150#	720						275			
6EAM31/S4	1 x 2	600#	150#	1440						275			
6EAM41/S4	1 1/2 x 2	900#	300#	2160						600			
6EAM51/S4	1 1/2 x 2	1500#	300#	3600						600			
6EAM61A/S4	1 1/2 x 3	2500#	300#	4000						720			

F Orifice

U.S. Customary Units, API Area: 0.307 sq. in., Actual Area: 0.371 sq. in.

Type number	Valve size	ASME Flange class		Maximum Set Pressure, psig						Back Pressure Limit Psi @ 100°F	Material		Inlet Temp. Range
Conventional	Inlet Outlet	Inlet RF	Outlet RF	-450°F -75°F	-75°F -21°F	-20°F +100° F	450°F	800°F	1000°F	Conventional Type	Body & Bonnet	Spring	
6FAM01	1 1/2 x 2	150#	150#			285	185	80		285	Carbon Steel	Chrome Alloy	-20°F to 800°F
6FAM11	1 1/2 x 2	300#	150#			285	285	285		285			
6FAM21	1 1/2 x 2	300#	150#			740	620	410		285			
6FAM31	1 1/2 x 2	600#	150#			1480	1235	825		285			
6FAM41A	1 1/2 x 3	900#	300#			2220	1855	1235		740			
6FAM51A	1 1/2 x 3	1500#	300#			3705	3090	2055		740			
6FAM61A	1 1/2 x 3	2500#	300#			5000	5000	3430		740			
6FAM23	1 1/2 x 2	300#	150#					510	215	285	Chrome Moly Steel	High Temp. Alloy	801°F to 1000°F
6FAM33	1 1/2 x 2	600#	150#					1015	430	285			
6FAM43A	1 1/2 x 3	900#	300#					1525	650	740			
6FAM53A	1 1/2 x 3	1500#	300#					2540	1080	740			
6FAM63A	1 1/2 x 3	2500#	300#					4230	1800	740			
6FAM01/S3	1 1/2 x 2	150#	150#		275					275	316 St. St.	Chrome Alloy Nickel Plated	-21°F To -75°F
6FAM11/S3	1 1/2 x 2	300#	150#		275					275			
6FAM21/S3	1 1/2 x 2	300#	150#		720					275			
6FAM31/S3	1 1/2 x 2	600#	150#		1440					275			
6FAM41A/S3	1 1/2 x 3	900#	300#		2160					720			
6FAM51A/S3	1 1/2 x 3	1500#	300#		3600					720			
6FAM61A/S3	1 1/2 x 3	2500#	300#		5000					720			
6FAM01/S4	1 1/2 x 2	150#	150#	275						275	316 St. St.	316 St. St.	-76°F To -450°F
6FAM11/S4	1 1/2 x 2	300#	150#	275						275			
6FAM21/S4	1 1/2 x 2	300#	150#	720						275			
6FAM31/S4	1 1/2 x 2	600#	150#	1440						275			
6FAM41A/S4	1 1/2 x 3	900#	300#	2160						720			
6FAM51A/S4	1 1/2 x 3	1500#	300#	2200						720			
6FAM61A/S4	1 1/2 x 3	2500#	300#	3400						720			

G Orifice

U.S. Customary Units, API Area: 0.503 sq. in., Actual Area: 0.559 sq. in.

Type number	Valve size	ASME Flange class		Maximum Set Pressure, psig						Back Pressure Limit Psi @ 100°F	Material		Inlet Temp. Range
Conventional	Inlet Outlet	Inlet RF	Outlet RF	-450°F -75°F	-75°F -21°F	-20°F +100°F	450°F	800°F	1000°F	Conventional Type	Body & Bonnet	Spring	
6GAM01A	1 1/2 x 3	150#	150#			285	185	80		285	Carbon Steel	Chrome Alloy	-20°F to 800°F
6GAM11A	1 1/2 x 3	300#	150#			285	285	285		285			
6GAM21A	1 1/2 x 3	300#	150#			740	620	410		285			
6GAM31A	1 1/2 x 3	600#	150#			1480	1235	825		285			
6GAM41A	1 1/2 x 3	900#	300#			2220	1855	1235		740			
6GAM51	2 x 3	1500#	300#			3705	3090	2055		740			
6GAM61	2 x 3	2500#	300#			3705	3705	3430		740			
6GAM23A	1 1/2 x 3	300#	150#					510	215	285	Chrome Moly Steel	High Temp. Alloy	801°F to 1000°F
6GAM33A	1 1/2 x 3	600#	150#					1015	430	285			
6GAM43A	1 1/2 x 3	900#	300#					1525	650	740			
6GAM53	2 x 3	1500#	300#					2540	1080	740			
6GAM63	2 x 3	2500#	300#					3705	1800	740			
6GAM01A/S3	1 1/2 x 3	150#	150#		275					275	316 St. St.	Chrome Alloy Nickel Plated	-21°F to -75°F
6GAM11A/S3	1 1/2 x 3	300#	150#		275					275			
6GAM21A/S3	1 1/2 x 3	300#	150#		720					275			
6GAM31A/S3	1 1/2 x 3	600#	150#		1440					275			
6GAM41A/S3	1 1/2 x 3	900#	300#		2160					720			
6GAM51/S3	2 x 3	1500#	300#		3600					720			
6GAM61/S3	2 x 3	2500#	300#		3705					720			
6GAM01A/S4	1 1/2 x 3	150#	150#	275						275	316 St. St.	316 St. St.	-76°F to -450°F
6GAM11A/S4	1 1/2 x 3	300#	150#	275						275			
6GAM21A/S4	1 1/2 x 3	300#	150#	720						275			
6GAM31A/S4	1 1/2 x 3	600#	150#	1440						275			
6GAM41A/S4	1 1/2 x 3	900#	300#	2160						600			
6GAM51/S4	2 x 3	1500#	300#	2450						600			
6GAM61/S4	2 x 3	2500#	300#	2600						720			

H Orifice

U.S. Customary Units, API Area: 0.785 sq. in., Actual Area: 0.873 sq. in.

Type number	Valve size	ASME Flange class		Maximum Set Pressure, psig						Back Pressure Limit Psi @ 100°F	Material		Inlet Temp. Range
Conventional	Inlet Outlet	Inlet RF	Outlet RF	-450°F -75°F	-75°F -21°F	-20°F +100°F	450°F	800°F	1000°F	Conventional Type	Body & Bonnet	Spring	
6HAM01	1 1/2 x 3	150#	150#			285	185	80		285	Carbon Steel	Chrome Alloy	-20°F To 800°F
6HAM11	1 1/2 x 3	300#	150#			285	285	285		285			
6HAM21	2 x 3	300#	150#			740	620	410		285			
6HAM31	2 x 3	600#	150#			1480	1235	825		285			
6HAM41	2 x 3	900#	150#			2220	1855	1235		285			
6HAM51	2 x 3	1500#	300#			2750	2750	2055		740			
6HAM23	2 x 3	300#	150#					510	215	285	Chrome Moly Steel	High Temp. Alloy	801°F to 1000°F
6HAM33	2 x 3	600#	150#					1015	430	285			
6HAM43	2 x 3	900#	150#					1525	650	285			
6HAM53	2 x 3	1500#	300#					2540	1080	740			
6HAM01/S3	1 1/2 x 3	150#	150#		275					275	316 St. St.	Chrome Alloy Nickel Plated	-21°F To -75°F
6HAM11/S3	1 1/2 x 3	300#	150#		275					275			
6HAM21/S3	2 x 3	300#	150#		720					275			
6HAM31/S3	2 x 3	600#	150#		1440					275			
6HAM41/S3	2 x 3	900#	150#		2160					275			
6HAM51/S3	2 x 3	1500#	300#		2750					720			
6HAM01/S4	1 1/2 x 3	150#	150#	275						275	316 St. St.	316 St. St.	-76°F to -450°F
6HAM11/S4	1 1/2 x 3	300#	150#	275						275			
6HAM21/S4	2 x 3	300#	150#	720						275			
6HAM31/S4	2 x 3	600#	150#	1440						275			
6HAM41/S4	2 x 3	900#	150#	1485						275			
6HAM51/S4	2 x 3	1500#	300#	1600						720			

J Orifice

U.S. Customary Units, API Area: 1.287 sq. in., Actual Area: 1.430 sq. in.

Type number	Valve size	ASME Flange class		Maximum Set Pressure, psig						Back Pressure Limit Psi @ 100°F	Material		Inlet Temp. Range
Conventional	Inlet Outlet	Inlet RF	Outlet RF	-450°F -75°F	-75°F -21°F	-20°F +100°F	450°F	800°F	1000°F	Conventional Type	Body & Bonnet	Spring	
6JAM01	2 x 3	150#	150#			285	185	80		285	Carbon Steel	Chrome Alloy	-20°F to 800°F
6JAM11	2 x 3	300#	150#			285	285	285		285			
6JAM21A	3 x 4	300#	150#			740	620	410		285			
6JAM31A	3 x 4	600#	150#			1480	1235	825		285			
6JAM41	3 x 4	900#	150#			2220	1855	1235		285			
6JAM51	3 x 4	1500#	300#			2700	2700	2055		600			
6JAM23A	3 x 4	300#	150#					510	215	285	Chrome Moly Steel	High Temp. Alloy	801°F to 1000°F
6JAM33A	3 x 4	600#	150#					1015	430	285			
6JAM43A	3 x 4	900#	150#					1525	650	285			
6JAM53	3 x 4	1500#	300#					2540	1080	600			
6JAM01/S3	2 x 3	150#	150#		275					275	316 St. St.	Chrome Alloy Nickel Plated	-21°F to -75°F
6JAM11/S3	2 x 3	300#	150#		275					275			
6JAM21/S3	3 x 4	300#	150#		720					275			
6JAM31/S3	3 x 4	600#	150#		1440					275			
6JAM41/S3	3 x 4	900#	150#		2160					275			
6JAM51/S3	3 x 4	1500#	300#		2750					600			
6JAM01/S4	2 x 3	150#	150#	275						275	316 St. St.	316 St. St.	-76°F To -450°F
6JAM11/S4	2 x 3	300#	150#	275						275			
6JAM21/S4	3 x 4	300#	150#	500						275			
6JAM31/S4	3 x 4	600#	150#	625						275			
6JAM41/S4	3 x 4	900#	150#	800						275			
6JAM51/S4	3 x 4	1500#	300#	800						600			

K Orifice

U.S. Customary Units, API Area: 1.838 sq. in., Actual Area: 2.042 sq. in.

Type number	Valve size	ASME Flange class		Maximum Set Pressure, psig						Back Pressure Limit Psi @ 100°F	Material		Inlet Temp. Range
Conventional	Inlet Outlet	Inlet RF	Outlet RF	-450°F -75°F	-75°F -21°F	-20°F +100°F	450°F	800°F	1000°F	Conventional Type	Body & Bonnet	Spring	
6KAM01	3 x 4	150#	150#			285	185	80		285	Carbon Steel	Chrome Alloy	-20°F To 800°F
6KAM11	3 x 4	300#	150#			285	285	285		285			
6KAM21	3 x 4	300#	150#			740	620	410		285			
6KAM31	3 x 4	600#	150#			1480	1235	825		285			
6KAM41	3 x 6	900#	150#			2220	1855	1235		285			
6KAM51	3 x 6	1500#	300#			2220	2220	2055		600			
6KAM23	3 x 4	300#	150#					510	215	285	Chrome Moly Steel	High Temp. Alloy	801°F To 1000°F
6KAM33	3 x 4	600#	150#					1015	430	285			
6KAM43A	3 x 6	900#	150#					1525	650	285			
6KAM53	3 x 6	1500#	300#					2220	1080	600			
6KAM01/S3	3 x 4	150#	150#		275					275	316 St. St.	Chrome Alloy Nickel Plated	-21°F To -75°F
6KAM11/S3	3 x 4	300#	150#		275					275			
6KAM21/S3	3 x 4	300#	150#		720					275			
6KAM31/S3	3 x 4	600#	150#		1440					275			
6KAM41/S3	3 x 6	900#	150#		2160					275			
6KAM51/S3	3 x 6	1500#	300#		2220					600			
6KAM01/S4	3 x 4	150#	150#	275						275	316 St. St.	316 St. St.	-76°F to -450°F
6KAM11/S4	3 x 4	300#	150#	275						275			
6KAM21/S4	3 x 4	300#	150#	525						275			
6KAM31/S4	3 x 4	600#	150#	600						275			
6KAM41/S4	3 x 6	900#	150#	600						275			
6KAM51/S4	3 x 6	1500#	300#	750						600			

L Orifice

U.S. Customary Units, API Area: 1.838 sq. in., Actual Area: 2.042 sq. in.

Type number	Valve size	ASME Flange class		Maximum Set Pressure, psig						Back Pressure Limit Psi @ 100°F	Material		Inlet Temp. Range
Conventional	Inlet Outlet	Inlet RF	Outlet RF	-450°F -75°F	-75°F -21°F	-20°F +100°F	450°F	800°F	1000°F	Conventional Type	Body & Bonnet	Spring	
6LAM01	3 x 4	150#	150#			285	185	80		285	Carbon Steel	Chrome Alloy	-20°F To 800°F
6LAM11	3 x 4	300#	150#			285	285	285		285			
6LAM21	4 x 6	300#	150#			740	620	410		285			
6LAM31	4 x 6	600#	150#			1000	1000	825		285			
6LAM41	4 x 6	900#	150#			1500	1500	1100		285			
6LAM51	4 x 6	1500#	150#			1500	1500	1500		285			
6LAM23	4 x 6	300#	150#					510	215	285	Chrome Moly Steel	High Temp. Alloy	801°F to 1000°F
6LAM33	4 x 6	600#	150#					1000	430	285			
6LAM43	4 x 6	900#	150#					1500	650	285			
6LAM53	4 x 6	1500#	150#					1500	1080	285			
6LAM01/S3	3 x 4	150#	150#		275					275	316 St. St.	Chrome Alloy Nickel Plated	-21°F To -75°F
6LAM11/S3	3 x 4	300#	150#		275					275			
6LAM21/S3	4 x 6	300#	150#		720					275			
6LAM31/S3	4 x 6	600#	150#		1000					275			
6LAM41/S3	4 x 6	900#	150#		1500					275			
6LAM01/S4	3 x 4	150#	150#	275						275	316 St. St.	316 St. St.	-76°F to -450°F
6LAM11/S4	3 x 4	300#	150#	275						275			
6LAM21/S4	4 x 6	300#	150#	535						275			
6LAM31/S4	4 x 6	600#	150#	535						275			
6LAM41/S4	4 x 6	900#	150#	700						275			

M Orifice

U.S. Customary Units, API Area: 3.60 sq. in., Actual Area: 4.000 sq. in.

Type number	Valve size	ASME Flange class		Maximum Set Pressure, psig						Back Pressure Limit Psi @ 100°F	Material		Inlet Temp. Range
Conventional	Inlet Outlet	Inlet RF	Outlet RF	-450°F -75°F	-75°F 21°F	-20°F +100 °F	450°F	800°F	1000°F	Conventional Type	Body & Bonnet	Spring	
6MAM01	4 x 6	150#	150#			285	185	80		285	Carbon Steel	Chrome Alloy	-20°F to 800°F
6MAM11	4 x 6	300#	150#			285	285	285		285			
6MAM21	4 x 6	300#	150#			740	620	410		285			
6MAM31	4 x 6	600#	150#			1100	1100	825		285			
6MAM41	4 x 6	900#	150#			1100	1100	1100		285			
6MAM23	4 x 6	300#	150#					510	215	285	Chrome Moly Steel	High Temp. Alloy	801°F to 1000°F
6MAM33	4 x 6	600#	150#					1000	430	285			
6MAM43	4 x 6	900#	150#					1100	650	285			
6MAM01/S3	4 x 6	150#	150#		275					275	316 St. St.	Chrome Alloy Nickel Plated	-21°F to -75°F
6MAM11/S3	4 x 6	300#	150#		275					275			
6MAM21/S3	4 x 6	300#	150#		720					275			
6MAM31/S3	4 x 6	600#	150#		1100					275			
6MAM01/S4	4 x 6	150#	150#	275						275	316 St. St.	316 St. St.	-76°F to -450°F
6MAM11/S4	4 x 6	300#	150#	275						275			
6MAM21/S4	4 x 6	300#	150#	525						275			
6MAM31/S4	4 x 6	600#	150#	600						275			

N Orifice

U.S. Customary Units, API Area: 4.34 sq. in., Actual Area: 4.822 sq. in.

Type number	Valve size	ASME Flange class		Maximum Set Pressure, psig						Back Pressure Limit Psi @ 100°F	Material		Inlet Temp. Range
Conventional	Inlet Outlet	Inlet RF	Outlet RF	-450°F -75°F	-75°F -21°F	-20°F +100°F	450°F	800°F	1000°F	Conventional Type	Body & Bonnet	Spring	
6NAM01	4 x 6	150#	150#			285	185	80		285	Carbon Steel	Chrome Alloy	-20°F To 800°F
6NAM11	4 x 6	300#	150#			285	285	285		285			
6NAM21	4 x 6	300#	150#			740	620	410		285			
6NAM31	4 x 6	600#	150#			1000	1000	825		285			
6NAM41	4 x 6	900#	150#			1000	1000	1000		285			
6NAM23	4 x 6	300#	150#					510	215	285	Chrome Moly Steel	High Temp. Alloy	801°F To 1000°F
6NAM33	4 x 6	600#	150#					1000	430	285			
6NAM43	4 x 6	900#	150#					1000	650	285			
6NAM01/S3	4 x 6	150#	150#		275					275	316 St. St.	Chrome Alloy Nickel Plated	-21°F to -75°F
6NAM11/S3	4 x 6	300#	150#		275					275			
6NAM21/S3	4 x 6	300#	150#		720					275			
6NAM31/S3	4 x 6	600#	150#		1000					275			
6NAM01/S4	4 x 6	150#	150#	275						275	316 St. St.	316 St. St.	-76°F To -450°F
6NAM11/S4	4 x 6	300#	150#	275						275			
6NAM21/S4	4 x 6	300#	150#	450						275			
6NAM31/S4	4 x 6	600#	150#	500						275			

P Orifice

U.S. Customary Units, API Area: 6.38 sq. in., Actual Area: 7.087 sq. in.

Type number	Valve size	ASME Flange class		Maximum Set Pressure, psig						Back Pressure Limit Psi @ 100°F	Material		Inlet Temp. Range
Conventional	Inlet Outlet	Inlet RF	Outlet RF	-450°F -75°F	-75°F -21°F	-20°F +100°F	450°F	800°F	1000°F	Conventional Type	Body & Bonnet	Spring	
6PAM01	4 x 6	150#	150#			285	185	80		285	Carbon Steel	Chrome Alloy	-20°F to 800°F
6PAM11	4 x 6	300#	150#			285	285	285		285			
6PAM21	4 x 6	300#	150#			525	525	410		285			
6PAM31	4 x 6	600#	150#			1000	1000	825		285			
6PAM41	4 x 6	900#	150#			1000	1000	1000		285			
6PAM23	4 x 6	300#	150#					510	215	285	Chrome Moly Steel	High Temp. Alloy	801°F to 1000°F
6PAM33	4 x 6	600#	150#					1000	430	285			
6PAM43	4 x 6	900#	150#					1000	650	285			
6PAM01/S3	4 x 6	150#	150#		275					275	316 St. St.	Chrome Alloy Nickel Plated	-21°F To -75°F
6PAM11/S3	4 x 6	300#	150#		275					275			
6PAM21/S3	4 x 6	300#	150#		525					275			
6PAM31/S3	4 x 6	600#	150#		1000					275			
6PAM01/S4	4 x 6	150#	150#	175						175	316 St. St.	316 St. St.	-76°F To -450°F
6PAM11/S4	4 x 6	300#	150#	175						175			
6PAM21/S4	4 x 6	300#	150#	300						275			
6PAM31/S4	4 x 6	600#	150#	480						275			

Q Orifice

U.S. Customary Units, API Area: 11.05 sq. in., Actual Area: 12.27 sq. in.

Type number	Valve size	ASME Flange class		Maximum Set Pressure, psig						Back Pressure Limit Psi @ 100°F	Material		Inlet Temp. Range
Conventional	Inlet Outlet	Inlet RF	Outlet RF	-450°F -75°F	-75°F -21°F	-20°F +100°F	450°F	800°F	1000°F	Conventional Type	Body & Bonnet	Spring	
6QAM01	6 x 8	150#	150#			165	165	80		115	Carbon Steel	Chrome Alloy	-20°F To 800°F
6QAM11	6 x 8	300#	150#			165	165	165		115			
6QAM21	6 x 8	300#	150#			300	300	300		115			
6QAM31	6 x 8	600#	150#			600	600	600		115			
H6QAM31	6 x 8	600#	150#			900	900	825		285			
6QAM23	6 x 8	300#	150#					165	165	115	Chrome Moly Steel	High Temp. Alloy	801°F to 1000°F
6QAM33	6 x 8	600#	150#					600	430	115			
H6QAM33	6 x 8	600#	150#					900	430	285			
6QAM01/S3	6 x 8	150#	150#		165					115	316 St. St.	Chrome Alloy Nickel Plated	-21°F To -75°F
6QAM11/S3	6 x 8	300#	150#		165					115			
6QAM21/S3	6 x 8	300#	150#		300					115			
6QAM31/S3	6 x 8	600#	150#		600					115			
6QAM01/S4	6 x 8	150#	150#	165						115	316 St. St.	316 St. St.	-76°F To -450°F
6QAM11/S4	6 x 8	300#	150#	165						115			
6QAM21/S4	6 x 8	300#	150#	250						115			
6QAM31/S4	6 x 8	600#	150#	300						115			

R Orifice

U.S. Customary Units, API Area: 16.00 sq. in., Actual Area: 17.78 sq. in.

Type number	Valve size	ASME Flange class		Maximum Set Pressure, psig						Back Pressure Limit Psi @ 100°F	Material		Inlet Temp. Range
Conventional	Inlet Outlet	Inlet RF	Outlet RF	-450°F -75°F	-75°F -21°F	-20°F +100°F	450°F	800°F	1000°F	Conventional Type	Body & Bonnet	Spring	
6RAM01	6 x 8	150#	150#			100	100	80		60	Carbon Steel	Chrome Alloy	-20°F To 800°F
6RAM11	6 x 8	300#	150#			100	100	100		60			
6RAM21	6 x 10	300#	150#			230	230	230		100			
6RAM31	6 x 10	600#	150#			300	300	300		100			
H6RAM31	6 x 10	600#	150#			600	600	600		285			
6RAM23	6 x 8	300#	150#					100	100	60	Chrome Moly Steel	High Temp. Alloy	801°F To 1000°F
6RAM33	6 x 10	600#	150#					300	300	100			
H6RAM33	6 x 10	600#	150#					600	430	285			
6RAM01/S3	6 x 8	150#	150#		100					60	316 St. St.	Chrome Alloy Nickel Plated	-21°F To -75°F
6RAM11/S3	6 x 8	300#	150#		100					60			
6RAM21/S3	6 x 10	300#	150#		230					100			
6RAM31/S3	6 x 10	600#	150#		300					100			
6RAM01/S4	6 x 8	150#	150#	55						55	316 St. St.	316 St. St.	-76°F to -450°F
6RAM11/S4	6 x 8	300#	150#	55						55			
6RAM21/S4	6 x 10	300#	150#	150						100			
6RAM31/S4	6 x 10	600#	150#	200						100			

T Orifice

U.S. Customary Units, API Area: 16.00 sq. in., Actual Area: 17.78 sq. in.

Type number	Valve size	ASME Flange class		Maximum Set Pressure, psig						Back Pressure Limit Psi @ 100°F	Material		Inlet Temp. Range
Conventional	Inlet Outlet	Inlet RF	Outlet RF	-450°F -75°F	-75°F -21°F	-20°F +100°F	450°F	800°F	1000°F	Conventional Type	Body & Bonnet	Spring	
6TAM01	8 x 10	150#	150#			65	65	65		30	Carbon Steel	Chrome Alloy	-20°F to 800°F
6TAM11	8 x 10	300#	150#			65	65	65		30			
6TAM21	8 x 10	300#	150#			120	120	120		60			
H6TAM21	8 x 10	300#	150#			300	300	300		100			
6TAM23	8 x 10	300#	150#					120	120	60	Chrome Moly Steel	High Temp. Alloy	801°F to 1000°F
H6TAM23	8 x 10	300#	150#					300	215	100			
6TAM21	8 x 10	150#	150#		65					30	316 St. St.	Chrome Alloy Nickel Plated	-21°F To -75°F
6TAM31	8 x 10	300#	150#		65					30			
H6TAM31	8 x 10	300#	150#		120					60			
6TAM21	8 x 10	150#	150#	50						30	316 St. St.	316 St. St.	-76°F to -450°F
6TAM31	8 x 10	300#	150#	50						30			
H6TAM31	8 x 10	300#	150#	65						60			

Air Capacities – 6000 Series: 10% Overpressure, API

Capacities in Standard Cubic feet Per Minute at 60°F

Set Pressure (psig)	Orifice Letter Designation & Areas, Sq. Inches													
Areas	D	E	F	G	H	J	K	L	M	N	P	Q	R	T
API	0.110	0.196	0.307	0.503	0.785	1.287	1.838	2.853	3.60	4.34	6.38	11.05	16.0	26.0
Actual	0.150	0.225	0.371	0.559	0.873	1.43	2.042	3.170	4.000	4.822	7.087	12.27	17.78	28.94
15	77	115	190	287	448	735	1050	1630	2057	2479	3644	6310	9144	14884
20	88	133	219	331	517	847	1210	1879	2371	2859	4202	7275	10542	17159
30	112	168	278	419	654	1072	1531	2378	3000	3617	5316	9205	13339	21711
40	138	207	342	516	805	1320	1885	2926	3692	4451	6542	11328	16415	26718
50	164	246	406	612	957	1567	2238	3475	4384	5286	7769	13450	19491	31725
60	190	285	470	709	1108	1815	2591	4023	5076	6120	8995	15573	22567	36732
70	216	324	535	806	1259	2062	2945	4571	5769	6954	10221	17696	25643	41738
80	242	363	599	902	1410	2309	3298	5120	6461	7788	11447	19819	28719	46745
90	268	402	663	999	1561	2557	3651	5668	7153	8623	12673	21942	31795	51752
100	294	441	727	1096	1712	2804	4004	6217	7845	9457	13899	24064	34871	56759
150	423	635	1048	1579	2467	4041	5771	8959	11305	13628	20030	34678	50251	81793
200	553	830	1369	2063	3222	5278	7537	11701	14765	17799	26160	45293	65632	106827
250	683	1025	1690	2547	3977	6515	9304	14443	18225	21970	32291	55907	81012	131862
300	813	1219	2011	3030	4732	7752	11070	17185	21685	26142	38421	66521	96393	156896
350	942	1414	2332	3514	5488	8989	12836	19928	25145	30313	44552	77135	111773	
400	1072	1609	2653	3997	6243	10226	14603	22670	28606	34484	50682	87749	127154	
450	1202	1803	2974	4481	6998	11463	16369	25412	32066	38655	56813	98363	142534	
500	1332	1998	3295	4964	7753	12700	18136	28154	35526	42827	62943	108977	157914	
550	1461	2192	3616	5448	8508	13937	19902	30896	38986	46998	69074	119591	173295	
600	1591	2387	3936	5931	9263	15174	21669	33639	42446	51169	75204	130205	188675	
650	1721	2582	4257	6415	10019	16411	23435	36381	45906	55340	81335	140819		
700	1851	2776	4578	6899	10774	17648	25201	39123	49367	59511	87466	151433		
750	1981	2971	4899	7382	11529	18885	26968	41865	52827	63683	93596	162047		
800	2110	3166	5220	7866	12284	20122	28734	44607	56287	67854	99727	172661		
850	2240	3360	5541	8349	13039	21359	30501	47349	59747	72025	105857	183275		
900	2370	3555	5862	8833	13795	22596	32267	50092	63207	76196	111988	193889		
950	2500	3750	6183	9316	14550	23833	34033	52834	66667	80368	118118			
1000	2629	3944	6504	9800	15305	25070	35800	55576	70127	84539	124249			
1050	2759	4139	6825	10283	16060	26307	37566	58318	73588					
1100	2889	4333	7146	10767	16815	27544	39333	61060	77048					
1150	3019	4528	7467	11251	17570	28781	41099	63802						
1200	3148	4723	7788	11734	18326	30018	42865	66545						
1250	3278	4917	8109	12218	19081	31255	44632	69287						
1300	3408	5112	8429	12701	19836	32492	46398	72029						
1350	3538	5307	8750	13185	20591	33729	48165	74771						
1400	3667	5501	9071	13668	21346	34966	49931	77513						
1450	3797	5696	9392	14152	22102	36203	51698	80256						
1500	3927	5891	9713	14635	22857	37440	53464	82998						
1550	4057	6085	10034	15119	23612	38677	55230							
1600	4186	6280	10355	15603	24367	39914	56997							
1650	4316	6474	10676	16086	25122	41151	58763							
1700	4446	6669	10997	16570	25877	42388	60530							
1750	4576	6864	11318	17053	26633	43625	62296							
1800	4705	7058	11639	17537	27388	44862	64062							
1850	4835	7253	11960	18020	28143	46099	65829							
1900	4965	7448	12281	18504	28898	47336	67595							
2000	5224	7837	12922	19471	30409	49810	71128							
2100	5484	8226	13564	20438	31919	52284	74661							
2200	5743	8615	14206	21405	33429	54758	78194							
2300	6003	9005	14848	22372	34940	57232								
2400	6262	9394	15490	23339	36450	59706								
2500	6522	9783	16132	24307	37960	62180								
2600	6781	10172	16774	25274	39471	64654								
2700	7041	10562	17415	26241	40981	67128								
2800	7301	10951	18057	27208										
2900	7560	11340	18699	28175										
3000	7820	11730	19341	29142										
3500	9117	13676	22550	33978										
3700	9636	14454	23834	35912										
4000	10415	15622	25760											
4500	11712	17569	28969											
5000	13010	19515	32178											
5500	14307	21461												
6000	15605	23408												

General Notes:

- For sizing purposes the effective coefficient of discharge Kd for air, gas, and steam is 0.975 when sizing using the API effective areas.
- Capacities at 30 psig and below are based on 3 PSI overpressure.
- Above capacities should also be used for 6000L series when used in air service.

Steam Capacities – 6000 Series: 10% Overpressure, API

Capacities in Pounds per hour at saturation temperature

Set Pressure (psig)	Orifice Letter Designation & Areas, Sq. Inches													
Areas	D	E	F	G	H	J	K	L	M	N	P	Q	R	T
API	0.110	0.196	0.307	0.503	0.785	1.287	1.838	2.853	3.60	4.34	6.38	11.05	16.0	26.0
Actual	0.150	0.225	0.371	0.559	0.873	1.43	2.042	3.170	4.000	4.822	7.087	12.27	17.78	28.94
15	216	325	536	807	1261	2066	2950	4580	5779	6967	10240	17729	25690	41815
20	249	374	618	931	1454	2382	3401	5280	6663	8032	11805	20439	29618	48209
30	316	474	781	1178	1840	3014	4303	6681	8430	10163	14937	25861	37475	60997
40	389	583	962	1449	2264	3709	5296	8222	10375	12507	18382	31825	46117	75063
50	461	692	1142	1721	2688	4404	6289	9763	12319	14850	21826	37789	54759	89130
60	534	802	1322	1993	3113	5099	7281	11303	14263	17194	25271	43753	63401	103196
70	607	911	1503	2265	3537	5794	8274	12844	16207	19538	28716	49717	72043	117263
80	680	1021	1683	2536	3961	6489	9266	14385	18152	21882	32160	55681	80685	131329
90	753	1130	1863	2808	4386	7184	10259	15926	20096	24226	35605	61645	89327	145396
100	826	1239	2044	3080	4810	7879	11251	17467	22040	26569	39050	67609	97969	159462
150	1191	1786	2945	4438	6931	11354	16214	25171	31761	38288	56273	97428	141180	229795
200	1555	2333	3847	5797	9053	14830	21176	32875	41482	50007	73497	127248	184390	300127
250	1920	2880	4749	7155	11175	18305	26139	40579	51203	61726	90720	157067	227601	370460
300	2284	3427	5650	8514	13296	21780	31102	48283	60925	73445	107943	186887	270811	440792
350	2649	3973	6552	9872	15418	25256	36064	55987	70646	85163	125167	216707	314022	
400	3013	4520	7454	11231	17540	28731	41027	63691	80367	96882	142390	246526	357232	
450	3378	5067	8355	12589	19661	32206	45990	71395	90088	108601	159614	276346	400443	
500	3742	5614	9257	13948	21783	35681	50952	79099	99809	120320	176837	306165	443653	
550	4107	6161	10158	15306	23905	39157	55915	86803	109530	132039	194061	335985	486864	
600	4471	6707	11060	16665	26026	42632	60878	94507	119251	143758	211284	365805	530074	
650	4836	7254	11962	18023	28148	46107	65840	102211	128973	155476	228507	395624		
700	5201	7801	12863	19382	30269	49583	70803	109915	138694	167195	245731	425444		
750	5565	8348	13765	20741	32391	53058	75766	117619	148415	178914	262954	455263		
800	5930	8895	14667	22099	34513	56533	80728	125323	158136	190633	280178	485083		
850	6294	9441	15568	23458	36634	60009	85691	133027	167857	202352	297401	514903		
900	6659	9988	16470	24816	38756	63484	90653	140731	177578	214071	314625	544722		
950	7023	10535	17372	26175	40878	66959	95616	148435	187299	225789	331848			
1000	7388	11082	18273	27533	42999	70435	100579	156139	197020	237508	349071			
1050	7752	11629	19175	28892	45121	73910	105541	163843	206742					
1100	8117	12176	20076	30250	47243	77385	110504	171547	216463					
1150	8481	12722	20978	31609	49364	80860	115467	179251						
1200	8846	13269	21880	32967	51486	84336	120429	186955						
1250	9211	13816	22781	34326	53608	87811	125392	194659						
1300	9575	14363	23683	35684	55729	91286	130355	202363						
1350	9940	14910	24585	37043	57851	94762	135317	210067						
1400	10304	15456	25486	38401	59972	98237	140280	217771						
1450	10669	16003	26388	39760	62094	101712	145242	225475						
1500	11088	16633	27426	41324	64537	105714	150956	234345						
1550	11489	17234	28417	42817	66868	109532	156409							
1600	11891	17838	29413	44318	69212	113372	161891							
1650	12309	18464	30444	45872	71640	117348	167569							
1700	12728	19093	31483	47438	74083	121352	173287							
1750	13152	19728	32529	49013	76545	125383	179043							
1800	13564	20347	33549	50551	78947	129316	184661							
1850	14006	21010	34643	52197	81518	133530	190677							
1900	14438	21657	35711	53807	84031	137645	196553							
2000	15325	22987	37903	57111	89191	146098	208625							
2100	16240	24360	40167	60522	94517	154823	221084							
2200	17202	25803	42546	64107	100118	163996	234181							
2300	18182	27272	44970	67758	105819	173335								
2400	19214	28821	47523	71605	111826	183175								
2500	20285	30427	50171	75596	118059	193386								
2600	21416	32124	52970	79811	124643	204168								
2700	22631	33947	55975	84339	131714	215753								
2800	23916	35874	59154	89129										
2900	25318	37978	62622	94355										

General Notes:

- For sizing purposes the effective coefficient of discharge Kd for air, gas, and steam is 0.975 when sizing using the API effective areas.
- Capacities at 30 psig and below are based on 3 PSI overpressure.
- Above capacities should also be used for 6000L series when used in air service.

Water Capacities – 6000L Series: 10% Overpressure, API

Capacities in Gallons Per Minute at 70°F

Set Pressure (psig)	Orifice Letter Designation & Areas, Sq. Inches													
Areas	D	E	F	G	H	J	K	L	M	N	P	Q	R	T
API	0.110	0.196	0.307	0.503	0.785	1.287	1.838	2.853	3.60	4.34	6.38	11.05	16.0	26.0
Actual	0.150	0.225	0.371	0.559	0.873	1.43	2.042	3.170	4.000	4.822	7.087	12.27	17.78	28.94
15	16	24	39	59	92	150	214	333	420	507	745	1289	1868	3041
20	18	27	44	66	104	170	242	376	475	573	842	1457	2112	3438
30	21	32	53	80	124	204	290	451	569	686	1008	1746	2530	4118
40	25	37	61	92	143	235	335	521	657	792	1164	2016	2921	4756
50	28	41	68	103	160	263	375	582	734	886	1302	2254	3266	5317
60	30	45	75	112	176	288	411	638	805	970	1426	2469	3578	5825
70	33	49	81	122	189	311	443	689	869	1048	1540	2667	3865	6292
80	35	52	86	130	203	332	474	736	929	1120	1647	2851	4132	6726
90	37	55	91	137	215	352	503	781	986	1188	1747	3024	4382	7134
100	39	58	96	145	227	372	530	823	1039	1252	1841	3188	4620	7520
150	48	72	118	177	278	455	649	1008	1272	1534	2255	3904	5658	9210
200	55	83	136	205	320	525	750	1164	1469	1771	2604	4508	6533	10635
250	62	92	152	229	358	587	838	1302	1643	1981	2911	5041	7304	11890
300	67	101	167	252	392	644	919	1426	1800	2170	3189	5522	8002	13025
350	73	109	180	271	424	695	992	1541	1944	2344	3445	5964	8643	
400	78	117	193	290	453	743	1061	1647	2078	2505	3683	6376	9240	
450	83	124	204	308	481	788	1125	1747	2204	2657	3906	6763	9800	
500	87	131	215	325	507	831	1186	1841	2324	2801	4117	7129	10330	
550	91	137	226	341	531	871	1244	1931	2437	2938	4318	7477	10834	
600	95	143	236	356	555	910	1299	2017	2545	3069	4510	7809	11316	
650	99	149	245	370	578	947	1352	2100	2649	3194	4694	8128		
700	103	154	255	384	600	983	1403	2179	2749	3315	4872	8435		
750	107	160	264	398	621	1018	1453	2255	2846	3431	5043	8731		
800	110	165	272	411	641	1051	1500	2329	2939	3543	5208	9017		
850	114	170	281	423	661	1083	1546	2401	3030	3653	5368	9295		
900	117	175	289	436	680	1115	1591	2471	3118	3758	5524	9564		
950	120	180	297	448	699	1145	1635	2538	3203	3861	5675			
1000	123	185	304	459	717	1175	1677	2604	3286	3962	5823			
1050	126	189	312	470	735	1204	1719	2669	3367					
1100	129	194	319	482	752	1232	1759	2731	3447					
1150	132	198	326	492	769	1260	1799	2793						
1200	135	202	333	503	785	1287	1838	2853						
1250	137	206	340	513	802	1313	1875	2912						
1300	140	210	347	524	817	1340	1913	2969						
1350	143	214	354	533	833	1365	1949	3026						
1400	146	218	360	543	848	1390	1985	3082						
1450	148	222	367	553	863	1414	2020	3136						
1500	151	226	373	562	878	1439	2055	3190						
1550	153	230	379	571	893	1462	2088							
1600	155	233	385	581	907	1486	2122							
1650	158	237	391	590	921	1509	2155							
1700	160	241	397	598	935	1532	2187							
1750	163	244	403	607	948	1554	2219							
1800	165	248	409	616	962	1576	2251							
1850	167	251	414	624	975	1598	2282							
1900	169	254	420	633	988	1619	2312							
2000	174	261	431	649	1014	1661	2372							
2100	178	267	441	665	1039	1702	2431							
2200	182	274	452	681	1063	1742	2488							
2300	186	280	462	696	1087	1782								
2400	190	286	472	711	1111	1820								
2500	194	292	482	726	1134	1857								
2600	198	298	491	740	1156	1894								
2700	202	303	500	754	1178	1930								
2800	206	309	510	768										
2900	209	314	314	782										
3000	213	320	320	795										
3500	230	345	345	859										
3700	237	355	355	883										
4000	246	369	369											
4500	261	392	646											
5000	275	413	681											
5500	289	433												
6000	301	452												

General Notes:

- For sizing purposes, the effective coefficient of discharge Kd for liquids is 0.724 when sizing using the API effective areas.
- Capacities at 30 psig and below are based on 3 PSI overpressure.
- The 6000L series may be used in compressible services. See the appropriate 6000 air and steam tables for capacities.

Water Capacities – 6000 Series: 25% Overpressure, API

Capacities in Gallons Per Minute at 70°F

Set Pressure (psig)	Orifice Letter Designation & Areas, Sq. Inches													
Areas	D	E	F	G	H	J	K	L	M	N	P	Q	R	T
API	0.110	0.196	0.307	0.503	0.785	1.287	1.838	2.853	3.60	4.34	6.38	11.05	16.0	26.0
Actual	0.150	0.225	0.371	0.559	0.873	1.43	2.042	3.170	4.000	4.822	7.087	12.27	17.78	28.94
15	14	21	35	53	82	136	193	300	379	457	672	1163	1685	2743
20	16	24	40	61	95	156	223	347	438	528	776	1342	1946	3167
30	20	30	49	75	117	192	274	425	536	646	950	1644	2383	3879
40	23	35	57	86	135	221	316	491	619	746	1097	1899	2752	4479
50	26	39	64	97	151	247	353	548	692	834	1226	2123	3076	5007
60	28	42	70	106	165	271	387	601	758	914	1343	2325	3370	5485
70	30	46	76	114	179	293	418	649	819	987	1451	2512	3640	5925
80	33	49	81	122	191	313	447	694	875	1055	1551	2685	3892	6334
90	35	52	86	130	203	332	474	736	929	1119	1645	2848	4128	6718
100	37	55	91	137	214	350	499	776	979	1180	1734	3002	4351	7082
150	45	71	111	168	261	428	611	950	1198	1445	2124	3677	5328	8673
200	52	77	128	193	302	495	706	1097	1384	1669	2452	4246	6153	10015
250	58	92	143	216	337	553	790	1226	1547	1866	2742	4747	6879	11197
300	64	95	157	237	370	606	865	1344	1695	2044	3004	5200	7536	12266
350	69	103	169	256	399	655	934	1451	1831	2208	3244	5617	8139	
400	73	110	181	274	427	700	999	1551	1958	2360	3468	6005	8702	
450	78	116	192	290	453	742	1060	1645	2076	2503	3678	6369	9229	
500	82	123	203	306	477	782	1117	1734	2189	2638	3878	6713	9729	
550	86	129	213	321	501	821	1171	1819	2295	2767	4067	7041	10204	
600	90	135	222	335	523	857	1223	1900	2398	2890	4248	7354	10657	
650	94	140	231	349	544	892	1273	1978	2495	3008	4421	7655		
700	97	146	240	362	565	926	1322	2052	2590	3122	4588	7944		
750	100	151	248	375	585	958	1368	2124	2681	3232	4749	8222		
800	104	156	257	387	604	990	1413	2194	2768	3337	4905	8492		
850	107	160	264	399	623	1020	1456	2262	2854	3440	5056	8753		
900	110	165	272	410	641	1050	1499	2327	2936	3540	5203	9007		
950	113	170	280	422	658	1078	1540	2391	3016	3637	5345			
1000	116	174	287	432	675	1106	1580	2453	3095	3731	5484			
1050	118	178	294	443	692	1133	1619	2513	3171					
1100	122	182	301	454	708	1160	1657	2573	3246					
1150	124	186	307	463	724	1186	1694	2630						
1200	127	191	314	474	740	1212	1730	2687						
1250	129	194	320	483	755	1237	1766	2742						
1300	132	198	327	493	770	1262	1801	2797						
1350	134	202	333	502	784	1285	1835	2850						
1400	137	206	339	512	799	1309	1869	2902						
1450	139	209	345	520	813	1332	1902	2953						
1500	142	213	351	530	827	1355	1935	3004						
1550	144	216	357	538	841	1377	1967							
1600	147	220	363	547	854	1400	1998							
1650	149	223	368	555	867	1421	2029							
1700	151	227	374	564	880	1443	2060							
1750	153	230	379	572	893	1463	2090							
1800	156	233	385	580	906	1484	2120							
1850	157	236	390	588	918	1505	2149							
1900	160	239	395	596	931	1525	2178							
2000	164	246	406	612	955	1564	2234							
2100	168	252	416	627	978	1603	2289							
2200	172	258	425	642	1002	1641	2343							
2300	176	264	435	656	1024	1678								
2400	180	270	444	670	1046	1714								
2500	184	275	454	684	1068	1749								
2600	187	281	463	698	1089	1784								
2700	191	286	471	711	1110	1818								
2800	194	291	480	724										
2900	198	296	488	737										
3000	201	301	497	749										
3500	217	325	537	809										
3700	223	334	552	832										
4000	232	348	574											
4500	246	369	609											
5000	260	389	641											
5500	272	408												
6000	284	426												

General Notes:

- For sizing purposes the effective coefficient of discharge Kd for liquids is 0.62 when sizing using the API effective areas.
- Capacities at 30 psig and below are based on 3 PSI overpressure.

D Orifice

Metric Units, API Area: 71 mm², Actual Area: 97 mm²

Type number	Valve size	ASME Flange class		Maximum Set Pressure, barg						Back Pressure Limit barg @ 38°C	Material		Inlet Temp. Range
Conventional	Inlet Outlet	Inlet RF	Outlet RF	-268°C -60°C	-59°C -30°C	-29°C +38°C	232°C	427°C	538°C	Conventional Type	Body & Bonnet	Spring	
6DAM01	1 x 2	150#	150#			19.6	12.7	5.5		19.6	Carbon Steel	Chrome Alloy	-29°C To 427°C
6DAM11	1 x 2	300#	150#			19.6	19.6	19.6		19.6			
6DAM21	1 x 2	300#	150#			51.0	42.7	28.2		19.6			
6DAM31	1 x 2	600#	150#			102	85.1	56.8		19.6			
6DAM41	1 1/2 x 2	900#	300#			153	128	85.1		41.3			
6DAM51	1 1/2 x 2	1500#	300#			255	213	142		41.3			
6DAM61A	1 1/2 x 3	2500#	300#			425	355	236		51			
6DAM23	1 x 2	300#	150#					35.1	14.8	19.6	Chrome Moly Steel	High Temp. Alloy	428°C to 538°C
6DAM33	1 x 2	600#	150#					69.9	29.6	19.6			
6DAM43	1 1/2 x 2	900#	300#					105	44.8	41.3			
6DAM53	1 1/2 x 2	1500#	300#					175	74.4	41.3			
6DAM63A	1 1/2 x 3	2500#	300#					291	124	51			
6DAM01/S3	1 x 2	150#	150#		18.9					18.9	316 St. St.	Chrome Alloy Nickel Plated	-30°C to -59°C
6DAM11/S3	1 x 2	300#	150#		18.9					18.9			
6DAM21/S3	1 x 2	300#	150#		49.6					18.9			
6DAM31/S3	1 x 2	600#	150#		99.2					18.9			
6DAM41/S3	1 1/2 x 2	900#	300#		149					41.3			
6DAM51/S3	1 1/2 x 2	1500#	300#		248					41.3			
6DAM61A/S3	1 1/2 x 3	2500#	300#		413					49.6			
6DAM01/S4	1 x 2	150#	150#	18.9						18.9	316 St. St.	316 St. St.	-60°C to -268°C
6DAM11/S4	1 x 2	300#	150#	18.9						18.9			
6DAM21/S4	1 x 2	300#	150#	49.6						18.9			
6DAM31/S4	1 x 2	600#	150#	99.2						18.9			
6DAM41/S4	1 1/2 x 2	900#	300#	149						41.3			
6DAM51/S4	1 1/2 x 2	1500#	300#	248						41.3			
6DAM61A/S4	1 1/2 x 3	2500#	300#	276						49.6			

E Orifice

Metric Units, API Area: 126 mm², Actual Area: 145 mm²

Type number	Valve size	ASME Flange class		Maximum Set Pressure, barg						Back Pressure Limit barg @ 38°C	Material		Inlet Temp. Range
Conventional	Inlet Outlet	Inlet RF	Outlet RF	-268°C -60°C	-59°C -30°C	-29°C +38°C	232°C	427°C	538°C	Conventional Type	Body & Bonnet	Spring	
6EAM01	1 x 2	150#	150#			19.6	12.7	5.5		19.6	Carbon Steel	Chrome Alloy	-29°C to 427°C
6EAM11	1 x 2	300#	150#			19.6	19.6	19.6		19.6			
6EAM21	1 x 2	300#	150#			51.0	42.7	28.2		19.6			
6EAM31	1 x 2	600#	150#			102	85.1	56.8		19.6			
6EAM41	1 1/2 x 2	900#	300#			153	128	85.1		41.3			
6EAM51	1 1/2 x 2	1500#	300#			255	213	142		41.3			
6EAM61A	1 1/2 x 3	2500#	300#			425	355	236		51			
6EAM23	1 x 2	300#	150#					35.1	14.8	19.6	Chrome Moly Steel	High Temp. Alloy	428°C to 538°C
6EAM33	1 x 2	600#	150#					69.9	29.6	19.6			
6EAM43	1 1/2 x 2	900#	300#					105	44.8	41.3			
6EAM53	1 1/2 x 2	1500#	300#					175	74.4	41.3			
6EAM63A	1 1/2 x 3	2500#	300#					291	124	51			
6EAM01/S3	1 x 2	150#	150#		18.9					18.9	316 St. St.	Chrome Alloy Nickel Plated	-30°C to -59°C
6EAM11/S3	1 x 2	300#	150#		18.9					18.9			
6EAM21/S3	1 x 2	300#	150#		49.6					18.9			
6EAM31/S3	1 x 2	600#	150#		99.2					18.9			
6EAM41/S3	1 1/2 x 2	900#	300#		149					41.3			
6EAM51/S3	1 1/2 x 2	1500#	300#		248					41.3			
6EAM61A/S3	1 1/2 x 3	2500#	300#		413					49.6			
6EAM01/S4	1 x 2	150#	150#	18.9						18.9	316 St. St.	316 St. St.	-60°C to -268°C
6EAM11/S4	1 x 2	300#	150#	18.9						18.9			
6EAM21/S4	1 x 2	300#	150#	49.6						18.9			
6EAM31/S4	1 x 2	600#	150#	99.2						18.9			
6EAM41/S4	1 1/2 x 2	900#	300#	149						41.3			
6EAM51/S4	1 1/2 x 2	1500#	300#	248						41.3			
6EAM61A/S4	1 1/2 x 3	2500#	300#	276						49.6			

F Orifice

Metric Units, API Area: 198 mm², Actual Area: 239 mm²

Type number	Valve size	ASME Flange class		Maximum Set Pressure, barg						Back Pressure Limit barg @ 38°C	Material		Inlet Temp. Range
Conventional	Inlet Outlet	Inlet RF	Outlet RF	-268°C -60°C	-59°C -30°C	-29°C +38° C	232°C	427°C	538°C	Conventional Type	Body & Bonnet	Spring	
6FAM01	1 1/2 x 2	150#	150#			19.6	12.7	5.5		19.6	Carbon Steel	Chrome Alloy	-29°C to 427°C
6FAM11	1 1/2 x 2	300#	150#			19.6	19.6	19.6		19.6			
6FAM21	1 1/2 x 2	300#	150#			51.0	42.7	28.2		19.6			
6FAM31	1 1/2 x 2	600#	150#			102	85.1	56.8		19.6			
6FAM41A	1 1/2 x 3	900#	300#			153	128	85.1		51			
6FAM51A	1 1/2 x 3	1500#	300#			255	213	142		51			
6FAM61A	1 1/2 x 3	2500#	300#			345	345	236		51			
6FAM23	1 1/2 x 2	300#	150#					35.1	14.8	19.6	Chrome Moly Steel	High Temp. Alloy	428°C to 538°C
6FAM33	1 1/2 x 2	600#	150#					69.9	29.6	19.6			
6FAM43A	1 1/2 x 3	900#	300#					105	44.8	51			
6FAM53A	1 1/2 x 3	1500#	300#					175	74.4	51			
6FAM63A	1 1/2 x 3	2500#	300#					291	124	51			
6FAM01/S3	1 1/2 x 2	150#	150#		18.9					18.9	316 St. St.	Chrome Alloy Nickel Plated	-30°C to -59°C
6FAM11/S3	1 1/2 x 2	300#	150#		18.9					18.9			
6FAM21/S3	1 1/2 x 2	300#	150#		49.6					18.9			
6FAM31/S3	1 1/2 x 2	600#	150#		99.2					18.9			
6FAM41A/S3	1 1/2 x 3	900#	300#		149					49.6			
6FAM51A/S3	1 1/2 x 3	1500#	300#		248					49.6			
6FAM61A/S3	1 1/2 x 3	2500#	300#		345					49.6			
6FAM01/S4	1 1/2 x 2	150#	150#	18.9						18.9	316 St. St.	316 St. St.	-60°C to -268°C
6FAM11/S4	1 1/2 x 2	300#	150#	18.9						18.9			
6FAM21/S4	1 1/2 x 2	300#	150#	49.6						18.9			
6FAM31/S4	1 1/2 x 2	600#	150#	99.2						18.9			
6FAM41A/S4	1 1/2 x 3	900#	300#	149						49.6			
6FAM51A/S4	1 1/2 x 3	1500#	300#	152						49.6			
6FAM61A/S4	1 1/2 x 3	2500#	300#	234						49.6			

G Orifice

Metric Units, API Area: 325 mm², Actual Area: 361 mm²

Type number	Valve size	ASME Flange class		Maximum Set Pressure, barg						Back Pressure Limit barg @ 38°C	Material		Inlet Temp. Range
Conventional	Inlet Outlet	Inlet RF	Outlet RF	-268°C -60°C	-59°C -30°C	-29°C +38°C	232°C	427°C	538°C	Conventional Type	Body & Bonnet	Spring	
6GAM01A	1 1/2 x 3	150#	150#			19.6	12.7	5.5		19.6	Carbon Steel	Chrome Alloy	-29°C To 427°C
6GAM11A	1 1/2 x 3	300#	150#			19.6	19.6	19.6		19.6			
6GAM21A	1 1/2 x 3	300#	150#			51.0	42.7	28.2		19.6			
6GAM31A	1 1/2 x 3	600#	150#			102	85.1	56.8		19.6			
6GAM41A	1 1/2 x 3	900#	300#			153	128	85.1		51			
6GAM51	2 x 3	1500#	300#			255	213	142		51			
6GAM61	2 x 3	2500#	300#			255	255	236		51			
6GAM23A	1 1/2 x 3	300#	150#					35.1	14.8	19.6	Chrome Moly Steel	High Temp. Alloy	428°C to 538°C
6GAM33A	1 1/2 x 3	600#	150#					69.9	29.6	19.6			
6GAM43A	1 1/2 x 3	900#	300#					105	44.8	51			
6GAM53	2 x 3	1500#	300#					175	74.4	51			
6GAM63	2 x 3	2500#	300#					255	124	51			
6GAM01A/S3	1 1/2 x 3	150#	150#		18.9					18.9	316 St. St.	Chrome Alloy Nickel Plated	-30°C to -59°C
6GAM11A/S3	1 1/2 x 3	300#	150#		18.9					18.9			
6GAM21A/S3	1 1/2 x 3	300#	150#		49.6					18.9			
6GAM31A/S3	1 1/2 x 3	600#	150#		99.2					18.9			
6GAM41A/S3	1 1/2 x 3	900#	300#		149					49.6			
6GAM51/S3	2 x 3	1500#	300#		248					49.6			
6GAM61/S3	2 x 3	2500#	300#		255					49.6			
6GAM01A/S4	1 1/2 x 3	150#	150#	18.9						18.9	316 St. St.	316 St. St.	-60°C to -268°C
6GAM11A/S4	1 1/2 x 3	300#	150#	18.9						18.9			
6GAM21A/S4	1 1/2 x 3	300#	150#	49.6						18.9			
6GAM31A/S4	1 1/2 x 3	600#	150#	99.2						18.9			
6GAM41A/S4	1 1/2 x 3	900#	300#	149						49.6			
6GAM51/S4	2 x 3	1500#	300#	169						49.6			
6GAM61/S4	2 x 3	2500#	300#	179						49.6			

H Orifice

Metric Units, API Area: 506 mm², Actual Area: 563 mm²

Type number	Valve size	ASME Flange class		Maximum Set Pressure, barg						Back Pressure Limit barg @ 38°C	Material		Inlet Temp. Range
Conventional	Inlet Outlet	Inlet RF	Outlet RF	-268°C -60°C	-59°C -30°C	-29°C +38°C	232°C	427°C	538°C	Conventional Type	Body & Bonnet	Spring	
6HAM01	1 1/2 x 3	150#	150#			19.6	12.7	5.5		19.6	Carbon Steel	Chrome Alloy	-29°C To 427°C
6HAM11	1 1/2 x 3	300#	150#			19.6	19.6	19.6		19.6			
6HAM21	2 x 3	300#	150#			51.0	42.7	28.2		19.6			
6HAM31	2 x 3	600#	150#			102	85.1	56.8		19.6			
6HAM41	2 x 3	900#	150#			153	128	85.1		19.6			
6HAM51	2 x 3	1500#	300#			189	189	142		51			
6HAM23	2 x 3	300#	150#					35.1	14.8	19.6	Chrome Moly Steel	High Temp. Alloy	428°C To 538°C
6HAM33	2 x 3	600#	150#					69.9	29.6	19.6			
6HAM43	2 x 3	900#	150#					105	44.8	19.6			
6HAM53	2 x 3	1500#	300#					175	74.4	51			
6HAM01/S3	1 1/2 x 3	150#	150#		18.9					18.9	316 St. St.	Chrome Alloy Nickel Plated	-30°C to -59°C
6HAM11/S3	1 1/2 x 3	300#	150#		18.9					18.9			
6HAM21/S3	2 x 3	300#	150#		49.6					18.9			
6HAM31/S3	2 x 3	600#	150#		99.2					18.9			
6HAM41/S3	2 x 3	900#	150#		149					18.9			
6HAM51/S3	2 x 3	1500#	300#		189					49.6			
6HAM01/S4	1 1/2 x 3	150#	150#	18.9						18.9	316 St. St.	316 St. St.	-60°C to -268°C
6HAM11/S4	1 1/2 x 3	300#	150#	18.9						18.9			
6HAM21/S4	2 x 3	300#	150#	49.6						18.9			
6HAM31/S4	2 x 3	600#	150#	99.2						18.9			
6HAM41/S4	2 x 3	900#	150#	102						18.9			
6HAM51/S4	2 x 3	1500#	300#	110						49.6			

J Orifice

Metric Units, API Area: 830 mm², Actual Area: 923 mm²

Type number	Valve size	ASME Flange class		Maximum Set Pressure, barg						Back Pressure Limit barg @ 38°C	Material		Inlet Temp. Range
Conventional	Inlet Outlet	Inlet RF	Outlet RF	-268°C -60°C	-59°C -30°C	-29°C +38°C	232°C	427°C	538°C	Conventional Type	Body & Bonnet	Spring	
6JAM01	2 x 3	150#	150#			19.6	12.7	5.5		19.6	Carbon Steel	Chrome Alloy	-29°C to 427°C
6JAM11	2 x 3	300#	150#			19.6	19.6	19.6		19.6			
6JAM21A	3 x 4	300#	150#			51.0	42.7	28.2		19.6			
6JAM31A	3 x 4	600#	150#			102	85.1	56.8		19.6			
6JAM41	3 x 4	900#	150#			153	128	85.1		19.6			
6JAM51	3 x 4	1500#	300#			186	186	142		41.3			
6JAM23A	3 x 4	300#	150#					35.1	14.8	19.6	Chrome Moly Steel	High Temp. Alloy	428°C to 538°C
6JAM33A	3 x 4	600#	150#					69.9	29.6	19.6			
6JAM43A	3 x 4	900#	150#					105	44.8	19.6			
6JAM53	3 x 4	1500#	300#					175	74.4	41.3			
6JAM01/S3	2 x 3	150#	150#		18.9					18.9	316 St. St.	Chrome Alloy Nickel Plated	-30°C to -59°C
6JAM11/S3	2 x 3	300#	150#		18.9					18.9			
6JAM21/S3	3 x 4	300#	150#		49.6					18.9			
6JAM31/S3	3 x 4	600#	150#		99.2					18.9			
6JAM41/S3	3 x 4	900#	150#		149					18.9			
6JAM51/S3	3 x 4	1500#	300#		189					41.3			
6JAM01/S4	2 x 3	150#	150#	18.9						18.9	316 St. St.	316 St. St.	-60°C to -268°C
6JAM11/S4	2 x 3	300#	150#	18.9						18.9			
6JAM21/S4	3 x 4	300#	150#	34.5						18.9			
6JAM31/S4	3 x 4	600#	150#	43.1						18.9			
6JAM41/S4	3 x 4	900#	150#	55						18.9			
6JAM51/S4	3 x 4	1500#	300#	55						41.3			

K Orifice

Metric Units, API Area: 1186 mm², Actual Area: 1317 mm²

Type number	Valve size	ASME Flange class		Maximum Set Pressure, barg						Back Pressure Limit barg @ 38°C	Material		Inlet Temp. Range
Conventional	Inlet Outlet	Inlet RF	Outlet RF	-268°C -60°C	-59°C -30°C	-29°C +38°C	232°C	427°C	538°C	Conventional Type	Body & Bonnet	Spring	
6KAM01	3 x 4	150#	150#			19.6	12.7	5.5		19.6	Carbon Steel	Chrome Alloy	-29°C to 427°C
6KAM11	3 x 4	300#	150#			19.6	19.6	19.6		19.6			
6KAM21	3 x 4	300#	150#			51.0	42.7	28.2		19.6			
6KAM31	3 x 4	600#	150#			102	85.1	56.8		19.6			
6KAM41	3 x 6	900#	150#			153	128	85.1		19.6			
6KAM51	3 x 6	1500#	300#			153	153	142		41.3			
6KAM23	3 x 4	300#	150#					35.1	14.8	19.6	Chrome Moly Steel	High Temp. Alloy	428°C to 538°C
6KAM33	3 x 4	600#	150#					69.9	29.6	19.6			
6KAM43A	3 x 6	900#	150#					105	44.8	19.6			
6KAM53	3 x 6	1500#	300#					153	74.4	41.3			
6KAM01/S3	3 x 4	150#	150#		18.9					18.9	316 St. St.	Chrome Alloy Nickel Plated	-30°C to -59°C
6KAM11/S3	3 x 4	300#	150#		18.9					18.9			
6KAM21/S3	3 x 4	300#	150#		49.6					18.9			
6KAM31/S3	3 x 4	600#	150#		99.2					18.9			
6KAM41/S3	3 x 6	900#	150#		149					18.9			
6KAM51/S3	3 x 6	1500#	300#		153					41.3			
6KAM01/S4	3 x 4	150#	150#	18.9						18.9	316 St. St.	316 St. St.	-60°C to -268°C
6KAM11/S4	3 x 4	300#	150#	18.9						18.9			
6KAM21/S4	3 x 4	300#	150#	36.2						18.9			
6KAM31/S4	3 x 4	600#	150#	41.3						18.9			
6KAM41/S4	3 x 6	900#	150#	41.3						18.9			
6KAM51/S4	3 x 6	1500#	300#	51.7						41.3			

L Orifice

Metric Units, API Area: 1841 mm², Actual Area: 2045 mm²

Type number	Valve size	ASME Flange class		Maximum Set Pressure, barg						Back Pressure Limit barg @ 38°C	Material		Inlet Temp. Range
Conventional	Inlet Outlet	Inlet RF	Outlet RF	-268°C -60°C	-59°C -30°C	-29°C +38°C	232°C	427°C	538°C	Conventional Type	Body & Bonnet	Spring	
6LAM01	3 x 4	150#	150#			19.6	12.7	5.5		19.6	Carbon Steel	Chrome Alloy	-29°C To 427°C
6LAM11	3 x 4	300#	150#			19.6	19.6	19.6		19.6			
6LAM21	4 x 6	300#	150#			51.0	42.7	28.2		19.6			
6LAM31	4 x 6	600#	150#			68.9	68.9	56.8		19.6			
6LAM41	4 x 6	900#	150#			103	103	75.8		19.6			
6LAM51	4 x 6	1500#	150#			103	103	103		41.3			
6LAM23	4 x 6	300#	150#					35.1	14.8	19.6	Chrome Moly Steel	High Temp. Alloy	428°C to 538°C
6LAM33	4 x 6	600#	150#					68.9	29.6	19.6			
6LAM43	4 x 6	900#	150#					103	44.8	19.6			
6LAM53	4 x 6	1500#	150#					103	74.4	41.3			
6LAM01/S3	3 x 4	150#	150#		18.9					18.9	316 St. St.	Chrome Alloy Nickel Plated	-30°C to -59°C
6LAM11/S3	3 x 4	300#	150#		18.9					18.9			
6LAM21/S3	4 x 6	300#	150#		49.6					18.9			
6LAM31/S3	4 x 6	600#	150#		68.9					18.9			
6LAM41/S3	4 x 6	900#	150#		103					18.9			
6LAM01/S4	3 x 4	150#	150#	18.9						18.9	316 St. St.	316 St. St.	-60°C to -268°C
6LAM11/S4	3 x 4	300#	150#	18.9						18.9			
6LAM21/S4	4 x 6	300#	150#	36.9						18.9			
6LAM31/S4	4 x 6	600#	150#	36.9						18.9			
6LAM41/S4	4 x 6	900#	150#	48.2						18.9			

M Orifice

Metric Units, API Area: 2323 mm², Actual Area: 2581 mm²

Type number	Valve size	ASME Flange class		Maximum Set Pressure, barg						Back Pressure Limit barg @ 38°C	Material		Inlet Temp. Range
Conventional	Inlet Outlet	Inlet RF	Outlet RF	-268°C -60°C	-59°C -30°C	-29°C +38°C	232°C	427°C	538°C	Conventional Type	Body & Bonnet	Spring	
6MAM01	4 x 6	150#	150#			19.6	12.7	5.5		19.6	Carbon Steel	Chrome Alloy	-29°C to 427°C
6MAM11	4 x 6	300#	150#			19.6	19.6	19.6		19.6			
6MAM21	4 x 6	300#	150#			51.0	42.7	28.2		19.6			
6MAM31	4 x 6	600#	150#			75.8	75.8	56.8		19.6			
6MAM41	4 x 6	900#	150#			75.8	75.8	75.8		19.6			
6MAM23	4 x 6	300#	150#					35.1	14.8	19.6	Chrome Moly Steel	High Temp. Alloy	428°C to 538°C
6MAM33	4 x 6	600#	150#					68.9	29.6	19.6			
6MAM43	4 x 6	900#	150#					75.8	44.8	19.6			
6MAM01/S3	4 x 6	150#	150#		18.9					18.9	316 St. St.	Chrome Alloy Nickel Plated	-30°C to -59°C
6MAM11/S3	4 x 6	300#	150#		18.9					18.9			
6MAM21/S3	4 x 6	300#	150#		49.6					18.9			
6MAM31/S3	4 x 6	600#	150#		75.8					18.9			
6MAM01/S4	4 x 6	150#	150#	18.9						18.9	316 St. St.	316 St. St.	-60°C to -268°C
6MAM11/S4	4 x 6	300#	150#	18.9						18.9			
6AMM21/S4	4 x 6	300#	150#	36.2						18.9			
6MAM31/S4	4 x 6	600#	150#	41.3						18.9			

N Orifice

Metric Units, API Area: 2800 mm², Actual Area: 3111 mm²

Type number	Valve size	ASME Flange class		Maximum Set Pressure, barg						Back Pressure Limit barg @ 38°C	Material		Inlet Temp. Range
Conventional	Inlet Outlet	Inlet RF	Outlet RF	-268°C -60°C	-59°C -30°C	-29°C +38°C	232°C	427°C	538°C	Conventional Type	Body & Bonnet	Spring	
6NAM01	4 x 6	150#	150#			19.6	12.7	5.5		19.6	Carbon Steel	Chrome Alloy	-29°C to 427°C
6NAM11	4 x 6	300#	150#			19.6	19.6	19.6		19.6			
6NAM21	4 x 6	300#	150#			51.0	42.7	28.2		19.6			
6NAM31	4 x 6	600#	150#			68.9	68.9	56.8		19.6			
6NAM41	4 x 6	900#	150#			68.9	68.9	68.9		19.6			
6NAM23	4 x 6	300#	150#					35.1	14.8	19.6	Chrome Moly Steel	High Temp. Alloy	428°C to 538°C
6NAM33	4 x 6	600#	150#					68.9	29.6	19.6			
6NAM43	4 x 6	900#	150#					68.9	44.8	19.6			
6NAM01/S3	4 x 6	150#	150#		18.9					18.9	316 St. St.	Chrome Alloy Nickel Plated	-30°C to -59°C
6NAM11/S3	4 x 6	300#	150#		18.9					18.9			
6NAM21/S3	4 x 6	300#	150#		49.6					18.9			
6NAM31/S3	4 x 6	600#	150#		68.9					18.9			
6NAM01/S4	4 x 6	150#	150#	18.9						18.9	316 St. St.	316 St. St.	-60°C to -268°C
6NAM11/S4	4 x 6	300#	150#	18.9						18.9			
6NAM21/S4	4 x 6	300#	150#	31.0						18.9			
6NAM31/S4	4 x 6	600#	150#	34.5						18.9			

P Orifice

Metric Units, API Area: 4116 mm², Actual Area: 4572 mm²

Type number	Valve size	ASME Flange class		Maximum Set Pressure, barg						Back Pressure Limit barg @ 38°C	Material		Inlet Temp. Range
Conventional	Inlet Outlet	Inlet RF	Outlet RF	-268°C -60°C	-59°C -30°C	-29°C +38°C	232°C	427°C	538°C	Conventional Type	Body & Bonnet	Spring	
6PAM01	4 x 6	150#	150#			19.6	12.7	5.5		19.6	Carbon Steel	Chrome Alloy	-29°C to 427°C
6PAM11	4 x 6	300#	150#			19.6	19.6	19.6		19.6			
6PAM21	4 x 6	300#	150#			36.2	36.2	28.2		19.6			
6PAM31	4 x 6	600#	150#			68.9	68.9	56.8		19.6			
6PAM41	4 x 6	900#	150#			68.9	68.9	68.9		19.6			
6PAM23	4 x 6	300#	150#					35.1`	14.8	19.6	Chrome Moly Steel	High Temp. Alloy	428°C to 538°C
6PAM33	4 x 6	600#	150#					68.9	29.6	19.6			
6PAM43	4 x 6	900#	150#					68.9	44.8	19.6			
6PAM01/S3	4 x 6	150#	150#		18.9					18.9	316 St. St.	Chrome Alloy Nickel Plated	-30°C to -59°C
6PAM11/S3	4 x 6	300#	150#		18.9					18.9			
6PAM21/S3	4 x 6	300#	150#		36.2					18.9			
6PAM31/S3	4 x 6	600#	150#		68.9					18.9			
6PAM01/S4	4 x 6	150#	150#	12.1						12.1	316 St. St.	316 St. St.	-60°C to -268°C
6PAM11/S4	4 x 6	300#	150#	12.1						12.1			
6PAM21/S4	4 x 6	300#	150#	20.7						18.9			
6PAM31/S4	4 x 6	600#	150#	33.1						18.9			

Q Orifice

Metric Units, API Area: 7129 mm², Actual Area: 7916 mm²

Type number	Valve size	ASME Flange class		Maximum Set Pressure, barg						Back Pressure Limit barg @ 38°C	Material		Inlet Temp. Range
Conventional	Inlet Outlet	Inlet RF	Outlet RF	-268°C -60°C	-59°C -30°C	-29°C +38°C	232°C	427°C	538°C	Conventional Type	Body & Bonnet	Spring	
6QAM01	6 x 8	150#	150#			11.4	11.4	5.5		7.9	Carbon Steel	Chrome Alloy	-29°C to 427°C
6QAM11	6 x 8	300#	150#			11.4	11.4	11.4		7.9			
6QAM21	6 x 8	300#	150#			20.7	20.7	20.7		7.9			
6QAM31	6 x 8	600#	150#			41.3	41.3	41.3		7.9			
H6QAM31	6 x 8	600#	150#			62.0	62.0	56.8		19.6			
6QAM23	6 x 8	300#	150#					11.4	11.4	7.9	Chrome Moly Steel	High Temp. Alloy	428°C to 538°C
6QAM33	6 x 8	600#	150#					41.3	29.6	7.9			
H6QAM33	6 x 8	600#	150#					62.0	29.6	19.6			
6QAM01/S3	6 x 8	150#	150#		11.4					7.9	316 St. St.	Chrome Alloy Nickel Plated	-30°C to -59°C
6QAM11/S3	6 x 8	300#	150#		11.4					7.9			
6QAM21/S3	6 x 8	300#	150#		20.7					7.9			
6QAM31/S3	6 x 8	600#	150#		41.3					7.9			
6QAM01/S4	6 x 8	150#	150#	11.4						7.9	316 St. St.	316 St. St.	-60°C to -268°C
6QAM11/S4	6 x 8	300#	150#	11.4						7.9			
6QAM21/S4	6 x 8	300#	150#	17.2						7.9			
6QAM31/S4	6 x 8	600#	150#	20.7						7.9			

R Orifice

Metric Units, API Area: 10323 mm², Actual Area: 11471 mm²

Type number	Valve size	ASME Flange class		Maximum Set Pressure, barg						Back Pressure Limit barg @ 38°C	Material		Inlet Temp. Range
Conventional	Inlet Outlet	Inlet RF	Outlet RF	-268°C -60°C	-59°C -30°C	-29°C +38°C	232°C	427°C	538°C	Conventional Type	Body & Bonnet	Spring	
6RAM01	6 x 8	150#	150#			6.9	6.9	5.5		4.1	Carbon Steel	Chrome Alloy	-29°C to 427°C
6RAM11	6 x 8	300#	150#			6.9	6.9	6.9		4.1			
6RAM21	6 x 10	300#	150#			15.8	15.8	15.8		6.9			
6RAM31	6 x 10	600#	150#			20.7	20.7	20.7		6.9			
H6RAM31	6 x 10	600#	150#			41.3	41.3	41.3		19.6			
6RAM23	6 x 8	300#	150#					6.9	6.8	4.1	Chrome Moly Steel	High Temp. Alloy	428°C to 538°C
6RAM33	6 x 10	600#	150#					20.7	20.7	6.9			
H6RAM33	6 x 10	600#	150#					41.3	29.6	19.6			
6RAM01/S3	6 x 8	150#	150#		6.9					4.1	316 St. St.	Chrome Alloy Nickel Plated	-30°C to -59°C
6RAM11/S3	6 x 8	300#	150#		6.9					4.1			
6RAM21/S3	6 x 10	300#	150#		15.8					6.9			
6RAM31/S3	6 x 10	600#	150#		20.7					6.9			
6RAM01/S4	6 x 8	150#	150#	3.8						4.1	316 St. St.	316 St. St.	-60°C to -268°C
6RAM11/S4	6 x 8	300#	150#	3.8						4.1			
6RAM21/S4	6 x 10	300#	150#	10.3						6.9			
6RAM31/S4	6 x 10	600#	150#	13.8						6.9			

T Orifice

Metric Units, API Area: 16774 mm², Actual Area: 18671 mm²

Type number	Valve size	ASME Flange class		Maximum Set Pressure, barg						Back Pressure Limit barg @ 38°C	Material		Inlet Temp. Range
Conventional	Inlet Outlet	Inlet RF	Outlet RF	-268°C -60°C	-59°C -30°C	-29°C +38°C	232°C	427°C	538°C	Conventional Type	Body & Bonnet	Spring	
6TAM01	8 x 10	150#	150#			4.5	4.5	4.5		2.1	Carbon Steel	Chrome Alloy	-29°C to 427°C
6TAM11	8 x 10	300#	150#			4.5	4.5	4.5		2.1			
6TAM21	8 x 10	300#	150#			8.3	8.3	8.3		4.1			
H6TAM21	8 x 10	300#	150#			20.7	20.7	20.7		6.9			
6TAM23	8 x 10	300#	150#					8.3	8.2	4.1	Chrome Moly Steel	High Temp. Alloy	428°C to 538°C
H6TAM23	8 x 10	300#	150#					20.7	14.8	6.9			
6TAM21	8 x 10	150#	150#		4.5					2.1	316 St. St.	Chrome Alloy Nickel Plated	-30°C to -59°C
6TAM31	8 x 10	300#	150#		4.5					2.1			
H6TAM31	8 x 10	300#	150#		8.3					4.1			
6TAM21	8 x 10	150#	150#	3.4						2.1	316 St. St.	316 St. St.	-60°C to -268°C
6TAM31	8 x 10	300#	150#	3.4						2.1			
H6TAM31	8 x 10	300#	150#	4.5						4.1			

Air Capacities – 6000 Series: 10% Overpressure, API

Capacities in Standard Cubic Meters Per Minute at 15.6°C

Set Pressure (barg)	Orifice Letter Designation & Areas, mm²													
Areas	D	E	F	G	H	J	K	L	M	N	P	Q	R	T
API	71	126	198	325	506	830	1186	1841	2323	2800	4116	7129	10323	16774
Actual	97	145	239	361	563	923	1317	2045	2581	3111	4572	7916	11471	18671
1	2.1	3.2	5.3	8.0	12.5	20.5	29.2	45.4	57.3	69.1	101	176	255	415
2	3.1	4.6	7.7	11.6	18.1	29.7	42.4	65.9	83.2	100	147	255	369	602
3	4.1	6.2	10.3	15.5	24.3	39.8	56.9	88.3	111	134	197	341	495	806
4	5.2	7.8	12.9	19.5	30.5	50.0	71.4	110	139	168	247	429	621	1012
5	6.3	9.4	15.6	23.5	36.7	60.1	85.9	133	168	202	298	516	748	1217
6	7.3	11.0	18.2	27.4	42.9	70.3	100	155	196	237	348	603	874	1423
7	8.4	12.6	20.8	31.4	49.1	80.4	114	178	225	271	398	690	1000	1629
8	9.5	14.2	23.5	35.4	55.3	90.6	129	200	253	305	449	777	1127	1834
9	10.5	15.8	26.1	39.4	61.5	100	143	223	282	339	499	865	1253	2040
10	11.6	17.4	28.7	43.3	67.7	110	158	246	310	374	550	952	1379	2246
12	13.7	20.6	34.0	51.3	80.1	131	187	291	367	442	650	1126	1632	2657
14	15.9	23.8	39.3	59.2	92.5	151	216	336	424	511	751	1301	1885	3068
16	18.0	27.0	44.6	67.2	104	171	245	381	480	579	852	1475	2138	3480
18	20.1	30.2	49.8	75.1	117	192	274	426	537	648	952	1649	2390	3891
20	22.3	33.4	55.1	83.1	129	212	303	471	594	716	1053	1824	2643	4302
22	24.4	36.6	60.4	91.0	142	232	332	516	651	785	1154	1998	2896	
24	26.5	39.8	65.7	98.9	154	253	361	561	708	853	1255	2173	3148	
26	28.6	43.0	70.9	106	167	273	390	606	765	922	1355	2347	3401	
28	30.8	46.2	76.2	114	179	293	419	651	822	991	1456	2521	3654	
30	32.9	49.4	81.5	122	191	314	448	696	878	1059	1557	2696	3906	
32	35.0	52.6	86.7	130	204	334	477	741	935	1128	1658	2870	4159	
34	37.2	55.8	92.0	138	216	354	506	786	992	1196	1758	3044	4412	
36	39.3	59.0	97.3	146	229	375	535	831	1049	1265	1859	3219	4665	
38	41.4	62.2	102	154	241	395	564	876	1106	1333	1960	3393	4917	
40	43.6	65.4	107	162	253	415	593	921	1163	1402	2060	3568	5170	
42	45.7	68.6	113	170	266	436	622	966	1220	1470	2161	3742		
44	47.8	71.8	118	178	278	456	651	1011	1276	1539	2262	3916		
46	50.0	75.0	123	186	291	476	680	1057	1333	1607	2363	4091		
48	52.1	78.2	128	194	303	497	709	1102	1390	1676	2463	4265		
50	54.2	81.4	134	202	315	517	738	1147	1447	1744	2564	4440		
60	64.9	97.4	160	242	377	619	884	1372	1731	2087	3068	5312		
70	75.5	113	186	281	439	720	1029	1597	2015					
80	86.2	129	213	321	502	822	1174	1822						
90	96.9	145	239	361	564	923	1319	2048						
100	107	161	266	400	626	1025	1464	2273						
110	118	177	292	440	688	1127	1609							
120	128	193	318	480	750	1228	1754							
130	139	209	345	520	812	1330	1899							
140	150	225	371	559	874	1432	2044							
150	160	241	397	599	936	1533	2190							
160	171	257	424	639	998	1635								
170	182	273	450	678	1060	1736								
180	192	289	476	718	1122	1838								
190	203	305	503	758										
200	214	321	529	798										
210	224	337	556	837										
220	235	353	582	877										
230	246	369	608	917										
240	256	385	635	957										
250	267	401	661	996										
260	278	417	687											
270	288	433	714											
280	299	449	740											
290	310	465	767											
300	320	481	793											
310	331	497	819											
320	342	513	846											
330	352	529	872											
340	363	545	898											
350	374	561												
360	384	577												
370	395	593												
380	406	609												
390	416	625												
400	427	641												
410	438	657												

General Notes:

- For sizing purposes the effective coefficient of discharge Kd for air, gas, and steam is 0.975 when sizing using the API effective areas.
- Above capacities should also be used for 6000L series when used in air service.
- Capacities at 2.0 barg set pressure and below are based on 0.2 Bar overpressure.

Steam Capacities – 6000 Series: 10% Overpressure, API

Capacities in Standard Cubic Meters Per Minute at 15.6°C

Set Pressure (barg)	Orifice Letter Designation & Areas, mm²													
Areas	D	E	F	G	H	J	K	L	M	N	P	Q	R	T
API	71	126	198	325	506	830	1186	1841	2323	2800	4116	7129	10323	16774
Actual	97	145	239	361	563	923	1317	2045	2581	3111	4572	7916	11471	18671
1	96.8	145	239	360	563	923	1318	2046	2581	3112	4574	7919	11476	18679
2	140	210	347	523	817	1338	1911	2967	3744	4514	6634	11486	16645	27093
3	188	282	465	700	1094	1793	2560	3975	5015	6046	8886	15386	22295	36289
4	236	354	583	879	1373	2250	3213	4988	6294	7588	11153	19309	27981	45544
5	284	426	702	1058	1653	2707	3866	6002	7574	9130	13419	23233	33666	54798
6	331	497	821	1237	1932	3165	4519	7016	8853	10672	15685	27157	39352	64052
7	379	569	939	1415	2211	3622	5172	8029	10132	12214	17951	31080	45038	73307
8	427	641	1058	1594	2490	4079	5825	9043	11411	13756	20218	35004	50723	82561
9	475	713	1177	1773	2769	4536	6478	10057	12690	15298	22484	38928	56409	91816
10	523	785	1295	1952	3048	4994	7131	11070	13969	16840	24750	42851	62095	101070
11	571	857	1414	2131	3328	5451	7784	12084	15248	18382	27016	46775	67780	110324
12	619	929	1532	2309	3607	5908	8437	13098	16527	19924	29283	50699	73466	119579
13	667	1001	1651	2488	3886	6365	9090	14112	17806	21466	31549	54622	79152	128833
14	715	1073	1770	2667	4165	6823	9743	15125	19086	23008	33815	58546	84837	138087
15	763	1145	1888	2846	4444	7280	10396	16139	20365	24550	36082	62470	90523	147342
16	811	1217	2007	3024	4723	7737	11049	17153	21644	26092	38348	66393	96208	156596
17	859	1289	2126	3203	5003	8195	11702	18166	22923	27634	40614	70317	101894	165850
18	907	1361	2244	3382	5282	8652	12355	19180	24202	29176	42880	74241	107580	175105
19	955	1433	2363	3561	5561	9109	13008	20194	25481	30718	45147	78164	113265	184359
20	1003	1505	2482	3739	5840	9566	13661	21207	26760	32260	47413	82088	118951	193614
22	1099	1649	2719	4097	6398	10481	14967	23235	29318	35344	51945	89935	130322	
24	1195	1793	2956	4454	6957	11396	16273	25262	31877	38427	56478	97783	141694	
26	1291	1936	3193	4812	7515	12310	17579	27290	34435	41511	61010	105630	153065	
28	1387	2080	3431	5169	8073	13225	18885	29317	36993	44595	65543	113477	164436	
30	1483	2224	3668	5527	8632	14139	20191	31344	39551	47679	70075	121325	175807	
32	1579	2368	3905	5884	9190	15054	21497	33372	42110	50763	74608	129172	187179	
34	1675	2512	4142	6242	9748	15968	22803	35399	44668	53847	79141	137019	198550	
36	1770	2656	4380	6599	10307	16883	24109	37427	47226	56931	83673	144867	209921	
38	1866	2800	4617	6957	10865	17798	25415	39454	49784	60015	88206	152714	221293	
40	1962	2944	4854	7314	11423	18712	26721	41481	52342	63099	92738	160562	232664	
42	2058	3088	5092	7672	11982	19627	28027	43509	54901	56183	97271	168409		
44	2154	3232	5329	8029	12540	20541	29333	45536	57459	69267	101803	176256		
46	2250	3375	5566	8387	13098	21456	30638	47563	60017	72351	106336	184104		
48	2346	3519	5803	8744	13657	22370	31944	49591	62575	75435	110868	191951		
50	2442	3663	6041	9102	14215	23285	33250	51618	65134	78519	115401	199798		
52	2538	3807	6278	9459	14773	24199	34556	53646	67692	81603	119933	207646		
54	2634	3951	6515	9817	15332	25114	35862	55673	70250	84686	124466	215493		
56	2730	4095	6753	10175	15890	26029	37168	57700	72808	87770	128998	223340		
58	2826	4239	6990	10532	16448	26943	38474	59728	75366	90854	133531	231188		
60	2922	4383	7227	10890	17007	27858	39780	61755	77925	93938	138063	239035		
62	3018	4527	7464	11247	17565	28772	41086	63783	80483	97022	142596	246882		
64	3114	4671	7702	11605	18123	29687	42392	65810	83041	100106	147128			
66	3209	4814	7939	11962	18682	30601	43698	67837	85599	103190	151661			
68	3305	4958	8176	12320	19240	31516	45004	69865	88158	106274	156194			
70	3401	5102	8413	12677	19798	32431	46310	71892	90716					
72	3497	5246	8651	13035	20357	33345	47616	73920	93274					
74	3593	5390	8888	13392	20915	34260	48922	75947	95832					
76	3689	5534	9125	13750	21473	35174	50228	77974						
78	3785	5678	9363	14107	22032	36089	51534	80002						
80	3881	5822	9600	14465	22590	37003	52840	82029						
82	3977	5966	9837	14822	23148	37918	54146	84056						
84	4073	6110	10074	15180	23707	38833	55452	86084						
86	4169	6253	10312	15537	24265	39747	56758	88111						
88	4265	6397	10549	15895	24823	40662	58064	90139						
90	4361	6541	10786	16252	25382	41576	59370	92166						
92	4457	6685	11023	16610	25940	42491	60676	94193						
94	4553	6829	11261	16967	26498	43405	61982	96221						
96	4648	6973	11498	17325	27057	44320	63288	98248						
98	4744	7117	11735	17682	27615	45234	64594	100276						
100	4840	7261	11973	18040	28173	46149	65900	102303						
110	5320	7980	13159	19827	30965	50722	72430							
120	5800	8700	14345	21615	33757	55295	78959							
130	6279	9419	15532	23402	36548	59867	85489							
140	6759	10139	16718	25190	39340	64440	92019							
150	7239	10858	17904	26978	42132	69013	98549							
160	7718	11578	19091	28765	44923	73586								
170	8198	12297	20277	30553	47715	78159								
180	8678	13017	21464	32340	50507	82732								
190	9157	13736	22650	34128										
200	9637	14456	23836	35915										

General Notes:

- For sizing purposes the effective coefficient of discharge Kd for air, gas, and steam is 0.975 when sizing using the API effective areas.
- Above capacities should also be used for 6000L series when used in steam service.
- Capacities at 2.0 barg set pressure and below are based on 0.2 Bar

Water Capacities – 6000L Series: 10% Overpressure, API

Capacities in Standard Cubic Meters Per Minute at 15.6°C

Set Pressure (barg)	Orifice Letter Designation & Areas, mm²													
Areas	D	E	F	G	H	J	K	L	M	N	P	Q	R	T
API	71	126	198	325	506	830	1186	1841	2323	2800	4116	7129	10323	16774
Actual	97	145	239	361	563	923	1317	2045	2581	3111	4572	7916	11471	18671
1	58.8	88.2	145	219	342	561	801	1243	1569	1891	2780	4813	6975	11354
2	79.5	119	196	296	463	758	1083	1681	2122	2558	3759	6509	9432	15353
3	97.3	145	240	362	566	927	1324	2056	2595	3128	4597	7960	11534	18775
4	112	168	277	418	653	1071	1529	2374	2996	3612	5309	9191	13319	21679
5	125	188	310	468	731	1197	1710	2655	3350	4038	5935	10276	14891	24238
6	137	206	340	512	800	1312	1873	2908	3669	4424	6502	11257	16312	26552
7	148	222	367	553	865	1417	2023	3141	3963	4778	7023	12159	17619	28679
8	158	238	393	592	924	1514	2163	3358	4237	5108	7508	12999	18836	30659
9	168	252	416	628	980	1606	2294	3562	4494	5418	7963	13787	19979	32519
10	177	266	439	662	1034	1693	2418	3754	4737	5711	8394	14533	21059	34278
12	194	291	481	725	1132	1855	2649	4113	5190	6256	9195	15920	23069	37550
14	210	315	519	783	1223	2004	2861	4442	5605	6757	9932	17196	24918	40558
16	224	337	555	837	1307	2142	3059	4749	5992	7224	10618	18383	26638	43359
18	238	357	589	888	1387	2272	3245	5037	6356	7662	11262	19498	28254	45989
20	251	376	621	936	1462	2395	3420	5310	6700	8077	11871	20553	29783	
22	263	395	651	982	1533	2512	3587	5569	7027	8471	12450	21556	31236	
24	275	412	680	1025	1601	2624	3747	5816	7339	8848	13004	22515	32625	
26	286	429	708	1067	1667	2731	3900	6054	7639	9209	13535	23434	33958	
28	297	445	735	1107	1730	2834	4047	6282	7927	9557	14046	24319	35239	
30	307	461	761	1146	1791	2933	4189	6503	8206	9892	14539	25172	36476	
32	317	476	786	1184	1849	3029	4326	6716	8475	10217	15016	25998		
34	327	491	810	1220	1906	3123	4459	6923	8736	10531	15478	26798		
36	337	505	833	1256	1961	3213	4589	7124	8989	10836	15927	27575		
38	346	519	856	1290	2015	3301	4714	7319	9235	11133	16363	28330		
40	355	533	878	1324	2068	3387	4837	7509	9475	11423	16788	29066		
42	364	546	900	1356	2119	3471	4956	7694	9709	11705	17203	29784		
44	372	559	921	1388	2169	3552	5073	7876	9938	11980	17608			
46	381	571	942	1420	2217	3632	5187	8053	10161	12249	18003			
48	389	583	962	1450	2265	3710	5299	8226	10380					
50	397	595	982	1480	2312	3787	5408	8395	10594					
60	435	652	1076	1621	2532	4148	5924	9197						
70	470	705	1162	1751	2735	4481	6399	9934						
80	502	753	1242	1872	2924	4790	6841	10620						
90	533	799	1318	1986	3102	5081	7256	11264						
100	561	842	1389	2093	3269	5356	7648	11873						
110	589	883	1457	2195	3429	5617	8021	12453						
120	615	923	1522	2293	3582	5867	8378	13006						
130	640	960	1584	2387	3728	6107	8720	13538						
140	664	997	1644	2477	3869	6337	9049							
150	688	1032	1701	2564	4004	6560	9367							
160	710	1066	1757	2648	4136	6775	9674							
170	732	1098	1811	2729	4263	6983	9972							
180	753	1130	1864	2809	4387	7186	10261							
190	774	1161	1915	2886	4507	7383	10542							
200	794	1191	1965	2961	4624	7574	10816							
210	814	1221	2013	3034	4738	7761	11083							
220	833	1250	2061	3105	4850	7944	11344							
230	852	1278	2107	3175	4959	8123	11599							
240	870	1305	2152	3243	5065	8297	11849							
250	888	1332	2197	3310	5170	8468								
260	905	1358	2240	3376	5272	8636								
270	923	1384	2283	3440	5373	8801								
280	940	1410	2325	3503	5471	8962								
290	956	1435	2366	3565	5568	9121								
300	973	1459	2406	3626										
310	989	1483	2446	3686										
320	1005	1507	2485	3745										
330	1020	1530	2524	3803										
340	1035	1553	2562	3860										
350	1051	1576	2599											
360	1066	1066	2636											
370	1080	1080	2672											
380	1095	1095												
390	1109	1109												
400	1123	1123												
410	1137	1137												

General Notes:

- For sizing purposes the effective coefficient of discharge Kd for liquids is 0.724 when sizing using the API effective areas.
- The 6000L series may be used in compressible services. See the appropriate 6000 air and steam capacity tables.
- Capacities at 2.0 barg set pressure and below are based on 0.2 Bar overpressure.

Water Capacities – 6000 Series: 25% Overpressure, API

Capacities in Standard Cubic Meters Per Minute at 15.6°C

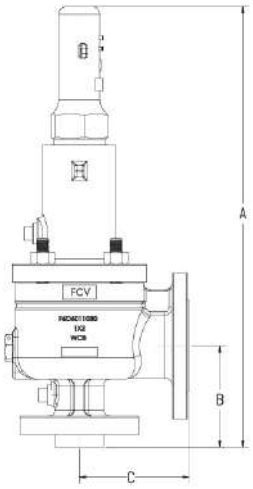
Set Pressure (barg)	Orifice Letter Designation & Areas, mm²													
Areas	D	E	F	G	H	J	K	L	M	N	P	Q	R	T
API	71	126	198	325	506	830	1186	1841	2323	2800	4116	7129	10323	16774
Actual	97	145	239	361	563	923	1317	2045	2581	3111	4572	7916	11471	18671
1	52.9	79.3	130	197	308	504	720	1118	1410	1700	2499	4328	6271	10208
2	74.8	112	185	278	435	713	1018	1581	1995	2405	3535	6120	8869	14436
3	91.6	137	226	341	533	873	1247	1936	2443	2946	4329	7496	10863	17681
4	105	158	261	394	615	1008	1440	2236	2821	3401	4999	8656	12543	20416
5	118	177	292	440	688	1127	1610	2500	3155	3803	5589	9678	14024	22826
6	129	194	320	482	754	1235	1764	2739	3456	4166	6123	10601	15362	25005
7	139	209	346	521	814	1334	1905	2958	3733	4500	6614	11451	16593	27008
8	149	224	370	557	870	1426	2037	3162	3990	4810	7070	12241	17739	28873
9	158	238	392	591	923	1513	2160	3354	4232	5102	7499	12984	18815	30625
10	167	250	413	623	973	1595	2277	3536	4461	5378	7905	13686	19833	32281
12	183	274	453	683	1066	1747	2495	3873	4887	5892	8659	14993	21726	35362
14	197	296	489	737	1152	1887	2695	4183	5279	6364	9353	16194	23466	38196
16	211	317	523	788	1231	2017	2881	4472	5643	6803	9999	17312	25087	40833
18	224	336	555	836	1306	2140	3055	4744	5986	7216	10606	18362	26608	43310
20	236	354	585	881	1377	2255	3221	5000	6310	7606	11179	19356	28048	
22	248	372	613	924	1444	2365	3378	5244	6618	7978	11725	20300	29417	
24	259	388	641	965	1508	2471	3528	5478	6912	8332	12246	21203	30725	
26	269	404	667	1005	1570	2572	3672	5701	7194	8673	12746	22069	31979	
28	279	419	692	1043	1629	2669	3811	5916	7466	9000	13228	22902	33187	
30	289	434	716	1080	1686	2762	3945	6124	7728	9316	13692	23706	34351	
32	299	448	740	1115	1741	2853	4074	6325	7981	9621	14141	24483		
34	308	462	763	1149	1795	2941	4200	6520	8227	9918	14576	25237		
36	317	476	785	1183	1847	3026	4321	6709	8465	10205	14999	25968		
38	326	489	806	1215	1898	3109	4440	6893	8697	10485	15410	26680		
40	334	501	827	1247	1947	3190	4555	7072	8923	10757	15810	27373		
42	343	514	848	1277	1995	3269	4668	7246	9144	11023	16201	28049		
44	350	526	868	1307	2042	3345	4777	7417	9359	11282	16582			
46	358	538	887	1337	2088	3421	4885	7583	9569	11536	16955			
48	366	549	906	1366	2133	3494	4990	7747	9775					
50	374	561	925	1394	2177	3566	5093	7906	9977					
60	409	614	1013	1527	2385	3907	5579	8661						
70	442	664	1094	1649	2576	4220	6026	9355						
80	473	709	1170	1763	2754	4511	6442	10001						
90	501	752	1241	1870	2921	4785	6833	10608						
100	529	793	1308	1971	3079	5044	7202	11181						
110	554	832	1372	2068	3229	5290	7554	11727						
120	579	869	1433	2160	3373	5525	7890	12249						
130	603	904	1492	2248	3511	5751	8212	12749						
140	626	939	1548	2333	3643	5968	8522							
150	648	972	1602	2414	3771	6177	8821							
160	669	1003	1655	2494	3895	6380	9111							
170	689	1034	1706	2570	4015	6576	9391							
180	709	1064	1755	2645	4131	6767	9663							
190	729	1093	1803	2717	4244	6952	9928							
200	748	1122	1850	2788	4354	7133	10186							
210	766	1150	1896	2857	4462	7309	10438							
220	784	1177	1941	2924	4567	7481	10683							
230	802	1203	1984	2990	4670	7649	10923							
240	819	1229	2027	3054	4770	7814	11158							
250	836	1254	2069	3117	4869	7975								
260	853	1279	2110	3179	4965	8133								
270	869	1304	2150	3240	5060	8288								
280	885	1328	2189	3299	5152	8440								
290	901	1351	2228	3357	5244	8589								
300	916	1374	2266	3415										
310	931	1397	2304	3471										
320	946	1419	2341	3527										
330	961	1441	2377	3582										
340	975	1463	2413	3635										
350	989	1484	2448											
360	1003	1505	2483											
370	1017	1526	2517											
380	1031	1547												
390	1044	1567												
400	1058	1587												
410	1071	1607												

General Notes:

- For sizing purposes the effective coefficient of discharge Kd for liquids is 0.62 when sizing using the API effective areas.
- Capacities at 2.0 barg set pressure and below are based on 0.2 Bar overpressure.

Dimensions

Orifice	Size	Class	A	B	C
D	1 X 2	150 X 150	460±10.0	105.0	114.5
D	1 X 2	300 X 150	460±10.0	105.0	114.5
D	1 X 2	300 X 150	460±10.0	105.0	114.5
D	1 X 2	600 X 150	460±10.0	105.0	114.5
D	1.5 X 2	900 X 300	460±10.0	124.0	152.5
D	1.5 X 2	1500 X 300	460±10.0	124.0	152.5
D	1.5 X 3	2500 X 300	460±10.0	136.5	152.5
E	1 X 2	150 X 150	460±10.0	105.0	114.5
E	1 X 2	300 X 150	460±10.0	105.0	114.5
E	1 X 2	300 X 150	460±10.0	105.0	114.5
E	1 X 2	600 X 150	460±10.0	105.0	114.5
E	1.5 X 2	900 X 300	460±10.0	124.0	152.5
E	1.5 X 2	1500 X 300	460±10.0	124.0	152.5
E	1.5 X 3	2500 X 300	460±10.0	136.5	152.5
F	1.5 X 2	150 X 150	470±10.0	124.0	120.5
F	1.5 X 2	300 X 150	470±10.0	124.0	120.5
F	1.5 X 2	300 X 150	470±10.0	124.0	120.5
F	1.5 X 2	600 X 150	470±10.0	124.0	120.5
F	1.5 X 3	900 X 300	470±10.0	124.0	152.5
F	1.5 X 3	1500 X 300	470±10.0	124.0	152.5
F	1.5 X 3	2500 X 300	470±10.0	136.5	152.5
G	1.5 X 2	150 X 150	470±10.0	124.0	120.5
G	1.5 X 3	300 X 150	470±10.0	124.0	120.5
G	1.5 X 3	300 X 150	470±10.0	124.0	120.5
G	1.5 X 3	600 X 150	470±10.0	124.0	120.5
G	1.5 X 3	900 X 300	470±10.0	124.0	152.5
G	2 X 3	1500 X 300	470±10.0	155.0	171.0
G	2 X 3	2500 X 300	470±10.0	155.0	171.0
H	1.5 X 3	150 X 150	490±10.0	130.0	124.0
H	1.5 X 3	300 X 150	490±10.0	130.0	124.0
H	2 X 3	300 X 150	490±10.0	130.0	124.0
H	2 X 3	600 X 150	490±10.0	124.0	152.5
H	2 X 3	900 X 150	490±10.0	124.0	152.5
H	2 X 3	1500 X 300	490±10.0	155.0	171.0
J	2 X 3	150 X 150	560±10.0	130.0	124.0
J	2 X 3	300 X 150	560±10.0	130.0	124.0
J	3 X 4	300 X 150	560±10.0	136.0	143.0
J	3 X 4	600 X 150	560±10.0	152.0	185.0
J	3 X 4	900 X 150	560±10.0	185.0	180.0
J	3 X 4	1500 X 300	560±10.0	185.0	180.0
K	3 X 4	150 X 150	650.0±10.0	155.0	162.0
K	3 X 4	300 X 150	650.0±10.0	155.0	162.0
K	3 X 4	300 X 150	650.0±10.0	155.0	162.0
K	3 X 4	600 X 150	650.0±10.0	185.0	180.0
K	3 X 6	900 X 150	650.0±10.0	185.0	180.0
K	3 X 6	1500 X 300	650.0±10.0	185.0	180.0
L	3 X 4	150 X 150	650.0±10.0	155.0	162.0
L	3 X 4	300 X 150	650.0±10.0	155.0	162.0
L	4 X 6	300 X 150	650.0±10.0	155.0	162.0
L	4 X 6	600 X 150	650.0±10.0	181.0	229.0
L	4 X 6	900 X 150	650.0±10.0	225.5	254.0
L	4 X 6	1500 X 300	650.0±10.0	225.5	254.0
M	4 X 6	150 X 150	765.0±10.0	181.0	229.0
M	4 X 6	300 X 150	765.0±10.0	181.0	229.0
M	4 X 6	300 X 150	765.0±10.0	181.0	229.0
M	4 X 6	600 X 150	765.0±10.0	225.5	254.0
M	4 X 6	900 X 150	765.0±10.0	225.5	254.0
N	4 X 6	150 X 150	765.0±10.0	181.0	229.0
N	4 X 6	300 X 150	765.0±10.0	181.0	229.0
N	4 X 6	300 X 150	765.0±10.0	181.0	229.0
N	4 X 6	600 X 150	765.0±10.0	225.5	254.0
N	4 X 6	900 X 150	765.0±10.0	225.5	254.0
P	4 X 6	150 X 150	760.0±10.0	181.0	229.0
P	4 X 6	300 X 150	760.0±10.0	181.0	229.0
P	4 X 6	300 X 150	760.0±10.0	181.0	229.0
P	4 X 6	600 X 150	760.0±10.0	225.5	254.0
P	4 X 6	900 X 150	760.0±10.0	225.5	254.0
Q	6 X 8	150 X 150	900.0±10.0	240.0	241.0
Q	6 X 8	300 X 150	900.0±10.0	240.0	241.0
Q	6 X 8	300 X 150	900.0±10.0	240.0	241.0
Q	6 X 8	600 X 150	900.0±10.0	240.0	241.0
Q	6 X 8	600 X 150	900.0±10.0	240.0	241.0
R	6 X 8	150 X 150	900.0±10.0	240.0	241.0
R	6 X 8	300 X 150	900.0±10.0	240.0	241.0
R	6 X 10	300 X 150	900.0±10.0	240.0	241.0
R	6 X 10	600 X 150	900.0±10.0	240.0	241.0
R	6 X 10	600 X 150	900.0±10.0	240.0	241.0
T	8 X 10	150 X 150	1130.0±10.0	276.0	279.5
T	8 X 10	300 X 150	1130.0±10.0	276.0	279.5
T	8 X 10	300 X 150	1130.0±10.0	276.0	279.5
T	8 X 10	600 X 150	1130.0±10.0	276.0	279.5



A – Total height of the valve

B – Bottom to Centre distance of the valve

C – Centre to Outlet face distance

Sizing

General Equations

Before beginning any calculations, it is necessary to establish the general category of the pressure relief valve to be used. This section covers conventional spring-loaded types and BalanSeal spring-loaded types. Pilot-operated valves are covered in a separate catalogue. Given the rate of fluid flow to be relieved, the usual procedure is to first calculate the minimum area required in the valve orifice for the conditions contained in one of the following equations. In the case of steam, air or water, the selection of an orifice may be made directly from the capacity tables. The second step is to select the specific type of valve that meets the pressure and temperature requirements. General equations are given first, to identify the basic terms that correlate with ASME Pressure Vessel Code, Section VIII. Since these equations are conservative, it is recommended that computations of relieving loads avoid cascading of safety factors or multiple contingencies beyond the reasonable flow needed to protect the pressure vessel.

Conventional Valves – Constant Back Pressure Only

The conventional valve may be used when the variation in back pressure does not exceed 10% of the set pressure, provided the corresponding variation in set pressure is acceptable.

Orifice area calculations — Constant Back Pressure

VAPORS or GASES – Lbs./hr:

$$A = \frac{W\sqrt{T}\sqrt{Z}}{C\,K_d\,P\sqrt{M}K_b}$$

K_b = 1 when back pressure is below 55% of abs. relieving pressure.

VAPORS or GASES – S.C.F.M:

$$A = \frac{V\sqrt{G}\sqrt{T}\sqrt{Z}}{1.175\,C\,K_d\,P\,K_b}$$

K_b = 1 when back pressure is below 55% of abs. relieving pressure.

STEAM – Lbs./hr:

$$A = \frac{W_s}{51.5\,K_d\,P\,K_b\,K_{sh}\,K_n}$$

K_b =1 when back pressure is below 55% of abs. relieving pressure.

K_{sh} = 1 for Sat. Steam.

AIR – S.C.F.M:

$$A = \frac{V_a\sqrt{T}}{418\,K_d\,PK_b}$$

K_b =1 when back pressure is below 55% of abs. relieving pressure.

LIQUIDS – G.P.M, ASME Code:

$$A = \frac{V_L\sqrt{G}}{38.0\,K_d\sqrt{\Delta P}K_u}$$

K_u = 1 at normal viscosities.

LIQUIDS – G.P.M, Non-ASME Code:

$$A = \frac{V_L\sqrt{G}}{38.0\,K_d\sqrt{1.25(P_1-P_2)}\,K_p\,K_u}$$

K_p = 1 at 25% overpressure.

K_u = 1 at normal viscosities.

Nomenclature

A = Required orifice area in square inches. This value may be compared with the API effective areas included in this catalogue and defined in ASME/API Standard 526 or the ASME actual area.

W = Required vapor capacity in pounds per hour.

Ws = Required steam capacity in pounds per hour.

V = Required gas capacity in S.C.F.M.

Va = Required air capacity in S.C.F.M.

VL = Required liquid capacity in U.S. gallons per minute.

G = Specific gravity of gas (air=1) or specific gravity of liquid (water=1) at actual discharge temperature will obtain a safe valve size.

M = Average molecular weight of vapor.

P = Relieving pressure in pounds per square inch absolute=set pressure+overpressure+14.7. Minimum overpressure is 3 psi.

P1 = Set pressure at inlet, psig.

P2 = Back pressure at outlet, psig.

ΔP = Set pressure + overpressure, psig – back pressure, psig. At 10% overpressure ΔP=1.1P1 -P2. Below 30 psig set, ΔP=P1 +3-P2.

T = Inlet temperature absolute (°F+460).

Z = Compressibility factor corresponding to T and P (if this factor is not available, compressibility correction can be safely ignored by using a value of Z=1.0).

C = Gas or vapor flow constant. Select from table on page 86 or use the curve and table on page 85.

K = Ratio of specific heats, Cp/Cv. This value is constant for an ideal gas. If this ratio is unknown, the value k=1.001, C=315 will result in a safe valve size. Isentropic coefficient n may be used instead of k. See curve and table on page 85.

Kp = Liquid capacity correction factor for overpressures lower than 25%. See curve on page 89. Non-Code equations only.

Kb = Vapor or gas flow correction factor for constant back pressures above critical pressure. See curve on page 87.

Kv = Vapor or gas flow factor for variable back pressures. See curve on page 87. BalanSeal valves only.

Kw = Liquid flow factor for variable and constant back pressures. See curve on page 89. BalanSeal valves only.

Ku = Liquid viscosity correction factor. See chart on page 90 or curve on page 91.

Ksh = Steam superheat correction factor. See table on page 88.

Kn = Napier steam correction factor for set pressures between 1500 and 2900 psig. See table on page 88. Kd = Coefficient of Discharge, where:

Kd =

Service Fluid	Coefficient of Discharge When Sizing Using	
	API Effective areas	ASME Actual Areas
Air, Steam, Vapor& Gas	0.953	0.858
Liquid (ASME code)	0.724	0.652
Liquid (Non code)	0.640	0.576

Sizing

BalanSeal Valves – Variable or Constant Back Pressure

The BalanSeal (balanced bellows) valve is used to prevent corrosion of the guiding surfaces of a pressure relief valve, to confine the lading fluid and prevent contamination, or to make the valve suitable for variable back pressure service. When the BalanSeal valve is under constant or variable back pressure conditions, the valve capacity is affected. Depending on the percentage of maximum back pressure to the flowing pressure of the valve, a factor for the correction of valve capacity is necessary. The effect on valve capacity is different in liquid service than in vapor and gas service, so correction factors vary. In the calculations that follow, use Kv for vapours and gases as shown on page 87 and Kw for liquids as shown on page 89. When sizing and selecting a BalanSeal valve, follow the same procedures as for conventional valves, but use the following equations that incorporate the correction factors Kv and Kw. The BalanSeal valve must be used when the variation in back pressure exceeds 10% of set pressure.

Orifice area calculations

VAPORS or GASES – Lbs./hr:

$$A = \frac{W\sqrt{T}\sqrt{Z}}{C\,K_d\,P\sqrt{M}K_v}$$

55% of abs. relieving pressure.

VAPORS or GASES – S.C.F.M:

$$A = \frac{V\sqrt{G}\sqrt{T}\sqrt{Z}}{1.175\,C\,K_d\,P\,K_v}$$

relieving pressure.

STEAM – Lbs./hr:

$$A = \frac{W_s}{51.5\,K_d\,P\,K_v\,K_{sh}\,K_n}$$

of abs. relieving pressure.

AIR – S.C.F.M:

$$A = \frac{V_a\sqrt{T}}{418\,K_d\,PK_v}$$

LIQUIDS – G.P.M, ASME Code:

$$A = \frac{V_L\sqrt{G}}{38.0\,K_d\sqrt{\Delta P}\,K_w K_u}$$

ratio.

LIQUIDS – G.P.M, Non-ASME Code:

$$A = \frac{V_L\sqrt{G}}{38.0\,K_d\sqrt{1.25(P_1-P_2)}\,K_p\,K_w K_u}$$

use conservative value of $K_c = 1$

Note: When back pressure P_2 is variable, use the maximum value.

Capacity Correction Factors

K_g = Sizing Factor for specific gravity

$= \frac{1}{\sqrt{G}}$

$K_g = 1$ for air and water

K_m = Sizing factor for molecular weight 55% of abs.

$=\sqrt{M}$

K_t = Sizing factor for temperature 55%

$= \frac{\sqrt{520}}{\sqrt{T}}$

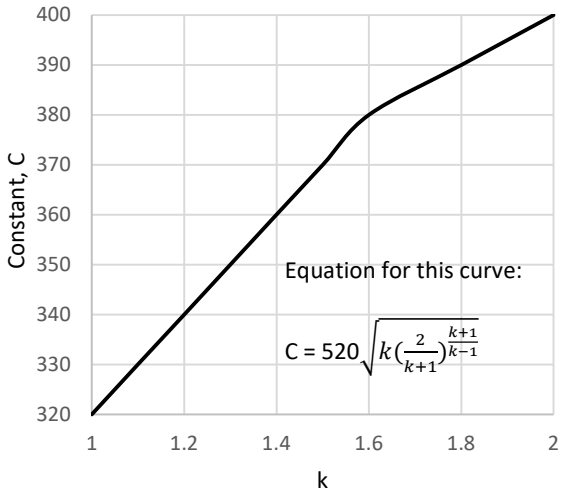
K_c = Sizing factor for specific heat Hzxnkk

Ratio = $\frac{C}{315}$

*If specific heat ratio is unknown, u

Gas or Vapor Flow Constant C for Gas or Vapor Related to Ratio of Specific Heats (k = C_p/C_v)					
k	Constant C	k	Constant C	k	Constant C
1.00	315	1.26	343	1.52	366
1.02	318	1.28	345	1.54	368
1.04	320	1.30	347	1.56	369
1.06	322	1.32	349	1.58	371
1.08	324	1.34	351	1.60	372
1.10	327	1.36	352	1.62	374
1.12	329	1.38	354	1.64	376
1.14	331	1.40	356	1.66	377
1.16	333	1.42	358	1.68	379
1.18	335	1.44	359	1.70	380
1.20	337	1.46	361	2.00	400
1.22	339	1.48	363	2.20	412
1.24	341	1.50	364	-	-

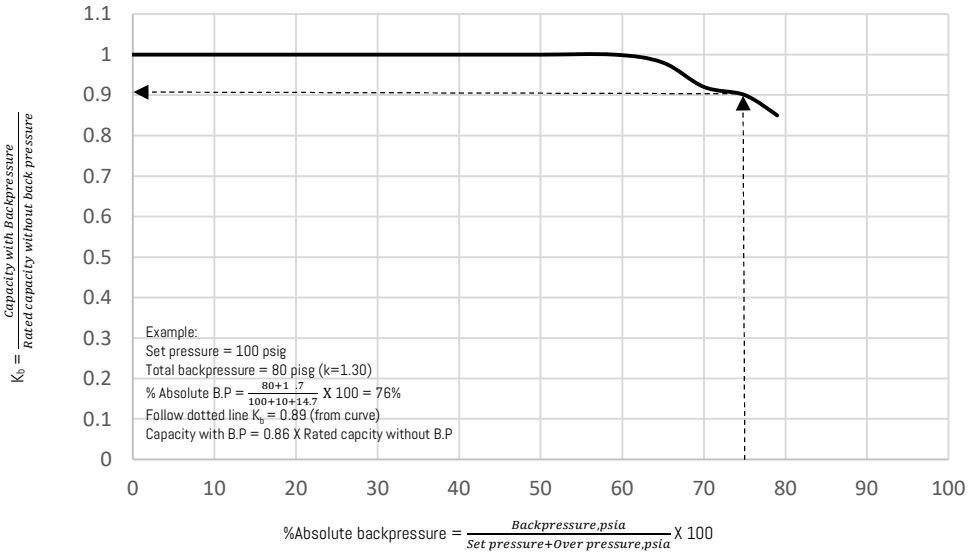
Constant C for Gas or Vapor Related to Ratio of Specific Heats (k = C_p/C_v)



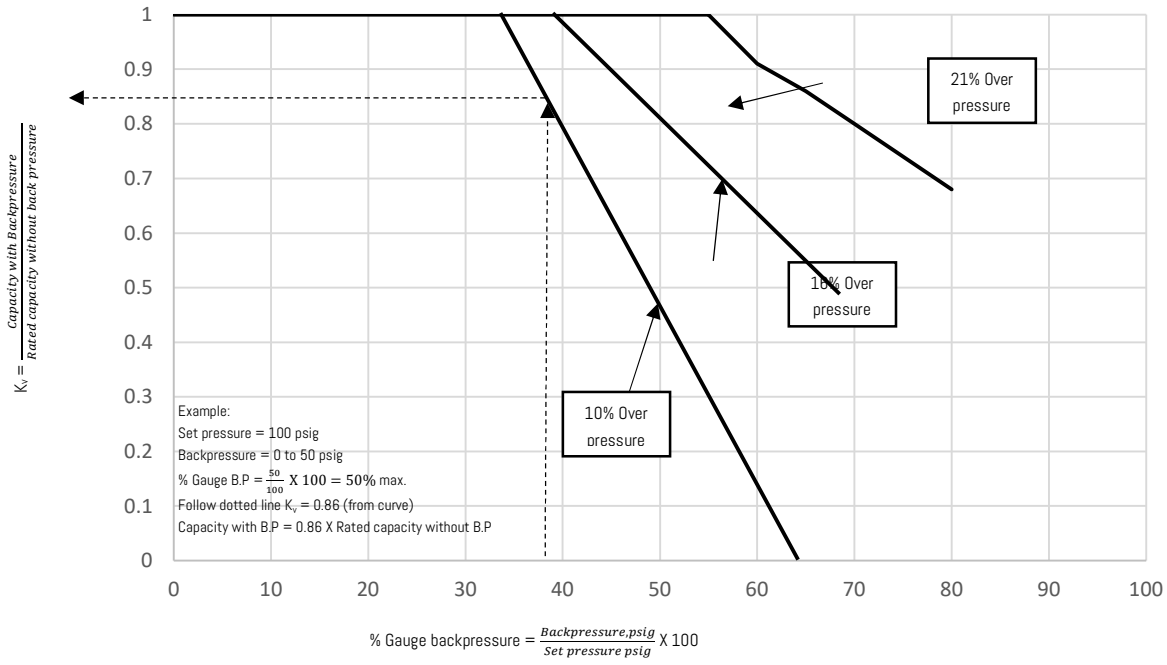
Fluid data

Fluid	Formula	Molecular weight	Specific Gravity		k (C_p/C_v)	C (Constant)
			Liquid	Gas		
Acetic Acid	$HC_2H_3O_2$	60.05	1.049	2.073	1.15	332
Acetone	C_3H_6O	58.08	0.791	–	–	–
Acetylene	C_2H_2	26.04	0.62	0.899	1.26	343
Air	-	28.97	0.86	1	1.4	356
Ammonia	NH_3	17.03	0.817	0.588	1.33	350
Argon	A	39.94	1.65	1.388	1.67	378
Benzene	C_6H_6	78.11	0.879	2.696	1.12	329
Butane/n-Butane	C_4H_{10}	58.12	0.579	2.006	1.094	326
Carbon Dioxide	CO_2	44.01	1.101	1.519	1.3	347
Carbon Disulfide	CS_2	76.13	1.263	2.628	1.21	338
Carbon Monoxide	CO	28	0.814	0966	1.4	356
Chlorine	Cl_2	70.9	1.58	2.45	1.36	353
Cyclohexane	C_6H_{12}	84.16	0.779	2.905	1.09	326
Dowtherm A	-	165	1.064	–	–	–
Dowtherm J	-	134	0.931	–	–	–
Ethane	C_2H_6	30.07	0.546	1.04	1.22	339
Ethyl Alcohol (Ethanol)	C_2H_6O	46.07	0.789	1.59	1.13	330
Ethyl Chloride	C_2H_5Cl	64.52	0.903	2.227	1.19	336
Ethylene (Ethene)	C_2H_4	28.05	0.566	0.968	1.26	343
Freon 12	CCl_2F_2	120.9	1.35	4.17	1.14	331
Helium	He	4	–	0.138	1.66	377
Hexane	C_6H_{14}	86.17	0.659	2.974	1.06	322
Hydrochloric Acid	HCl	36.5	1.64	–	–	–
Hydrofluoric Acid	HF	20.01	0.92	–	–	–
Hydrogen	H_2	2.016	0.0709	0.069	1.14	357
Hydrogen Sulphide	H_2S	34.07	0.79	1.176	1.32	349
Kerosene	C_9H_2O	128.3	0.815	–	–	–
Methane	CH_4	16.04	0.415	0.554	1.31	348
Methyl Alcohol	CH_4O	32.04	0.792	1.111	1.2	337
Methyl Chloride	CH_3Cl	50.49	0.952	1.743	1.2	337
Natural Gas (typical)	-	19	0.45	0.656	1.27	344
Nitric Acid	HNO_3	63.02	1.502	–	–	–
Nitrogen	N_2	28	1.026	0.967	1.4	356
Nitrous Oxide	N_2O	44	1.226	1.519	1.3	347
Oxygen	O_2	32	1.426	1.104	1.4	356
Pentane	C_5H_{12}	72.15	0.631	2.49	1.07	323
Propane	C_3H_8	44.09	0.585	1.522	1.13	330
Styrene	C_8H_8	104.14	0.906	3.6	1.07	323
Sulphur Dioxide	SO_2	64.06	1.434	2.21	1.29	346
Sulfuric Acid	H_2SO_4	98.08	1.83	–	–	–
Therminol D-12	-	162	0.76	–	–	–
Therminol VP-1	-	166	1.061	–	–	–
Toluene	C_7H_8	92.1	0.87	3.18	1.1	327
Water	H_2O	18.02	1	0.622	1.31	348

Back Pressure Sizing Factor K_b



Back Pressure Sizing Factor K_v Balanseal valve only – Vapours and Gases



Sizing Factors for Steam

Equation: Where:

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

P = relieving pressure, psia

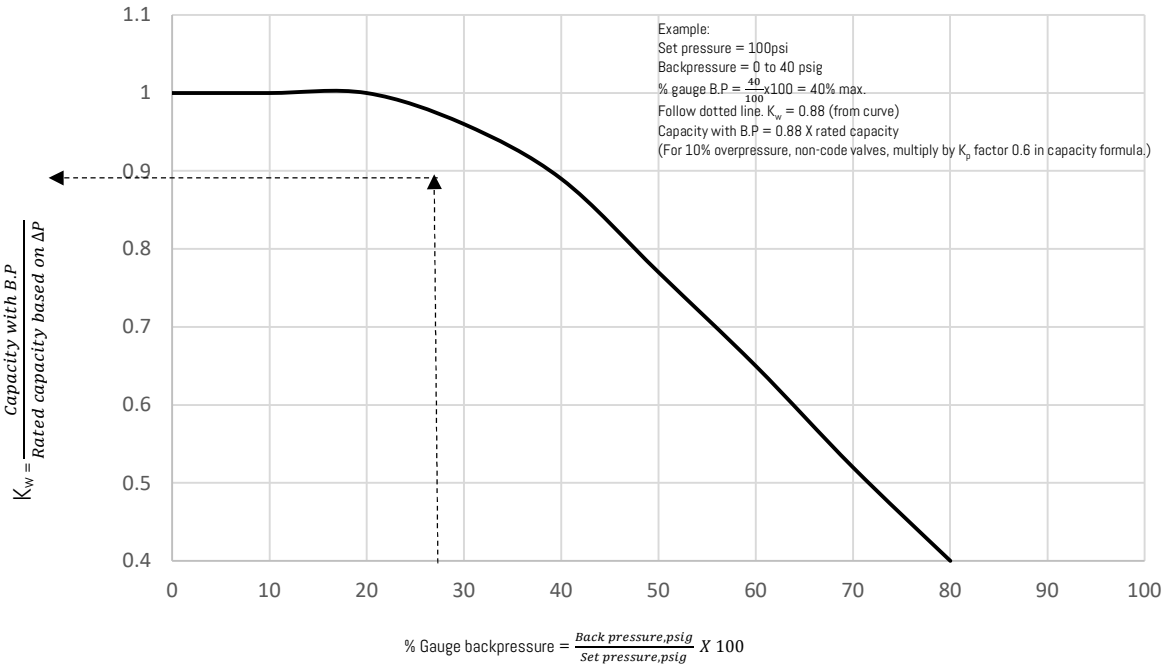
K_n Napier Correction Factor for Set Pressures Between 1500 and 2900 psig at 10% Overpressure

Set Press. psig	K_n	Set Press. psig	K_n	Set Press. psig	K_n	Set Press. psig	K_n	Set Press. psig	K_n	Set Press. psig	K_n	Set Press. psig	K_n	Set Press. psig	K_n	Set Press. psig	K_n	Set Press. psig	K_n
1500	1.005	1640	1.014	1780	1.025	1920	1.037	2060	1.050	2200	1.066	2340	1.083	2480	1.104	2620	1.128	2760	1.157
1510	1.005	1650	1.015	1790	1.026	1930	1.038	2070	1.051	2210	1.067	2350	1.085	2490	1.105	2630	1.130	2770	1.159
1520	1.006	1660	1.016	1800	1.026	1940	1.039	2080	1.052	2220	1.068	2360	1.086	2500	1.107	2640	1.132	2780	1.161
1530	1.007	1670	1.016	1810	1.027	1950	1.040	2090	1.053	2230	1.069	2370	1.087	2510	1.109	2650	1.134	2790	1.164
1540	1.007	1680	1.017	1820	1.028	1960	1.040	2100	1.054	2240	1.070	2380	1.089	2520	1.110	2660	1.136	2800	1.166
1550	1.008	1690	1.018	1830	1.029	1970	1.041	2110	1.055	2250	1.072	2390	1.090	2530	1.112	2670	1.138	2810	1.169
1560	1.009	1700	1.019	1840	1.030	1980	1.042	2120	1.057	2260	1.073	2400	1.092	2540	1.114	2680	1.140	2820	1.171
1570	1.009	1710	1.019	1850	1.031	1990	1.043	2130	1.058	2270	1.074	2410	1.093	2550	1.115	2690	1.142	2830	1.174
1580	1.010	1720	1.020	1860	1.031	2000	1.044	2140	1.059	2280	1.075	2420	1.095	2560	1.117	2700	1.144	2840	1.176
1590	1.011	1730	1.021	1870	1.032	2010	1.045	2150	1.060	2290	1.077	2430	1.096	2570	1.119	2710	1.146	2850	1.179
1600	1.011	1740	1.022	1880	1.033	2020	1.046	2160	1.061	2300	1.078	2440	1.098	2580	1.121	2720	1.148	2860	1.181
1610	1.012	1750	1.023	1890	1.034	2030	1.047	2170	1.062	2310	1.079	2450	1.099	2590	1.122	2730	1.150	2870	1.184
1620	1.013	1760	1.023	1900	1.035	2040	1.048	2180	1.063	2320	1.081	2460	1.101	2600	1.124	2740	1.152	2880	1.187
1630	1.014	1770	1.024	1910	1.036	2050	1.049	2190	1.064	2330	1.082	2470	1.102	2610	1.126	2750	1.155	2890	1.189
																		2900	1.192

K_{sh} Superheat Correction Factor

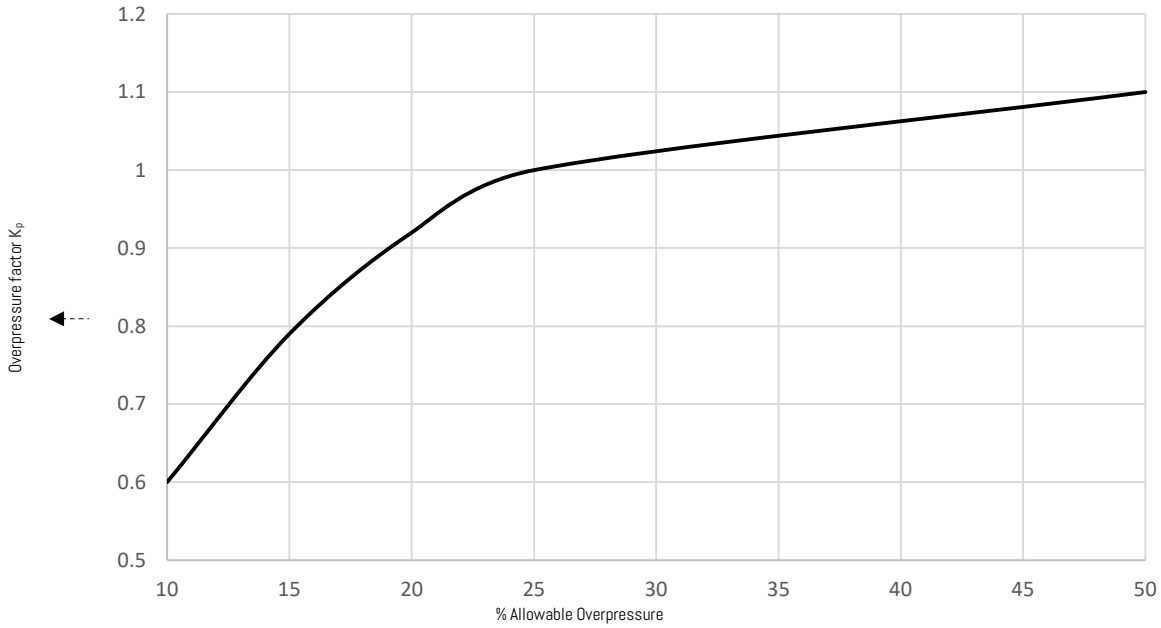
Set. Pres. psig	Sat. Steam Temp. °F	Total Temperature in Degrees Fahrenheit											
		280 300 320	340 360 380	400 420 440	460 480 500	520 540 560	580 600 620	640 660 680	700 720 740	760 780 800	820 840 860	880 900 920	940 960 980 1000
15	250	1.00 1.00 1.00	0.99 0.99 0.98	0.98 0.97 0.96	0.95 0.94 0.93	0.92 0.91 0.90	0.89 0.88 0.87	0.86 0.86 0.85	0.84 0.83 0.83	0.82 0.81 0.81	0.80 0.79 0.79	0.78 0.78 0.77	0.76 0.76 0.75 0.75
20	259	1.00 1.00 1.00	0.99 0.99 0.98	0.98 0.97 0.96	0.95 0.94 0.93	0.92 0.91 0.90	0.89 0.88 0.87	0.86 0.86 0.85	0.84 0.83 0.83	0.82 0.81 0.81	0.80 0.79 0.79	0.78 0.78 0.77	0.77 0.76 0.75 0.75
40	287	– 1.00 1.00	1.00 0.99 0.99	0.98 0.97 0.96	0.95 0.94 0.93	0.92 0.91 0.90	0.89 0.88 0.87	0.87 0.86 0.85	0.84 0.84 0.83	0.82 0.82 0.81	0.80 0.79 0.79	0.78 0.78 0.77	0.77 0.76 0.75 0.75
60	308	– – 1.00	1.00 0.99 0.99	0.98 0.97 0.96	0.95 0.94 0.93	0.92 0.91 0.90	0.89 0.88 0.87	0.87 0.86 0.85	0.84 0.84 0.83	0.82 0.82 0.81	0.80 0.80 0.79	0.78 0.78 0.77	0.77 0.76 0.76 0.75
80	324	– – –	1.00 1.00 0.99	0.99 0.98 0.97	0.99 0.98 0.97	0.92 0.91 0.90	0.89 0.89 0.88	0.87 0.86 0.85	0.84 0.84 0.83	0.82 0.82 0.81	0.80 0.80 0.79	0.78 0.78 0.77	0.77 0.76 0.76 0.75
100	338	– – –	– 1.00 1.00	0.99 0.98 0.97	0.96 0.95 0.94	0.93 0.92 0.91	0.90 0.89 0.88	0.87 0.86 0.85	0.85 0.84 0.83	0.82 0.82 0.81	0.80 0.80 0.79	0.78 0.78 0.77	0.77 0.76 0.76 0.75
120	350	– – –	– 1.00 1.00	0.99 0.98 0.97	0.96 0.95 0.94	0.93 0.92 0.91	0.90 0.89 0.88	0.87 0.86 0.85	0.85 0.84 0.83	0.82 0.82 0.81	0.80 0.80 0.79	0.78 0.78 0.77	0.77 0.76 0.76 0.75
140	361	– – –	– – 1.00	1.00 0.99 0.98	0.96 0.95 0.94	0.93 0.92 0.91	0.90 0.89 0.88	0.87 0.86 0.85	0.85 0.84 0.83	0.82 0.82 0.81	0.80 0.80 0.79	0.78 0.78 0.77	0.77 0.76 0.76 0.75
160	371	– – –	– – 1.00	1.00 0.99 0.98	0.97 0.95 0.94	0.93 0.92 0.91	0.90 0.89 0.88	0.87 0.86 0.86	0.85 0.84 0.83	0.82 0.82 0.81	0.80 0.80 0.79	0.79 0.78 0.77	0.77 0.76 0.76 0.75
180	380	– – –	– – –	1.00 0.99 0.98	0.97 0.96 0.95	0.93 0.92 0.91	0.90 0.89 0.88	0.87 0.86 0.86	0.85 0.84 0.83	0.82 0.82 0.81	0.80 0.80 0.79	0.79 0.78 0.77	0.77 0.76 0.76 0.75
200	388	– – –	– – –	1.00 0.99 0.99	0.97 0.96 0.95	0.93 0.92 0.91	0.90 0.89 0.88	0.87 0.86 0.86	0.85 0.84 0.83	0.83 0.82 0.81	0.81 0.80 0.79	0.79 0.78 0.77	0.77 0.76 0.76 0.75
220	395	– – –	– – –	1.00 1.00 0.99	0.98 0.96 0.95	0.94 0.93 0.92	0.91 0.90 0.89	0.88 0.87 0.86	0.85 0.84 0.84	0.83 0.82 0.81	0.81 0.80 0.79	0.79 0.78 0.78	0.77 0.76 0.76 0.75
240	403	– – –	– – –	– 1.00 0.99	0.98 0.97 0.95	0.94 0.93 0.92	0.91 0.90 0.89	0.88 0.87 0.86	0.85 0.84 0.84	0.83 0.82 0.81	0.81 0.80 0.79	0.79 0.78 0.78	0.77 0.76 0.76 0.75
260	409	– – –	– – –	– 1.00 0.99	0.98 0.97 0.96	0.94 0.93 0.92	0.91 0.90 0.89	0.88 0.87 0.86	0.85 0.85 0.84	0.83 0.82 0.81	0.81 0.80 0.79	0.79 0.78 0.78	0.77 0.76 0.76 0.75
280	416	– – –	– – –	– 1.00 1.00	0.98 0.97 0.96	0.95 0.93 0.92	0.91 0.90 0.89	0.88 0.87 0.86	0.85 0.85 0.84	0.83 0.82 0.82	0.81 0.80 0.80	0.79 0.78 0.78	0.77 0.77 0.76 0.75
300	422	– – –	– – –	– – 1.00	0.99 0.98 0.96	0.95 0.93 0.92	0.91 0.90 0.89	0.88 0.87 0.86	0.86 0.85 0.84	0.83 0.82 0.82	0.81 0.80 0.80	0.79 0.78 0.78	0.77 0.77 0.76 0.75
350	436	– – –	– – –	– – 1.00	1.00 0.99 0.97	0.96 0.94 0.93	0.92 0.91 0.90	0.89 0.88 0.87	0.86 0.85 0.84	0.83 0.83 0.82	0.81 0.81 0.80	0.79 0.78 0.78	0.77 0.77 0.76 0.75
400	448	– – –	– – –	– – –	1.00 0.99 0.98	0.96 0.95 0.93	0.92 0.91 0.90	0.89 0.88 0.87	0.86 0.85 0.84	0.84 0.83 0.82	0.81 0.81 0.80	0.79 0.79 0.78	0.77 0.77 0.76 0.75
450	460	– – –	– – –	– – –	– 1.00 0.99	0.97 0.96 0.94	0.93 0.92 0.91	0.89 0.88 0.87	0.86 0.86 0.85	0.84 0.83 0.82	0.82 0.81 0.80	0.79 0.79 0.78	0.78 0.77 0.76 0.75
500	470	– – –	– – –	– – –	– 1.00 0.99	0.98 0.96 0.94	0.93 0.92 0.91	0.90 0.89 0.88	0.87 0.86 0.85	0.84 0.83 0.82	0.82 0.81 0.80	0.79 0.79 0.78	0.78 0.77 0.76 0.75
550	480	– – –	– – –	– – –	– – 1.00	0.99 0.97 0.95	0.94 0.92 0.91	0.90 0.89 0.88	0.87 0.86 0.85	0.84 0.83 0.82	0.82 0.81 0.80	0.80 0.79 0.78	0.78 0.77 0.76 0.76
600	489	– – –	– – –	– – –	– – 1.00	0.99 0.98 0.96	0.94 0.93 0.92	0.90 0.89 0.88	0.87 0.86 0.85	0.84 0.84 0.83	0.82 0.81 0.80	0.80 0.79 0.78	0.78 0.77 0.76 0.76
650	497	– – –	– – –	– – –	– – –	1.00 0.99 0.97	0.95 0.94 0.92	0.91 0.90 0.89	0.87 0.86 0.85	0.85 0.84 0.83	0.82 0.81 0.81	0.80 0.79 0.78	0.78 0.77 0.77 0.76
700	506	– – –	– – –	– – –	– – –	1.00 0.99 0.97	0.96 0.94 0.93	0.91 0.90 0.89	0.88 0.87 0.86	0.85 0.84 0.83	0.82 0.81 0.81	0.80 0.79 0.79	0.78 0.77 0.77 0.76
750	513	– – –	– – –	– – –	– – –	1.00 1.00 0.98	0.96 0.95 0.93	0.92 0.90 0.89	0.88 0.87 0.86	0.85 0.84 0.83	0.83 0.82 0.81	0.80 0.79 0.79	0.78 0.77 0.77 0.76
800	520	– – –	– – –	– – –	– – –	– 1.00 0.99	0.97 0.95 0.94	0.92 0.91 0.90	0.88 0.87 0.86	0.85 0.84 0.84	0.83 0.82 0.81	0.80 0.80 0.79	0.78 0.78 0.77 0.76
850	527	– – –	– – –	– – –	– – –	– 1.00 0.99	0.98 0.96 0.94	0.93 0.92 0.90	0.89 0.88 0.87	0.86 0.85 0.84	0.83 0.82 0.81	0.81 0.80 0.79	0.78 0.78 0.77 0.76
900	533	– – –	– – –	– – –	– – –	– 1.00 1.00	0.99 0.97 0.95	0.93 0.92 0.90	0.89 0.88 0.87	0.86 0.85 0.84	0.83 0.82 0.81	0.81 0.80 0.79	0.79 0.78 0.77 0.77
950	540	– – –	– – –	– – –	– – –	– – 1.00	0.99 0.97 0.95	0.94 0.92 0.91	0.89 0.88 0.87	0.86 0.85 0.84	0.83 0.82 0.82	0.81 0.80 0.79	0.79 0.78 0.77 0.77
1000	546	– – –	– – –	– – –	– – –	– – 1.00	0.99 0.98 0.96	0.94 0.93 0.91	0.90 0.89 0.87	0.86 0.85 0.84	0.83 0.83 0.82	0.81 0.80 0.79	0.79 0.78 0.77 0.77
1050	552	– – –	– – –	– – –	– – –	– – 1.00	1.00 0.99 0.97	0.95 0.93 0.92	0.90 0.89 0.88	0.87 0.86 0.85	0.84 0.83 0.82	0.81 0.80 0.80	0.79 0.78 0.77 0.77
1100	558	– – –	– – –	– – –	– – –	– – –	1.00 0.99 0.98	0.95 0.94 0.92	0.91 0.89 0.88	0.87 0.86 0.85	0.84 0.83 0.82	0.81 0.81 0.80	0.79 0.78 0.78 0.77
1150	563	– – –	– – –	– – –	– – –	– – –	1.00 0.99 0.98	0.96 0.94 0.92	0.91 0.90 0.88	0.87 0.86 0.85	0.84 0.83 0.82	0.81 0.81 0.80	0.79 0.78 0.78 0.77
1200	569	– – –	– – –	– – –	– – –	– – –	1.00 0.99 0.98	0.97 0.95 0.93	0.91 0.90 0.89	0.87 0.86 0.85	0.84 0.83 0.82	0.81 0.81 0.80	0.79 0.78 0.78 0.77
1250	574	– – –	– – –	– – –	– – –	– – –	– 0.99 0.98	0.97 0.95 0.93	0.92 0.90 0.89	0.88 0.87 0.85	0.85 0.84 0.83	0.82 0.81 0.80	0.79 0.79 0.78 0.77
1300	579	– – –	– – –	– – –	– – –	– – –	– 1.00 0.99	0.98 0.96 0.94	0.92 0.91 0.89	0.88 0.87 0.86	0.85 0.84 0.83	0.82 0.81 0.80	0.79 0.79 0.78 0.77
1350	584	– – –	– – –	– – –	– – –	– – –	– 1.00 0.99	0.98 0.96 0.94	0.93 0.91 0.90	0.88 0.87 0.86	0.85 0.84 0.83	0.82 0.81 0.80	0.80 0.79 0.78 0.78
1400	588	– – –	– – –	– – –	– – –	– – –	– 1.00 1.00	0.99 0.97 0.95	0.93 0.92 0.90	0.89 0.88 0.86	0.85 0.84 0.83	0.82 0.81 0.81	0.80 0.79 0.78 0.78
1450	593	– – –	– – –	– – –	– – –	– – –	– – 1.00	0.99 0.97 0.95	0.94 0.92 0.90	0.89 0.88 0.86	0.85 0.84 0.83	0.82 0.81 0.81	0.80 0.79 0.78 0.78
1500	597	– – –	– – –	– – –	– – –	– – –	– – 1.00	0.99 0.97 0.96	0.94 0.92 0.91	0.89 0.88 0.87	0.86 0.84 0.84	0.83 0.82 0.81	0.80 0.79 0.78 0.78
1600	606	– – –	– – –	– – –	– – –	– – –	– – 1.00	0.98 0.97 0.96	0.94 0.93 0.91	0.89 0.88 0.86	0.85 0.84 0.83	0.82 0.81 0.80	0.79 0.78 0.78 0.77
1700	615	– – –	– – –	– – –	– – –	– – –	– – 1.00	0.99 0.97 0.96	0.95 0.93 0.91	0.89 0.88 0.86	0.85 0.84 0.83	0.82 0.81 0.79	0.79 0.78 0.77 0.77
1800	622	– – –	– – –	– – –	– – –	– – –	– – –	0.99 0.98 0.97	0.95 0.93 0.91	0.89 0.88 0.86	0.85 0.84 0.82	0.81 0.80 0.79	0.79 0.78 0.77 0.76
1900	630	– – –	– – –	– – –	– – –	– – –	– – –	1.00 0.98 0.97	0.96 0.93 0.91	0.89 0.88 0.86	0.85 0.84 0.82	0.81 0.80 0.79	0.78 0.78 0.77 0.76
2000	636	– – –	– – –	– – –	– – –	– – –	– – –	– 1.00 0.98	0.96 0.93 0.91	0.89 0.87 0.86	0.84 0.83 0.82	0.81 0.80 0.79	0.78 0.77 0.76 0.76
2100	644	– – –	– – –	– – –	– – –	– – –	– – –	– 1.00 0.98	0.95 0.93 0.91	0.89 0.87 0.86	0.84 0.83 0.82	0.81 0.79 0.78	0.77 0.77 0.76 0.75
2200	650	– – –	– – –	– – –	– – –	– – –	– – –	– 1.00 0.98	0.95 0.93 0.91	0.89 0.87 0.85	0.84 0.82 0.81	0.80 0.79 0.78	0.77 0.76 0.75 0.74
2300	658	– – –	– – –	– – –	– – –	– – –	– – –	– 1.00 0.98	0.95 0.93 0.91	0.89 0.87 0.85	0.84 0.82 0.81	0.79 0.78 0.77	0.76 0.75 0.75 0.74
2400	663	– – –	– – –	– – –	– – –	– – –	– – –	– – 0.98	0.95 0.93 0.91	0.89 0.87 0.85	0.83 0.82 0.80	0.79 0.78 0.77	0.76 0.75 0.74 0.73
2500	669	– – –	– – –	– – –	– – –	– – –	– – –	– – 0.98	0.95 0.93 0.90	0.88 0.86 0.84	0.83 0.81 0.80	0.78 0.77 0.76	0.75 0.74 0.73 0.72
2600	675	– – –	– – –	– – –	– – –	– – –	– – –	– – 1.00	0.96 0.93 0.90	0.88 0.85 0.84	0.82 0.80 0.79	0.77 0.76 0.75	0.74 0.73 0.72 0.71
2700	680	– – –	– – –	– – –	– – –	– – –	– – –	– – –	1.00 0.95 0.90	0.88 0.85 0.83	0.81 0.79 0.78	0.76 0.75 0.74	0.73 0.72 0.71 0.70
2800	686	– – –	– – –	– – –	– – –	– – –	– – –	– – –	1.00 0.95 0.90	0.88 0.85 0.82	0.80 0.78 0.76	0.75 0.74 0.73	0.72 0.71 0.70 0.69
2900	691	– – –	– – –	– – –	– – –	– – –	– – –	– – –	– 1.00 0.90	0.87 0.84 0.82	0.80 0.78 0.76	0.75 0.73 0.72	0.71 0.70 0.69 0.68

Variable or Constant backpressure sizing factor K_w (Balanseal valve only)



Overpressure sizing factor K_p other than 25% overpressure

Conventional and balanseal valve: Non-Code liquids only



Sizing Factors for Liquids

Viscosity Correction using Chart Method

Sizing Method

Since the viscosity correction factor depends on the actual orifice area, direct solution is not possible and a trial orifice size must be found before the Ku can be determined accurately.

Example: ASME Code liquid application, solving for actual areas. If non-ASME Code is required, substitute appropriate equation.

Viscosity-Saybolt Universal Secs	1250 SSU @ 100°F
Capacity Required	800 gpm
Set Pressure (P1)	170 psig
Constant Back Pressure (P2)	40 psig
Differential Pressure (1.1 P1 -P2)	147 psig
Allowable Overpressure	10%
Specific Gravity	0.98 @ 100°F
Relieving Temperature	100°F

1 Calculate Trial Orifice: Calculate the trial orifice area from the liquid equation

$$A = \frac{V_L\sqrt{G}}{38.0\,K_d\sqrt{\Delta P}K_u} = \frac{800(0.99)}{38.0(0.576)\sqrt{187-40}\,(1)} = 2.98\text{sq.in actual area}$$

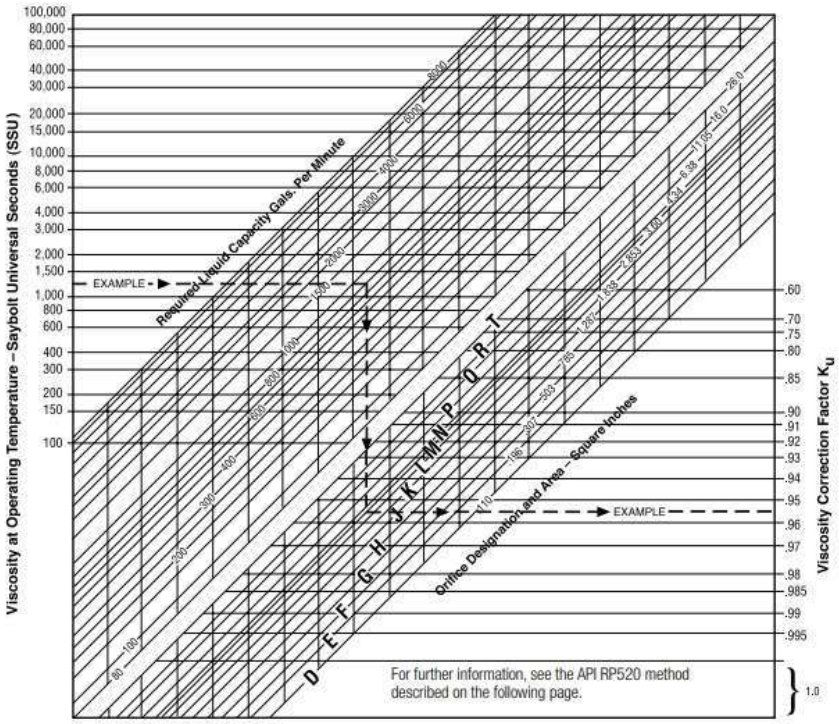
If BalanSeal valve construction is used and variable back pressure conditions exist, use the maximum back pressure to determine P2 in the equation, and correct Kw factor. See curve on page 89. Use the following equation:

$$A = \frac{V_L\sqrt{G}}{38.0\,K_d\sqrt{\Delta P}\,K_w K_u}$$

Select the next larger orifice size or an M orifice with 4.0 sq. in. orifice area. This should be about 20% greater than the calculated area to allow for reduction of capacity due to viscosity correction factor K_u.

2 Use Chart to Find Ku: Enter the Viscosity Correction Chart from the left, reading 1250 SSU. Follow the example line horizontally to the required 800 gpm. Drop vertically to the selected trial orifice M, and proceed horizontally right to the Ku scale, reading $K_u = 0.955$.

Step 3 Verify Orifice Selection: This chart is designed to minimize the trial and error required for solution. Note that the exit from the chart is from the orifice line to the Ku scale. By looking vertically, the next larger or smaller orifice show alternate values of the A term and the corresponding Ku term without repeating all the steps.



Sizing Factors for Liquids

Viscosity Correction, Reynold's Number Method of API RP520

As an alternative to the sizing method discussed on the previous page, you may use the method given in API RP520 for sizing viscous liquids. When a relief valve is sized for viscous liquid services, it is suggested that it be sized first as a no viscous type application in order to obtain a preliminary required discharge area, A. From manufacturer's standard orifice sizes, the next larger orifice size should be used to determine the Reynold's number R from either one of the following:

$R = \frac{V_L (2800G)}{\mu \sqrt{A}}$ or $*R = \frac{12700\, V_L}{U \sqrt{A}}$ (use of this equation is not recommended for viscosities less than 100 SSU)

After the value of R is determined, the factor KV ** is obtained from the graph. Factor KV is applied to correct the preliminary required discharge area. If the corrected area exceeds the chosen standard orifice area, the calculations should be repeated using the next larger standard orifice size.

Nomenclature

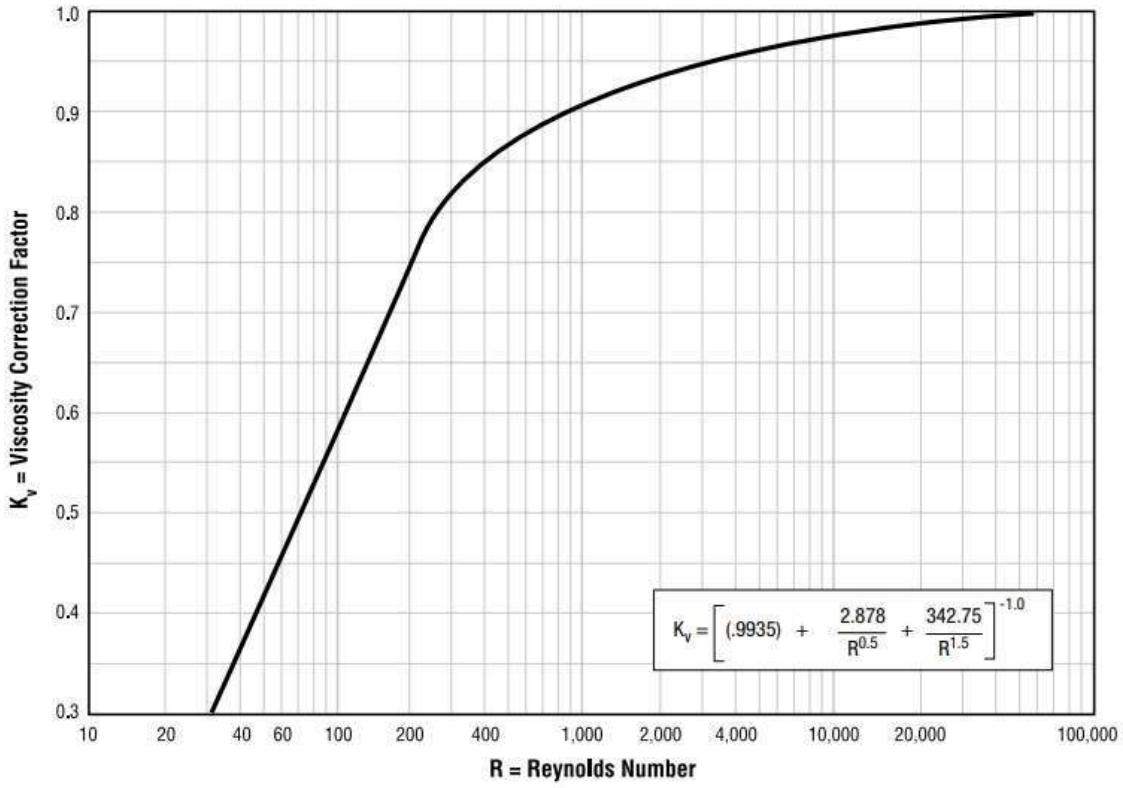
V_L = Flow rate at the flowing temperature in the U.S. gallon per minute.

G = Specific gravity of the liquid at the flowing temperature referred to water = 1.00 at 70ºF.

μ = Absolute viscosity at the flowing temperature in centipoises.

A = Discharge area in square inches from manufacturer's standard orifice areas[1].

U = Viscosity at the flowing temperature in Saybolt Universal Seconds.



General Notes:

Select using either API effective area or ASME actual area depending on the sizing method being used.

Unit Conversion for Pressure, Temperature, and Flow Capacity

Proper unit conversion is essential in selecting and analysing safety relief valves (SRVs), as different industries and standards use varying measurement units. Below are common conversions for pressure, temperature, and flow capacity.

1. Pressure Unit Conversion

Pressure is commonly measured in **psi, bar, kPa, mmHg, atm**, etc.

Unit	To psi (Multiply by)	To bar (Multiply by)	To kPa (Multiply by)	To atm (Multiply by)
1 psi	1.0	0.06895	6.895	0.06804
1 bar	14.5038	1.0	100	0.98692
1 kPa	0.14504	0.01	1.0	0.009869
1 atm	14.696	1.01325	101.325	1.0
1 mmHg	0.01934	0.001333	0.1333	0.001315

Example: Convert **50 psi** to **bar**

50×0.06895=3.4475 bar50\times0.06895=3.4475\text{bar}50×0.06895=3.4475 bar

2. Temperature Unit Conversion

Temperature is measured in **Celsius (°C), Fahrenheit (°F), and Kelvin (K).**

Unit	To °C	To °F	To K
°C to °F	(°C × 9/5) + 32	—	°C + 273.15
°F to °C	(°F − 32) × 5/9	—	(°F − 32) × 5/9 + 273.15
K to °C	K − 273.15	(K − 273.15) × 9/5 + 32	—

Example: Convert **100°C** to **Fahrenheit**

(100×95)+32=212°F(100\times\frac{9}{5})+32 = 212°F(100×59)+32=212°F

Example: Convert **500 K** to **Celsius**

500−273.15=226.85°C500 - 273.15 = 226.85°C500−273.15=226.85°C

3. Flow Capacity Unit Conversion

Flow capacity in safety relief valves depends on whether the medium is **gas, liquid, or steam**.

a) Gas & Air Flow (Standard Cubic Feet per Minute - SCFM, Nm³/h, L/min)

Unit	To SCFM (Multiply by)	To Nm³/h (Multiply by)	To L/min (Multiply by)
1 SCFM	1.0	1.69	28.32
1 Nm³/h	0.59	1.0	16.67
1 L/min	0.03531	0.06	1.0

- **Example:** Convert **100 SCFM** to **Nm³/h**
- 100×1.69=169 Nm³/h100\times1.69=169\text{Nm³/h}100×1.69=169 Nm³/h

b) Liquid Flow (Gallons per Minute - GPM, Liters per Minute - LPM, Cubic Meters per Hour - m³/h)

Unit	To GPM (Multiply by)	To LPM (Multiply by)	To m³/h (Multiply by)
1 GPM	1.0	3.785	0.2271
1 LPM	0.2642	1.0	0.06
1 m³/h	4.4029	16.67	1.0

- **Example: Convert 50 GPM to LPM**
- 50×3.785=189.25 LPM50\times3.785=189.2\text{LPM}50×3.785=189.25 LPM

c) Steam Flow (lbs/hr, kg/hr, Tons per Hour - TPH)

Unit	To lb/hr (Multiply by)	To kg/hr (Multiply by)	To TPH (Multiply by)
1 lb/hr	1.0	0.4536	0.0004536
1 kg/hr	2.2046	1.0	0.001
1 TPH	2204.6	1000	1.0

Example: Convert **500 lb/hr** to **kg/hr**

500×0.4536=226.8 kg/hr500\times0.4536=226.8\text{kg/hr}500×0.4536=226.8 kg/hr

Shop facilities

Functional test bench

Following testing can be performed

- Set pressure test.
- Seat tightness test as per. API 527.
- Secondary pressure zone test.
- Test medium - Air, Nitrogen, & Water.

Performance testing skid - Air & Water

Following testing can be performed

- Reseating / Blow down pressure.
- Lift measurement.
- Flow measurement.
- Pressure range up to 56 bar.
- Test medium - Air & Water.

Hydrostatic test bench

Following Testing can be performed

- Hydrostatic test as per. ASME B16.34.
- Shell test for following parts
- Body, Bonnet, Cap & Nozzle.
- Shell test can be performed 1.5 times of working pressure.
- Capable to test up to 2500# flange rating.
- Test medium - De-minaralized water

Lapping & Polishing Machine

- Lapping and polishing of nozzle and disc seating surface.
- Abrasive used diamond slurry 3 micron.

Pressure relief valves

Series 3000

Pipe line valves

Diaphragm valves

Series 6000

Resilient seated gate valve

Certifications

BAS ISO certificate

TUV nord certificate

IEC certificate

Manufactured by

Fluid control valves and components
Sf.no: 208/3b, Anjugam nagar,
Udayampalayam, Chinnavedampatti,
Coimbatore, Tamilnadu, India - 641049

Contact no. +91-9843052005, +91-8095045661
sales@ellemengineering.com
www.ellemengineering.com