



SARASIN-RSBD™

Safety Relief Valves

STARFLOW

QUALITY ASSURANCE

Trillium operates quality programmes to cover the full scope of their activities. Comprehensive quality systems have been developed to serve the power, oil and gas and industrial markets which they serve.

The company holds approvals to or complies with:

- ASME Section III 'N', 'NPT', 'NV'
- ASME Section I 'V'
- ASME Section VIII 'UV'
- EN ISO 9001: 2008
- EN ISO 14001: 2004
- OHSAS 18001: 2007
- API Q1 TO API LICENCES API 6D (6D-0182) AND API 6A (6A-0445)
- API STD 520
- API STD 526
- API STD 527
- API STD 2000
- ISO 4126

The Quality systems have been approved for the supply of products to meet the requirements of the Pressure Equipment Directive (PED) and compliance modules A, D1, H, B&D have been applied in categories I through IV respectively.

The company is committed to compliance with legislation and has an established environment and health and safety policy.

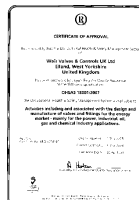
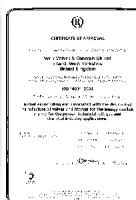
An ongoing commitment to customer care is met through the process of continuous improvement and the further development of our systems and processes towards meeting ISO 9001:2008.

SARASIN-RSBD™

The Sarasin-RSBD™ range of products is manufactured in accordance with ASME, API and ISO standards and therefore can meet most of worldwide customers requirements. The company holds approvals or complies with:

- EN ISO 9001:2008 - EN ISO 14001:2004
- OHSAS 18001: 2007
- PED 97/23/EC Module B+D Category IV
- ATEX 94/9/EC
- ASME Section I 'V' - ASME Section VIII 'UV'
- API STD 520 - API STD 526 - API STD 527
- API STD 2000
- ISO 4126
- SELO

Specifically, Trillium can design and manufacture special valves to meet special customer requirements.



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High Performance Buttery Valves
BDK™
Industrial Valves
BLAKEBOROUGH®
Control & Severe Service Valves
HOPKINSONS®
Parallel Slide Gate & Globe Valves
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Portfolio of engineered service solutions and aftermarket support



TRILLIUM FLOW TECHNOLOGIES™

Trillium provides critical service and safety valves, specialist pumps and service support to flow control and rotating equipment. Our world-wide reputation is based on engineering excellence applied to a comprehensive range of specialist products and effective customer support.

We have the capability to deliver complete valve solutions for major projects in the power generation, oil and gas exploration and general industrial sectors. Our global network of service operations specialise in the maintenance, upgrade and management of power and industrial assets at customer sites.

Trillium manufactures the Sarasin-RSBD range of pressure safety valves and safety devices for oil and gas, petrochemical and chemical industries, pipelines, thermal and nuclear power plants, sugar refineries and pulp mills.

VALVE TESTING

All pressure containing items are hydrostatically tested, seat leakage tested and functionally tested.

We can also perform gas, packing emission, cryogenic and advanced functional testing, as well as seismic testing for nuclear applications.

MATERIAL TESTING

- Non-destructive examination by radiography, ultrasonics, magnetic particle and liquid penetrant.
- Chemical analysis by computer controlled direct reading emission spectrometer.
- Mechanical testing for tensile properties at ambient and elevated temperatures, bend and hardness testing. Charpy testing at ambient, elevated and sub-zero temperatures.

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Introduction

This catalogue describes STARFLOW safety relief valves manufactured for use in refineries, petrochemical and chemical processes, piping, pressure vessels, heat exchangers, cryogenic plants, process steam, thermal relief, compression stations and pipelines.

STARFLOW safety relief valves are designed and manufactured in accordance with API Std 526 and ASME Section VIII Division 1, and have been capacity tested and certified by the National Board of Pressure Vessel Inspectors. The Starflow also meets the requirements of ISO 4126 Part 1.

General STARFLOW High Performance Features

High capacity and performances

STARFLOW safety relief valves are designed on concepts of safety, high performance, interchangeability and simplicity.

These considerations led to the STARFLOW line of valves, P3 (conventional), P4 (balanced bellows), P5 (steam service).

STARFLOW valves are designed to meet the requirements of the ASME Code, Section VIII Div.1 and capacities have been certified with a high discharge coefficient.

STARFLOW safety relief valves are suitable for air, gas or steam service as well as for liquids.

Designed for trouble free operation

The STARFLOW line has been designed to API Std 526 standard with an integral stainless steel nozzle, a self-aligning top-guided disc and disc holder and a single nozzle adjusting ring for blowdown setting. All sliding surfaces are made of stainless steel from different grades providing sufficient difference of hardness to prevent seizing or galling and to increase precision.

The disc is designed to withstand high and low temperatures without leakage due to non-uniform thermal expansion. Its thickness is minimal, and it is self-aligning.

STARFLOW valves, in the "STARSOFT" version, are provided with a soft seat, made of materials such as fluorocarbon, nitrile or silicone for applications where premium tightness is required. The soft seat is designed so that it cannot blow out under pressure.

Full lift within 10% overpressure and short blowdown are achieved with the single adjustable nozzle ring design. The deflector provides a raising force to open the valve completely to permit full capacity flow. The form of the secondary orifice situated between the deflector and the adjusting ring can be modified to obtain the desired blowdown.

The single nozzle adjusting ring facilitates the setting of the valve. The design of this ring is such that it cannot affect the flow of the valve.

A complete range of safety relief valves

The STARFLOW line includes all orifices from D to T (Complying with API Std 526), plus two extra-large orifices V and W (Complying with ASME B&PVC Section VIII Div.1) and covers the range of 150 lbs to 2500 lbs flange ratings, from 1" (DN 25) to 12" (DN 300). The bodies and bonnets are made from castings, while corrosion resistant materials are used for the internal trim.

Materials are designed for service temperatures from -270°C to 538°C. Different bills of materials have been established to cover most of the possible applications, especially when corrosion is a consideration. Special alloys such as Duplex, Alloy 400 (Monel), Alloy C276, or other materials suitable for sour environments may be supplied on request.

Designed for interchangeability

When starting up or maintaining a process plant, it is sometimes necessary to make modifications to the initial design and change valve configurations.

When the STARFLOW line was designed, it was decided that the different versions of the basic valve were to be interchangeable.

Consequently it is possible to convert any STARFLOW design into another one with the minimum of additional parts.

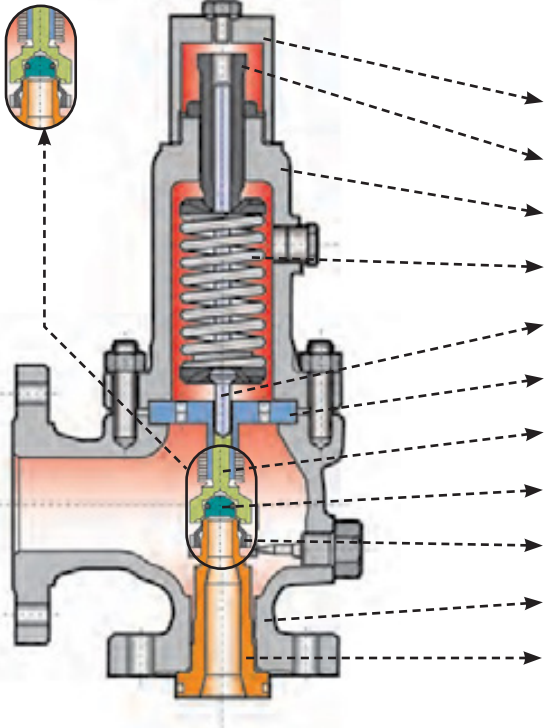
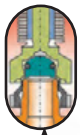
A conventional type (P3) may very easily be converted into a balanced bellows type (P4) just by adding a bellows sub-assembly.

To reduce inventory, steam valves (P5) use the same components as process valves (P3).

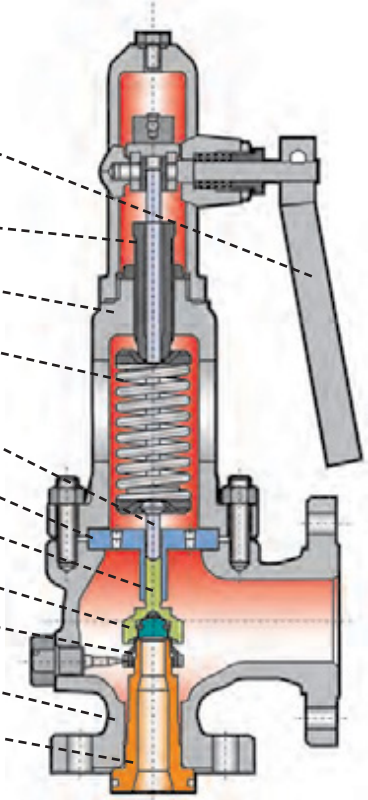
Metal to metal seat tightness and simple operation

The STARFLOW metal-to-metal seated valves are carefully lapped and mirror-polished and lapping is controlled with optical flats. This lapping together with the disc design assures excellent tightness and easy maintenance.

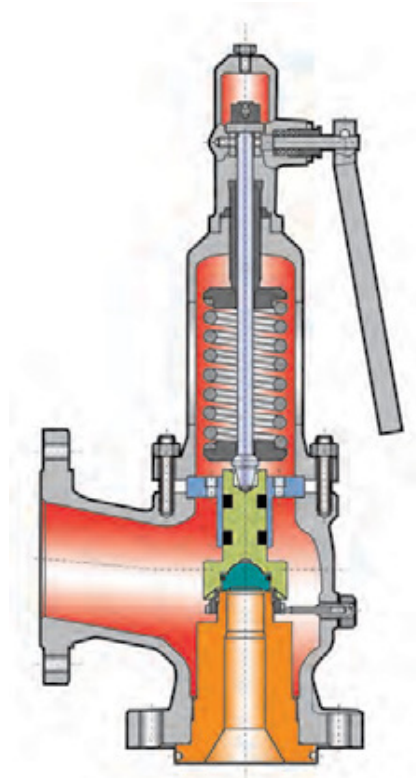
Balanced type P4



- Lever
- Cap
- Adjusting screw
- Bonnet
- Spring
- Spindle
- Guide
- Disc Holder
- Disc
- Adjusting ring
- Body
- Full nozzle



Conventional type P3



Steam type P5

Steam type S5

Description

STARFLOW RANGE

- Certified ASME Section VIII Div. 1 (stamp UV)
- Sizes: 1" x 2" to 12" x 12" x 12" (dual outlet)
- API STD 526 orifices from D to T
- Effective orifice areas from D (0.865 cm²) to W (452 cm²)

STARFLOW P3

- Pressure (API STD 526) from 0.35 to 414 barg
- Pressure (ASME B16.34) from 0.35 to 430 barg
- Temperature from -196°C to +538°C
- "Starsoft" soft seat available for improved tightness

STARFLOW P4

- Ditto as P3
- The balanced bellows isolate spring chamber from media and balance the valve against the back pressure effects.

STARFLOW P5

- Pressure class 150# and 300#
- Pressure (ASME) from 0.35 barg to 45.9 barg
- Temperature upto +538°C
- Stellite nozzle
- Opened bonnet (small orifices) and yoke (large orifices)

STARFLOW S5

- Pressure class 150# to 2500#
- Pressure from 0.35 barg
- Temperature upto 538°C (and over on request)
- Stellite nozzle
- Opened bonnet (small orifices) and yoke (large orifices)
- Enlarged guide (intrinsically balanced)
- Thermoglide rings contact between the guide and the disc holder: improved gliding, no seize, perfect repeatability and smooth opening.

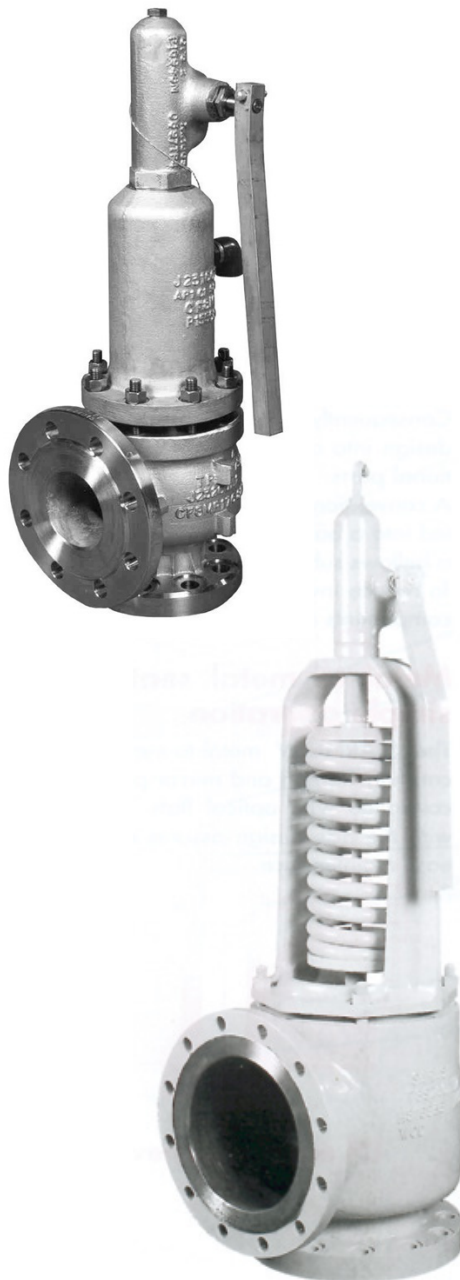


TABLE 1

STARFLOW P3/P4/P5/S5 Inlet x Outlet Size Combinations (in.) Orifice Area (sq. in.)					Inlet Flange Rating ASME B16.5	Outlet Flange Rating ASME B16.5
Actual	0.134	0.273	0.373	0.589		
API	0.110	0.196	0.307	0.503		
ORIFICE	D	E	F	G		
150	1 x 2	1 x 2	1 1/2 x 2	1 1/2 x 3	150	150
	1 x 2	1 x 2	1 1/2 x 2	1 1/2 x 3	300	
	1 x 2	1 x 2	1 1/2 x 2	1 1/2 x 3	300	
	1 x 2	1 x 2	1 1/2 x 2	1 1/2 x 3	600	
300	1 1/2 x 2	1 1/2 x 2	1 1/2 x 3	1 1/2 x 3	900	300
	1 1/2 x 2	1 1/2 x 2	1 1/2 x 3	2 x 3	1500	
	1 1/2 x 3	1 1/2 x 3	1 1/2 x 3	2 x 3	2500	

TABLE 2

STARFLOW P3/P4/P5/S5 Inlet x Outlet Size Combinations (in.) Orifice Area (sq. in)													Inlet Flange Rating ASME B16.5	Outlet Flange Rating ASME B16.5
Actual	0.881	1.457	2.097	3.284	4.093	4.987	7.215	12.91	17.81	28.87	46.75	70.10		
API	0.785	1.287	1.838	2.853	3.6	4.34	6.38	11.05	16	26	N/A	N/A		
ORIFICE	H	J	K	L	M	N	P	Q	R	T	V	W		
150	1 1/2 x 3	2 x 3	3 x 4	3 x 4	4 x 6	4 x 6	4 x 6	6 x 8	6 x 8	8 x 10	10 x 14	12x12x12	150	150
	1 1/2 x 3	2 x 3	3 x 4	3 x 4	4 x 6	4 x 6	4 x 6	6 x 8	6 x 8	8 x 10	10 x 14	12x12x12	300	
	2 x 3	3 x 4	3 x 4	4 x 6	4 x 6	4 x 6	4 x 6	6 x 8	6 x 10	8 x 10	10 x 14	12x12x12	300	
	2 x 3	3 x 4	3 x 4	4 x 6	4 x 6	4 x 6	4 x 6	6 x 8	6 x 10	-	-	-	600	
	2 x 3	3 x 4	3 x 6	4 x 6	4 x 6	4 x 6	4 x 6	-	-	-	-	-	900	
300	2 x 3	3 x 4	3 x 6	4 x 6*	-	-	-	-	-	-	-	-	1500	300
	-	-	-	-	-	-	-	-	-	-	-	-	2500	

Note:

Inlet and outlet size combinations as well as Orifice sizes shown in the table above are compliant with API standard 526.

– Fourth Edition, 1995 (and later)

* Supplied with a 150# outlet

Design Information

Set pressure limits and tolerances

Safety relief valves having a set pressure above 1 barg are covered by the requirements of ASME B&PV Code Section VIII Div.1:

- Capacity rated at 10% overpressure in critical discharge conditions, or 0.2 barg, whichever is greater.
- Adjustable blowdown between 5 to 7% of set pressure on compressible fluid.
- Set pressure tolerances :
 - ± 0.13 bar for pressures up to 4.8 bar.
 - ± 3% of set pressure for pressures above 4.8 bar.
- Seat tightness test performed at :
 - 90% of set pressure for pressures above 3.45 bar.
 - 0.35 bar below set pressure for pressures below 3.45 bar.

Flange tolerances and dimensions

STARFLOW safety relief valve flanges are machined to ASME B 16.5 (identical to EN 1759 flanges) except that the raised face dimension of the inlet flange is larger than ASME due to the full nozzle construction.

Centre to face dimensions comply with API Std 526. Flanges may be machined to various facings : raised face - large or small male or female face - large or small tongue or groove face - ring joint face, as well as to various finishes : spiral or concentric serrated, smooth finish, etc. Raised face with smooth finish (Ra 3.2 - 6.3 mm max) is standard.

Any other flange standard is available if specified (EN 1092, DIN 2501).

Set pressure adjustment

Back pressure correction Type P4 balanced bellows valves do not need any back pressure setting correction. Type P3 conventional valves operating against a constant back pressure are set without back pressure. The spring setting pressure (without back pressure) will then be the actual set pressure derated by the value of the constant back pressure.

Set pressure modifications

The spring should not be re-set for any pressure higher than 5% above or below that for which the safety relief valve is marked (Code ASME Section VIII Div.1, UG126).

Springs

A number is stamped on each valve spring where the size of the wire permits it. The spring number is also stamped on the nameplate. For proper operation and to assure correct alignment of parts, springs should be ordered complete with washers.

If the valve set pressure is to be changed, a new spring may be necessary and the following information should be given :

1. Serial number or nominal valve size and type
2. Set pressure and backpressure
3. Fluid
4. Maximum operating temperature

Working pressure and set pressure

It is recommended to set the safety relief valves as high as possible above the maximum operating pressure.

The margin between the operating pressure and the set pressure should not fall below 10% of the set pressure in order to avoid undesired relief cycles or seat leakage.

For operating pressure very close to set pressure, it is advisable to use pilot operated valves.

Seat tightness of safety relief valves

All STARFLOW safety relief valves are individually tested according to API STD 527 and sealed prior to shipment.

Test procedure

The valve is mounted vertically as indicated in the diagram below. Immediately after triggering, the pressure is maintained at 90% of set pressure or at set pressure less 0.35 barg for valves at less than 3.45 barg. Test pressure is applied for a minimum of 1 minute for valves of inlet sizes up to 2", 2 minutes for sizes 2 1/2", 3" and 4", 5 minutes for sizes 6" and above.

Tightness on air test bench

Air at atmospheric temperature is used as pressure medium. The leakage rate in bubbles per minute shall not exceed the numbers listed in Table 3 for metal/metal seated valves.

For soft seated valves, no leakage is authorized.

For steam valves tested on an air bench, the outlet flange is sealed and the body is filled with water up to 12.7 mm above the nozzle seat. Leakage criteria is equal to half that shown in Table 3.

Tightness on liquid test bench

Water at atmospheric temperature is used as pressure medium. Leakage rate must be less than 0.39 cm³/hr/mm of inlet orifice for metal/metal seated valves. For soft seated valves, no leakage is authorized.

Tightness on steam test bench

No visible or audible leakage is authorized.

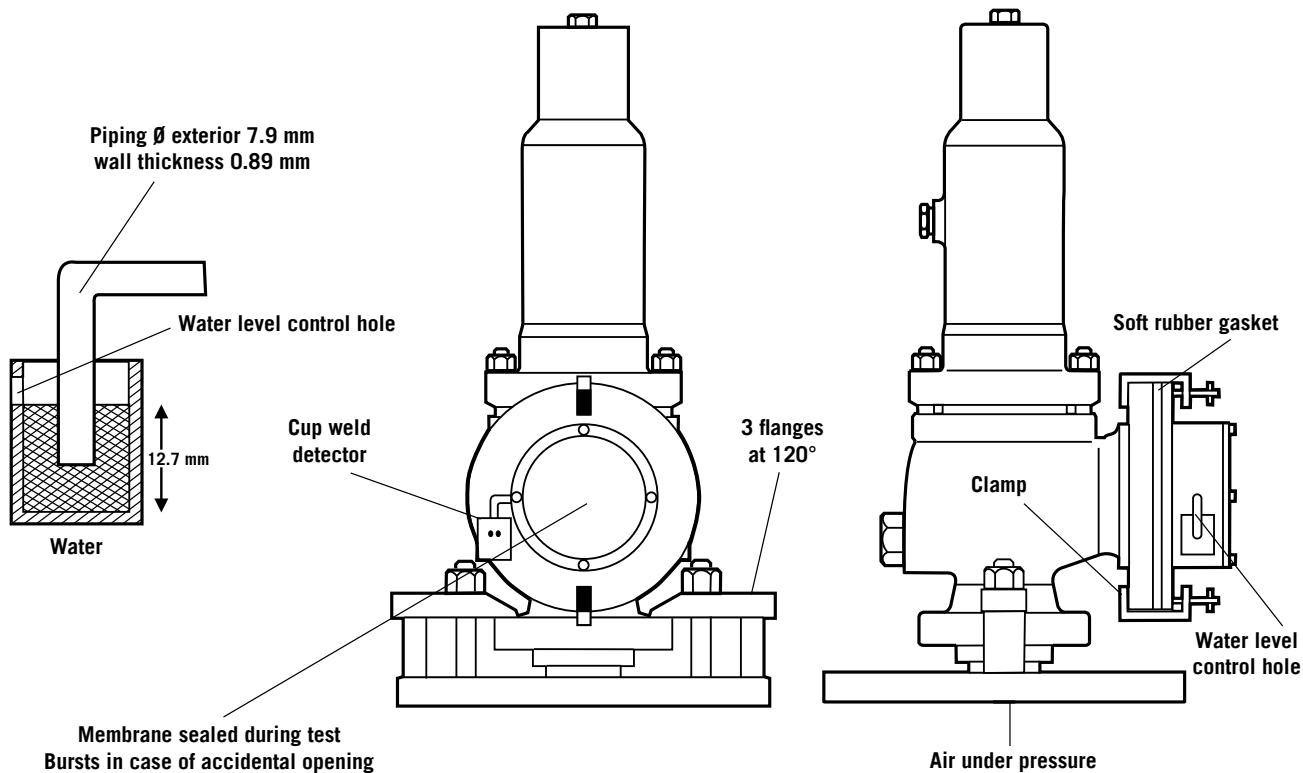


TABLE 3

Set pressure			Orifices less than or equal to F			Orifices larger than F		
Barg	Psig	Mpag	Bubbles / minute	Sm ³ /day	SCF/day	Bubbles / minute	Sm ³ /day	SCF/day
1.03-68.96	15-1000	0.103-6.896	40	0.017	0.60	20	0.0085	0.30
103	1500	10.3	60	0.026	0.90	30	0.013	0.45
130	2000	13.0	80	0.034	1.20	40	0.017	0.60
172	2500	17.2	100	0.043	1.50	50	0.021	0.75
207	3000	20.7	100	0.043	1.50	60	0.026	0.90
276	4000	27.6	100	0.043	1.50	80	0.034	1.20
385	5000	38.5	100	0.043	1.50	100	0.043	1.50
414	6000	41.4	100	0.043	1.50	100	0.043	1.50

Storage

Safety relief valves are often stored at the site for many months before they are actually installed.

Unless they are properly stored and protected their performance may be adversely affected. The valves should therefore be left in their shipping boxes, in a vertical position and stored in a dry place until their installation.

Installation

To avoid damage to valves at start up, piping connections, valve inlet and pressure bearing parts should be thoroughly cleaned and all foreign bodies should be eliminated.

Inlet piping

The inside pipe diameter should be equal or superior to the inlet valve diameter. A valve should never be installed on a fitting with a smaller inside diameter than the inlet connection. The connection piping should be as short as possible.

The valve should be mounted vertically on the pipe inlet. The inlet flange bolts and studs should be drawn down evenly and in such a way as to avoid straining the valve body with possible distortion of the nozzle flange or misalignment of the valve parts. Compliance with the above recommendations will assure proper valve operation.

Outlet piping

The outlet piping should be simple and direct, at least of the same diameter as the outlet and designed to minimize loads on the valve:

- Valve discharge loads
- Discharge pipe expansion loads
- Vibrations
- Discharge pipe misalignment causing static loads

Reaction force calculation

The discharge of a pressure relief valve imposes a reactive load which is supported by the piping system. In some cases all reactive loading due to the operation of the valve is transmitted to the valve and inlet piping.

The horizontal reaction force at the outlet of the valve discharging to atmosphere may be evaluated by an approximation formula as follows :

$$F = K_F \times A \times P_1$$

A more precise calculation is provided with the valve data sheet.

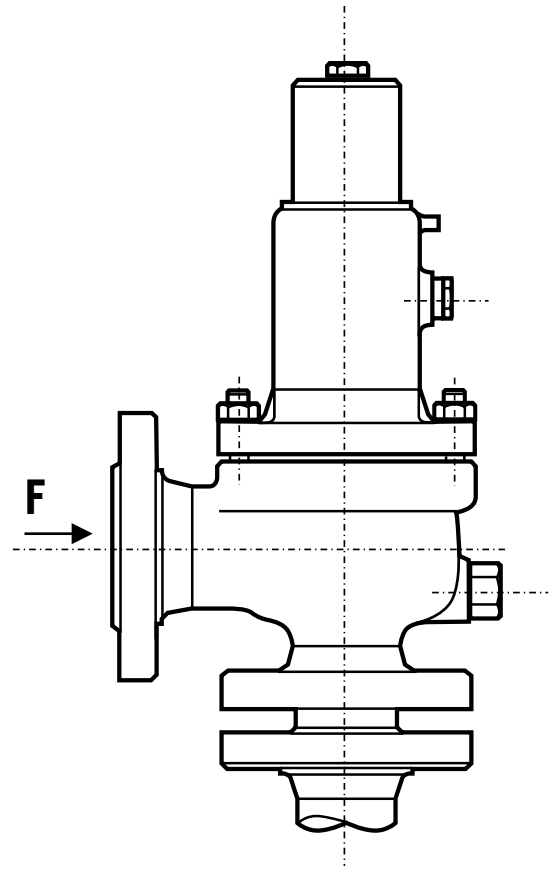
Where :

F = is the reactive force in daN

K_F = is a factor which depends on the fluid and the size of the outlet of the valve, as shown hereunder.

A = is the orifice area of the valve nozzle, in cm², to be found in the sizing section of this catalogue.

P_1 = is the absolute relieving pressure, including overpressure, in bar abs.



This formula includes both momentum and static pressure effects.

VALUES OF K_F		
Outlet DN	Fluid : air	Fluid : steam
2" and 2 1/2"	1.9	2.0
3" and 4"	1.5	1.6
6"	1.3	1.3
8" and over	1.1	1.1

Example: For a valve of " T " orifice, outlet DN 10", set at 12.1 bar, operating on air with 10% overpressure :

$$K_F = 1.1$$

$$A = 168\text{cm}^2$$

$$P_1 = (1.10 \times 12.1 + 1.013) = 14.32 \text{ bar abs}$$

$$F = 2647 \text{ daN}$$

Balanced bellows safety relief valves

Balanced bellows valves should be used :

- When a double tightness barrier is required by the process fluid in the secondary pressure zone of the safety relief valve.
- When the valve is subjected to a back pressure between 10 and 50% of the set pressure.

When a conventional safety relief valve discharges against a back pressure, the opening pressure is the set pressure with atmospheric back pressure augmented by the actual superimposed back pressure just before the valve opens.

If the back pressure is variable, then the opening pressure of a conventional valve will also be variable.

To solve this problem it is highly recommended to use a balanced bellows safety relief valve. The effective area of the bellows is substantially the same as the seating area of the disc on the nozzle and the bellows is vented to atmosphere through a hole drilled into the bonnet wall. The opening pressure of the safety relief valve is then independent of the back pressure.

Back pressure limits for “P4” balanced bellows safety relief valves are shown in the appropriate section of this catalogue.

The design of the STARFLOW safety relief valve is such that a conventional “P3” valve can easily be converted into a balanced bellows “P4” valve just by adding a bellows (part n°19) and removing the vent plug in the bonnet.

Bellows valves type “P4” are available for orifices D to W.

Balanced bellows valves at low set pressure (i.e. below 1.5 barg) should be avoided in small orifices.

Soft seated valves

A soft seated STARFLOW safety relief valve is available for special applications where premium tightness is required or where the operating pressure is very close to the set pressure of the safety relief valve.

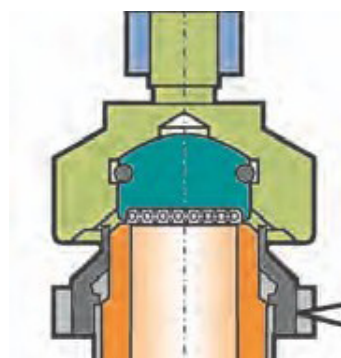
The STARSOFT seat design is unique : an elastomer seat is moulded into a groove machined in the valve disc. This design prevents soft seat blowout under the effect of pressure. Metal seat is provided on the external seating area.

With this configuration, the recognised maximum set pressure is 100 barg. For pressures above this value it is possible to use the soft ring design (see cryogenic material on page 14) limited to 200 barg.

A wide variety of soft materials is available for various mediums and temperature ranges.

Fluorocarbon is the standard material, suitable for major applications between -18 and +200°C. Silicone, Buna-N (nitrile), Ethylene-Propylene or other materials are available on another design. Other materials, such as resins, are available with another design (see cryogenic materials on page 14).

The STARSOFT soft seated valve is bubble tight at 90% of set pressure and meets API STD 527 tightness standard at 95% of the set pressure.



Nevertheless it is not recommended to get the operating pressure higher than 93% of the set pressure as per API and ASME requirements. The operating pressure has to be lower than the blowdown (-7% to set pressure).

The compatibility of the fluid with the elastomer should be carefully considered by the purchaser. Full information about the various elastomers to be used on Starsoft is available from the factory.

	Fluorocarbon (Dipolymer)	Silicone
Min. T°	-18°C	-60°C
Max. T°	+200°C	+200°C
Compatible fluids (on Starsoft)	Air Carbon Dioxide Chlorine Water Crude Oil (<121°C) Detergent Solutions Fuel Oil Gasoline HC Gas Helium Natural Gas Phosphoric Acid Propane Sulfur Chloride (aqu.) Sulfuric Acid (<60%) Sulfuric Acid (100%) Water	Air Ammonia Gas Detergent Solutions Liquid Oxygen Natural Gas Water

Rupture discs and safety valves combination

A rupture disc can be installed upstream of a safety relief valve either as protection against highly corrosive fluid or in order to guarantee complete tightness.

This assembly requires the following arrangements:

- A fragmenting type disc must not be used
- The disc must burst cleanly and leave no obstruction for the fluid once it is broken
- The dimensions of the disc must not be inferior to the inlet DN of the valve
- It must be possible to monitor the space between the rupture disc and the disc of the safety valve all the time and this space must be linked to the atmosphere for as long as the disc has not burst, by means of an excess flow valve. It may also be equipped with a vent valve and a pressure gauge.
- For installation governed by the ASME Code, the combination must be flow tested, and the assigned derating factor applied, or, alternatively for non tested combinations a 0.9 derating factor must be applied.

A rupture disc can also be mounted at the outlet of a safety relief valve.

Materials and Construction

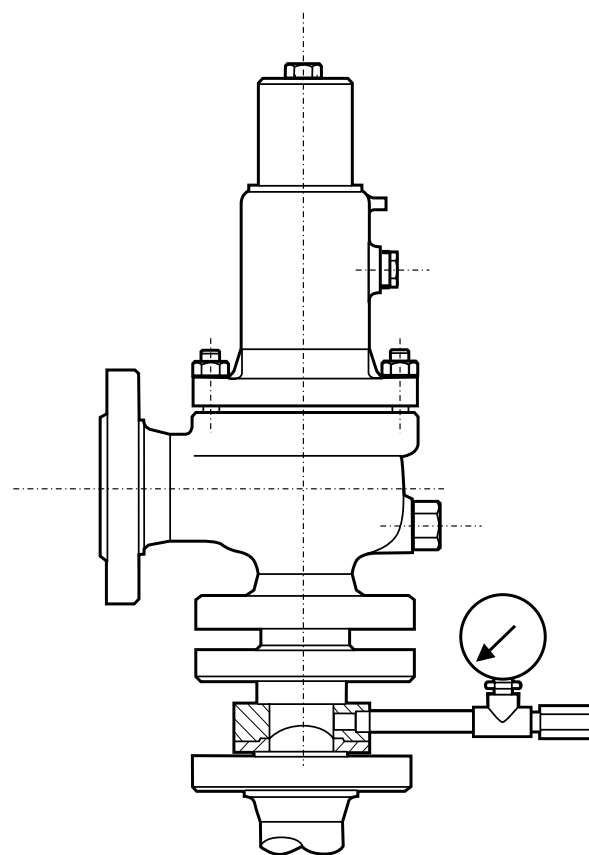
Comparison of various materials

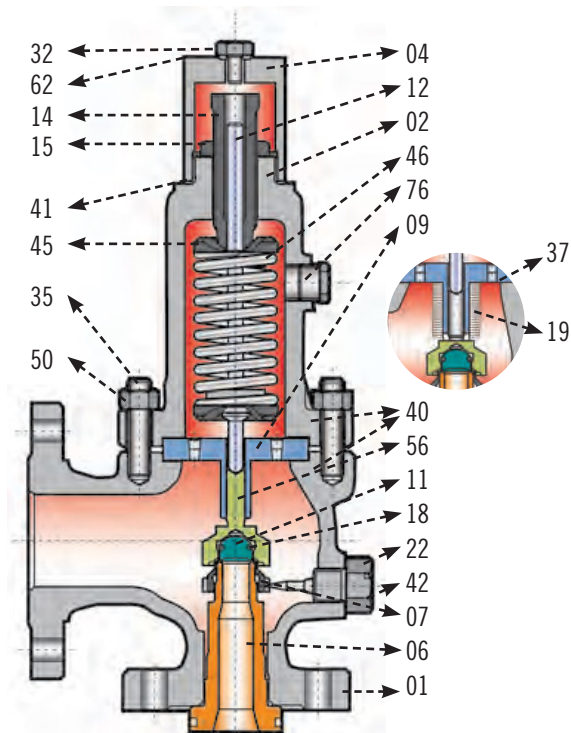
ASME or ASTM designations of material will prevail in this catalogue

This table shows the basic specification of the various materials as well as the corresponding grade in european standards.

TABLE 4

Type of Material	US Standard	European Standard & Grade	Orifices less than or equal to F
Castings			
Carbon steel for high temperature service	SA 216 Gr WCC	GP280GH EN 10213-2	J02503
Killed carbon steel for temperatures down to -46°C	SA 352 Gr LCC	G20Mn5QT EN 10213-3	J02505
Carbon steel for very high temperature service	SA 217 Gr WC6	G17CrMo5-5 EN 10213-2	J12072
Carbon steel for very high temperature service	SA 217 Gr WC9	-	J21890
Austenitic stainless steel	SA 351 Gr CF3M	GxCrNiMo19.11.2 EN 10213-4	J92800
Austenitic stainless steel	SA 351 Gr CF8	Gx5CrNi19.10 EN 10213-4	J92600
Forgings and bars			
Martensitic stainless steel 13 Cr	SA 479 Ty 410	X12Cr13 EN 10088-3	S41000
Ferritic stainless steel 17 Cr - 2Ni	SA 479 Ty 431	X17CrNi16.2 EN 10088-3	
Precipitation hardened stainless steel (17/4 PH)	SA 564 Ty 630	X5CrNiCuNb16.4 EN 10088-3	S17400
Austenitic stainless steel 18 Cr - 10 Ni	SA 479 Ty 304	X5CrNi18.10 EN 10088-3	S30400
Austenitic stainless steel 18 Cr - 10 Ni - 3 Mo	SA 479 Ty 316L	X2CrNiMo17.12.2 EN 10088-3	S31603
Austenitic stainless steel 15 Cr - 25 Ni - 1.25 Mo	SA 638 Gr 660	Z6NCTDV 25-15 EN 10088-3	S66286
Bolting			
Alloy steel 1 Cr - 1/4 Mo	SA 193 Gr B7	42CrMo4 Pr EN 10269	
Low temperature alloy steel	SA 320 Gr L7	42CrMo4 Pr EN 10269	
Austenitic stainless steel 18 Cr - 10 Ni	SA 193 Gr B8	X6CrNi18.10 Pr EN 10629	
Carbon steel nuts	SA 194 Gr 2H	C45E 1 Pr EN 10269	
Stainless steel nuts 18 Cr - 8 Ni	SA 194 Gr 8	X4CrNi18.10 Pr 10269	
Carbon steel nuts for low temperature	SA 194 Gr 4	-	





P3 conventional and P4 balanced types

Materials for standard applications, high temperature, low temperature and corrosive fluids.

For maximum resistance in particularly severe environmental conditions, see the STARFLOW P4 bellows valve specially designed for this application. (see corrosive service application)

For hot water applications where flashing can occur downstream of the seat and nozzle, the bellows type P450 is recommended. (see steam valve).

Notes	Part N°	Part Name	Standard Materials -29°C to +427°C Material code 30	Standard Materials for Low Temperature -45°C to -29°C Material code 19	Standard Materials for Corrosive and Low Temperature down to -60°C Material code 16	Standard Materials for High Temperature up to 538°C Material code 32
	01	Body	SA 216 Gr WCC	SA 352 Gr LCC	SA 351 Gr CF8M	SA 217 Gr WC6
	02	Bonnet	SA 216 Gr WCC	SA 352 Gr LCC	SA 351 Gr CF8M	SA 217 Gr WC6
	04	Cap	CARBON STEEL	CARBON STEEL	SS 316L	CARBON STEEL
1	06	Nozzle	SS 316L	SS 316L	SS 316L	SS 316
1	07	Adjusting ring	A 351 Gr CF3M	A 351 Gr CF3M	A 351 Gr CF3M	A 351 Gr CF3M
1	09	Guide	SS 431	SS 431	SS 316L	SS 431
1	11	Disc	SS 17/4 PH	SS 17/4 PH	SS 316L stellited	SS 316 stellited
	12	Spindle	SS 410	SS 410	SS 316L	SS 410
	14	Adjusting screw	SS 410	SS 410	SS 316L	SS 410
	15	Adjusting screw locknut	SS 316L	SS 316L	SS 316L	SS 316L
1	18	Retaining ring	SS	SS	SS	SS
1,2,3	19	Balanced Bellows	SS 316L	SS 316L	SS 316L	SS 316L
	22	Adjusting ring screw	SS 316L	SS 316L	SS 316L	SS 316L
	35	Bonnet stud	A 193 Gr B7	A 320 Gr L7	A 193 Gr B8	A 193 Gr B16
2,3	37	Bellows plate	SS 316L	SS 316L	SS 316L	SS 316L
1	40	Body/bonnet gasket	SS	SS	SS	SS
1	41	Bonnet/cap gasket	SS	SS	SS	SS
1	42	Adjusting ring screw gasket	SS	SS	SS	SS
1	45	Spring washers (upper & lower)	CARBON STEEL	CARBON STEEL	SS 316L	CARBON STEEL
1	46	Spring	ALLOY STEEL (4)	ALLOY STEEL (4)	SS 316 (5)	ALLOY
	50	Nut	A 194 Gr 2H	A 194 Gr 4	A 194 Gr 8	A 194 Gr 2H
3	56	Disc holder	SS 316L	SS 316L	SS 316L	SS 316L

Note:

1. Recommended spare parts
2. Bellows type only
3. Bellows sub-assembly
4. Aluminised alloy steel 50CV4
5. 316 up to 300°C - 17.4 PH up to 427 °C - ALLOY up to 538°C
6. Nozzle and disc are SS 316L stellited for pressure class 900 and above

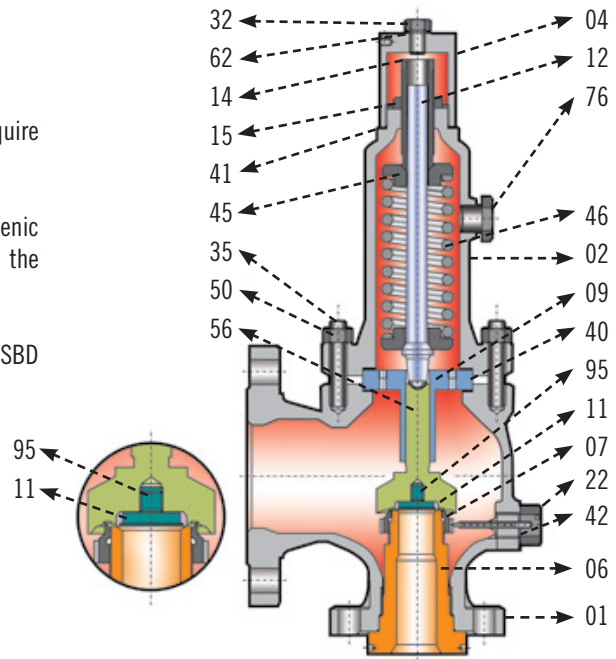
P3 conventional and P4 balanced types

Materials for Cryogenic and Liquefied Natural Gas.

Liquefied Natural Gas and more generally cryogenic applications require special features for the internal materials.

End-users and contractors must be aware that any leakage on cryogenic applications could create an ice ball around the seat and affect the pressure safety valve reliability.

In order to prevent any leakage due to seat damage, Sarasin-RSBD recommend the use of soft seat.



Soft Disc Table

Notes	Part N°	Part Name	Materials for Cryogenic and LNG below -46°C Material code 10
	01	Body	SA 351 Gr CF8M
	02	Bonnet	SA 351 Gr CF8M
	04	Cap	SS 316L
1	06	Nozzle	SS 316L
1	07	Adjusting ring	A 351 Gr CF3M
1	09	Guide	SS 316L
1	11	Disc	(Soft Disc Table)
	12	Spindle	SS 316L
	14	Adjusting screw	SS 316L
	15	Adjusting screw locknut	SS 316L
1,2,3	19	Balanced Bellows	SS 316L
	22	Adjusting ring screw	SS 316L
	35	Bonnet stud	A 320 Gr B8
2,3	37	Bellows plate	SS 316L
1	40	Body/bonnet gasket	SS 316L
1	41	Bonnet/cap gasket	SS 316L
1	42	Adjusting ring screw gasket	SS 316L
1	45	Spring washers (upper & lower)	SS 316L
1	46	Spring	SS 316L
	50	Nut	A 194 Gr 8
3	56	Disc holder	SS 316L
	62	Plug Gasket	SS 316L
	76	Plug	SS 316L
	95	Disc Retainer	SS 316L

Set Pressure (barg)	Seat Material
1 < SP < 26	PTFE
26 < SP < 66	PCTFE
66 < SP < 200	PEEK

Note:

1. Recommended spare parts
2. Bellows type only
3. Bellows sub-assembly
4. Nozzle and disc are SS 316L stellited for pressure class 900 and above

P3 conventional and P4 balanced types

Corrosive and sour gas service

Many process streams in oil and gas industry contain enough H₂S to cause sulfide stress cracking (SSC) in susceptible materials. It exists in two different domains in which two different standards may be applicable:

- Oil and Gas production: NACE MR0175/ISO 15156
 - Part 1 - 2001 : General principles for selection of cracking resistant materials
 - Part 2 - 2003 : Cracking-resistant carbon and low alloy steels, and the use of cast irons.
 - Part 3 - 2003 : Cracking-resistant CRAs (corrosion-resistant alloys) and other alloys.
- Oil and gas refining: NACE MR0103

The last revisions of NACE MR0175/15156 shows results of the inadequacy of some standard materials commonly used in the oil and gas industry. We then highlight this point and ask the end-user to clearly specify the condition of use (fluid details, pressure, temperature) in order to be able to select acceptable materials.

Sarasin-RSBD manufactures a large variety of valves used in sour service. Based on our experience and the last edition of the standards, the definition of the actual critical components in a pressure safety valve should be mutually agreed between the purchaser and Trillium (Sarasin-RSBD).

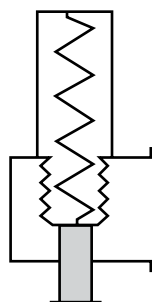
Please note, materials are applicable for NACE MR0175 / ISO 15156 according to the different paragraphs of the standard. As a first approach, we can note the following:

Materials	Paragraph
SA 352 Gr LCC	MR0175 / ISO 15156-2 ¶ A2-1-2
SA 216 Gr WCC	MR0175 / ISO 15156-2 ¶ A2-1-2
SA 217 Gr WC6	MR0175 / ISO 15156-2 ¶ A2-1-2
SA 479 Gr 316L	MR0175 / ISO 15156-3 ¶ A2-2 Table 2
UNS S31803	MR0175 / ISO 15156-3 ¶ A7-2 Table 24
UNS N06625	MR0175 / ISO 15156-3 ¶ A4-2 Table 13
UNS N07750	MR0175 / ISO 15156-3 ¶ A2-9 Table 36

As an example of selection, Trillium can advise the following valve configuration. The conditions here are not so restrictive: temperature limited to 149°C (300°F):

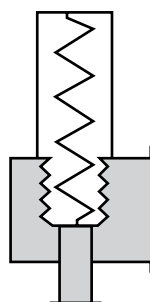
Part	SGA	Applicable paragraph	
01	Body	SA 216 Gr WCC	MR0175/ISO 15156-2 § A2-1-2
06/11	Nozzle / Disc	SA 479 Gr 316L	MR0175/ISO 15156-2 § A2-1-2
	Other parts	Standard	

Part	SGB	Applicable paragraph	
01	Body	SA 216 Gr WCC	MR0175/ISO 15156-2 § A2-1-2
02	Bonnet	SA 216 Gr WCC	MR0175/ISO 15156-2 § A2-1-2
06/11	Nozzle / Disc	SA 479 Gr 316L	MR0175/ISO 15156-3 § A2-2 Table A2
19	Balanced Bellows (if appl.)	UNS N06625 (ALLOY 625)	MR0175/ISO 15156-3 § A4-2 Table A13
46	P3 Spring P4 Spring	UNS N07750 (ALLOY X750) Alloy Steel	MR0175/ISO 15156-3 § A9-2 Table A36
	Other parts	Standard	



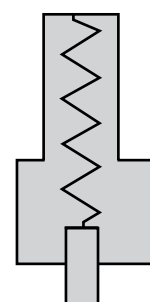
SGA for Starflow P3 & P4:

The backpressure side (secondary pressure zone) of the valve is not pressurized under the conditions defined in the NACE specification and therefore not subject to the specification.



SGB for Starflow P3 & P4:

The backpressure side of the valve is limited by the bellows. The NACE specification will apply to the wet components located in this area.



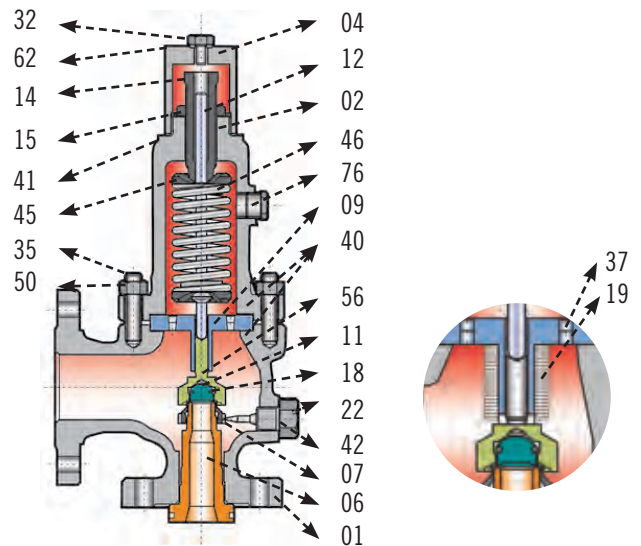
SGB for Starflow P3:

The overall valve is subject to the NACE specification.

P3 conventional and P4 balanced types

Nickel Copper Alloy

Application : corrosive fluid



Notes	Part N°	Part Name	Nickel Copper Alloy					
			P3, P4	P4 Only			P3, P4	
			Material code M1	Material code M2	Material code M3	Material code M4	Material code M5	Material code M6
	01	Body	SA 216 Gr WCC(5)	SA 216 Gr WCC(5)	SA 216 Gr WCC(5)	ALLOY 400	ALLOY 400	ALLOY 400
	02	Bonnet	SA 216 Gr WCC(5)	SA 216 Gr WCC(5)	SA 216 Gr WCC(5)	SA 216 Gr WCC(5)	ALLOY 400	ALLOY 400
	04	Cap	CARBON STEEL	CARBON STEEL	CARBON STEEL	CARBON STEEL	ALLOY 400	ALLOY 400
1	06	Nozzle	ALLOY 500	ALLOY 500	ALLOY 500	ALLOY 500	ALLOY 500	ALLOY 500
1	07	Adjusting ring	A 351 Gr CF3M	A 351 Gr CF3M	ALLOY 400	ALLOY 400	ALLOY 400	ALLOY 400
1	09	Guide	SS 431	SS 431	SS 431	SS 431	ALLOY 400	ALLOY 400
1	11	Disc	ALLOY 500	ALLOY 500	ALLOY 500	ALLOY 500	ALLOY 500	ALLOY 500
	12	Spindle	SS 410	SS 410	SS 410	SS 410	ALLOY 400	ALLOY 400
	14	Adjusting screw	SS 410	SS 410	SS 410	SS 410	ALLOY 400	ALLOY 400
	15	Adjusting screw locknut	SS 316L	SS 316L	SS 316L	SS 316L	ALLOY 400	ALLOY 400
1	18	Retaining ring	ALLOY 625	ALLOY 625	ALLOY 625	ALLOY 625	ALLOY 625	ALLOY 625
1,2,3	19	Balanced Bellows	SS 316L	ALLOY 400	ALLOY 400	ALLOY 400	ALLOY 400	ALLOY 400
	22	Adjusting ring screw	SS 316L	SS 316L	ALLOY 400	ALLOY 400	ALLOY 400	ALLOY 400
	35	Bonnet stud	A 193 Gr B7	A 193 Gr B7	A 193 Gr B7	A 193 Gr B7	A 193 Gr B8	A 193 Gr B8
2,3	37	Bellows plate	SS 316L	MONEL	ALLOY 400	ALLOY 400	ALLOY 400	ALLOY 400
1	40	Body/bonnet gasket	SS	SS	ALLOY 400	ALLOY 400	ALLOY 400	ALLOY 400
1	41	Bonnet/cap gasket	SS	SS	ALLOY 400	ALLOY 400	ALLOY 400	ALLOY 400
1	42	Adjusting ring screw gasket	SS	SS	ALLOY 400	ALLOY 400	ALLOY 400	ALLOY 400
1	45	Spring washers (upper & lower)	CARBON STEEL	CARBON STEEL	CARBON STEEL	CARBON STEEL	ALLOY 400	ALLOY 400
1	46	Spring	ALLOY ST. (4)	ALLOY ST. (4)	ALLOY ST. (4)	ALLOY ST. (4)	ALLOY 400	ALLOY X750
	50	Nut	A 194 Gr 2H	A 194 Gr 2H	A 194 Gr 2H	A 194 Gr 2H	A 194 Gr 8	A 194 Gr 8
3	56	Disc holder	SS 316L	SS 316L	ALLOY 400	ALLOY 400	ALLOY 400	ALLOY 400

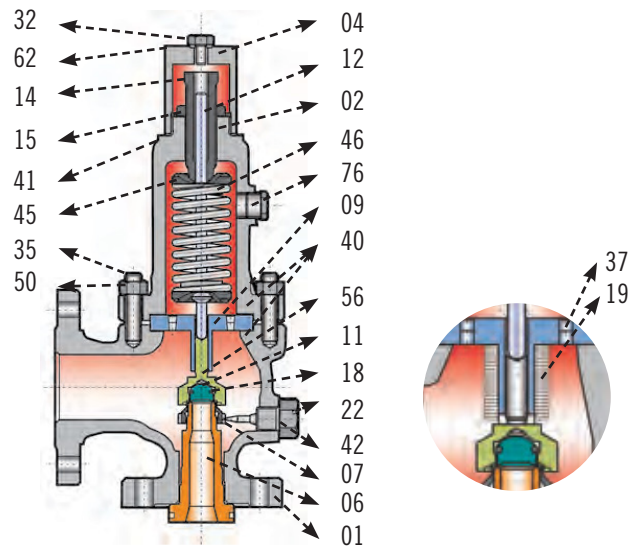
Note:

1. Recommended spare parts
2. Bellows type only
3. Bellows sub-assembly
4. Aluminised steel 50CV4
5. Carbon content less than 0.25%, HRC < 22
6. Standard is Alloy 400 UNS J24135 for castings, UNS N04400 for internals excepted that nozzle and disc is UNS N05500.

P3 conventional and P4 balanced types

Alloy C

Application : corrosive fluid



Notes	Part N°	Part Name	Alloy C				
			P3, P4	P4 Only			P3, P4
			Material code H1	Material code H2	Material code H3	Material code H4	Material code H6
	01	Body	SA 216 Gr WCC(6)	SA 216 Gr WCC(6)	SA 216 Gr WCC(6)	ALLOY C	ALLOY C
	02	Bonnet	SA 216 Gr WCC(6)	SA 216 Gr WCC(6)	SA 216 Gr WCC(6)	SA 216 Gr WCC(6)	ALLOY C
	04	Cap	CARBON STEEL (6)	CARBON STEEL (6)	CARBON STEEL (6)	CARBON STEEL(6)	ALLOY C
1	06	Nozzle	ALLOY C	ALLOY C	ALLOY C	ALLOY C	ALLOY C
1	07	Adjusting ring	A 351 Gr CF3M	A 351 Gr CF3M	ALLOY C	ALLOY C	ALLOY C
1	09	Guide	SS 431	SS 431	SS 431	SS 431	ALLOY C
1	11	Disc	ALLOY C	ALLOY C	ALLOY C	ALLOY C	ALLOY C
	12	Spindle	SS 410	SS 410	SS 410	SS 410	ALLOY C
	14	Adjusting screw	SS 410	SS 410	SS 410	SS 410	ALLOY C
	15	Adjusting screw locknut	SS 316L	SS 316L	SS 316L	SS 316L	ALLOY C
1	18	Retaining ring	ALLOY 625	ALLOY 625	ALLOY 625	ALLOY 625	ALLOY 625
1,2,3	19	Balanced Bellows	SS 316L	ALLOY C	ALLOY C	ALLOY C	ALLOY C
	22	Adjusting ring screw	SS 316L	SS 316L	ALLOY C	ALLOY C	ALLOY C
	35	Bonnet stud	A 193 Gr B7	A 193 Gr B7	A 193 Gr B7	A 193 Gr B7	A 193 Gr B8
2,3	37	Bellows plate	SS 316L	ALLOY C	ALLOY C	ALLOY C	ALLOY C
1	40	Body/bonnet gasket	SS	SS	ALLOY 400	ALLOY 400	ALLOY 400
1	41	Bonnet/cap gasket	SS	SS	ALLOY 400	ALLOY 400	ALLOY 400
1	42	Adjusting ring screw gasket	SS	SS	ALLOY 400	ALLOY 400	ALLOY 400
1	45	Spring washers (upper & lower)	CARBON STEEL	CARBON STEEL	CARBON STEEL	CARBON STEEL	ALLOY C
1	46	Spring	ALLOY ST. (4)	ALLOY ST. (4)	ALLOY ST. (4)	ALLOY ST. (4)	ALLOY X750 (5)
	50	Nut	A 194 Gr 2H	A 194 Gr 2H	A 194 Gr 2H	A 194 Gr 2H	A 194 Gr 8
3	56	Disc holder	SS 316L	SS 316L	ALLOY C	ALLOY C	ALLOY C

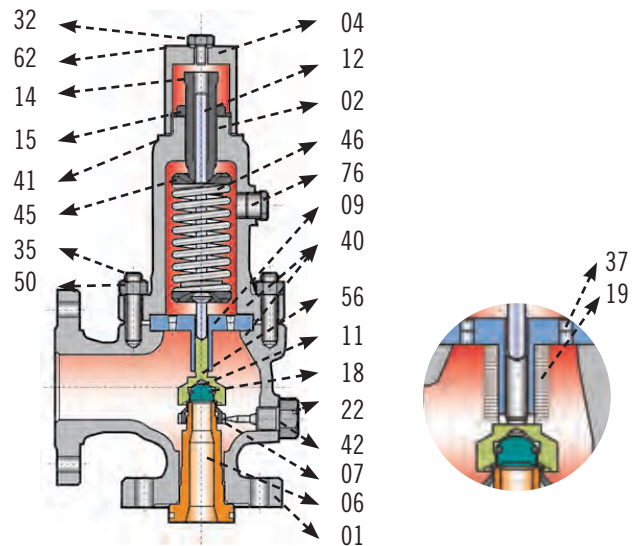
Note:

1. Recommended spare parts
2. Bellows type only
3. Bellows sub-assembly
4. Aluminised steel 50CV4
5. Alloy C on request
6. Carbon content 0.25%, HRC < 22
7. Standard Alloy C type is UNS 10276

P3 conventional and P4 balanced types

Duplex

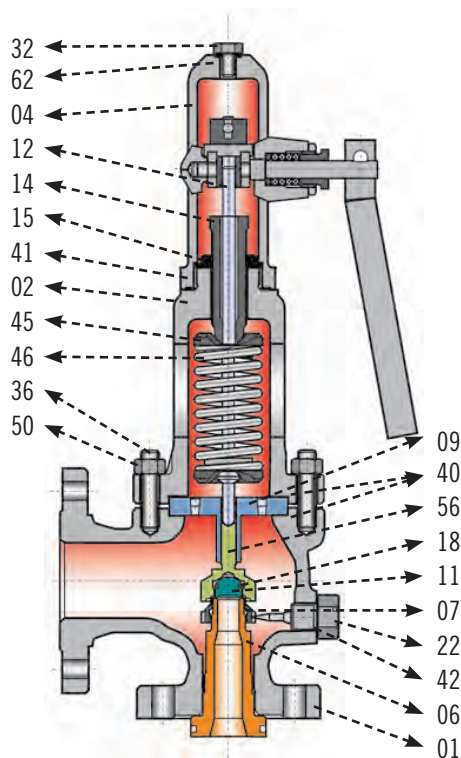
Application : corrosive fluid and offshore



Notes	Part N°	Part Name	Duplex					
			P3, P4	P4 Only			P3, P4	
			Material code D1	Material code D2	Material code D3	Material code D4	Material code D5	Material code D6
	01	Body	SA 216 Gr WCC	SA 216 Gr WCC	SA 216 Gr WCC	DUPLEX (5)	DUPLEX (5)	DUPLEX (5)
	02	Bonnet	SA 216 Gr WCC	SA 216 Gr WCC	SA 216 Gr WCC	SA 216 Gr WCC	DUPLEX (5)	DUPLEX (5)
	04	Cap	CARBON STEEL	CARBON STEEL	CARBON STEEL	CARBON STEEL	DUPLEX (5)	DUPLEX (5)
1	06	Nozzle	DUPLEX (5)	DUPLEX (5)	DUPLEX (5)	DUPLEX (5)	DUPLEX (5)	DUPLEX (5)
1	07	Adjusting ring	A 351 Gr CF3M	A 351 Gr CF3M	DUPLEX (5)	DUPLEX (5)	DUPLEX (5)	DUPLEX (5)
1	09	Guide	SS 431	SS 431	SS 431	SS 431	DUPLEX (5)	DUPLEX (5)
1	11	Disc	DUPLEX (5)	DUPLEX (5)	DUPLEX (5)	DUPLEX (5)	DUPLEX (5)	DUPLEX (5)
	12	Spindle	SS 410	SS 410	SS 410	SS 410	DUPLEX (5)	DUPLEX (5)
	14	Adjusting screw	SS 410	SS 410	SS 410	SS 410	DUPLEX (5)	DUPLEX (5)
	15	Adjusting screw locknut	SS 316L	SS 316L	SS 316L	SS 316L	DUPLEX (5)	DUPLEX (5)
1	18	Retaining ring	ALLOY 625	ALLOY 625	ALLOY 625	ALLOY 625	ALLOY 625	ALLOY 625
1,2,3	19	Balanced Bellows	SS 316L	ALLOY 625	ALLOY 625	ALLOY 625	ALLOY 625	ALLOY 625
	22	Adjusting ring screw	SS 316L	SS 316L	DUPLEX (5)	DUPLEX (5)	DUPLEX (5)	DUPLEX (5)
	35	Bonnet stud	A 193 Gr B7	A 193 Gr B7	A 193 Gr B7	A 193 Gr B7	DUPLEX (5)	DUPLEX (5)
2,3	37	Bellows plate	SS 316L	DUPLEX (5)	DUPLEX (5)	DUPLEX (5)	DUPLEX (5)	DUPLEX (5)
1	40	Body/bonnet gasket	SS	SS	ALLOY 400	ALLOY 400	ALLOY 400	ALLOY 400
1	41	Bonnet/cap gasket	SS	SS	ALLOY 400	ALLOY 400	ALLOY 400	ALLOY 400
1	42	Adjusting ring screw gasket	SS	SS	ALLOY 400	ALLOY 400	ALLOY 400	ALLOY 400
1	45	Spring washers (upper & lower)	CARBON STEEL	CARBON STEEL	CARBON STEEL	CARBON STEEL	ALLOY 400	ALLOY 400
1	46	Spring	ALLOY ST. (4)	ALLOY ST. (4)	ALLOY ST. (4)	ALLOY ST. (4)	SS 316L	ALLOY X750
	50	Nut	A 194 Gr 2H	A 194 Gr 2H	A 194 Gr 2H	A 194 Gr 2H	DUPLEX (5)	DUPLEX (5)
3	56	Disc holder	SS 316L	SS 316L	DUPLEX (5)	DUPLEX (5)	DUPLEX (5)	DUPLEX (5)

Note:

1. Recommended spare parts
2. Bellows type only
3. Bellows sub-assembly
4. Aluminised steel 50CV4
5. Standard Duplex is UNS J92205 (Duplex G4) for castings and UNS 31803 (22%) for internals
6. Option : Superduplex (25%) UNS 32750 or 32760 on request



Valves for steam applications P5 with open bonnet or yoke

Valves for hot water applications P3-P4 with closed bonnet and lifting lever

Standard materials

Notes	Part N°	Part Name	P5 Standard Materials		P3/P4
			Up to 427°C Material code 30	From 427 to 538°C Material code 32 (7)	Up to 427°C Material code 50 (6)
	01	Body	SA 216 Gr WCC	SA 217 Gr WC6	SA 216 Gr WCC
	02	Yoke (1)	SA 216 Gr WCC	SA 216 Gr WCC	SA 216 Gr WCC
	04	Cap	SA 216 Gr WCC	SA 216 Gr WCC	SA 216 Gr WCC
1	06	Nozzle	SS 410 stellited	SS 316 stellited	SS 410 stellited
1	07	Adjusting ring	A 351 Gr CF3M	A 351 Gr CF3M	A 351 Gr CF3M
1	09	Guide	SS 431	SS 431	SS 431
1	11	Disc	SS 17/4 PH	SS 316L stellited	SS 17/4 PH
	12	Spindle	SS 410	SS 410	SS 410
	14	Adjusting screw	SS 410	SS 410	SS 410
	15	Adjusting screw locknut	SS 316L	SS 316L	SS 316L
1	18	Retaining ring	SS	SS	SS
1,2,3	19	Balanced Bellows			SS 316L
	22	Adjusting ring screw	SS 316L	SS 316L	SS 316L
	35	Bonnet stud	A 193 Gr B7	A 194 Gr B16	A 193 B7
2,3	37	Bellows plate			SS 316L
1	40	Body/bonnet gasket	SS	SS	SS
1	41	Bonnet/cap gasket	SS	SS	SS
1	42	Adjusting ring screw gasket	SS	SS	SS
1	45	Spring washers (upper & lower)	CARBON STEEL	CARBON STEEL	CARBON STEEL
1	46	Spring	ALLOY STEEL	ALLOY STEEL	ALLOY STEEL
	50	Nut	A 194 Gr 2H	A 194 Gr 2H	A 194 Gr 2H
3	56	Disc holder	SS 316L	SS 316L	SS 316L

Note:

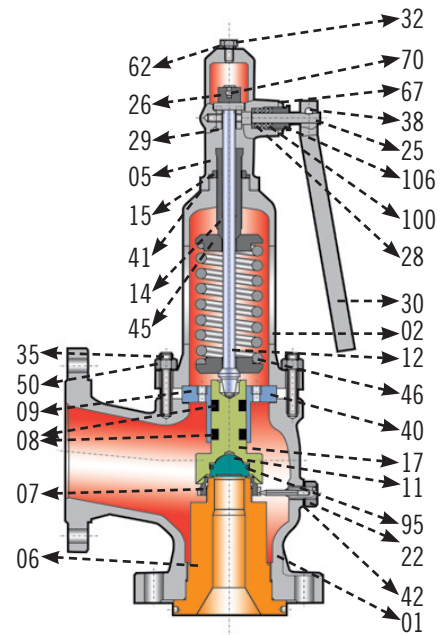
1. Recommended spare parts
2. Bellows type only
3. Bellows sub-assembly
4. Lever is mandatory on steam applications according to ASME, API and ISO standards and some local laws.
5. Open bonnet for code 30 and 32 (till P orifice - Yoke from Q orifice)
6. Lever required for code 50
7. The code was previously '02'

Valves for steam application S5 with open bonnet or yoke

Standard materials

Starflow S5 has been specifically designed for steam process applications. The main improved features compared to a standard API valve design are :

- Enlarged guide to guarantee improved gliding.
- Thermoglide rings to improve gliding and avoid seizing.
- Intrinsically balanced : allows up to 50% back- pressure within the outlet flange rating limits.



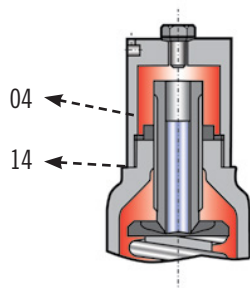
Notes	Part N°	Part Name	S5 Standard Materials	
			Up to 427°C Material code 30	From 427 to 538°C Material code 02
1	01	Body	SA 216 Gr WCC	SA 217 Gr WC6
	02	Yoke	SA 216 Gr WCC	SA 216 Gr WCC
	05	Cap	SA 216 Gr WCC	SA 216 Gr WCC
	06	Nozzle	SS 316 stellited	SS 316 stellited
	07	Adjusting ring	A 351 Gr CF3M	A 351 Gr CF3M
	08	Disc Holder Ring	Thermoglide™	Thermoglide™
	09	Guide	SS 431	SS 431
	11	Disc	SS 660	SS 660
	12	Spindle	SS 410	SS 410
	14	Adjusting screw	SS 410	SS 410
	15	Adjusting screw locknut	SS 316L	SS 316L
	22	Adjusting ring screw	SS 316L	SS 316L
	25	Fork Shaft	SS 316L	SS 316L
	26	Spindle Nut	SS 316L	SS 316L
	28	Lever Ring	SS 316L	SS 316L
	29	Lever Fork	SA 351 Gr. CF3M	SA 351 Gr. CF3M
	30	Lever	CARBON STEEL	CARBON STEEL
	32	Cap Plug	STAINLESS STEEL	STAINLESS STEEL
	35	Bonnet stud	A 193 Gr B7	A 194 Gr B16
	40	Body/bonnet gasket	SS	SS
	41	Bonnet/cap gasket	SS	SS
	42	Adjusting ring screw gasket	SS	SS
	45	Spring washers (upper & lower)	CARBON STEEL	CARBON STEEL
	46	Spring	ALLOY STEEL	ALLOY STEEL
	50	Nut	A 194 Gr 2H	A 194 Gr 2H
	56	Disc Holder	SS 316L	SS 316L
	62	Plug Gasket	STAINLESS STEEL	STAINLESS STEEL
	67	Lever Nut	SS 316L	SS 316L
	95	Retaining ring	SS	SS

Note:

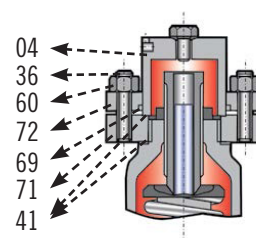
1. Open bonnet till P orifice - Yoke from Q orifice

Cap Types

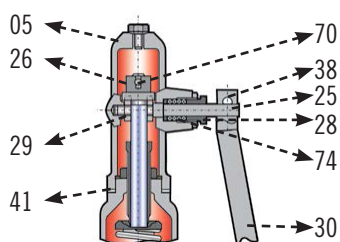
Screwed cap (standard)



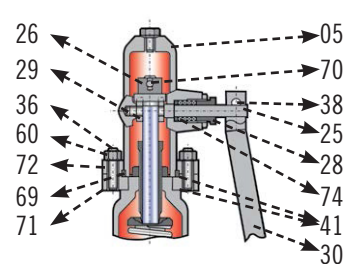
Bolted cap



Packed lever (standard)



Bolted (and packed) lever



Part N°	Part Name	Standard Materials (3)	SS Materials (3)
04	Cap (1)	CARBON STEEL	SS 316L
05	Cap with lever (2)	A 216 Gr WCC	A 351 Gr CF8M
25	Shaft	SS 316L	SS 316L
26	Stem nut	SS 316L	SS 316L
28	Packing press	SS 316L	SS 316L
29	Fork	A 351 Gr CF3M	A 351 Gr CF3M
30	Lever	CARBON STEEL	SS
36	Threaded rod	A 193 Gr B7	A 193 Gr B8T
38	Key	CARBON STEEL	CARBON STEEL
41	Gasket	SS	SS
60	Nuts	A 194 Gr 2H	A 194 Gr 8
69	Retainer ring	SS	SS
70	Pin	SS	SS
71	Lower flange	CARBON STEEL	SS 316L
72	Upper flange	CARBON STEEL	SS 316L
74	Packing	GRAPHITE	PTFE

Note:

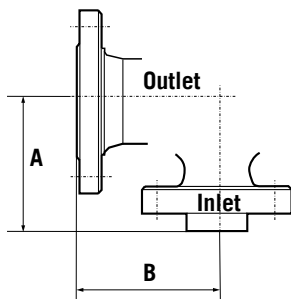
1. Possibility of spindle with threaded end to check set pressure in situ
2. Exists in open version
3. Other materials available according to bill of materials

Standard options

- Inlet and outlet flange : specify flange standard and surface finish if different from standard. ASME B16.5 flanges are identical to EN 1759 flanges.
- Test gag : optional (sometimes named transportation gag)
- Lifting device : STARFLOW safety relief valves, with the exception of the P5 model (open bonnet for steam applications) as well as models P450 and P350 (closed bonnet, balanced bellows or not, for hot water applications) are normally supplied without lifting device.
If the lifting device is necessary it has to be specified for example, to comply with ASME.
Lifting devices may be plain or packed depending on the service requirements.
- Spring material : standard spring materials are those specified in the various bills of material. However, it is possible to specify other spring materials such as tungsten steel, stainless steel, Alloy X750, 17/4 PH etc.
- “STARSOFT” SOFT SEATED VALVE : all STARFLOW safety relief valves can be supplied with a “STARSOFT” soft seat as an option. We strongly encourage the user to select the soft material which is suitable for the intended service. Please check the temperature and chemical compatibility. Without any other specification from the customer, Fluorocarbon will be selected as standard material.
- Bellows material different from AISI 316L (such as Alloy 400 or Alloy 625) can be specified.
- The valves can be steam tested. Any kind of size can be tested upto 85 barg (for small sizes).

Options and special accessories

- Inlet flange to customer’s specification
- Outlet flange to customer’s specification or outlet flange rating above class 150 lbs rating
- Remotely controlled lifting device
- Change in standard bills of material
- Accessories such as cooling spool, valve lift indicator, leak detector, steam jacket, etc.
In case of special options or accessories specification, sufficient information should be supplied to the factory to avoid misunderstanding.

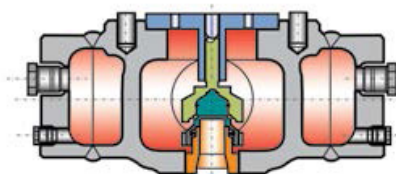


Nominal inlet diameter <4" A and B \pm 1.6 mm
Nominal outlet diameter >4" A and B \pm 3.2 mm

Options and Accessories

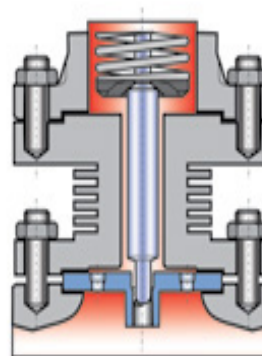
Steam jacket

In order to avoid solidification of the fluid in certain process lines, STARFLOW safety relief valves may be supplied with a steam jacket.



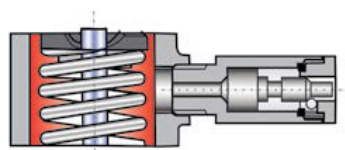
Cooling spool

STARFLOW safety relief valves can be supplied with a cooling spool so as to protect the spring from the fluid temperature.



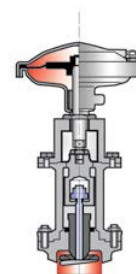
Leak detector

This device can be fitted to balanced bellows safety relief valves to indicate any damage or leakage of the bellows. An indicator switch can also be added to the leak detector.



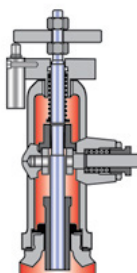
Remote Control Lifting Device

All STARFLOW valves can be equipped with a remote controlled pneumatic lifting device.



Valve opening detector

Electrical switch or explosion proof device indicating valve opening.



Orifice tables Starflow

Orifice	D	E	F	G	H	J	K	L	M	N	P	Q	R	T	V	W
Actual in ²	0.134	0.273	0.373	0.589	0.881	1.457	2.097	3.284	4.093	4.987	7.215	12.91	17.81	28.87	46.75	70.10
API in ²	0.11	0.196	0.307	0.503	0.785	1.287	1.838	2.853	3.6	4.34	6.38	11.05	16	26	-	-
Actual cm ²	0.865	1.76	2.406	3.800	5.684	9.400	13.52	21.42	26.42	32.16	46.55	83.53	114.9	186.2	301.6	452.3
API cm ²	0.71	1.26	1.98	3.24	5.06	8.30	11.86	18.41	23.2	28.0	41.2	71.2	103.2	167.8	-	-

Starflow P Series Selection Tables

How to use the selection tables

The correct STARFLOW model number may be selected by using the following selection tables or the selection diagrams.

These tables and have been established according to API STD 526 last edition, whilst the diagrams have been established according to ASME B16.34 last edition.

There are selection tables and selection diagrams for each orifice size from D to T (API STD 526) +V and W (ASME B16.34).

When the valve orifice size has been selected according to the duty requirements as well as the applicable sizing formula or capacity table (see the sizing section in our technical information catalogue), select the applicable selection table or diagram.

In the applicable selection table or diagram, for the specified service temperature, select the valve in accordance with the required set pressure. Selection diagrams should be used for interpolations.

The table or diagram then specifies the 5 first digits of the STARFLOW coding system. The table also shows the 3 following digits which refer to the service conditions (conventional-balanced bellows steam), as well as the inlet and outlet sizes and ratings, the maximum allowable back pressure and the body and spring materials.

Refer to the table of dimensions for geometric data and weight.

Example :

What is the model number for a 'D' orifice, set at 40 barg and 135°C ?

- Go to the 'D' orifice selection chart and find the location of the intersection 135°C - 40 barg
- Read the model number : P12D2330 (conventional), 1" x D x 2" rating 300 lbs, inlet 1" - 300 lbs, outlet 2" - 150 lbs, A = 104.8 mm, B = 114.3 mm, weight : 18 kg.

Notes :

These tables and diagrams have been issued according to API STD 526 and ASME B16.34. Therefore they do not take into consideration such parameters as corrosion and special service requirements. This data should be considered when selecting a model number. Refer to the section of this catalogue dealing with the different bills of material.

ORIFICE : D

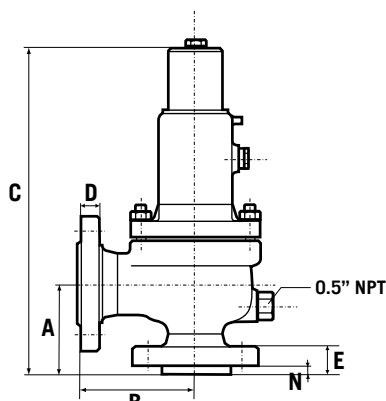
0.71 cm²

0.11 in²

Starflow P Series Selection Table

According to API Std 526 : (edition 2009)

INLET x ORIFICE x OUTLET	ANSI FLANGE RATING		MAX. SET PRESSURE barg (psig)									MAX. BACK PRESSURE (1) barg (psig)		MATERIALS		
	Inlet	Outlet	Model Number	Conventional	Bellows	Steam service	-268°C to -47°C (-450°F to -51°F)	-46°C to -29°C (-50°F to -21°F)	-29°C to +38°C (-20°F to 100°F)	<232°C (<450°F)	<427°C (<800°F)	<538°C (<1000°F)	Conventional	Bellows	Body	Spring
1 D 2	150	150	P12D1	330	430	530			19.8 (285)	13 (185)	5.5 (80)		19.8 (285)	16 (230)	SA 216 Gr. WCC	Alloy Steel
1 D 2	300	150	P12D7	330	430	530			19.8 (285)	19.8 (285)	19.8 (285)		19.8 (285)	16 (230)		
1 D 2	300	150	P12D2	330	430	530			51 (740)	42.4 (615)	29 (410)		19.8 (285)	16 (230)		
1 D 2	600	150	P12D3	330	430	530			102(1480)	85(1235)	58 (825)		19.8 (285)	16 (230)		
1 1/2 D 2	900	300	P72D4	330	430	530			153(2220)	128(1845)	86 (1235)		41 (600)	35 (500)		
1 1/2 D 2	1500	300	P72D5	330	430	530			255(3705)	213(3080)	144(2060)		41 (600)	35 (500)		
1 1/2 D3(4)	2500	300	P73D6	330	430	530			414(6000)	414(6000)	240(3430)		51 (740)	35 (500)		
1 D 2	300	150	P12D2	332	432	502					35 (510)	16 (225)	19.8 (285)	16 (230)	SA 216 Gr. WCC6	High Temp. Alloy Steel
1 D 2	600	150	P12D3	332	432	502					70 (1015)	32 (445)	19.8 (285)	16 (230)		
1 1/2 D 2	900	300	P72D4	332	432	502					105(1525)	46 (670)	41 (600)	35 (500)		
1 1/2 D 2	1500	300	P72D5	332	432	502					176(2540)	79 (1115)	41 (600)	35 (500)		
1 1/2 D3(4)	2500	300	P73D6	332	432	502					293(4230)	128(1860)	51 (740)	35 (500)		
1 D 2	150	150	P12D1	319	419			19.8 (285)					19.8 (285)	16 (230)	SA 352 Gr. LCC	Alloy Steel
1 D 2	300	150	P12D7	319	419			19.8 (285)					19.8 (285)	16 (230)		
1 D 2	300	150	P12D2	319	419			51 (740)					19.8 (285)	16 (230)		
1 D 2	600	150	P12D3	319	419			102(1480)					19.8 (285)	16 (230)		
1 1/2 D 2	900	300	P72D4	319	419			153(2220)					41 (600)	35 (500)		
1 1/2 D 2	1500	300	P72D5	319	419			255(3705)					41 (600)	35 (500)		
1 1/2 D3(4)	2500	300	P73D6	319	419			414(6000)					51 (740)	35 (500)		
1 D 2	150	150	P12D1	316	416		19 (275)						19 (275)	16 (230)	SA 351 Gr. CF8M	Stainless Steel
1 D 2	300	150	P12D7	316	416		19 (275)						19 (275)	16 (230)		
1 D 2	300	150	P12D2	316	416		50 (720)						19 (275)	16 (230)		
1 D 2	600	150	P12D3	316	416		99 (1440)						19 (275)	16 (230)		
1 1/2 D 2	900	300	P72D4	316	416		149(2160)						41 (600)	35 (500)		
1 1/2 D 2	1500	300	P72D5	316	416		248(3600)						41 (600)	35 (500)		
1 1/2 D3(4)	2500	300	P73D6	316	416		276(4000)						50 (720)	35 (500)		

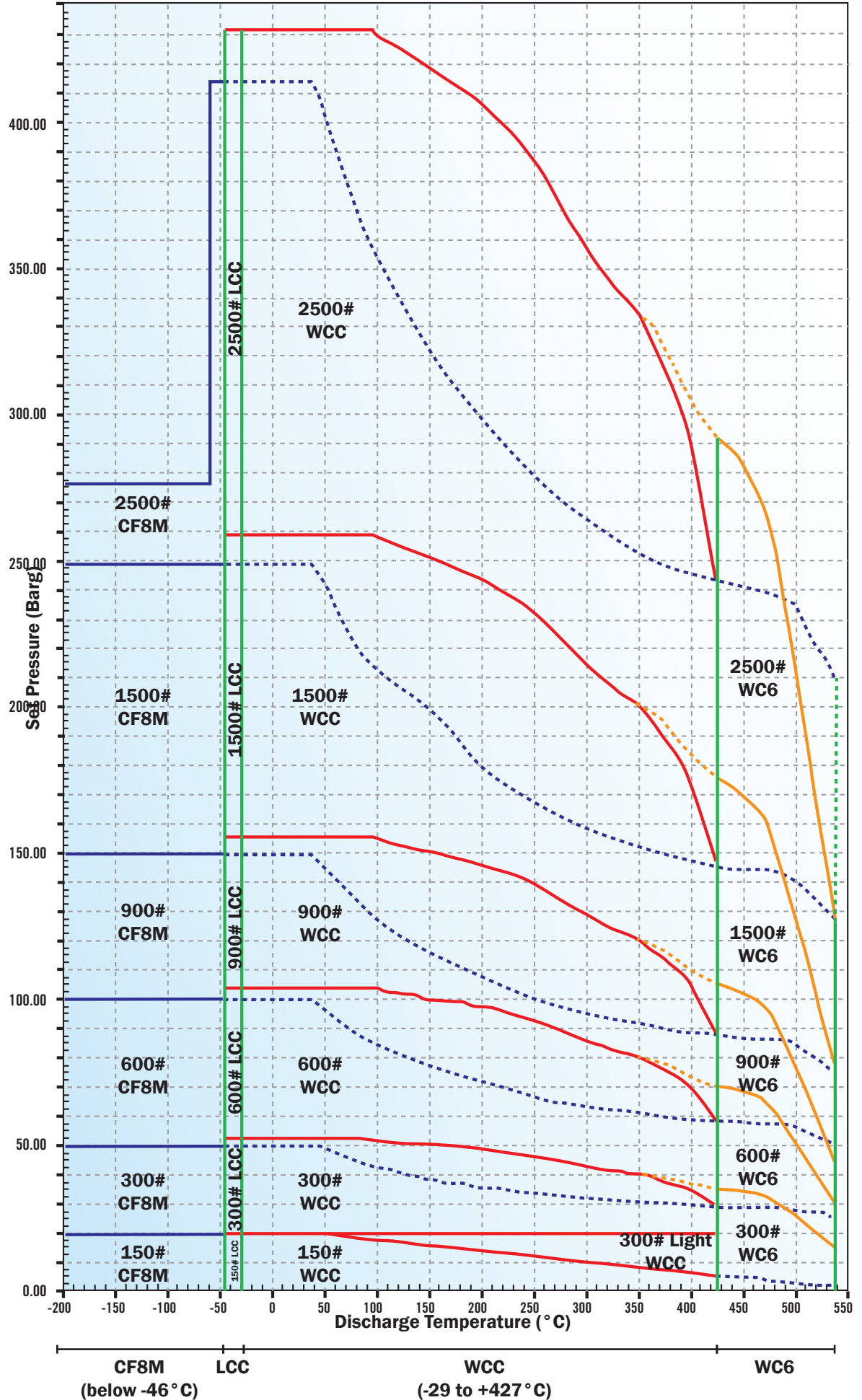


INLET x ORIFICE x OUTLET	ANSI FLANGE RATING		MODEL NUMBER	A(2) mm (in)	B(2) mm (in)	C mm (in)	D mm (in)	E mm (in)	N mm (in)	Approximate weight (3) kg (lbs)
	Inlet	Outlet								
1 D 2	150	150	P12D1	104.8 (4-1/8)	114.3 (4-1/2)	375 (15)	19.1 (3/4)	31 (1-1/4)	12 (1/2)	18 (40)
1 D 2	300	150	P12D7	104.8 (4-1/8)	114.3 (4-1/2)	375 (15)	19.1 (3/4)	31 (1-1/4)	12 (1/2)	18 (40)
1 D 2	300	150	P12D2	104.8 (4-1/8)	114.3 (4-1/2)	375 (15)	19.1 (3/4)	31 (1-1/4)	12 (1/2)	18 (40)
1 D 2	600	150	P12D3	104.8 (4-1/8)	114.3 (4-1/2)	375 (15)	19.1 (3/4)	31 (1-1/4)	12 (1/2)	19 (42)
1 1/2 D 2	900	300	P72D4	104.8 (4-1/8)	139.7 (5-1/2)	480 (19)	22.4 (7/8)	46 (1-13/16)	13 (1/2)	35 (77)
1 1/2 D 2	1500	300	P72D5	104.8 (4-1/8)	139.7 (5-1/2)	480 (19)	22.4 (7/8)	46 (1-13/16)	13 (1/2)	36 (79)
1 1/2 D 3(4)	2500	300	P73D6	139.7 (5-1/2)	177.8 (7)	505 (20)	28.4 (1 1/8)	59 (2-5/16)	13 (1/2)	45 (99)

1. Max. back pressure limits at 38°C; for higher temp. refer to ASME B16.5 flange ratings for conventional valves
2. Tolerances for A and B : ± 1.6 mm (±1/16 in)
3. Valves with lifting lever : add 10%
4. 2 1/2" outlet flange on request in conformity with API Std 526 ed.84, model becomes P75D6

P/T Selection Chart

Orifice D



ORIFICE : E

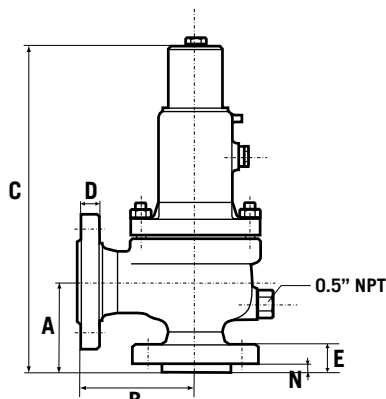
1.26 cm²

0.196 in²

Starflow P Series Selection Table

According to API Std 526 : (edition 2009)

INLET x ORIFICE x OUTLET	ANSI FLANGE RATING						MAX. SET PRESSURE barg (psig)						MAX. BACK PRESSURE (1) barg (psig)		MATERIALS	
	Inlet	Outlet	Model Number	Conventional	Bellows	Steam service	-268°C to -47°C (-450°F to -51°F)	-46°C to -29°C (-50°F to -21°F)	-29°C to +38°C (-20°F to 100°F)	<232°C (<450°F)	<427°C (<800°F)	<538°C (<1000°F)	Conventional	Bellows	Body	Spring
1 E 2	150	150	P12E1	330	430	530			19.8 (285)	13 (185)	5.5 (80)		19.8 (285)	16 (230)	SA 216 Gr. WCC	Alloy Steel
1 E 2	300	150	P12E7	330	430	530			19.8 (285)	19.8 (285)	19.8 (285)		19.8 (285)	16 (230)		
1 E 2	300	150	P12E2	330	430	530			51 (740)	42.4 (615)	29 (410)		19.8 (285)	16 (230)		
1 E 2	600	150	P12E3	330	430	530			102 (1480)	85 (1235)	58 (825)		19.8 (285)	16 (230)		
1½ E 2	900	300	P72E4	330	430	530			153 (2220)	128 (1845)	86 (1235)		41 (600)	35 (500)		
1½ E 2	1500	300	P72E5	330	430	530			255 (3705)	213 (3080)	144 (2060)		41 (600)	35 (500)		
1½ E 3(4)	2500	300	P73E6	330	430	530			414 (6000)	414 (6000)	240 (3430)		51 (740)	35 (500)		
1 E 2	300	150	P12E2	332	432	502					35 (510)	16 (225)	19.8 (285)	16 (230)	SA 216 Gr. WCC6	High Temp. Alloy Steel
1 E 2	600	150	P12E3	332	432	502					70 (1015)	32 (445)	19.8 (285)	16 (230)		
1½ E 2	900	300	P72E4	332	432	502					105 (1525)	46 (670)	41 (600)	35 (500)		
1½ E 2	1500	300	P72E5	332	432	502					176 (2540)	79 (1115)	41 (600)	35 (500)		
1½ E 3(4)	2500	300	P73E6	332	432	502					293 (4230)	128 (1860)	51 (740)	35 (500)		
1 E 2	150	150	P12E1	319	419			19.8 (285)					19.8 (285)	16 (230)	SA 352 Gr. LCC	Alloy Steel
1 E 2	300	150	P12E7	319	419			19.8 (285)					19.8 (285)	16 (230)		
1 E 2	300	150	P12E2	319	419			51 (740)					19.8 (285)	16 (230)		
1 E 2	600	150	P12E3	319	419			102 (1480)					19.8 (285)	16 (230)		
1½ E 2	900	300	P72E4	319	419			153 (2220)					41 (600)	35 (500)		
1½ E 2	1500	300	P72E5	319	419			255 (3705)					41 (600)	35 (500)		
1½ E 3 (4)	2500	300	P73E6	319	419			414 (6000)					51 (740)	35 (500)		
E 2	150	150	P12E1	316	416			19 (275)					19 (275)	16 (230)	SA 351 Gr. CF8M	Stainless Steel
1 E 2	300	150	P12E7	316	416			19 (275)					19 (275)	16 (230)		
1 E 2	300	150	P12E2	316	416			50 (720)					19 (275)	16 (230)		
1 E 2	600	150	P12E3	316	416			99 (1440)					19 (275)	16 (230)		
1½ E 2	900	300	P72E4	316	416			149 (2160)					41 (600)	35 (500)		
1½ E 2	1500	300	P72E5	316	416			248 (3600)					41 (600)	35 (500)		
1½ E 3 (4)	2500	300	P73E6	316	416			276 (4000)					50 (720)	35 (500)		

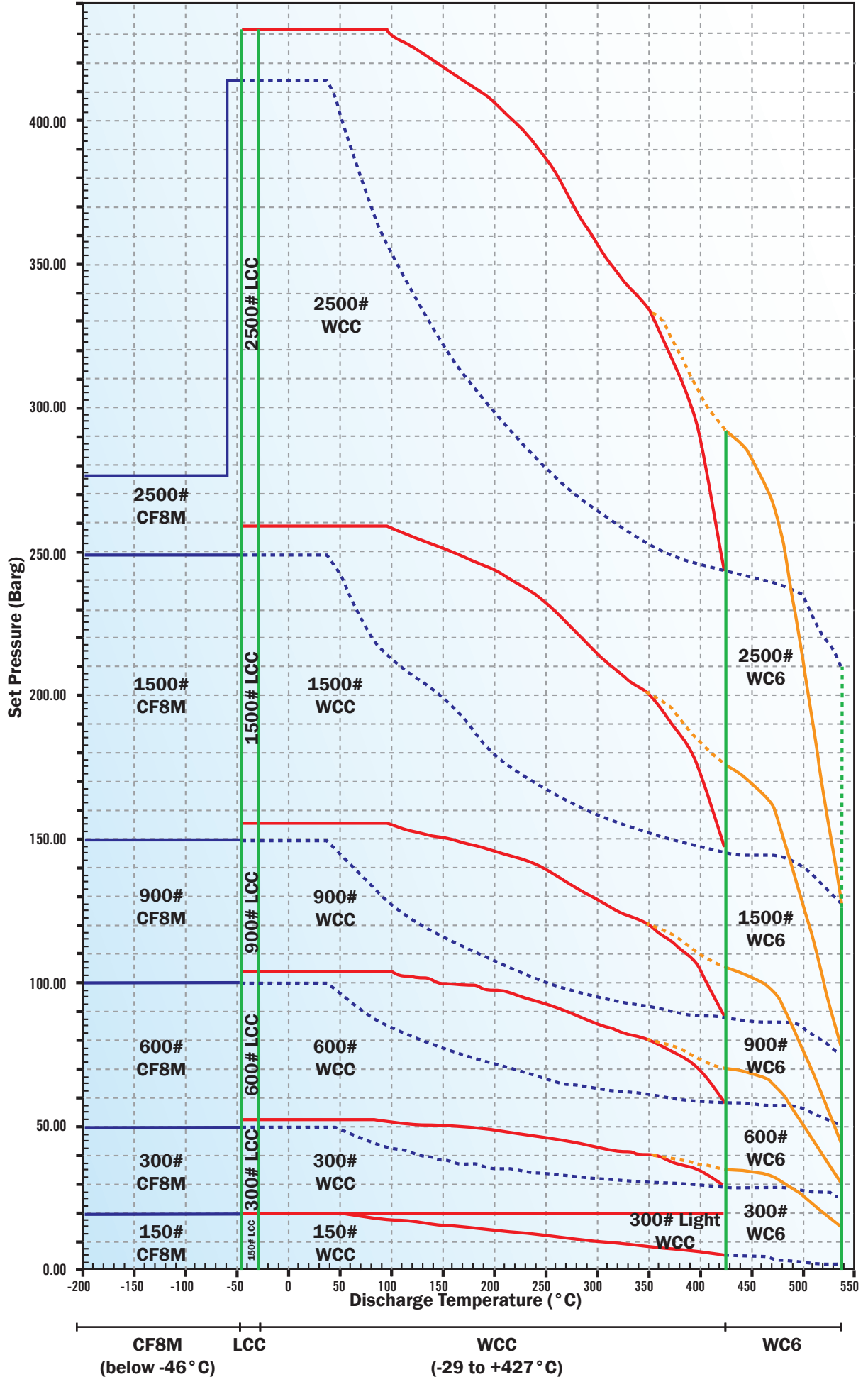


INLET x ORIFICE x OUTLET	ANSI FLANGE RATING		MODEL NUMBER	A(2) mm (in)	B(2) mm (in)	C mm (in)	D mm (in)	E mm (in)	N mm (in)	Approximate weight (3) kg (lbs)
	Inlet	Outlet								
1E2	150	150	P12E1	104.8 (4-1/8)	114.3 (4-1/2)	375 (15)	19.1 (3/4)	31 (1-1/4)	12 (1/2)	18 (40)
1E2	300	150	P12E7	104.8 (4-1/8)	114.3 (4-1/2)	375 (15)	19.1 (3/4)	31 (1-1/4)	12 (1/2)	18 (40)
1E2	300	150	P12E2	104.8 (4-1/8)	114.3 (4-1/2)	375 (15)	19.1 (3/4)	31 (1-1/4)	12 (1/2)	18 (40)
1E2	600	150	P72E3	104.8 (4-1/8)	114.3 (4-1/2)	375 (15)	19.1 (3/4)	31 (1-1/4)	12 (1/2)	19 (42)
1½ E 2	900	300	P72E4	104.8 (4-1/8)	139.7 (5-1/2)	480 (19)	22.4 (7/8)	46 (1-13/16)	13 (1/2)	35 (77)
1½ E 2	1500	300	P72E5	104.8 (4-1/8)	139.7 (5-1/2)	480 (19)	22.4 (7/8)	46 (1-13/16)	13 (1/2)	36 (79)
1½ E 3(4)	2500	300	P73E6	139.7 (5-1/2)	177.8 (7)	505 (20)	28.4 (1-1/2)	59 (2-5/16)	13 (1/2)	45 (99)

1. Max. back pressure limits at 38°C; for higher temp. refer to ASME B16.5 flange ratings for conventional valves
2. Tolerances for A and B : ± 1.6 mm (± 1/8 in)
3. Valves with lifting lever : add 10%
4. 2½" outlet flange on request in conformity with API Std 526 ed. 84, model becomes P75E6

P/T Selection Chart

Orifice E



ORIFICE : F

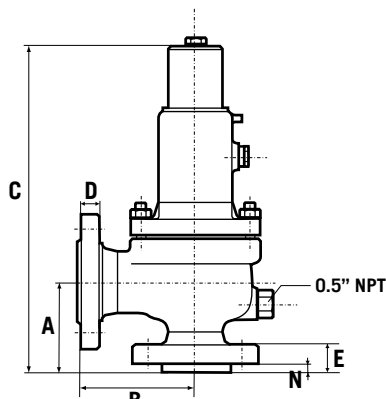
1.98 cm²

0.307 in²

Starflow P Series Selection Table

According to API Std 526 : (edition 2009)

INLET x ORIFICE x OUTLET	ANSI FLANGE RATING						MAX. SET PRESSURE barg (psig)						MAX. BACK PRESSURE (1) barg (psig)		MATERIALS	
	Inlet	Outlet	Model Number	Conventional	Bellows	Steam service	-268°C to -47°C (-450°F to -51°F)	-46°C to -29°C (-50°F to -21°F)	-29°C to +38°C (-20°F to 100°F)	<232°C (<450°F)	<427°C (<800°F)	<538°C (<1000°F)	Conventional	Bellows	Body	Spring
1 1/2 F 2	150	150	P72F1	330	430	530			19.8 (285)	13 (185)	5.5 (80)		19.8 (285)	16 (230)	SA 216 Gr. WCC	Alloy Steel
1 1/2 F 2	300	150	P72F7	330	430	530			19.8 (285)	19.8 (285)	19.8 (285)		19.8 (285)	16 (230)		
1 1/2 F 2	300	150	P72F2	330	430	530			51 (740)	42.4 (615)	29 (410)		19.8 (285)	16 (230)		
1 1/2 F 2	600	150	P72F3	330	430	530			102 (1440)	85 (1235)	58 (825)		19.8 (285)	16 (230)		
1 1/2 F 3 (4)	900	300	P73F4	330	430	530			153 (2220)	128 (1845)	85 (1235)		51 (740)	34 (500)		
1 1/2 F 3 (4)	1500	300	P73F5	330	430	530			255 (3705)	213 (3080)	144 (2060)		51 (740)	34 (500)		
1 1/2 F 3 (4)	2500	300	P73F6	330	430	530			345 (5000)	345 (5000)	240 (3430)		51 (740)	34 (500)		
1 1/2 F 2	300	150	P72F2	332	432	502					35 (510)	15 (225)	19.8 (285)	16 (230)	SA 216 Gr. WCC6	High Temp. Alloy Steel
1 1/2 F 2	600	150	P72F3	332	432	502					70 (1015)	31 (445)	19.8 (285)	16 (230)		
1 1/2 F 3 (4)	900	300	P73F4	332	432	502					105 (1525)	46 (670)	51 (740)	34 (500)		
1 1/2 F 3 (4)	1500	300	P73F5	332	432	502					175 (2540)	77 (1115)	51 (740)	34 (500)		
1 1/2 F 3 (4)	2500	300	P73F6	332	432	502					292 (4230)	128 (1860)	51 (740)	34 (500)		
1 1/2 F 2	150	150	P72F1	319	419			19.8 (285)					19.8 (285)	16 (230)	SA 352 Gr. LCC	Alloy Steel
1 1/2 F 2	300	150	P72F7	319	419			19.8 (285)					19.8 (285)	16 (230)		
1 1/2 F 2	300	150	P72F2	319	419			51 (740)					19.8 (285)	16 (230)		
1 1/2 F 2	600	150	P72F3	319	419			102 (1440)					19.8 (285)	16 (230)		
1 1/2 F 3 (4)	900	300	P73F4	319	419			153 (2220)					51 (740)	34 (500)		
1 1/2 F 3 (4)	1500	300	P73F5	319	419			255 (3705)					51 (740)	34 (500)		
1 1/2 F 3 (4)	2500	300	P73F6	319	419			345 (5000)					51 (740)	34 (500)		
1 1/2 F 2	150	150	P72F1	316	416		19 (275)						19 (275)	16 (230)	SA 351 Gr. CF8M	Stainless Steel
1 1/2 F 2	300	150	P72F7	316	416		19 (275)						19 (275)	16 (230)		
1 1/2 F 2	300	150	P72F2	316	416		50 (720)						19 (275)	16 (230)		
1 1/2 F 2	600	150	P72F3	316	416		99 (1440)						19 (275)	16 (230)		
1 1/2 F 3 (4)	900	300	P73F4	316	416		149 (2160)						50 (720)	34 (500)		
1 1/2 F 3 (4)	1500	300	P73F5	316	416		152 (2200)						50 (720)	34 (500)		
1 1/2 F 3 (4)	2500	300	P73F6	316	416		234 (3400)						50 (720)	34 (500)		

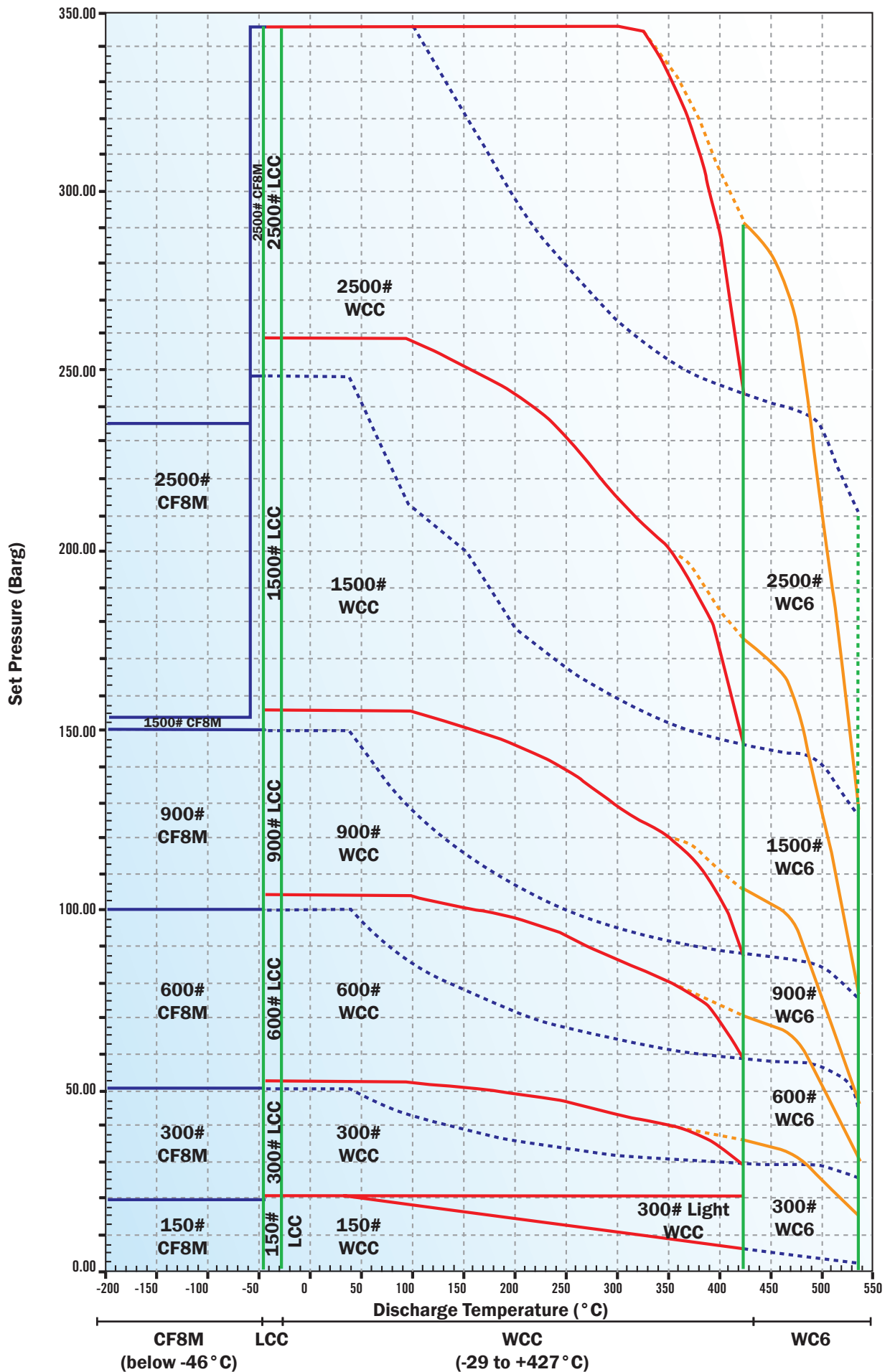


INLET x ORIFICE x OUTLET	ANSI FLANGE RATING		MODEL NUMBER	A(2) mm (in)	B(2) mm (in)	C mm (in)	D mm (in)	E mm (in)	N mm (in)	Approximate weight (3) kg (lbs)
	Inlet	Outlet								
1 1/2 F 2	150	150	P72F1	123.8 (4-7/8)	120.7 (4-3/4)	455 (18)	19.1 (3/4)	34 (1-5/16)	12 (1/2)	25 (55)
1 1/2 F 2	300	150	P72F7	123.8 (4-7/8)	120.7 (4-3/4)	455 (18)	19.1 (3/4)	36 (1-3/8)	12 (1/2)	27 (60)
1 1/2 F 2	300	150	P72F2	123.8 (4-7/8)	152.4 (6)	455 (18)	19.1 (3/4)	36 (1-3/8)	12 (1/2)	27 (60)
1 1/2 F 2	600	150	P72F3	123.8 (4-7/8)	152.4 (6)	455 (18)	19.1 (3/4)	36 (1-3/8)	12 (1/2)	31 (68)
1 1/2 F 3 (4)	900	300	P73F4	123.8 (4-7/8)	165.1 (6-1/2)	505 (20)	28.4 (1-1/8)	46 (1-13/16)	13 (1/2)	44 (97)
1 1/2 F 3 (4)	1500	300	P73F5	123.8 (4-7/8)	165.1 (6-1/2)	505 (20)	28.4 (1-1/8)	46 (1-13/16)	13 (1/2)	44 (97)
1 1/2 F 3 (4)	2500	300	P73F6	139.7 (5-1/2)	177.8 (7)	505 (20)	28.4 (1-1/8)	59 (2-5/16)	13 (1/2)	48 (108)

1. Max. back pressure limits at 38°C; for higher temp. refer to ASME B16.5 flange ratings for conventional valves
2. Tolerances for A and B : ± 1.6 mm (± 1/16 in)
3. Valves with lifting lever : add 10%
4. 2 1/2" outlet flange on request in conformity with API Std 526 ed. 84, model becomes P75F

P/T Selection Chart

Orifice F



ORIFICE : G

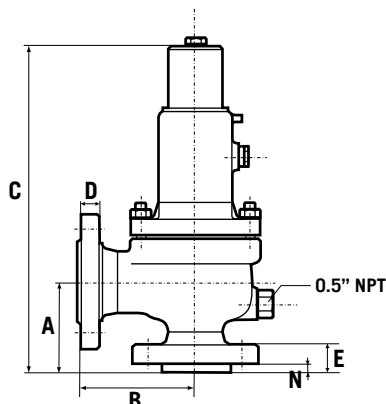
3.24 cm²

0.503 in²

Starflow P Series Selection Table

According to API Std 526 : (edition 2009)

INLET x ORIFICE x OUTLET	ANSI FLANGE RATING		MAX. SET PRESSURE barg (psig)						MAX. BACK PRESSURE (1) barg (psig)		MATERIALS					
	Inlet	Outlet	Model Number	Conventional	Bellows	Steam service	-268°C to -47°C (-450°F to -51°F)	-46°C to -29°C (-50°F to -21°F)	-29°C to +38°C (-20°F to 100°F)	<232°C (<450°F)	<427°C (<800°F)	<538°C (<1000°F)	Conventional	Bellows	Body	Spring
1 1/2 G 3 (4)	150	150	P73G1	330	430	530			19.8 (285)	13 (185)	5.5 (80)		19.8 (285)	16 (230)	SA 216 Gr. WCC	Alloy Steel
1 1/2 G 3 (4)	300	150	P73G7	330	430	530			19.8 (285)	19.8 (285)	19.8 (285)		19.8 (285)	16 (230)		
1 1/2 G 3 (4)	300	150	P73G2	330	430	530			51 (745)	42.4 (615)	29 (410)		19.8 (285)	16 (230)		
1 1/2 G 3 (4)	600	150	P73G3	330	430	530			102 (1440)	85 (1235)	58 (825)		19.8 (285)	16 (230)		
1 1/2 G 3 (4)	900	300	P73G4	330	430	530			153 (2220)	127 (1845)	85 (1235)		51 (740)	32 (470)		
2 G 3	1500	300	P23G5	330	430	530			255 (3705)	212 (3080)	144 (2060)		51 (740)	32 (470)		
2 G 3	2500	300	P23G6	330	430	530			255 (3705)	255 (3705)	240 (3430)		51 (740)	32 (470)		
1 1/2 G 3 (4)	300	150	P73G2	332	432	502					35 (510)	15 (225)	19.8 (285)	16 (230)	SA 216 Gr. WCC6	High Temp. Alloy Steel
1 1/2 G 3 (4)	600	150	P73G3	332	432	502					70 (1015)	31 (445)	19.8 (285)	16 (230)		
1 1/2 G 3 (4)	900	300	P73G4	332	432	502					105 (1525)	46 (670)	51 (740)	34 (500)		
2 G 3	1500	300	P23G5	332	432	502					175 (2540)	77 (1115)	51 (740)	34 (500)		
2 G 3	2500	300	P23G6	332	432	502					255 (3705)	128 (1860)	51 (740)	34 (500)		
1 1/2 G 3 (4)	150	150	P73G1	319	419			19.8 (285)					19.8 (285)	16 (230)	SA 352 Gr. LCC	Alloy Steel
1 1/2 G 3 (4)	300	150	P73G7	319	419			19.8 (285)					19.8 (285)	16 (230)		
1 1/2 G 3 (4)	300	150	P73G2	319	419			51 (745)					19.8 (285)	16 (230)		
1 1/2 G 3 (4)	600	150	P73G3	319	419			102 (1440)					19.8 (285)	16 (230)		
1 1/2 G 3 (4)	900	300	P73G4	319	419			153 (2220)					51 (740)	32 (470)		
2 G 3	1500	300	P23G5	319	419			255 (3705)					51 (740)	32 (470)		
2 G 3	2500	300	P23G6	319	419			255 (3705)					51 (740)	32 (470)		
1 1/2 G 3 (4)	150	150	P73G1	316	416		19 (275)						19 (275)	16 (230)	SA 351 Gr. CF8M	Stainless Steel
1 1/2 G 3 (4)	300	150	P73G7	316	416		19 (275)						19 (275)	16 (230)		
1 1/2 G 3 (4)	300	150	P73G2	316	416		50 (720)						19 (275)	16 (230)		
1 1/2 G 3 (4)	600	150	P73G3	316	416		99 (1440)						19 (275)	16 (230)		
1 1/2 G 3 (4)	900	300	P73G4	316	416		110 (1600)						50 (720)	34 (500)		
2 G 3	1500	300	P23G5	316	416		169 (2450)						50 (720)	34 (500)		
2 G 3	2500	300	P23G6	316	416		179 (2600)						50 (720)	34 (500)		

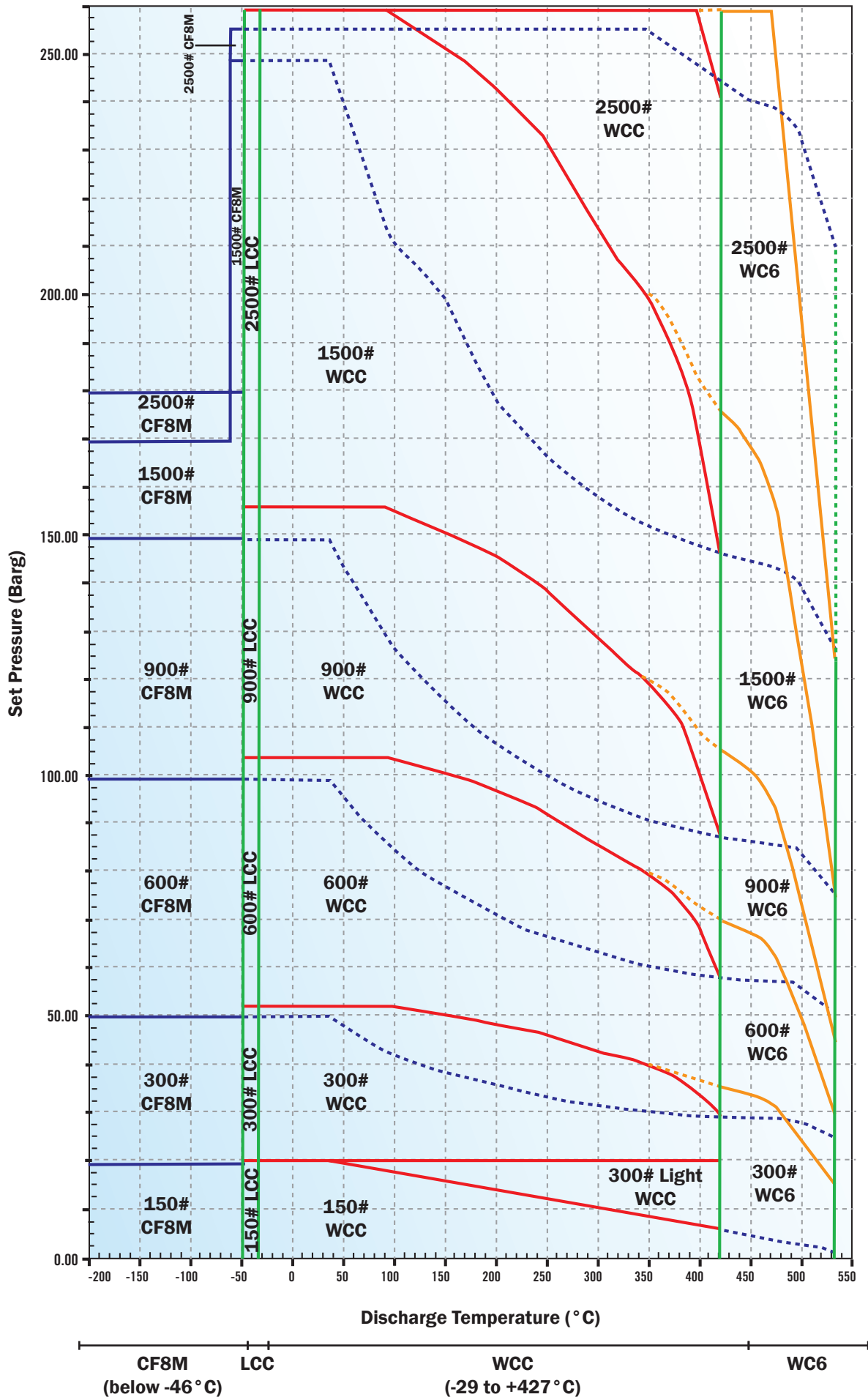


INLET x ORIFICE x OUTLET	ANSI FLANGE RATING		MODEL NUMBER	A(2) mm (in)	B(2) mm (in)	C mm (in)	D mm (in)	E mm (in)	N mm (in)	Approximate weight (3) kg (lbs)
	Inlet	Outlet								
1 1/2 G 3 (4)	150	150	P73G1	123.8 (4-7/8)	120.7 (4-3/4)	455 (18)	23.9 (15/16)	31 (1-1/4)	12 (1/2)	22 (48)
1 1/2 G 3 (4)	300	150	P73G7	123.8 (4-7/8)	120.7 (4-3/4)	455 (18)	23.9 (15/16)	34 (1-5/16)	12 (1/2)	23 (51)
1 1/2 G 3 (4)	300	150	P73G2	123.8 (4-7/8)	152.4 (6)	455 (18)	23.9 (15/16)	36 (1-3/8)	12 (1/2)	25 (55)
1 1/2 G 3 (4)	600	150	P73G3	123.8 (4-7/8)	152.4 (6)	455 (18)	23.9 (15/16)	36 (1-3/8)	12 (1/2)	26 (57)
1 1/2 G 3 (4)	900	300	P73G4	123.8 (4-7/8)	165.1 (6-1/2)	505 (20)	28.4 (1-1/8)	46 (1-13/16)	13 (1/2)	42 (93)
2 G 3	1500	300	P23G5	155.6 (6-1/8)	171.5 (6-3/4)	570 (23)	28.4 (1-1/8)	51 (2)	16 (5/8)	55 (121)
2 G 3	2500	300	P23G6	155.6 (6-1/8)	171.5 (6-3/4)	570 (23)	28.4 (1-1/8)	67 (2-5/8)	16 (5/8)	61 (134)

1. Max. back pressure limits at 38°C; for higher temp. refer to ASME B16.5 flange ratings for conventional valves
2. Tolerances for A and B : ± 1.6 mm (±1/16 in)
3. Valves with lifting lever : add 10%
4. 2 1/2" outlet flange on request in conformity with API Std 526 ed. 84, model becomes P75G

P/T Selection Chart

Orifice G



ORIFICE : H

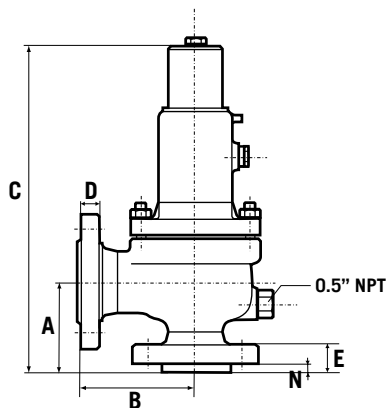
5.06 cm²

0.785 in²

Starflow P Series Selection Table

According to API Std 526 : (edition 2009)

INLET x ORIFICE x OUTLET	ANSI FLANGE RATING						MAX. SET PRESSURE barg (psig)						MAX. BACK PRESSURE (1) barg (psig)		MATERIALS	
	Inlet	Outlet	Model Number	Conventional	Bellows	Steam service	-268°C to -47°C (-450°F to -51°F)	-46°C to -29°C (-50°F to -21°F)	-29°C to +38°C (-20°F to 100°F)	<232°C (<450°F)	<427°C (<800°F)	<538°C (<1000°F)	Conventional	Bellows	Body	Spring
1 1/2 H 3	150	150	P73H1	330	430	530			19.8 (285)	13 (185)	5.5 (80)		19.8 (285)	16 (230)	SA 216 Gr. WCC	Alloy Steel
1 1/2 H 3	300	150	P73H7	330	430	530			19.8 (285)	19.8 (285)	19.8 (285)		19.8 (285)	16 (230)		
2 H 3	300	150	P23H2	330	430	530			51 (740)	42.4 (615)	29 (410)		19.8 (285)	16 (230)		
2 H 3	600	150	P23H3	330	430	530			102 (1480)	85 (1235)	58 (825)		19.8 (285)	16 (230)		
2 H 3	900	150	P23H4	330	430	530			153 (2220)	127 (1845)	85 (1235)		19.8 (285)	16 (230)		
2 H 3	1500	300	P23H5	330	430	530			190 (2750)	190 (2750)	144 (2060)		51 (740)	29 (415)		
2 H 3	300	150	P23H2	332	432	502					35 (510)	15 (225)	19.8 (285)	16 (230)	SA 216 Gr. WC6	High Temp. Alloy Steel
2 H 3	600	150	P23H3	332	432	502					56 (815)	31 (445)	19.8 (285)	16 (230)		
2 H 3	900	150	P23H4	332	432	502					84 (1225)	46 (670)	19.8 (285)	16 (230)		
2 H 3	1500	300	P23H5	332	432	502					141 (2040)	77 (1115)	51 (740)	29 (415)		
1 1/2 H 3	150	150	P73H1	319	419			19.8 (285)					19.8 (285)	16 (230)	SA 352 Gr. LCC	Alloy Steel
1 1/2 H 3	300	150	P73H7	319	419			19.8 (285)					19.8 (285)	16 (230)		
2 H 3	300	150	P23H2	319	419			51 (740)					19.8 (285)	16 (230)		
2 H 3	600	150	P23H3	319	419			102 (1480)					19.8 (285)	16 (230)		
2 H 3	900	150	P23H4	319	419			153 (2220)					19.8 (285)	16 (230)		
2 H 3	1500	300	P23H5	319	419			190 (2750)					51 (740)	29 (415)		
1 1/2 H 3	150	150	P73H1	316	416		19 (275)						19 (275)	16 (230)	SA 351 Gr. CF8M	Stainless Steel
1 1/2 H 3	300	150	P73H7	316	416		19 (275)						19 (275)	16 (230)		
2 H 3	300	150	P23H2	316	416		50 (720)						19 (275)	16 (230)		
2 H 3	600	150	P23H3	316	416		99 (1440)						19 (275)	16 (230)		
2 H 3	900	150	P23H4	316	416		102 (1485)						19 (275)	16 (230)		
2 H 3	1500	300	P23H5	316	416		110 (1600)						29 (415)	29 (415)		

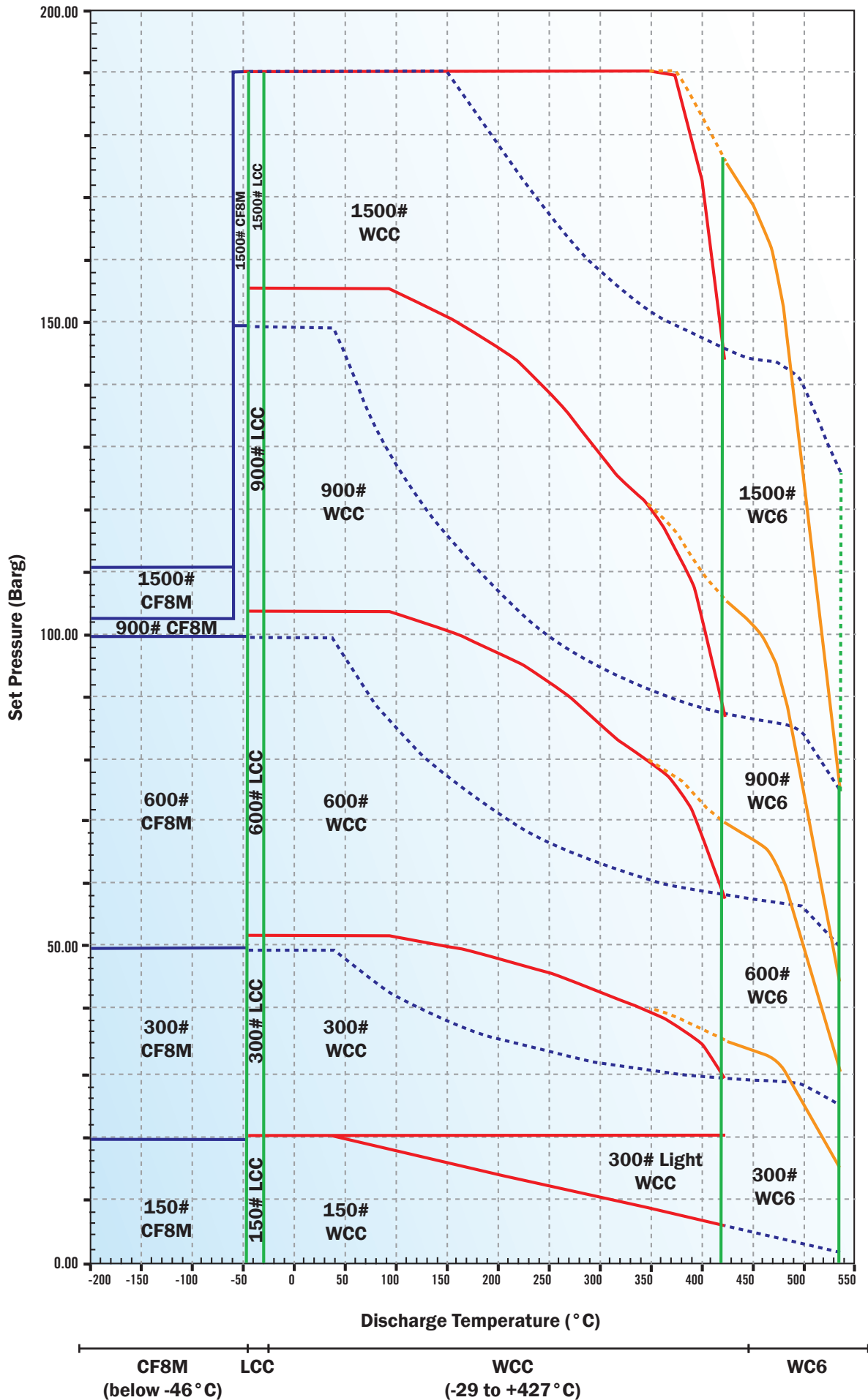


INLET x ORIFICE x OUTLET	ANSI FLANGE RATING		MODEL NUMBER	A(2) mm (in)	B(2) mm (in)	C mm (in)	D mm (in)	E mm (in)	N mm (in)	Approximate weight (3) kg (lbs)
	Inlet	Outlet								
1 1/2 H 3	150	150	P73H1	130.2 (5-1/8)	123.8 (4-7/8)	460 (18)	23.9 (15/16)	33 (1-5/16)	14 (9/16)	23 (51)
1 1/2 H 3	300	150	P73H7	130.2 (5-1/8)	123.8 (4-7/8)	460 (18)	23.9 (15/16)	36 (1-3/8)	14 (9/16)	25 (55)
2 H 3	300	150	P23H2	130.2 (5-1/8)	123.8 (4-7/8)	460 (18)	23.9 (15/16)	38 (1-1/2)	14 (9/16)	27 (60)
2 H 3	600	150	P23H3	154 (6-1/16)	161.9 (6-3/8)	515 (20)	23.9 (15/16)	41 (1-9/16)	14 (9/16)	38 (84)
2 H 3	900	150	P23H4	154 (6-1/16)	161.9 (6-3/8)	570 (22-1/2)	23.9 (15/16)	55 (2-1/16)	14 (9/16)	51 (112)
2 H 3	1500	300	P23H5	154 (6-1/16)	161.9 (6-3/8)	570 (22-1/2)	28.4 (1-1/8)	55 (2-1/16)	14 (9/16)	55 (121)

1. Max. back pressure limits at 38°C; for higher temp. refer to ASME B16.5 flange ratings for conventional valves
2. Tolerances for A and B : ± 1.6 mm (±1/16 in)
3. Valves with lifting lever : add 10%

P/T Selection Chart

Orifice H



ORIFICE : J

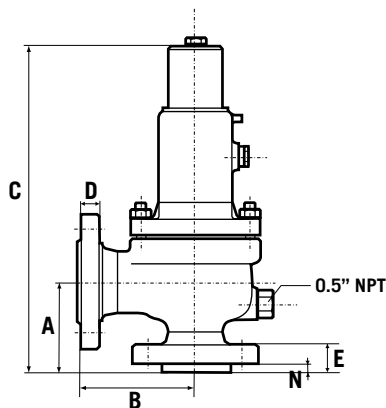
8.30 cm²

1.287 in²

Starflow P Series Selection Table

According to API Std 526 : (edition 2009)

INLET x ORIFICE x OUTLET	ANSI FLANGE RATING						MAX. SET PRESSURE barg (psig)						MAX. BACK PRESSURE (1) barg (psig)		MATERIALS	
	Inlet	Outlet	Model Number	Conventional	Bellows	Steam service	-268°C to -47°C (-450°F to -51°F)	-46°C to -29°C (-50°F to -21°F)	-29°C to +38°C (-20°F to 100°F)	<232°C (<450°F)	<427°C (<800°F)	<538°C (<1000°F)	Conventional	Bellows	Body	Spring
2 J 3	150	150	P23J1	330	430	530			19.8 (285)	13 (185)	5.5 (80)		19.8 (285)	16 (230)	SA 216 Gr. WCC	Alloy Steel
2 J 3	300	150	P23J7	330	430	530			19.8 (285)	19.8 (285)	19.8 (285)		19.8 (285)	16 (230)		
3 J 4 (5)	300	150	P34J2	330	430	530			51 (740)	42.4 (615)	29 (410)		19.8 (285)	16 (230)		
3 J 4 (5)	600	150	P34J3	330	430	530			102 (1480)	85 (1235)	58 (825)		19.8 (285)	16 (230)		
3 J 4	900	150	P34J4	330	430	530			153 (2220)	127 (1845)	85 (1235)		19.8 (285)	16 (230)		
3 J 4	1500	300	P34J5	330	430	530			186 (2700)	186 (2700)	144 (2060)		41 (600)	16 (230)		
3 J 4 (5)	300	150	P34J2	332	432	502					35 (510)	15 (225)	19.8 (285)	16 (230)	SA 216 Gr. WC6	High Temp. Alloy Steel
3 J 4 (5)	600	150	P34J3	332	432	502					56 (815)	31 (445)	19.8 (285)	16 (230)		
3 J 4	900	150	P34J4	332	432	502					84 (1225)	46 (670)	19.8 (285)	16 (230)		
3 J 4	1500	300	P34J5	332	432	502					141 (2040)	77 (1115)	41 (600)	16 (230)		
2 J 3	150	150	P23J1	319	419			19.8 (285)					19.8 (285)	16 (230)	SA 352 Gr. LCC	Alloy Steel
2 J 3	300	150	P23J7	319	419			19.8 (285)					19.8 (285)	16 (230)		
3 J 4 (5)	300	150	P34J2	319	419			51 (740)					19.8 (285)	16 (230)		
3 J 4 (5)	600	150	P34J3	319	419			102 (1480)					19.8 (285)	16 (230)		
3 J 4	900	150	P34J4	319	419			153 (2220)					19.8 (285)	16 (230)		
3 J 4	1500	300	P34J5	319	419			186 (2700)					41 (600)	16 (230)		
2 J 3	150	150	P23J1	316	416		19 (275)						19 (275)	16 (230)	SA 351 Gr. CF8M	Stainless Steel
2 J 3	300	150	P23J7	316	416		19 (275)						19 (275)	16 (230)		
3 J 4 (5)	300	150	P34J2	316	416		34 (500)						19 (275)	16 (230)		
3 J 4 (5)	600	150	P34J3	316	416		43 (625)						19 (275)	16 (230)		
3 J 4	900	150	P34J4	316	416		55 (800)						19 (275)	16 (230)		
3 J 4	1500	300	P34J5	316	416		55 (800)						41 (600)	16 (230)		

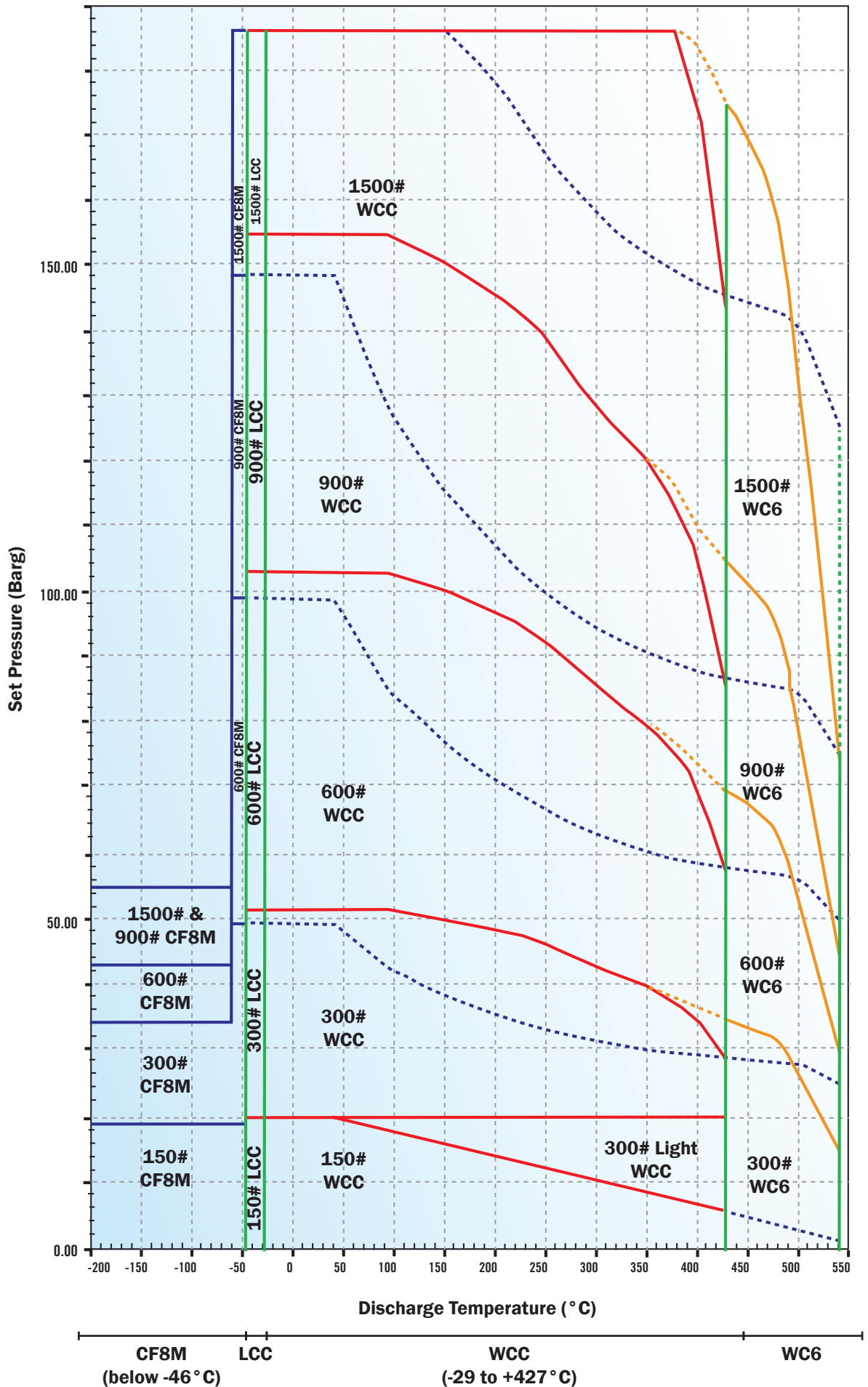


INLET x ORIFICE x OUTLET	ANSI FLANGE RATING		MODEL NUMBER	A(2) mm (in)	B(2) mm (in)	C mm (in)	D mm (in)	E mm (in)	N mm (in)	Approximate weight (3) kg (lbs)
	Inlet	Outlet								
2 J 3	150	150	P23J1	136.5 (5-3/8)	123.8 (4-7/8)	515 (20)	23.9 (15/16)	33 (1-5/16)	14 (9/16)	33 (73)
2 J 3	300	150	P23J7	136.5 (5-3/8)	123.8 (4-7/8)	515 (20)	23.9 (15/16)	38 (1-1/2)	14 (9/16)	35 (77)
3 J 4 (5)	300	150	P34J2	184.1 (7-1/4)	181 (7-1/8)	550 (22)	23.9 (15/16)	44 (1-3/4)	14 (9/16)	49 (108)
3 J 4 (5)	600	150	P34J3	184.1 (7-1/4)	181 (7-1/8)	590 (23)	23.9 (15/16)	47 (1-7/8)	14 (9/16)	60 (132)
3 J 4	900	150	P34J4	184.1 (7-1/4)	181 (7-1/8)	765 (30)	23.9 (15/16)	54 (2-1/16)	14 (9/16)	97 (213)
3 J 4	1500	300	P34J5	184.1 (7-1/4)	181 (7-1/8)	765 (30)	31.8 (1-1/4)	64 (2-1/2)	14 (9/16)	108 (238)

1. Max. back pressure limits at 38°C; for higher temp. refer to ASME B16.5 flange ratings for conventional valves
2. Tolerances for A and B : ± 1.6 mm (±1/16 in)
3. Valves with lifting lever : add 10%
4. 2½" inlet flange on request in conformity with API Std 526 ed. 84, model becomes P54J

P/T Selection Chart

Orifice J



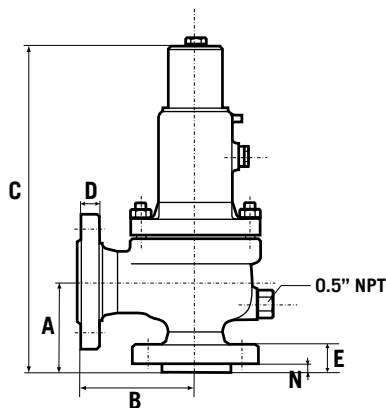
ORIFICE : K

11.86 cm²
1.838 in²

Starflow P Series Selection Table

According to API Std 526 : (edition 2009)

INLET x ORIFICE x OUTLET	ANSI FLANGE RATING		MAX. SET PRESSURE barg (psig)						MAX. BACK PRESSURE (1) barg (psig)		MATERIALS					
	Inlet	Outlet	Model Number	Conventional	Bellows	Steam service	-268°C to -47°C (-450°F to -51°F)	-46°C to -29°C (-50°F to -21°F)	-29°C to +38°C (-20°F to 100°F)	<232°C (<450°F)	<427°C (<800°F)	<538°C (<1000°F)	Conventional	Bellows	Body	Spring
3 K 4	150	150	P34K1	330	430	530			19.8 (285)	13 (185)	5.5 (80)		19.8 (285)	10 (150)	SA 216 Gr. WCC	Alloy Steel
3 K 4	300	150	P34K7	330	430	530			19.8 (285)	19.8 (285)	19.8 (285)		19.8 (285)	10 (150)		
3 K 4	300	150	P34K2	330	430	530			51 (740)	42.4 (615)	29 (410)		19.8 (285)	10 (150)		
3 K 4	600	150	P34K3	330	430	530			102 (1480)	85 (1235)	58 (825)		19.8 (285)	14 (200)		
3 K 6	900	150	P36K4	330	430	530			153 (2220)	127 (1845)	85 (1235)		19.8 (285)	14 (200)		
3 K 6	1500	300	P36K5	330	430	530			153 (2220)	153 (2220)	144 (2060)		41 (600)	14 (200)		
3 K 4	300	150	P34K2	332	432	502					35 (510)	15 (225)	19.8 (285)	10 (150)	SA 216 Gr. WC6	High Temp. Alloy Steel
3 K 4	600	150	P34K3	332	432	502					56 (815)	31 (445)	19.8 (285)	14 (200)		
3 K 6	900	150	P36K4	332	432	502					84 (1225)	46 (670)	19.8 (285)	14 (200)		
3 K 6	1500	300	P36K5	332	432	502					141 (2040)	77 (1115)	41 (600)	14 (200)		
3 K 4	150	150	P34K1	319	419			19.8 (285)					19.8 (285)	10 (150)	SA 352 Gr. LCC	Alloy Steel
3 K 4	300	150	P34K7	319	419			19.8 (285)					19.8 (285)	10 (150)		
3 K 4	300	150	P34K2	319	419			51 (740)					19.8 (285)	10 (150)		
3 K 4	600	150	P34K3	319	419			102 (1480)					19.8 (285)	14 (200)		
3 K 6	900	150	P36K4	319	419			153 (2220)					19.8 (285)	14 (200)		
3 K 6	1500	300	P36K5	319	419			153 (2220)					41 (600)	14 (200)		
3 K 4	150	150	P34K1	316	416		19 (275)						19 (275)	10 (150)	SA 351 Gr. CF8M	Stainless Steel
3 K 4	300	150	P34K7	316	416		19 (275)						19 (275)	10 (150)		
3 K 4	300	150	P34K2	316	416		36 (525)						19 (275)	10 (150)		
3 K 4	600	150	P34K3	316	416		41 (600)						19 (275)	14 (200)		
3 K 6	900	150	P36K4	316	416		41 (600)						19 (275)	14 (200)		
3 K 6	1500	300	P36K5	316	416		52 (750)						41 (600)	14 (200)		

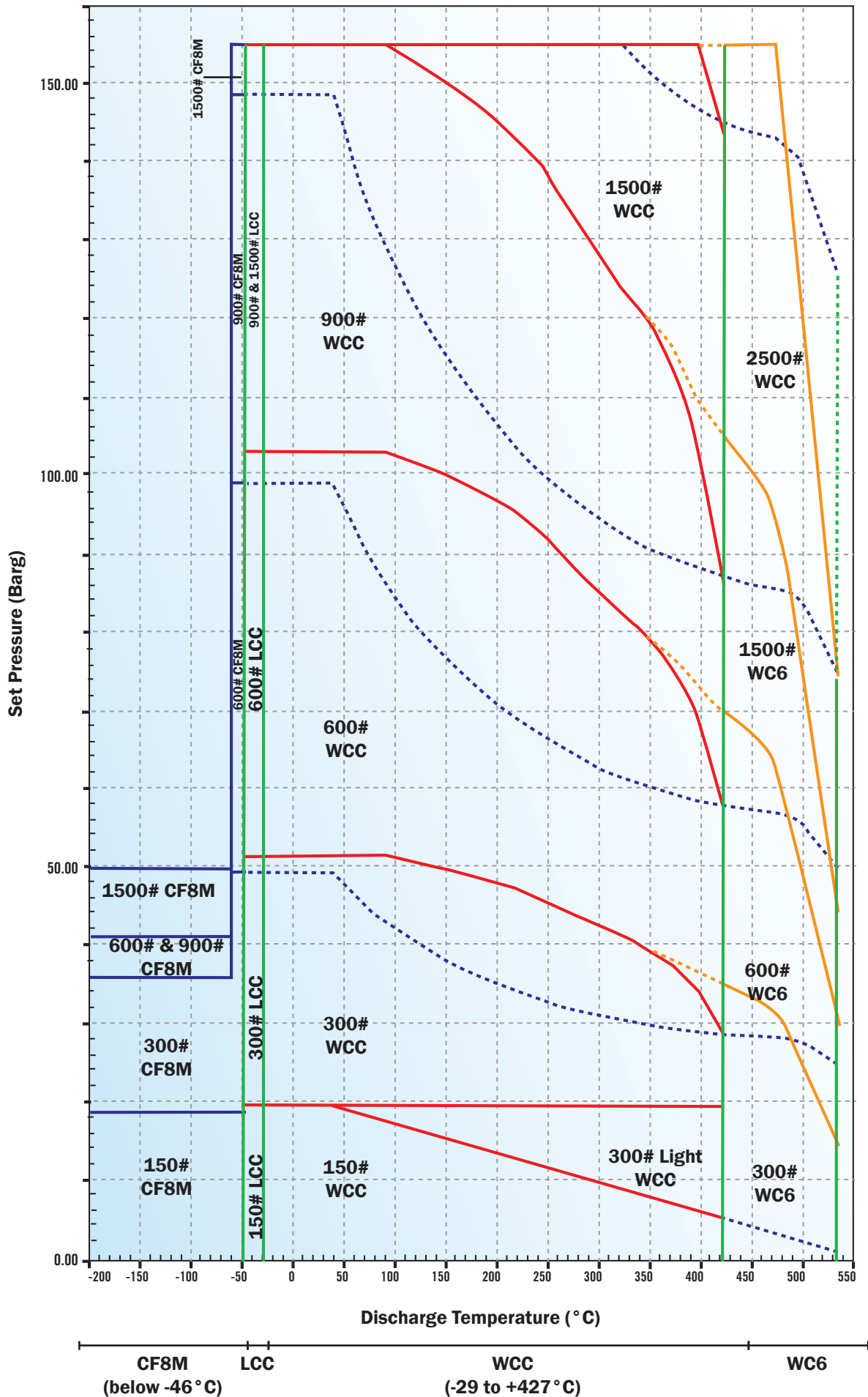


INLET x ORIFICE x OUTLET	ANSI FLANGE RATING		MODEL NUMBER	A(2) mm (in)	B(2) mm (in)	C mm (in)	D mm (in)	E mm (in)	N mm (in)	Approximate weight (3) kg (lbs)
	Inlet	Outlet								
3 K 4	150	150	P34K1	155.5 (6-1/8)	161.9 (6-3/8)	580 (23)	23.9 (15/16)	39 (1-1/4)	14 (9/16)	49 (108)
3 K 4	300	150	P34K7	155.5 (6-1/8)	161.9 (6-3/8)	580 (23)	23.9 (15/16)	45 (1-3/4)	14 (9/16)	54 (120)
3 K 4	300	150	P34K2	155.5 (6-1/8)	161.9 (6-3/8)	580 (23)	23.9 (15/16)	45 (1-3/4)	14 (9/16)	56 (123)
3 K 4	600	150	P34K3	184.1 (7-1/4)	181 (7-1/8)	635 (25)	23.9 (15/16)	47 (1-7/8)	14 (9/16)	68 (150)
3 K 6	900	150	P36K4	198.4 (7-13/16)	215.9 (8-1/2)	785 (31)	25.4 (1)	53 (2-1/16)	14 (9/16)	112 (247)
3 K 6	1500	300	P36K5	196.8 (7-3/4)	215.9 (8-1/2)	785 (31)	36.6 (1-7/16)	63 (2-7/16)	14 (9/16)	125 (275)

1. Max. back pressure limits at 38°C; for higher temp. refer to ASME B16.5 flange ratings for conventional valves
2. Tolerances for A and B : ± 1.6 mm (±1/16 in)
3. Valves with lifting lever : add 10%

P/T Selection Chart

Orifice K



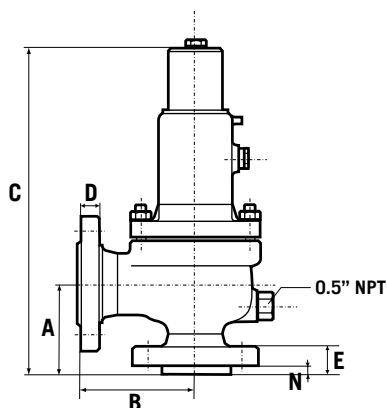
ORIFICE : L

18.41 cm²
2.853 in²

Starflow P Series Selection Table

According to API Std 526 : (edition 2009)

INLET x ORIFICE x OUTLET	ANSI FLANGE RATING						MAX. SET PRESSURE barg (psig)						MAX. BACK PRESSURE (1) barg (psig)		MATERIALS	
	Inlet	Outlet	Model Number	Conventional	Bellows	Steam service	-268°C to -47°C (-450°F to -51°F)	-46°C to -29°C (-50°F to -21°F)	-29°C to +38°C (-20°F to 100°F)	<-232°C (<-450°F)	<-427°C (<-800°F)	<-538°C (<-1000°F)	Conventional	Bellows	Body	Spring
3 L 4	150	150	P34L1	330	430	530			19.8 (285)	13 (185)	5.5 (80)		19.8 (285)	7 (100)	SA 216 Gr. WCC	Alloy Steel
3 L 4	300	150	P34L7	330	430	530			19.8 (285)	19.8 (285)	19.8 (285)		19.8 (285)	7 (100)		
4 L 6	300	150	P46L2	330	430	530			51 (740)	42.4 (615)	28 (410)		19.8 (285)	12 (170)		
4 L 6	600	150	P46L3	330	430	530			69 (1000)	69 (1000)	57 (825)		19.8 (285)	12 (170)		
4 L 6	900	150	P46L4	330	430	530			103 (1500)	103 (1500)	85 (1235)		19.8 (285)	12 (170)		
4 L 6	1500	150	P46L5	330	430	530				103 (1500)	103 (1500)		19.8 (285)	12 (170)		
4 L 6	300	150	P46L2	332	432	502					35 (510)	16 (225)	19.8 (285)	12 (170)	SA 216 Gr. WCC6	High Temp. Alloy Steel
4 L 6	600	150	P46L3	332	432	502					69 (1000)	31 (445)	19.8 (285)	12 (170)		
4 L 6	900	150	P46L4	332	432	502					103 (1500)	46 (670)	19.8 (285)	12 (170)		
4 L 6	1500	150	P46L5	332	432	502					103 (1500)	76 (1115)	19.8 (285)	12 (170)		
3 L 4	150	150	P34L1	319	419			19.8 (285)					19.8 (285)	7 (100)	SA 352 Gr. LCC	Alloy Steel
3 L 4	300	150	P34L7	319	419			19.8 (285)					19.8 (285)	7 (100)		
4 L 6	300	150	P46L2	319	419			51 (740)					19.8 (285)	12 (170)		
4 L 6	600	150	P46L3	319	419			69 (1000)					19.8 (285)	12 (170)		
4 L 6	900	150	P46L4	319	419			103 (1500)					19.8 (285)	12 (170)		
3 L 4	150	150	P34L1	316	416			19 (275)					19 (275)	7 (100)	SA 351 Gr. CF8M	Stainless Steel
3 L 4	300	150	P34L7	316	416			19 (275)					19 (275)	7 (100)		
4 L 6	300	150	P46L2	316	416			37 (535)					19 (275)	12 (170)		
4 L 6	600	150	P46L3	316	416			37 (535)					19 (275)	12 (170)		
4 L 6	900	150	P46L4	316	416			48 (700)					19 (275)	12 (170)		

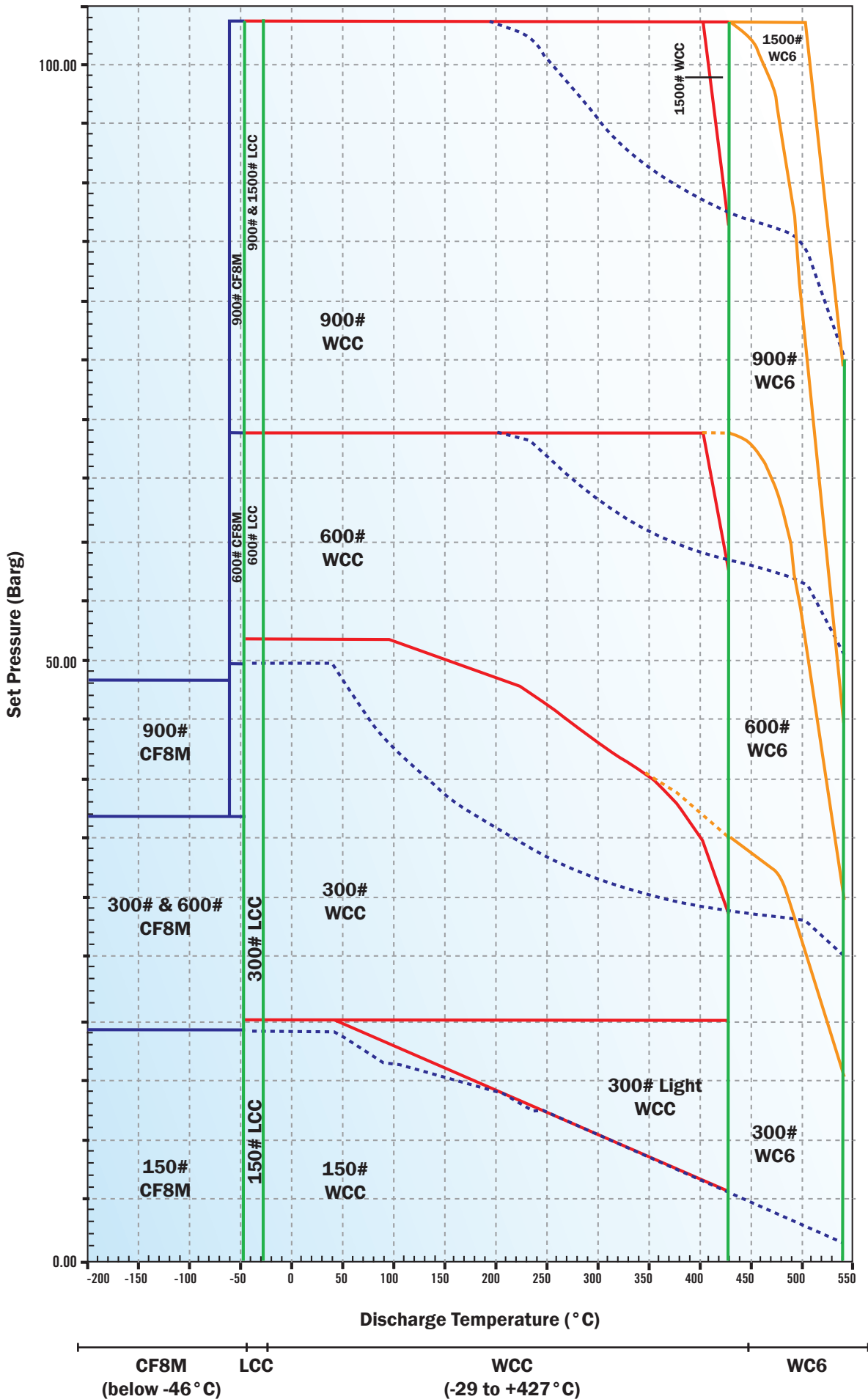


INLET x ORIFICE x OUTLET	ANSI FLANGE RATING		MODEL NUMBER	A(2) mm (in)	B(2) mm (in)	C mm (in)	D mm (in)	E mm (in)	N mm (in)	Approximate weight (3) kg (lbs)
	Inlet	Outlet								
3 L 4	150	150	P34L1	155.6 (6-1/8)	165.1 (6-1/2)	580 (23)	23.9 (15/16)	39 (1-1/2)	14 (9/16)	51 (112)
3 L 4	300	150	P34L7	155.6 (6-1/8)	165.1 (6-1/2)	580 (23)	23.9 (15/16)	45 (1-3/4)	14 (9/16)	57 (126)
4 L 6	300	150	P46L2	179.4 (7-1/16)	181 (7-1/8)	785 (31)	25.4 (1)	49 (1-15/16)	15.5 (5/8)	95 (210)
4 L 6	600	150	P46L3	179.4 (7-1/16)	203.2 (8)	845 (34)	25.4 (1)	56 (2-1/4)	15.5 (5/8)	115 (254)
4 L 6	900	150	P46L4	196.9 (7-3/4)	222.2 (8-3/4)	875 (35)	25.4 (1)	68 (2-11/16)	14.5 (9/16)	140 (310)
4 L 6	1500	150	P46L5	196.9 (7-3/4)	222.2 (8-3/4)	875 (35)	25.4 (1)	68 (2-11/16)	14.5 (9/16)	155 (342)

1. Max. back pressure limits at 38°C; for higher temp. refer to ASME B16.5 flange ratings for conventional valves
2. Tolerances for A and B : ± 1.6 mm (±1/16 in)
3. Valves with lifting lever : add 10%

P/T Selection Chart

Orifice L



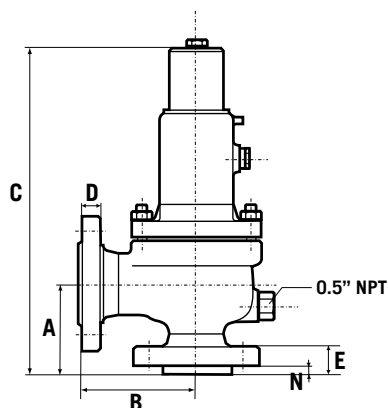
ORIFICE : M

23.2 cm²
3.60 in²

Starflow P Series Selection Table

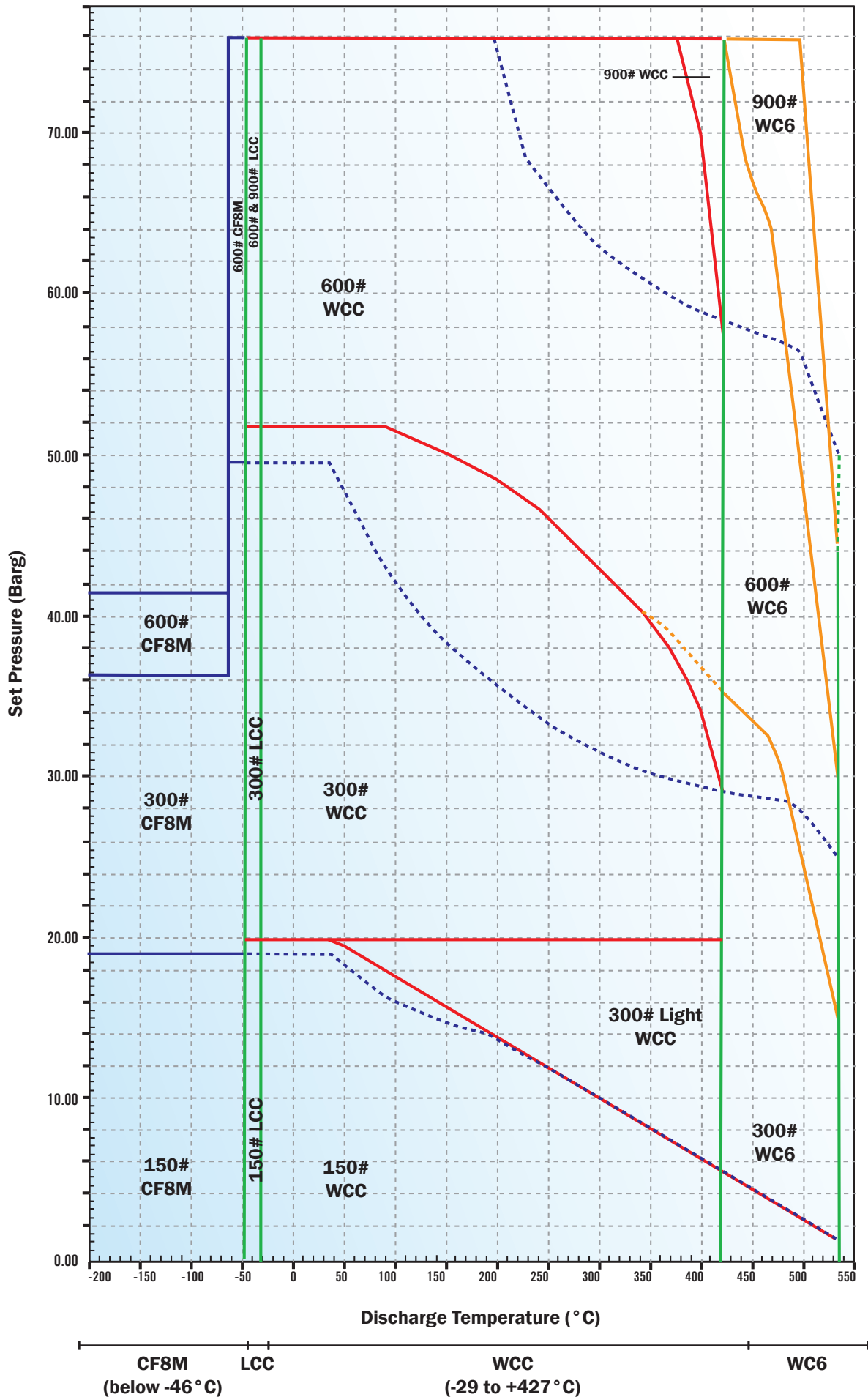
According to API Std 526 : (edition 2009)

INLET x ORIFICE x OUTLET	ANSI FLANGE RATING		Model Number	Conventional	Bellows	Steam service	MAX. SET PRESSURE barg (psig)					MAX. BACK PRESSURE (1) barg (psig)		MATERIALS		
	Inlet	Outlet					-268°C to -47°C (-450°F to -51°F)	-46°C to -29°C (-50°F to -21°F)	-29°C to +38°C (-20°F to 100°F)	<232°C (<450°F)	<427°C (<800°F)	<538°C (<1000°F)	Conventional	Bellows	Body	Spring
4 M 6	150	150	P46M1	330	430	530			19.8 (285)	13 (185)	5.5 (80)		19.8 (285)	5.5 (80)	SA 216 Gr. WCC	Alloy Steel
4 M 6	300	150	P46M7	330	430	530			19.8 (285)	19.8 (285)	19.8 (285)		19.8 (285)	5.5 (80)		
4 M 6	300	150	P46M2	330	430	530			51 (740)	42.4 (615)	28 (410)		19.8 (285)	11 (160)		
4 M 6	600	150	P46M3	330	430	530			76 (1100)	76 (1100)	57 (825)		19.8 (285)	11 (160)		
4 M 6	900	150	P46M4	330	430	530			76 (1100)	76 (1100)			19.8 (285)	11 (160)		
4 M 6	300	150	P46M2	332	432	502					35 (510)	16 (225)	19.8 (285)	11 (160)	SA 216 Gr. WC6	High Temp. Alloy Steel
4 M 6	600	150	P46M3	332	432	502					70 (1015)	31 (445)	19.8 (285)	11 (160)		
4 M 6	900	150	P46M4	332	432	502					76 (1100)	46 (670)	19.8 (285)	11 (160)		
4 M 6	150	150	P46M1	319	419			19.8 (285)					19.8 (285)	5.5 (80)	SA 352 Gr. LCC	Alloy Steel
4 M 6	300	150	P46M7	319	419			19.8 (285)					19.8 (285)	5.5 (80)		
4 M 6	300	150	P46M2	319	419			51 (740)					19.8 (285)	11 (160)		
4 M 6	600	150	P46M3	319	419			76 (1100)					19.8 (285)	11 (160)		
4 M 6	150	150	P46M1	316	416		19 (275)						19 (275)	5.5 (80)	SA 351 Gr. CF8M	Stainless Steel
4 M 6	300	150	P46M7	316	416		19 (275)						19 (275)	5.5 (80)		
4 M 6	300	150	P46M2	316	416		36 (525)						19 (275)	11 (160)		
4 M 6	600	150	P46M3	316	416		41 (600)						19 (275)	11 (160)		



INLET x ORIFICE x OUTLET	ANSI FLANGE RATING		MODEL NUMBER	A(2) mm (in)	B(2) mm (in)	C mm (in)	D mm (in)	E mm (in)	N mm (in)	Approximate weight (3) kg (lbs)
	Inlet	Outlet								
4 M 6	150	150	P46M1	177.8 (7)	184.1 (7-1/4)	725 (29)	25.4 (1)	40 (1-9/16)	14 (9/16)	85 (187)
4 M 6	300	150	P46M7	177.8 (7)	184.1 (7-1/4)	725 (29)	25.4 (1)	48 (1-7/8)	14 (9/16)	88 (194)
4 M 6	300	150	P46M2	177.8 (7)	184.1 (7-1/4)	785 (31)	25.4 (1)	48 (1-7/8)	14 (9/16)	95 (210)
4 M 6	600	150	P46M3	177.8 (7)	203.2 (8)	845 (34)	25.4 (1)	54 (2-1/8)	14 (9/16)	115 (254)
4 M 6	900	150	P46M4	196.8 (7-3/4)	222.2 (8-3/4)	950 (38)	25.4 (1)	68 (2-11/16)	14 (9/16)	165 (364)

1. Max. back pressure limits at 38°C; for higher temp. refer to ASME B16.5 flange ratings for conventional valves
2. Tolerances for A and B : ± 1.6 mm (±1/16 in)
3. Valves with lifting lever : add 10%



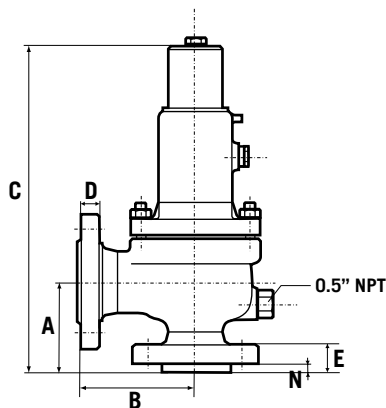
ORIFICE : N

28 cm²
4.34 in²

Starflow P Series Selection Table

According to API Std 526 : (edition 2009)

INLET x ORIFICE x OUTLET	ANSI FLANGE RATING						MAX. SET PRESSURE barg (psig)						MAX. BACK PRESSURE (1) barg (psig)		MATERIALS	
	Inlet	Outlet	Model Number	Conventional	Bellows	Steam service	-268°C to -47°C (-450°F to -51°F)	-46°C to -29°C (-50°F to -21°F)	-29°C to +38°C (-20°F to 100°F)	<232°C (<450°F)	<427°C (<800°F)	<538°C (<1000°F)	Conventional	Bellows	Body	Spring
4 N 6	150	150	P46N1	330	430	530			19.8 (285)	13 (185)	5.5 (80)		19.8 (285)	5.5 (80)	SA 216 Gr. WCC	Alloy Steel
4 N 6	300	150	P46N7	330	430	530			19.8 (285)	19.8 (285)	19.8 (285)		19.8 (285)	5.5 (80)		
4 N 6	300	150	P46N2	330	430	530			51 (740)	42.4 (615)	28 (410)		19.8 (285)	11 (160)		
4 N 6	600	150	P46N3	330	430	530			69 (1000)	69 (1000)	57 (825)		19.8 (285)	11 (160)		
4 N 6	900	150	P46N4	330	430	530			69 (1000)	69 (1000)			19.8 (285)	11 (160)		
4 N 6	300	150	P46N2	332	432	502					35 (510)	16 (225)	19.8 (285)	11 (160)	SA 216 Gr. WC6	High Temp. Alloy Steel
4 N 6	600	150	P46N3	332	432	502					69 (1000)	31 (445)	19.8 (285)	11 (160)		
4 N 6	900	150	P46N4	332	432	502					69 (1000)	46 (670)	19.8 (285)	11 (160)		
4 N 6	150	150	P46N1	319	419			19.8 (285)					19.8 (285)	5.5 (80)	SA 352 Gr. LCC	Alloy Steel
4 N 6	300	150	P46N7	319	419			19.8 (285)					19.8 (285)	5.5 (80)		
4 N 6	300	150	P46N2	319	419			51 (740)					19.8 (285)	11 (160)		
4 N 6	600	150	P46N3	319	419			69 (1000)					19.8 (285)	11 (160)		
4 N 6	150	150	P46N1	316	416		19 (275)						19 (275)	5.5 (80)	SA 351 Gr. CF8M	Stainless Steel
4 N 6	300	150	P46N7	316	416		19 (275)						19 (275)	5.5 (80)		
4 N 6	300	150	P46N2	316	416		31 (450)						19 (275)	11 (160)		
4 N 6	600	150	P46N3	316	416		34 (500)						19 (275)	11 (160)		

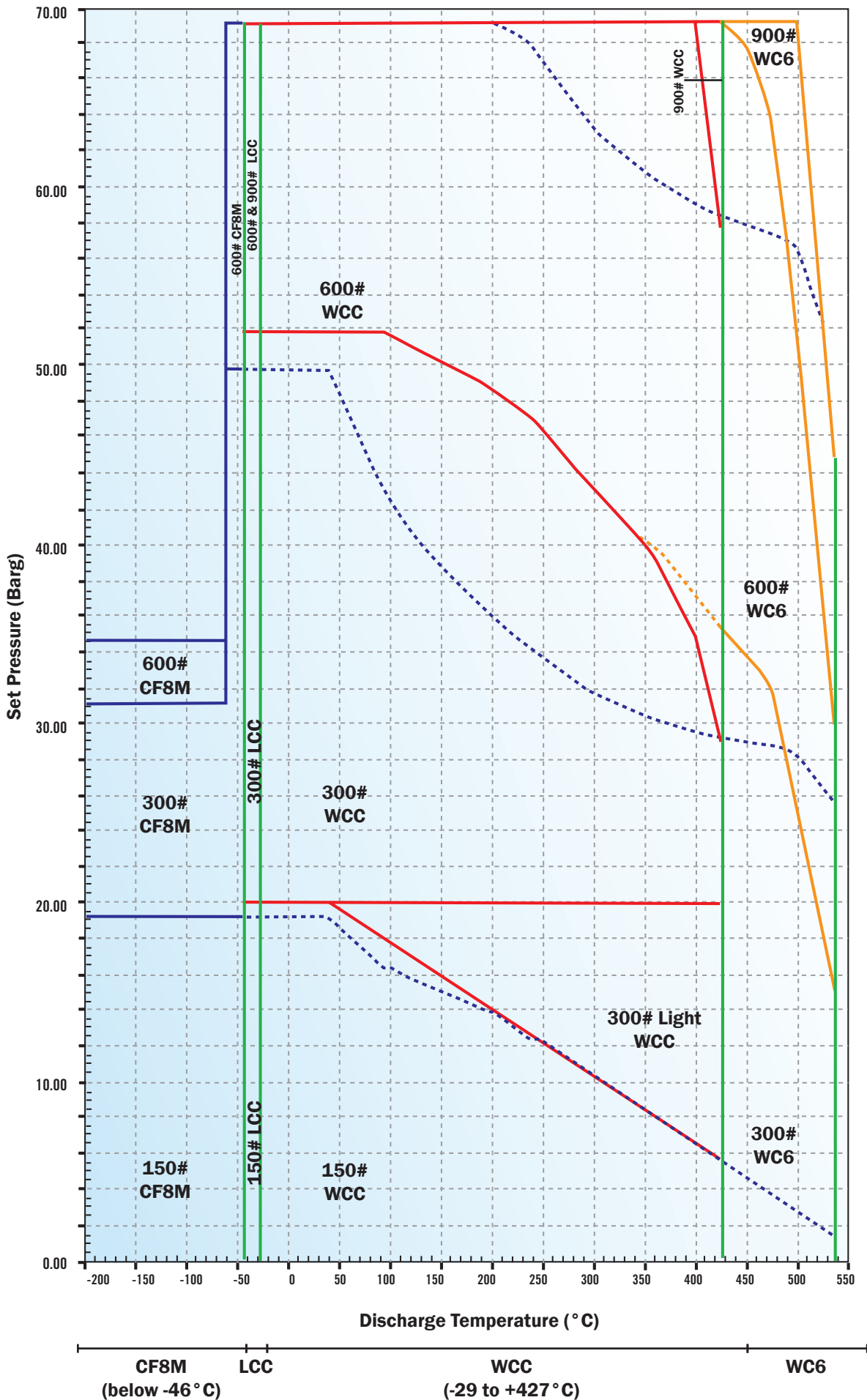


INLET x ORIFICE x OUTLET	ANSI FLANGE RATING		MODEL NUMBER	A(2) mm (in)	B(2) mm (in)	C mm (in)	D mm (in)	E mm (in)	N mm (in)	Approximate weight (3) kg (lbs)
	Inlet	Outlet								
4 N 6	150	150	P46N1	196.8 (7-3/4)	209.5 (8-1/4)	750 (30)	25.4 (1)	40 (1-9/16)	14 (9/16)	95 (210)
4 N 6	300	150	P46N7	196.8 (7-3/4)	209.5 (8-1/4)	750 (30)	25.4 (1)	48 (1-7/8)	14 (9/16)	100 (220)
4 N 6	300	150	P46N2	196.8 (7-3/4)	209.5 (8-1/4)	810 (32)	25.4 (1)	48 (1-7/8)	14 (9/16)	105 (232)
4 N 6	600	150	P46N3	196.8 (7-3/4)	222.2 (8-3/4)	870 (34)	25.4 (1)	54 (2-1/8)	14 (9/16)	125 (276)
4 N 6	900	150	P46N4	196.8 (7-3/4)	222.2 (8-3/4)	990 (39)	25.4 (1)	59 (2-5/16)	14 (9/16)	210 (460)

1. Max. back pressure limits at 38°C; for higher temp. refer to ASME B16.5 flange ratings for conventional valves
2. Tolerances for A and B : ± 1.6 mm (±1/16 in)
3. Valves with lifting lever : add 10%

P/T Selection Chart

Orifice N



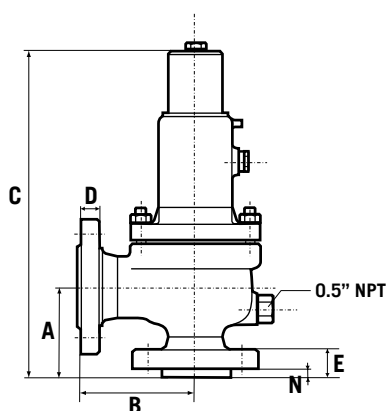
ORIFICE : P

41.2 cm²
6.38 in²

Starflow P Series Selection Table

According to API Std 526 : (edition 2009)

INLET x ORIFICE x OUTLET	ANSI FLANGE RATING						MAX. SET PRESSURE barg (psig)						MAX. BACK PRESSURE (1) barg (psig)		MATERIALS	
	Inlet	Outlet	Model Number	Conventional	Bellows	Steam service	-268°C to -47°C (-450°F to -51°F)	-46°C to -29°C (-50°F to -21°F)	-29°C to +38°C (-20°F to 100°F)	<232°C (<450°F)	<427°C (<800°F)	<538°C (<1000°F)	Conventional	Bellows	Body	Spring
4 P 6	150	150	P46P1	330	430	530			19.8 (285)	13 (185)	5.5 (80)		19.8 (285)	5.5 (80)	SA 216 Gr. WCC	Alloy Steel
4 P 6	300	150	P46P7	330	430	530			19.8 (285)	19.8 (285)	19.8 (285)		19.8 (285)	5.5 (80)		
4 P 6	300	150	P46P2	330	430	530			36.2 (525)	36.2 (525)	28 (410)		19.8 (285)	10 (150)		
4 P 6	600	150	P46P3	330	430	530			69 (1000)	69 (1000)	57 (825)		19.8 (285)	10 (150)		
4 P 6	900	150	P46P4	330	430	530			69 (1000)	69 (1000)			19.8 (285)	10 (150)		
4 P 6	300	150	P46P2	332	432	502					35 (510)	16 (225)	19.8 (285)	10 (150)	SA 216 Gr. WC6	High Temp. Alloy Steel
4 P 6	600	150	P46P3	332	432	502					69 (1000)	31 (445)	19.8 (285)	10 (150)		
4 P 6	900	150	P46P4	332	432	502					69 (1000)	46 (670)	19.8 (285)	10 (150)		
4 P 6	150	150	P46P1	319	419			19.8 (285)					19.8 (285)	5.5 (80)	SA 352 Gr. LCC	Alloy Steel
4 P 6	300	150	P46P7	319	419			19.8 (285)					19.8 (285)	5.5 (80)		
4 P 6	300	150	P46P2	319	419			36 (525)					19.8 (285)	10 (150)		
4 P 6	600	150	P46P3	319	419			69 (1000)					19.8 (285)	10 (150)		
4 P 6	150	150	P46P1	316	416		12 (175)						12 (175)	5.5 (80)	SA 351 Gr. CF8M	Stainless Steel
4 P 6	300	150	P46P7	316	416		12 (175)						12 (175)	5.5 (80)		
4 P 6	300	150	P46P2	316	416		21 (300)						19 (275)	10 (150)		
4 P 6	600	150	P46P3	316	416		33 (486)						19 (275)	10 (150)		

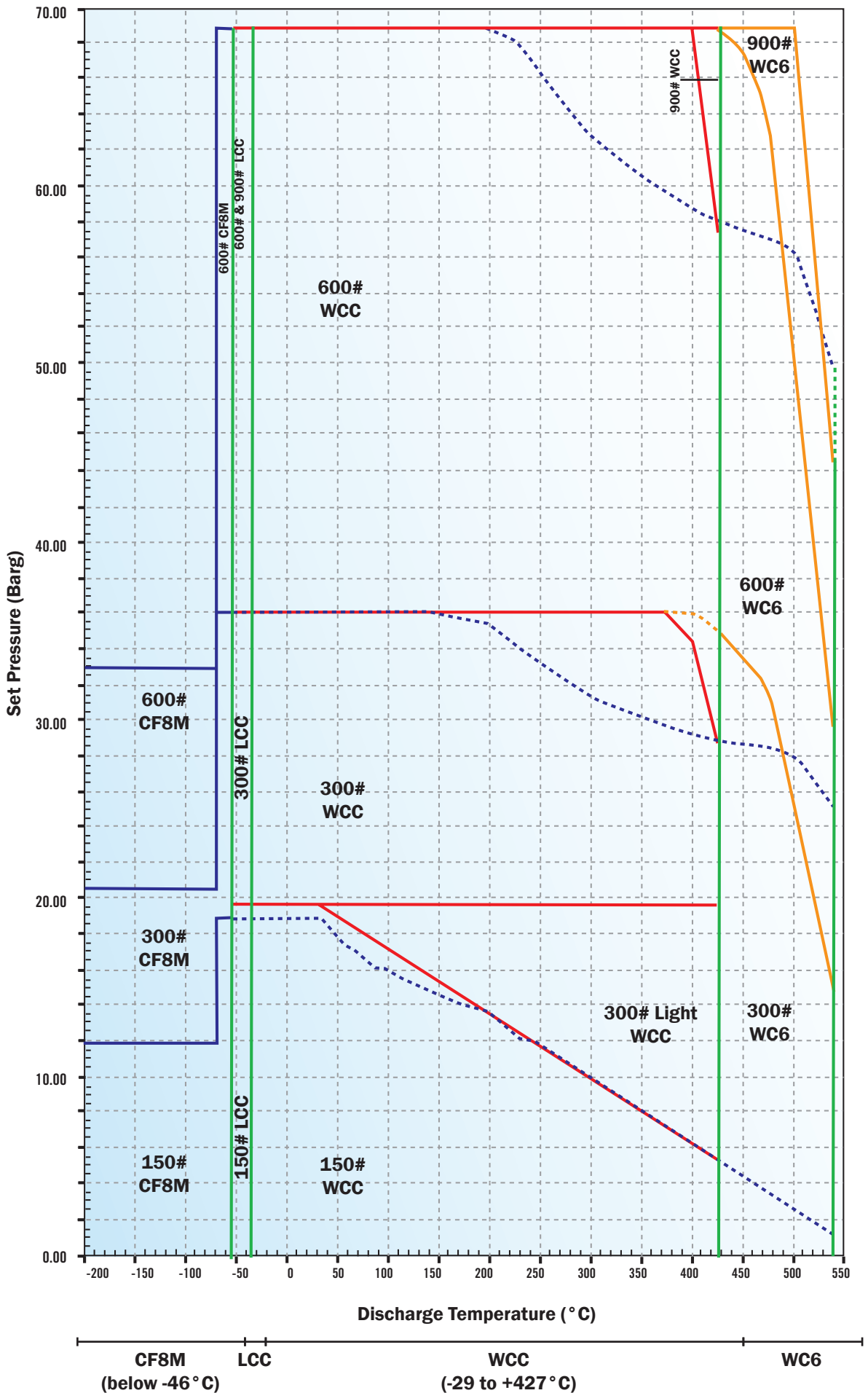


INLET x ORIFICE x OUTLET	ANSI FLANGE RATING		MODEL NUMBER	A(2) mm (in)	B(2) mm (in)	C mm (in)	D mm (in)	E mm (in)	N mm (in)	Approximate weight (3) kg (lbs)
	Inlet	Outlet								
4 P 6	150	150	P46P1	181 (7-1/8)	228.6 (9)	795 (32)	25.4 (1)	40 (1-9/16)	14 (9/16)	105 (232)
4 P 6	300	150	P46P7	181 (7-1/8)	228.6 (9)	795 (32)	25.4 (1)	46 (1-13/16)	14 (9/16)	110 (242)
4 P 6	300	150	P46P2	225.4 (8-7/8)	254 (10)	850 (34)	25.4 (1)	48 (1-7/8)	14 (9/16)	125 (276)
4 P 6	600	150	P46P3	225.4 (8-7/8)	254 (10)	875 (35)	25.4 (1)	54 (2-1/8)	14 (9/16)	145 (320)
4 P 6	900	150	P46P4	225.4 (8-7/8)	254 (10)	1180 (47)	25.4 (1)	59 (2-5/16)	14 (9/16)	250 (550)

1. Max. back pressure limits at 38°C; for higher temp. refer to ASME B16.5 flange ratings for conventional valves
2. Tolerances for A and B : ± 1.6 mm (±1/16 in)
3. Valves with lifting lever : add 10%

P/T Selection Chart

Orifice P



ORIFICE : Q

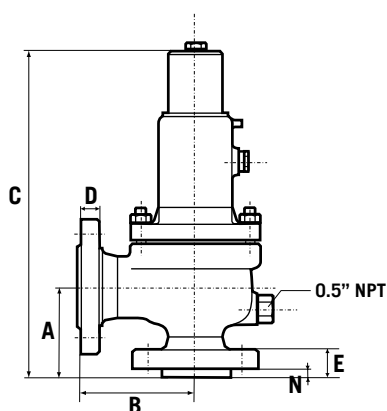
71.2 cm²

11.05 in²

Starflow P Series Selection Table

According to API Std 526 : (edition 2009)

INLET x ORIFICE x OUTLET	ANSI FLANGE RATING		MAX. SET PRESSURE barg (psig)									MAX. BACK PRESSURE (1) barg (psig)		MATERIALS		
	Inlet	Outlet	Model Number	Conventional	Bellows	Steam service	-268°C to -47°C (-450°F to -51°F)	-46°C to -29°C (-50°F to -21°F)	-29°C to +38°C (-20°F to 100°F)	<232°C (<450°F)	<427°C (<800°F)	<538°C (<1000°F)	Conventional	Bellows	Body	Spring
6 Q 8	150	150	P68Q1	330	430	530			11 (165)	11 (165)	5.5 (80)		8 (115)	5 (70)	SA 216 Gr. WCC	Alloy Steel
6 Q 8	300	150	P68Q7	330	430	530			11 (165)	11 (165)	11 (165)		8 (115)	5 (70)		
6 Q 8	300	150	P68Q2	330	430	530			21 (300)	21 (300)	21 (300)		8 (115)	8 (115)		
6 Q 8	600	150	P68Q3	330	430	530			41 (600)	41 (600)	41 (600)		8 (115)	8 (115)		
6 Q 8	300	150	P68Q2	332	432	502					11 (165)	11 (165)	8 (115)	8 (115)	SA 216 Gr. WC6	High Temp. Alloy Steel
6 Q 8	600	150	P68Q3	332	432	502				41 (600)	31 (445)	8 (115)	8 (115)			
6 Q 8	150	150	P68Q1	319	419			11 (165)					8 (115)	5 (70)	SA 352 Gr. LCC	Alloy Steel
6 Q 8	300	150	P68Q7	319	419			11 (165)					8 (115)	5 (70)		
6 Q 8	300	150	P68Q2	319	419			21 (300)					8 (115)	8 (115)		
6 Q 8	600	150	P68Q3	319	419			41 (600)					8 (115)	8 (115)		
6 Q 8	150	150	P68Q1	316	416		11 (165)						8 (115)	5 (70)	SA 351 Gr. CF8M	Stainless Steel
6 Q 8	300	150	P68Q7	316	416		11 (165)						8 (115)	5 (70)		
6 Q 8	300	150	P68Q2	316	416		17 (250)						8 (115)	8 (115)		
6 Q 8	600	150	P68Q3	316	416		21 (300)						8 (115)	8 (115)		

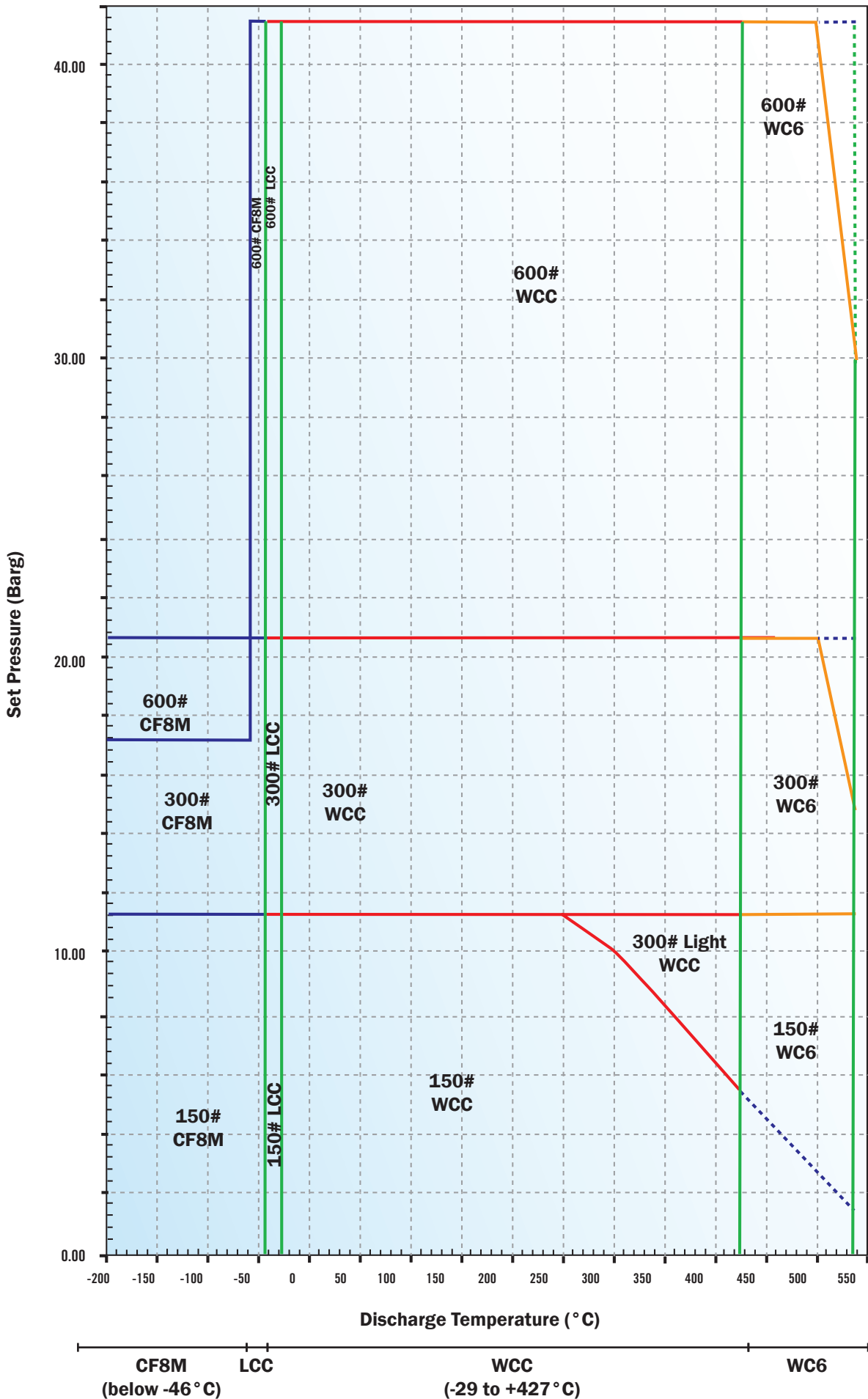


INLET x ORIFICE x OUTLET	ANSI FLANGE RATING		MODEL NUMBER	A(2) mm (in)	B(2) mm (in)	C mm (in)	D mm (in)	E mm (in)	N mm (in)	Approximate weight (3) kg (lbs)
	Inlet	Outlet								
6 Q 8	150	150	P68Q1	239.7 (9-7/16)	241.3 (9-1/2)	950 (38)	28.6 (1-1/8)	45 (1-3/4)	18 (11/16)	215 (474)
6 Q 8	300	150	P68Q7	239.7 (9-7/16)	241.3 (9-1/2)	950 (38)	28.6 (1-1/8)	57 (2-1/4)	18 (11/16)	230 (507)
6 Q 8	300	150	P68Q2	239.7 (9-7/16)	241.3 (9-1/2)	1070 (43)	28.6 (1-1/8)	57 (2-1/4)	18 (11/16)	255 (562)
6 Q 8	600	150	P68Q3	239.7 (9-7/16)	241.3 (9-1/2)	1140 (45)	28.6 (1-1/8)	68 (2-11/16)	18 (11/16)	305 (672)

1. Max. back pressure limits at 38°C; for higher temp. refer to ASME B16.5 flange ratings for conventional valves
2. Tolerances for A and B : ± 3.2 mm (± 1/8 in)
3. Valves with lifting lever : add 10%

P/T Selection Chart

Orifice Q



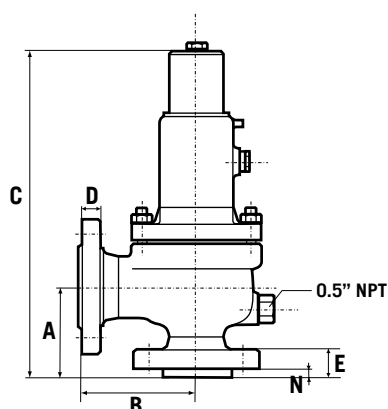
ORIFICE : R

103.2 cm²
16.00 in²

Starflow P Series Selection Table

According to API Std 526 : (edition 2009)

INLET x ORIFICE x OUTLET	ANSI FLANGE RATING		MAX. SET PRESSURE barg (psig)									MAX. BACK PRESSURE (1) barg (psig)		MATERIALS		
	Inlet	Outlet	Model Number	Conventional	Bellows	Steam service	-268°C to -47°C (-450°F to -51°F)	-46°C to -29°C (-50°F to -21°F)	-29°C to +38°C (-20°F to 100°F)	<232°C (<450°F)	<427°C (<800°F)	<538°C (<1000°F)	Conventional	Bellows	Body	Spring
6 R 8	150	150	P68R1	330	430	530			7 (100)	7 (100)	5.5 (80)		4 (60)	4 (60)	SA 216 Gr. WCC	Alloy Steel
6 R 8	300	150	P68R7	330	430	530			7 (100)	7 (100)	7 (100)		4 (60)	4 (60)		
6 R 10	300	150	P69R2	330	430	530			16 (230)	16 (230)	16 (230)		7 (100)	7 (100)		
6 R 10	600	150	P69R3	330	430	530			21 (300)	21 (300)	21 (300)		7 (100)	7 (100)	SA 216 Gr. WC6	High Temp. Alloy Steel
6 R 8	300	150	P69R2	332	432	502				7 (100)	7 (100)		4 (60)	4 (60)		
6 R 10	600	150	P69R3	332	432	502					21 (300)	21 (300)	7 (100)	7 (100)	SA 352 Gr. LCC	Alloy Steel
6 R 8	150	150	P68R1	319	419			7 (100)					4 (60)	4 (60)		
6 R 8	300	150	P68R7	319	419			7 (100)					4 (60)	4 (60)		
6 R 10	300	150	P69R2	319	419			16 (230)					7 (100)	7 (100)		
6 R 10	600	150	P69R3	319	419			21 (300)					7 (100)	7 (100)	SA 351 Gr. CF8M	Stainless Steel
6 R 8	150	150	P68R1	316	416		3.8 (55)						3.8 (55)	3.8 (55)		
6 R 8	300	150	P68R7	316	416		3.8 (55)						3.8 (55)	3.8 (55)		
6 R 10	300	150	P69R2	316	416		10 (150)						7 (100)	7 (100)		
6 R 10	600	150	P69R3	316	416		14 (200)						7 (100)	7 (100)		

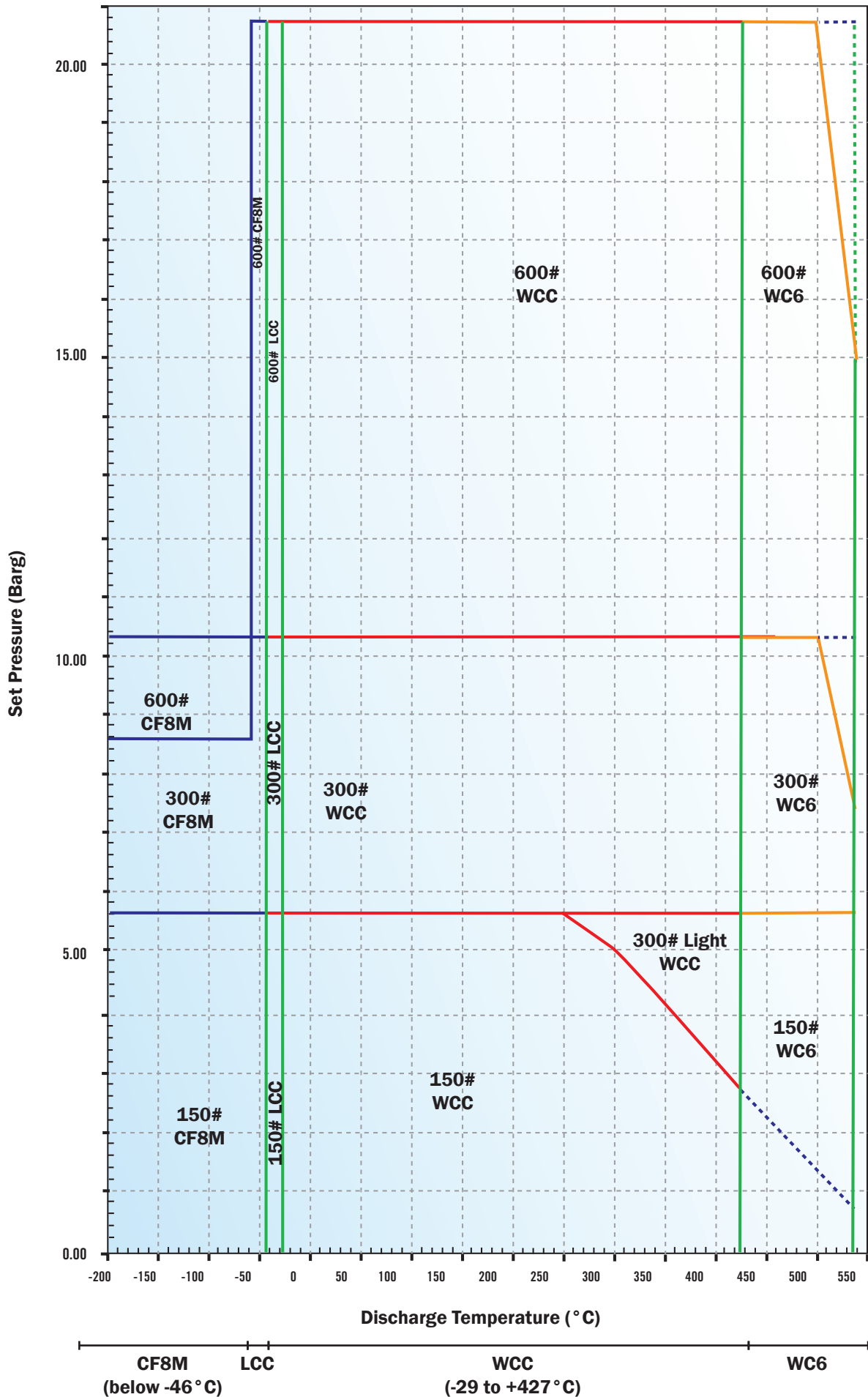


INLET x ORIFICE x OUTLET	ANSI FLANGE RATING		MODEL NUMBER	A(2) mm (in)	B(2) mm (in)	C mm (in)	D mm (in)	E mm (in)	N mm (in)	Approximate weight (3) kg (lbs)
	Inlet	Outlet								
6 R 8	150	150	P68R1	239.7 (9-7/16)	241.3 (9-1/2)	950 (38)	28.6 (1-1/8)	45 (1-3/4)	18 (11/16)	215 (474)
6 R 8	300	150	P68R7	239.7 (9-7/16)	241.3 (9-1/2)	950 (38)	28.6 (1-1/8)	57 (2-1/4)	18 (11/16)	230 (507)
6 R 10	300	150	P69R2	239.7 (9-7/16)	266.7 (10-1/2)	1070 (43)	30.2 (1-3/16)	57 (2-1/4)	18 (11/16)	275 (606)
6 R 10	600	150	P69R3	239.7 (9-7/16)	266.7 (10-1/2)	1140 (45)	30.2 (1-3/16)	68 (2-11/16)	18 (11/16)	325 (716)

1. Max. back pressure limits at 38°C; for higher temp. refer to ASME B16.5 flange ratings for conventional valves
2. Tolerances for A and B : ± 3.2 mm (± 1/8 in)
3. Valves with lifting lever : add 10%

P/T Selection Chart

Orifice R



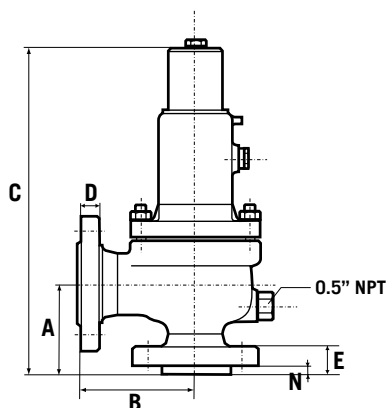
ORIFICE : T

168 cm²
26.00 in²

Starflow P Series Selection Table

According to API Std 526 : (edition 2009)

INLET x ORIFICE x OUTLET	ANSI FLANGE RATING		MAX. SET PRESSURE barg (psig)										MAX. BACK PRESSURE (1) barg (psig)		MATERIALS	
	Inlet	Outlet	Model Number	Conventional	Bellows	Steam service	-268°C to -47°C (-450°F to -51°F)	-46°C to -29°C (-50°F to -21°F)	-29°C to +38°C (-20°F to 100°F)	<232°C (<450°F)	<427°C (<800°F)	<538°C (<1000°F)	Conventional	Bellows	Body	Spring
8 T 10	150	150	P89T1	330	430	530			4.5 (65)	4.5 (65)	4.5 (65)		2 (30)	2 (30)	SA 216 Gr. WCC	Alloy Steel
8 T 10	300	150	P89T7	330	430	530			4.5 (65)	4.5 (65)	4.5 (65)		2 (30)	2 (30)		
8 T 10	300	150	P89T2	330	430	530			8 (120)	8 (120)	8 (120)		4 (60)	4 (60)		
8 T 10	300	150	P89T3	330	430	530			21 (300)	21 (300)	21 (300)		7 (100)	7 (100)		
8 T 10	300	150	P89T2	332	432	502					8 (120)	8 (120)	4 (60)	4 (60)	SA 216 Gr. WC6	High Temp. Alloy Steel
8 T 10	300	150	P89T3	332	432	502				21 (300)	16 (225)	7 (100)	7 (100)			
8 T 10	150	150	P89T1	319	419			4.5 (65)					2 (30)	2 (30)	SA 352 Gr. LCC	Alloy Steel
8 T 10	300	150	P89T7	319	419			4.5 (65)					2 (30)	2 (30)		
8 T 10	300	150	P89T2	319	419			8 (120)					4 (60)	4 (60)		
8 T 10	300	150	P89T3	319	419			21 (300)					7 (100)	7 (100)		
8 T 10	150	150	P89T1	316	416		3.5 (50)						2 (30)	2 (30)	SA 351 Gr. CF8M	Stainless Steel
8 T 10	300	150	P89T7	316	416		3.5 (50)						2 (30)	2 (30)		
8 T 10	300	150	P89T2	316	416		4.5 (65)						4 (60)	4 (60)		

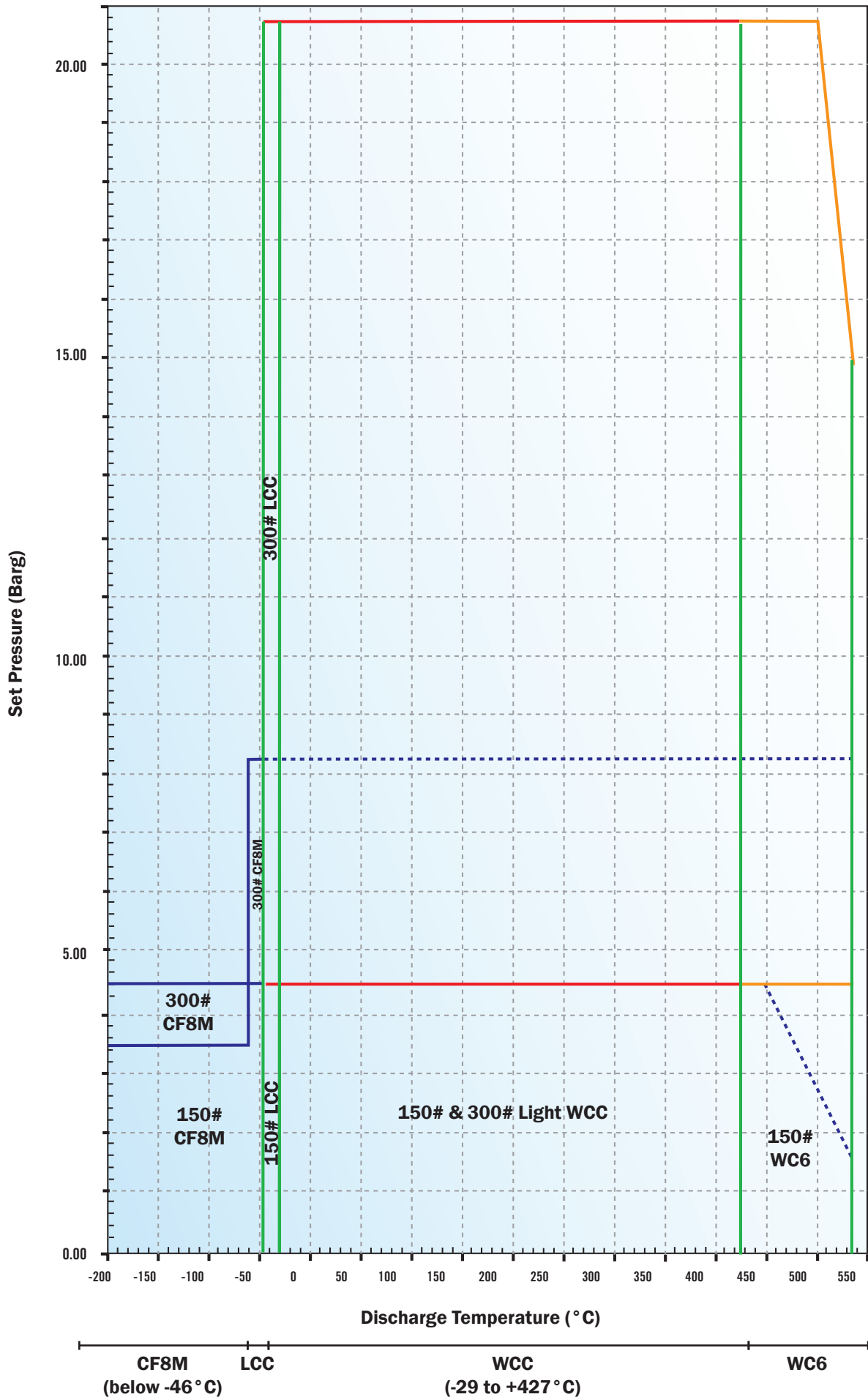


INLET x ORIFICE x OUTLET	ANSI FLANGE RATING		MODEL NUMBER	A(2) mm (in)	B(2) mm (in)	C mm (in)	D mm (in)	E mm (in)	N mm (in)	Approximate weight (3) kg (lbs)
	Inlet	Outlet								
8 T 10	150	150	P89T1	276.2 (10-7/8)	279.4 (11)	1020 (41)	30.2 (1-3/16)	49 (1-15/16)	18 (11/16)	290 (640)
8 T 10	300	150	P89T7	276.2 (10-7/8)	279.4 (11)	1020 (41)	30.2 (1-3/16)	61 (2-3/8)	18 (11/16)	310 (683)
8 T 10	300	150	P89T2	276.2 (10-7/8)	279.4 (11)	1200 (48)	30.2 (1-3/16)	61 (2-3/8)	18 (11/16)	340 (749)
8 T 10	300	150	P89T3	276.2 (10-7/8)	279.4 (11)	1200 (48)	30.2 (1-3/16)	61 (2-3/8)	18 (11/16)	350 (772)

1. Max. back pressure limits at 38°C; for higher temp. refer to ASME B16.5 flange ratings for conventional valves
2. Tolerances for A and B : ± 3.2 mm (± 1/8 in)
3. Valves with lifting lever : add 10%

P/T Selection Chart

Orifice T



ORIFICE : V

301.6 cm² (actual)
46.75 in² (actual)

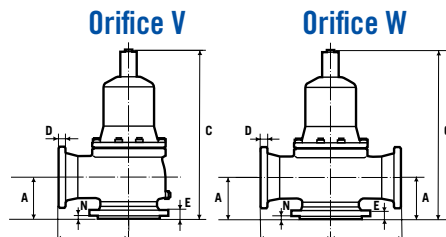
ORIFICE : W

452.3 cm² (actual)
70.10 in² (actual)

Starflow P Series Selection Table

According to API Std 526 : (edition 2009)

INLET x ORIFICE x OUTLET	ANSI FLANGE RATING						MAX. SET PRESSURE barg (psig)						MAX. BACK PRESSURE (1) barg (psig)		MATERIALS	
	Inlet	Outlet	Model Number	Conventional	Bellows	Steam service	-268°C to -47°C (-450°F to -51°F)	-46°C to -29°C (-50°F to -21°F)	-29°C to +38°C (-20°F to 100°F)	<232°C (<450°F)	<427°C (<800°F)	<538°C (<1000°F)	Conventional	Bellows	Body	Spring
10 V 14	150	150	P9BV1	330	430	530			7.1 (103)	7.1 (103)	5.5 (80)		2 (30)	3 (45)	SA 216 Gr. WCC	Alloy Steel
10 V 14	300	150	P9BV7	330	430	530			7.1 (103)	7.1 (103)	5.5 (80)		2 (30)	3 (45)		
10 V 14	300	150	P9BV2	330	430	530			20 (290)	20 (290)	20 (290)		4 (60)	3 (45)		
10 V 14	150	150	P9BV1	332	432	532					5.5 (80)	5.5 (80)	2 (30)	3 (45)	SA 216 Gr. WC6	High Temp. Alloy Steel
10 V 14	300	150	P9BV7	332	432	532					7.1 (103)	7.1 (103)	2 (30)	3 (45)		
10 V 14	300	150	P9BV2	332	432	532					20 (290)	20 (290)	4 (60)	3 (45)		
10 V 14	150	150	P9BV1	319	419			7.1 (103)					2 (30)	3 (45)	SA 352 Gr. LCC	Alloy Steel
10 V 14	300	150	P9BV7	319	419			7.1 (103)					2 (30)	3 (45)		
10 V 14	300	150	P9BV2	319	419			20 (290)					4 (60)	3 (45)		
10 V 14	150	150	P9BV1	316	416		7.1 (103)						2 (30)	3 (45)	SA 351 Gr. CF8M	Stainless Steel
10 V 14	300	150	P9BV7	316	416		7.1 (103)						2 (30)	3 (45)		
10 V 14	300	150	P9BV2	316	416		20 (290)						4 (60)	3 (45)		
12 W 12	150	150	PAAW1	330	430	530			6.3 (91)	6.3 (91)	5.5 (80)		2 (30)	2 (30)	SA 216 Gr. WCC	Alloy Steel
12 W 12	300	150	PAAW7	330	430	530			6.3 (91)	6.3 (91)	5.5 (80)		2 (30)	2 (30)		
12 W 12	300	150	PAAW2	330	430	530			20 (290)	20 (290)	20 (290)		4 (60)	4 (60)		
12 W 12	150	150	PAAW1	332	432	532					5.5 (80)	5.5 (80)	2 (30)	2 (30)	SA 216 Gr. WC6	High Temp. Alloy Steel
12 W 12	300	150	PAAW7	332	432	532					6.3 (91)	6.3 (91)	2 (30)	2 (30)		
12 W 12	300	150	PAAW2	332	432	532					20 (290)	20 (290)	4 (60)	4 (60)		
12 W 12	150	150	PAAW1	319	419			6.3 (91)					2 (30)	2 (30)	SA 352 Gr. LCC	Alloy Steel
12 W 12	300	150	PAAW7	319	419			6.3 (91)					2 (30)	2 (30)		
12 W 12	300	150	PAAW2	319	419			20 (290)					4 (60)	4 (60)		
12 W 12	150	150	PAAW1	316	416		6.3 (91)						2 (30)	2 (30)	SA 351 Gr. CF8M	Stainless Steel
12 W 12	300	150	PAAW7	316	416		6.3 (91)						2 (30)	2 (30)		
12 W 12	300	150	PAAW2	316	416								4 (60)	4 (60)		

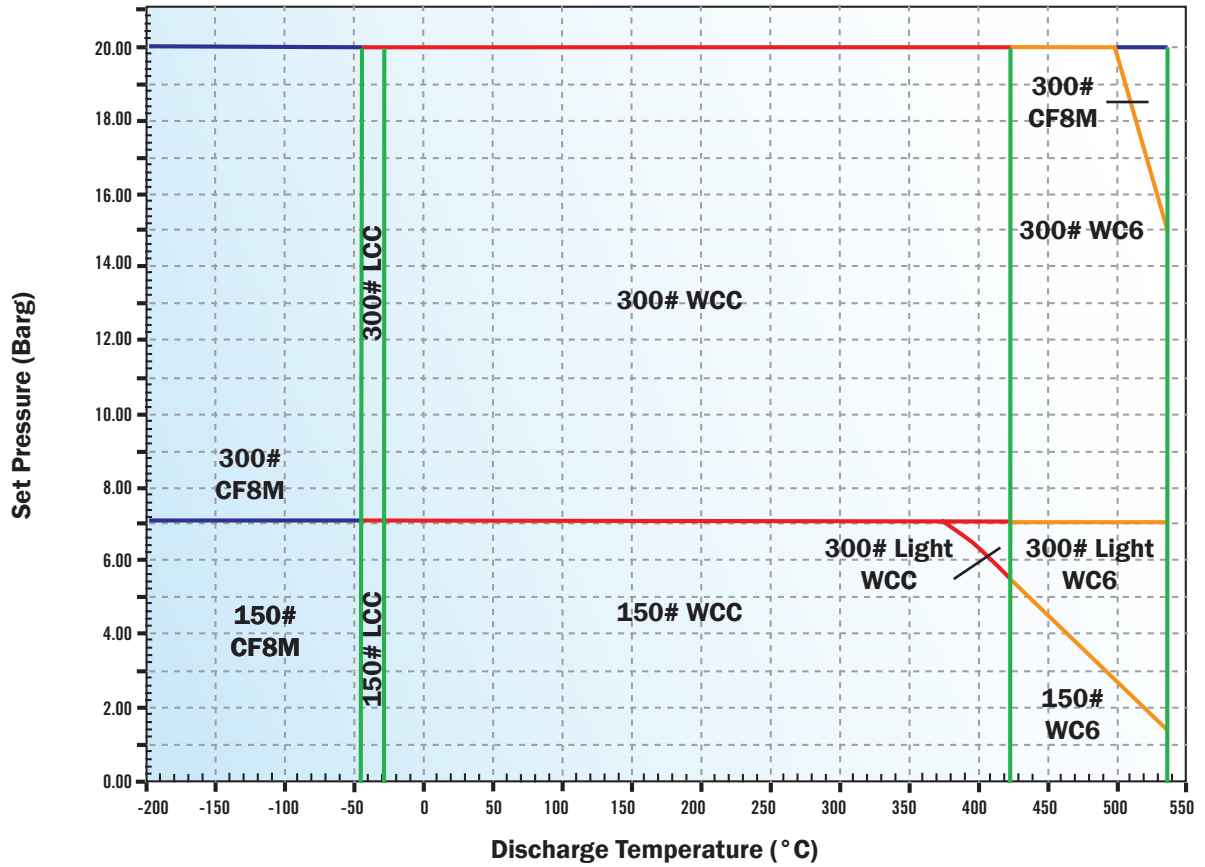


INLET x ORIFICE x OUTLET	ANSI FLANGE RATING		MODEL NUMBER	A(2) mm (in)	B(2) mm (in)	C mm (in)	D mm (in)	E mm (in)	N mm (in)	Approximate weight (3) kg (lbs)
	Inlet	Outlet								
10 V 14	150	150	P9BV1	380 (14-15/16)	370 (14-9/16)	1370 (53-15/16)	35 (1-3/8)	59 (2-5/16)	28 (1-1/8)	470 (1080)
10 V 14	300	150	P9BV7	380 (14-15/16)	370 (14-9/16)	1370 (53-15/16)	35 (1-3/8)	77.5 (3-1/16)	28 (1-1/8)	530 (1215)
10 V 14	300	150	P9BV2	380 (14-15/16)	370 (14-9/16)	1620 (63-3/4)	35 (1-3/8)	77.5 (3-1/16)	28 (1-1/8)	780 (1790)
12 W 12	150	150	PAAW1	328 (12-15/16)	430 (16-15/16)	1375 (54-1/8)	31.8 (1-1/4)	61 (2-3/8)	28 (1-1/8)	580 (1330)
12 W 12	300	150	PAAW7	328 (12-15/16)	430 (16-15/16)	1375 (54-1/8)	39 (1-9/16)	82 (3-1/4)	28 (1-1/8)	650 (1330)
12 W 12	300	150	PAAW2	328 (12-15/16)	430 (16-15/16)	1650 (64-15/16)	39 (1-9/16)	82 (3-1/4)	28 (1-1/8)	830 (1900)

1. Tolerances for A and B : ± 3.2 mm (±1/8 in)
2. Valves with lifting lever : add 5%

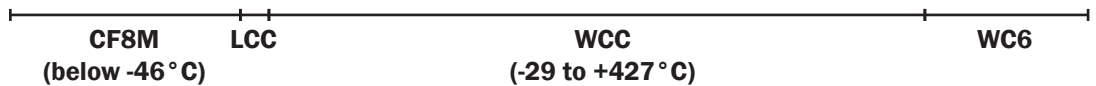
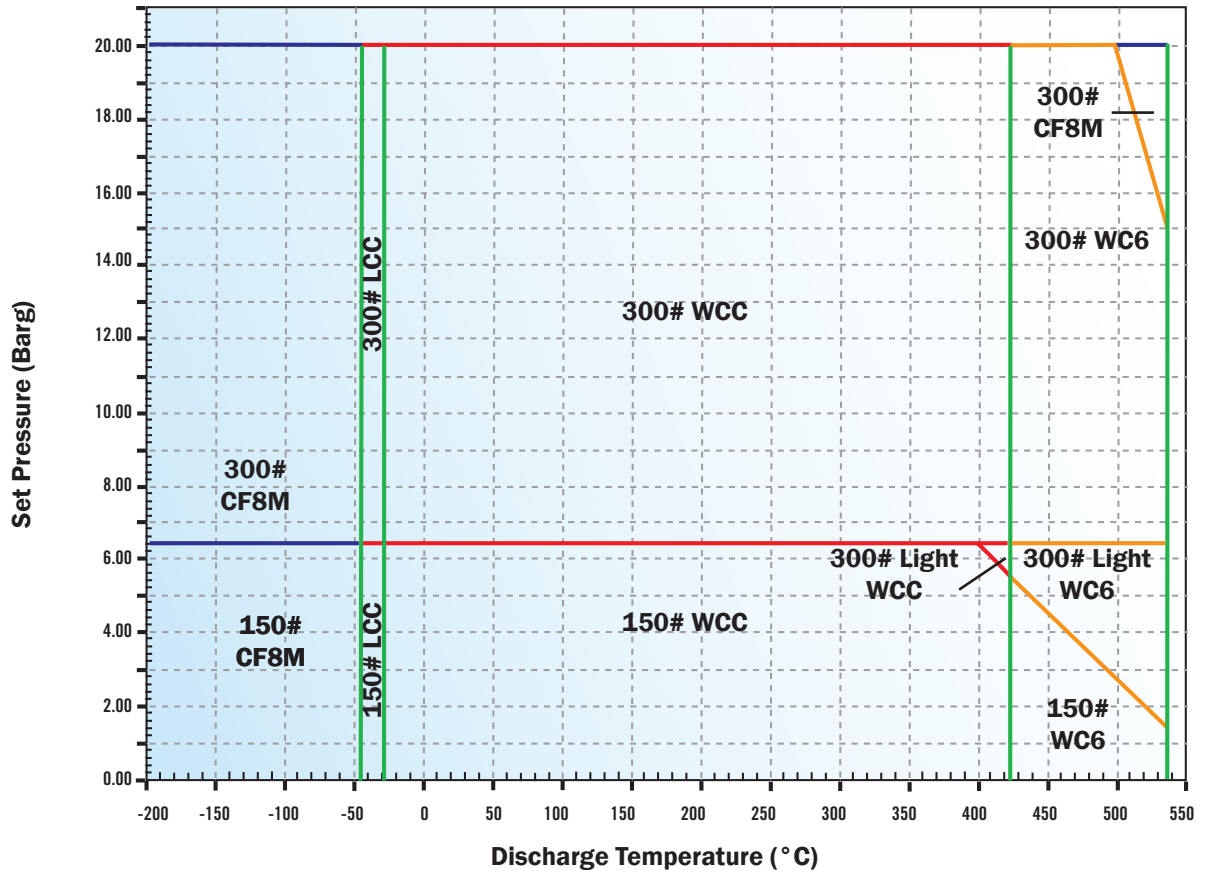
P/T Selection Chart

Orifice V



P/T Selection Chart

Orifice W



Starflow P Series Capacity Tables

Sizing a valve using capacity tables

For air, steam or water it can be quicker to size the valves using the capacity tables rather than the sizing formulas.

Example of sizing

Required flow :5 800 Nm³/ h of air

Set pressure :42 bar

Overpressure :10%

Using the air capacity table, with a set pressure of 42 bar, we find an orifice F (1.98 cm²), with a capacity of 6 193 Nm³/ h.

This capacity includes the safety margin of 0.9. (as per ASME and ISO requirements).

Starflow P Series Capacity Tables

Saturated Steam

Calculation according to API STD 520

Capacities T/hr at 10% overpressure

Orifices cm ² Set pressure - barg	D	E	F	G	H	J	K	L	M	N	P	Q	R	T
	0.71	1.26	1.98	3.24	5.06	8.30	11.86	18.41	23.22	28	41.2	71.2	103.2	168
1	0.08	0.14	0.21	0.35	0.55	0.90	1.28	1.99	2.51	3.02	4.45	7.69	11.14	18.13
1.5	0.10	0.17	0.27	0.44	0.69	1.13	1.61	2.50	3.16	3.81	5.60	9.69	14.04	22.85
2	0.12	0.21	0.32	0.53	0.83	1.36	1.95	3.02	3.81	4.60	6.76	11.69	16.94	27.57
2.5	0.14	0.24	0.38	0.62	0.97	1.60	2.28	3.54	4.46	5.38	7.92	13.69	19.84	32.29
3	0.16	0.28	0.44	0.71	1.11	1.83	2.61	4.06	5.12	6.17	9.08	15.69	22.74	37.01
3.5	0.18	0.31	0.49	0.80	1.26	2.06	2.95	4.57	5.77	6.96	10.23	17.69	25.64	41.73
4	0.20	0.35	0.55	0.90	1.40	2.30	3.28	5.09	6.42	7.74	11.39	19.69	28.54	46.45
4.5	0.22	0.38	0.60	0.99	1.54	2.53	3.61	5.61	7.07	8.53	12.55	21.69	31.44	51.17
5	0.24	0.42	0.66	1.08	1.68	2.76	3.95	6.13	7.73	9.32	13.71	23.69	34.34	55.89
5.5	0.26	0.45	0.71	1.17	1.83	2.99	4.28	6.64	8.38	10.10	14.86	25.69	37.23	60.61
6	0.28	0.49	0.77	1.26	1.97	3.23	4.61	7.16	9.03	10.89	16.02	27.69	40.13	65.33
6.5	0.30	0.53	0.83	1.35	2.11	3.46	4.95	7.68	9.68	11.68	17.18	29.69	43.03	70.05
7	0.32	0.56	0.88	1.44	2.25	3.69	5.28	8.19	10.33	12.46	18.34	31.69	45.93	74.77
8	0.36	0.63	0.99	1.62	2.54	4.16	5.95	9.23	11.64	14.04	20.65	35.69	51.73	84.21
8.5	0.38	0.67	1.05	1.72	2.68	4.39	6.28	9.75	12.29	14.82	21.81	37.69	54.63	88.93
9	0.40	0.70	1.10	1.81	2.82	4.63	6.61	10.26	12.94	15.61	22.97	39.69	57.53	93.65
9.5	0.42	0.74	1.16	1.90	2.96	4.86	6.94	10.78	13.60	16.40	24.13	41.69	60.43	98.37
10	0.44	0.77	1.22	1.99	3.11	5.09	7.28	11.30	14.25	17.18	25.28	43.69	63.33	103.09
11	0.48	0.84	1.33	2.17	3.39	5.56	7.94	12.33	15.55	18.76	27.60	47.69	69.13	112.54
12	0.52	0.91	1.44	2.35	3.67	6.03	8.61	13.37	16.86	20.33	29.91	51.69	74.93	121.98
13	0.56	0.99	1.55	2.53	3.96	6.49	9.28	14.40	18.16	21.90	32.23	55.70	80.73	131.42
14	0.60	1.06	1.66	2.72	4.24	6.96	9.94	15.44	19.47	23.48	34.54	59.70	86.53	140.86
15	0.64	1.13	1.77	2.90	4.53	7.43	10.61	16.47	20.77	25.05	36.86	63.70	92.32	150.30
16	0.68	1.20	1.88	3.08	4.81	7.89	11.28	17.50	22.08	26.62	39.17	67.70	98.12	159.74
18	0.75	1.34	2.11	3.44	5.38	8.82	12.61	19.57	24.69	29.77	43.80	75.70	109.72	178.62
20	0.83	1.48	2.33	3.81	5.95	9.76	13.94	21.64	27.30	32.92	48.43	83.70	121.32	197.50
22	0.91	1.62	2.55	4.17	6.52	10.69	15.28	23.71	29.91	36.06	53.06	91.70		
24	0.99	1.76	2.77	4.54	7.09	11.62	16.61	25.78	32.52	39.21	57.69	99.70		
26	1.07	1.91	3.00	4.90	7.65	12.56	17.94	27.85	35.13	42.36	62.32	107.71		
28	1.15	2.05	3.22	5.27	8.22	13.49	19.27	29.92	37.73	45.50	66.95	115.71		
30	1.23	2.19	3.44	5.63	8.79	14.42	20.61	31.99	40.34	48.65	71.58	123.71		
32	1.31	2.33	3.66	5.99	9.36	15.35	21.94	34.06	42.95	51.80	76.21	131.71		
34	1.39	2.47	3.89	6.36	9.93	16.29	23.27	36.13	45.56	54.94	80.84	139.71		
36	1.47	2.61	4.11	6.72	10.50	17.22	24.61	38.19	48.17	58.09	85.47	147.71		
38	1.55	2.76	4.33	7.09	11.07	18.15	25.94	40.26	50.78	61.24	90.11	155.72		
40	1.63	2.90	4.55	7.45	11.63	19.09	27.27	42.33	53.39	64.38	94.74	163.72		
42	1.71	3.04	4.78	7.81	12.20	20.02	28.60	44.40	56.00	67.53	99.37			
44	1.79	3.18	5.00	8.18	12.77	20.95	29.94	46.47	58.61	70.68	104.00			
46	1.87	3.32	5.22	8.54	13.34	21.88	31.27	48.54	61.22	73.82	108.63			
48	1.95	3.46	5.44	8.91	13.91	22.82	32.60	50.61	63.83	76.97	113.26			
50	2.03	3.61	5.67	9.27	14.48	23.75	33.94	52.68	66.44	80.12	117.89			
52	2.11	3.75	5.89	9.63	15.05	24.68	35.27	54.75	69.05	83.26	122.52			
54	2.19	3.89	6.11	10.00	15.62	25.61	36.60	56.81	71.66	86.41	127.15			
56	2.27	4.03	6.33	10.36	16.18	26.55	37.93	58.88	74.27	89.56	131.78			
58	2.35	4.17	6.56	10.73	16.75	27.48	39.27	60.95	76.88	92.70	136.41			
60	2.43	4.31	6.78	11.09	17.32	28.41	40.60	63.02	79.49	95.85	141.04			
65	2.63	4.67	7.33	12.00	18.74	30.74	43.93	68.19	86.01	103.72	152.61			
70	2.83	5.02	7.89	12.91	20.16	33.08	47.26	73.37	92.53	111.58	164.19			
75	3.03	5.38	8.45	13.82	21.59	35.41	50.60	78.54	99.06					
80	3.23	5.73	9.00	14.73	23.01	37.74	53.93	83.71	105.58					
85	3.43	6.08	9.56	15.64	24.43	40.07	57.26	88.88						
90	3.63	6.44	10.12	16.55	25.85	42.40	60.59	94.06						
95	3.83	6.79	10.67	17.46	27.27	44.74	63.92	99.23						
100	4.03	7.15	11.23	18.37	28.69	47.07	67.26	104.40						
110	4.43	7.85	12.34	20.19	31.54	51.73	73.92							
120	4.82	8.56	13.45	22.01	34.38	56.40	80.59							
130	5.22	9.27	14.57	23.84	37.22	61.06	87.25							
140	5.62	9.98	15.68	25.66	40.07	65.72	93.91							
150	6.02	10.69	16.79	27.48	42.91	70.39	100.58							
160	6.42	11.39	17.90	29.30	45.75	75.05								
170	6.82	12.10	19.02	31.12	48.60	79.72								
180	7.22	12.81	20.13	32.94	51.44	84.38								
190	7.62	13.52	21.24	34.76	54.28	89.04								
200	8.02	14.23	22.35	36.58										

Starflow P Series Capacity Tables

Water

Calculation according to API STD 520

Capacities m3/hr at 10% overpressure

Orifices cm ² Set pressure - barg	D	E	F	G	H	J	K	L	M	N	P	Q	R	T
	0.71	1.26	1.98	3.24	5.06	8.30	11.86	18.41	23.22	28	41.2	71.2	103.2	168
1	2.66	4.73	7.4	12.2	19.0	31	44	69	87	105	155	267	387	630
1.5	3.26	5.79	9.1	14.9	23.2	38	54	85	107	129	189	327	474	772
2	3.77	6.68	10.5	17.2	26.8	44	63	98	123	149	219	378	547	891
2.5	4.21	7.47	11.7	19.2	30.0	49	70	109	138	166	244	422	612	996
3	4.61	8.19	12.9	21.1	32.9	54	77	120	151	182	268	463	670	1092
3.5	4.98	8.84	13.9	22.7	35.5	58	83	129	163	196	289	500	724	1179
4	5.33	9.45	14.9	24.3	38.0	62	89	138	174	210	309	534	774	1260
4.5	5.65	10.03	15.8	25.8	40.3	66	94	146	185	223	328	567	821	1337
5	5.96	10.57	16.6	27.2	42.4	70	99	154	195	235	346	597	866	1409
5.5	6.25	11.08	17.4	28.5	44.5	73	104	162	204	246	362	626	908	1478
6	6.52	11.58	18.2	29.8	46.5	76	109	169	213	257	379	654	948	1544
6.5	6.79	12.05	18.9	31.0	48.4	79	113	176	222	268	394	681	987	1607
7	7.05	12.50	19.7	32.2	50.2	82	118	183	230	278	409	707	1024	1667
8	7.53	13.37	21.0	34.4	53.7	88	126	195	246	297	437	755	1095	1782
8.5	7.76	13.78	21.7	35.4	55.3	91	130	201	254	306	451	779	1129	1837
9	7.99	14.18	22.3	36.5	56.9	93	133	207	261	315	464	801	1161	1891
9.5	8.21	14.57	22.9	37.5	58.5	96	137	213	268	324	476	823	1193	1942
10	8.42	14.95	23.5	38.4	60.0	98	141	218	275	332	489	845	1224	1993
11	8.83	15.68	24.6	40.3	63.0	103	148	229	289	348	513	886	1284	2090
12	9.23	16.37	25.7	42.1	65.8	108	154	239	302	364	535	925	1341	2183
13	9.60	17.04	26.8	43.8	68.4	112	160	249	314	379	557	963	1396	2272
14	9.97	17.68	27.8	45.5	71.0	116	166	258	326	393	578	999	1448	2358
15	10.31	18.31	28.8	47.1	73.5	121	172	267	337	407	599	1034	1499	2441
16	10.65	18.91	29.7	48.6	75.9	125	178	276	348	420	618	1068	1548	2521
18	11.30	20.05	31.5	51.6	80.5	132	189	293	370	446	656	1133	1642	2674
20	11.91	21.14	33.2	54.4	84.9	139	199	309	390	470	691	1194	1731	2818
22	12.49	22.17	34.8	57.0	89.0	146	209	324	409	493	725	1253		
24	13.05	23.15	36.4	59.5	93.0	153	218	338	427	515	757	1308		
26	13.58	24.10	37.9	62.0	96.8	159	227	352	444	536	788	1362		
28	14.09	25.01	39.3	64.3	100.4	165	235	365	461	556	818	1413		
30	14.59	25.89	40.7	66.6	104.0	171	244	378	477	575	846	1463		
32	15.07	26.74	42.0	68.8	107.4	176	252	391	493	594	874	1511		
34	15.53	27.56	43.3	70.9	110.7	182	259	403	508	612	901	1557		
36	15.98	28.36	44.6	72.9	113.9	187	267	414	523	630	927	1602		
38	16.42	29.14	45.8	74.9	117.0	192	274	426	537	647	953	1646		
40	16.84	29.89	47.0	76.9	120.0	197	281	437	551	664	977	1689		
42	17.26	30.63	48.1	78.8	123.0	202	288	448	564	681	1002			
44	17.67	31.35	49.3	80.6	125.9	207	295	458	578	697	1025			
46	18.06	32.06	50.4	82.4	128.7	211	302	468	591	712	1048			
48	18.45	32.75	51.5	84.2	131.5	216	308	478	603	728	1071			
50	18.83	33.42	52.5	85.9	134.2	220	315	488	616	743	1093			
52	19.21	34.08	53.6	87.6	136.9	225	321	498	628	757	1114			
54	19.57	34.73	54.6	89.3	139.5	229	327	507	640	772	1136			
56	19.93	35.37	55.6	90.9	142.0	233	333	517	652	786	1157			
58	20.28	36.00	56.6	92.6	144.6	237	339	526	663	800	1177			
60	20.63	36.61	57.5	94.1	147.0	241	345	535	675	814	1197			
65	21.47	38.11	59.9	98.0	153.0	251	359	557	702	847	1246			
70	22.28	39.54	62.1	101.7	158.8	260	372	578	729	879	1293			
75	23.06	40.93	64.3	105.3	164.4	270	385	598	754					
80	23.82	42.27	66.4	108.7	169.8	278	398	618						
85	24.55	43.58	68.5	112.1	175.0	287	410	637						
90	25.27	44.84	70.5	115.3	180.1	295	422	655						
95	25.96	46.07	72.4	118.5	185.0	303	434	673						
100	26.63	47.26	74.3	121.5	189.8	311	445	691						
110	27.93	49.57	77.9	127.5	199.1	327	467							
120	29.17	51.77	81.4	133.1	207.9	341	487							
130	30.37	53.89	84.7	138.6	216.4	355	507							
140	31.51	55.92	87.9	143.8	224.6	368	526							
150	32.62	57.89	91.0	148.9	232.5	381	545							
160	33.69	59.78	93.9	153.7	240.1	394								
170	34.72	61.62	96.8	158.5	247.5	406								
180	35.73	63.41	99.6	163.1	254.7	418								
190	36.71	65.15	102.4	167.5	261.6	429								
200	37.66	66.84	105.0	171.9										
220	39.50	70.10	110.2	180.3										
240	41.26	73.22	115.1	188.3										
260	42.94	76.21	119.8	196.0										
280	44.57	79.09	124.3											
300	46.13	81.86	128.6											
320	47.64	84.55	132.9											
340	49.11	87.15	137.0											
360	50.53	89.68	140.9											
380	51.92	92.13												
400	53.27	94.53												
420	54.58	96.86												

Starflow Model Coding

Select the correct model number and designate the applicable options or accessories when ordering STARFLOW valves.

Model code system



Position 1)

P : Starflow P3 / P4 / P5
S : Starflow S5

Position 2) Inlet x outlet

1. 1" (DN 25)
2. 2" (DN 50)
3. 3" (DN 80)
4. 4" (DN 100)
5. 2 1/2" (DN 65)
6. 6" (DN 150)
7. 1 1/2" (DN 40)
8. 8" (DN 200)
9. 10" (DN 250)
- A. 12" (DN 300)
- B. 14" (DN 350)

Position 3) Orifice letter

(according to API Std 526)
D-E-F-G-H-J-K-L-M-N-P-Q-R-T
Additional non standard orifices : V-W

Position 4) Valve rating (ASME)

1. 150 lbs
2. 300 lbs
3. 600 lbs*
4. 900 lbs
5. 1500 lbs
6. 2500 lbs
7. 300 lbs
(light - with 150 lbs maximum sressure)

Position 5) Type

3. Conventional (closed bonnet)
4. Balanced bellows
5. Steam (open bonnet)

Position 6) Configuration

10. A 351 Gr CF8M (Cryogenic)
 14. A 351 Gr CF3M
 15. A 351 Gr CF8C
 16. A 351 Gr CF8M (Std Application)
 18. A 351 Gr CF8M / A 352 Gr LCC
 19. A 352 Gr LCC
 30. A 216 Gr WCC
 32. A 217 Gr WC6
 42. A 217 Gr WC9
 50. A 216 Gr WCC (Steam / Hot Water - P3 / P4)
 52. A 217 Gr C12A
- A201 to A206 : Alloy 20 AL1 to AL6 : Alloy 625 AY1 to AY6 : Alloy 825
AV1 to AV6 : Alloy 254 SMO CN1 to CN7 : A 351 Gr CN3MN
D1 to D6 : Duplex H1 to H6 : Alloy C M1 to M6 : Alloy 400
SD1 to SD6 : Superduplex MRA & MRB : NACE MR0103
SGA & SGB : NACE MR0175 / ISO 15156

Position 7) Flange Type

A = ASME B16.5 or EN 1759-1
P, F, G = EN 1092-1 or DIN - see table below Z = Special flanges

Position 11) Special

-Nothing Nothing special
-Z

Special device or requirement
(see the comments on the datasheet or consult the factory with the serial #)

Position 10) Flanges finish

- M** Inlet or outlet smooth finish
J Inlet flange finish RJ (according ASME B16.5)
E2 " " Small male face
E1 " " Large male face
E " " Male face
F2 " " Small female face
F1 " " Large female face
F " " Female face
C2 " " Small tongue face
C1 " " Large tongue face
C " " Tongue face
D2 " " Small groove face
D1 " " Large groove face
D " " Groove face
H Inlet hub connectors

Position 9) Options

- Nothing No accessories
L Packed lever for P3/P4
S Stellite nozzle and disc
B Stellite nozzle
G Stellite disc
K Long screwed spindle for on site tests.
V Test gag
R Plain lever for P3/P4
Y Soft seat disc (FKM standard)
Y1 Soft seat disc (PTFE)
Y2 Soft seat disc (NBR)
Y3 Soft seat disc (EPDM)
Y4 Soft seat disc (HNBR standard)
Y5 Soft seat disc (FFKM standard)
Y6 Soft seat disc (PEEK)
Y7 Soft seat disc (PCTFE)
Y8 Soft seat disc (VMQ)
Y9 Soft seat disc (FFKM hot temperature)
Y0 Soft seat disc (Special soft material and/or design)
H Bolted cap
N With UV Stamp : gas or steam
W With UV Stamp : liquid (without adjusting ring)

Position 8) Spring materials

- D : Chromium alloy, aluminized coated
D1 : Chromium alloy, cadmium coated
Q : Stainless steel 316
T : 2% tungsten steel
U : 9% tungsten steel
H : Alloy 600
J : Alloy X750 M : Alloy 400
K : Stainless steel 17.4PH
X : Special material : to be defined

Pressure series according to position 3	Inlet Ø PN	1"	1½"	2"	2½"	3"	4"	6"	8"	10"	12"	14"
1	10								F	F	F	F
	16				P	P	P	P	G	G	G	G
2	25	P	P	P					F	F	F	F
	40				P	P	P	P	G	G	G	G
3	64			F	F	F	F	F	-	-	-	-
	100	P	P	G	G	G	G	G	-	-	-	-

* Except T orifice is Class 300 flange.

** Today standard

How to choose a STARFLOW valve

1 - Data

- Required flow rate
- Set pressure
- Allowable overpressure
- Fluid data
 - gas (molecular weight, Cp/Cv, compressibility factor)
 - liquid (density, viscosity)
 - steam (temperature)
- Service conditions (back pressure, temperature)
- Environmental requirements (corrosion)
- Flange standards

2 - Orifice selection

Using capacity tables for known fluids (air/steam/water) and given overpressure, select the orifice size corresponding to minimum required flow rate.

3 - Valve selection

Using the capacity table or relevant orifice selection chart, select the model number that is suitable for pressure/temperature rating.

4 - Valve characteristics

- Selection table shows inlet x outlet sizes and flange ratings as well as valve dimensions and weights.
- Bills of material may be obtained from the appropriate section of this catalogue.

5 - Options and accessories

Options and accessories must be separately specified.

Order information

For proper and timely processing of your order, the following information should be given :

1. Quantity
2. Inlet and outlet size
3. STARFLOW model number
4. Inlet and outlet flange rating and facing if different from standard
5. Materials of construction if different from standard
6. Soft seat material required
7. Set pressure
8. Maximum inlet pressure
9. Maximum allowable overpressure
10. Service : liquid : specific gravity (water= 1), viscosity - gas : molecular weight and compressibility factor - steam : temperature
11. Back pressure, constant or variable, and value
12. Required capacity
13. Accessories : lever, test gag, other
14. Code requirements

When possible, we check the sizing and selection of the valves.

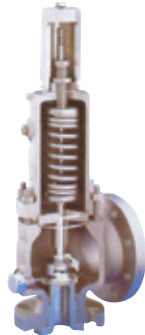
Spring Loaded Safety Relief Valves

Body in carbon steel, stainless steel, alloy and exotic materials; with bellows, lever and other accessories, to ensure suitability for all service conditions.



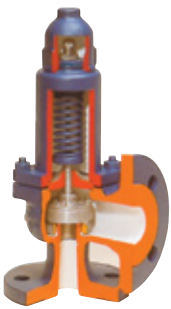
**Starflow S5
(steam only)**

ASME Section VIII Div. 1
(UV Stamp)
API Std 526
Full Nozzle - Enlarged
guide Inlet size : 1" to 12"
Rating : 150# to 2500#
Temp : up to 540°C



Starflow P3/P4/P5

ASME Section VIII Div. 1
(UV Stamp)
API Std 526
Full Nozzle
Inlet size: 1" to 12"
Rating: 150# to 2500#
Temp: -196°C up to
+540°C



63 Series

ISO 4126
Semi-nozzle
Inlet size: 3/4" to 10"
Rating: 150# to 300#
Temp:-196°C up to +330°C



Starflow P3/P4/P5

ASME Section VIII Div. 1
Portable SRV - Full nozzle
Screwed / Flanged / Welded
Size: 1/2" to 1 1/2" Rating:
150# to 2500#
Temp:-196°C up to +400°C



Starvalve Changeover Valves

Low pressure drop COV Standard COV
Combined valve with linkage system
Sizes: 1/2" - 10"
Pressure: up to 100 barg
Temp: -196°C up to +427°C
Mat: CS - SS

Pilot Operated Pressure Relief Valves

The Sarasin-RSBD pilot-operated pressure relief valve is an autonomous valve. It does not need any auxiliary source of power to operate. The advanced technology of Sarasin-RSBD valves has been adopted by the nuclear industry, French and U.S. Navies and by the Oil and Gas industries. It is complementary to the range of spring-loaded safety relief valves and covers a wide field of applications including severe conditions.



76 Series

Full nozzle



78 Series

Semi nozzle



86 Series

Full nozzle

Advantages of the Sarasin-RSBD Pilot-operated pressure relief valve

- leak-free pilot
- on-off opening, fully open or closed (limited maintenance)
- perfect tightness (no production loss)
- perfect operation, even with capacities smaller than those rated for all types of fluids
- excellent repeatability and reliability
- adjustable blowdown (pop action)
- no pressure/flow limit
- with additional equipment (solenoid valve), the safety relief valve can be used as a discharge valve.

To meet the most varied requirements, Sarasin- RSBD selects the appropriate pilot detector for the safety relief valve required (semi or full nozzle, with bellows, piston etc.)



**Gas - Liquid
Modulating action**



**Gas
Pop action**



**High temperature
steam - Gas
Pop action**



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