SAFETY RELIEF VALVES

REGPORT TECHNOLOGIES PVT LTD

RT-PSV-SERIES
SAFETY RELIEF VALVE

The effects of exceeding safe pressure levels in an unprotected pressure vessel or system can have disastrous effects on both plant and personnel. Spring Loaded Safety Valves or Safety Relief Valves are the most commonly used relieving safety device.

The most reliable Safety Relief Valves should be considered for the protection of process, personnel and equipments. **REGPORT** Safety Relief Valves are reliable, efficient, simple in construction and proven in field.

REGPORT Safety Valves meet the requirements of API as well as ASME standards. While designing the process parameters are studied thoroughly and a suitable valve is proposed based on the process requirement and safety.

REGPORT Safety Relief Valves are designed in Conventional, Balanced Bellow, Pilot Operated or even Dead Weight Type depending of the process requirements and application its serving thereof.

API CODE FOR SAFETY RELIEF VALVES

- **API RP 520** : Recommended Practice for the Design and of Pressure Relieving Systems in Refineries
  Part I : Design
  Part II : Installation
- **API RP 521** : Guide for Pressure Relief and Depress ring Systems
- **API Standard 526** : Flanged Steel Safety Relief Valves
- **API Standard 527** : Commercial Seat Tightness of Safety Relief Valves with Metal to Metal Seats

ASME CODE FOR SAFETY VALVES

- **ASME Sec VIII Div-I** : Rules for construction of Pressure Vessels
- **ASME Sec I** : Rules for construction of Power Boilers

Conventional Safety Relief Valves are those which work on simple working principle of force balance.

The fluid force acts on the Disk surface and balanced by spring force to keep the valve in closed condition. When the inlet fluid force exceeds the spring force, the Disk gets lifted from Nozzle and a passage is opened for releasing the excess pressure from the pressurized system.

R012 Series conventional Safety Relief Valves with bolted bonnet design are provided with adjustable blow down and over pressure at site. With the Nozzle Ring, widely called as Blow Down Ring, finetuning of over pressure and blow down can be done at site.

As a standard, unless specified, all our Safety Relief Valves are Full Nozzle Full Lift and tested for 10% over pressure.

Various Options and Accessories Available

- Cap : Screwed or Bolted
- Manual Lever : Plain or Packed
- Test Gag
- Open Bonnet for High Temperature

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R016 Series conventional Safety Relief Valves with Screwed bonnet design are provided with adjustable blow down and over pressure for all utility applications.

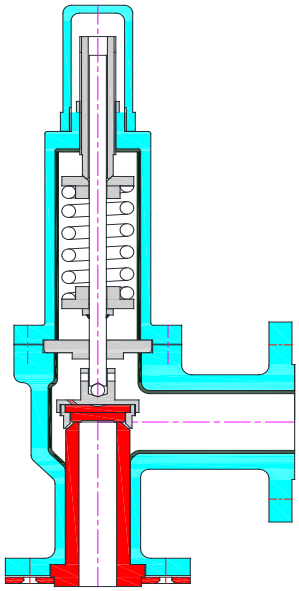
As a standard, unless specified, all our Safety Relief Valves are Full Nozzle Full Lift and tested for 10% over pressure.

Various Options and Accessories Available

- Cap : Screwed or Bolted
- Manual Lever : Plain or Packed
- Test Gag

R016 Series conventional Safety Relief Valves also offered as **Thermal Relief Valves** or **Thermal Safety Valves**. These are normally installed on Liquid Lines. These avoid over pressurization in the lines due to thermal expansion or evaporation on liquids in the closed pipelines or in case of discharge valve closure.

R014 Series Corrosive Service Safety Relief Valves with PTFE seating are designed for the corrosive media, wherein metallic nozzle and disk are not preferred due to either compatibility or cost involved.



In this specific design, the Nozzle is made up of PTFE and the disk shall be GFT. This provides excellent seating and ensures as good as zero leakage through valve when it is closed. We provide PTFE/Halar coating to the body and bonnet from inside to ensure the corrosion resistance in the event of opening of the safety relief valve. Special arrangement for holding the PTFE Nozzle is provided. The internals like Disk Holder, Stem and Guide are provided in AISI 316L to facilitate the corrosion resistance.

Eminently installed on GLR, HCL, Chlorine or excessively corrosive fluid lines, mainly in Pharmaceuticals or Chemical Plants as these provide a cost effective solution as compared to combination of PTFE Rupture Disc with SS Safety Relief Valve.

R015 Series Safety Relief Valves are designed in accordance ASME Sec I

As a standard, unless specified, all our Safety Relief Valves are Full Nozzle Full Lift and tested for 4% over pressure and 3% blowdown.

Various Options and Accessories Available

- End Connection : Flanged or Buttweld
- Cap : Screwed or Bolted
- Manual Lever
- Test Gag

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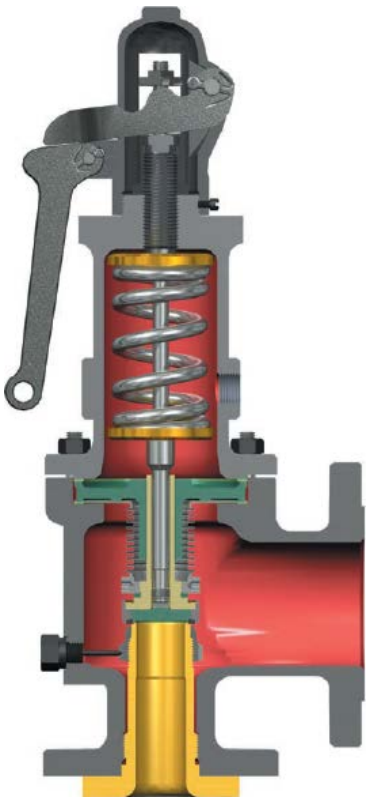
Conventional PRV shows unsatisfactory performance when excessive back pressure is applied or developed during relief, as the back pressure tends to reduce the lifting force, which holds the valve open. A balanced bellow type pressure relief valve is recommended to overcome this.



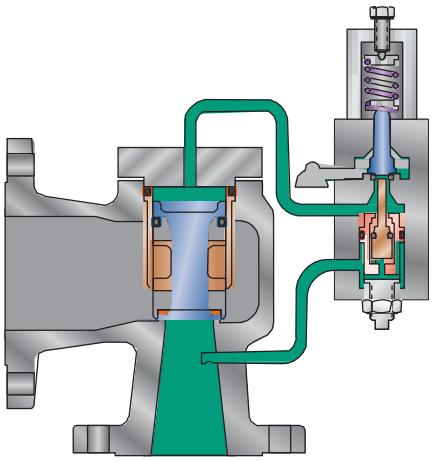
R019 Series Balanced Bellow Safety Relief Valves are provided with bolted bonnet design with an adjustable blow down and over pressure at site. With the Nozzle Ring, widely called as Blow Down Ring, finetuning of over pressure and blow down can be done at site.

Balanced Bellow Safety Relief Valves are offered wherein the fluid is very costly or corrosive or the built-up or Super-imposed back pressure is higher than 10% of set pressure. Balanced valves can typically be installed, where the total back pressure is more than 10% and does not exceed 40% of the set pressure.

As a standard, unless specified, all our Balanced Bellow Safety Relief Valves are Full Nozzle – Full Lift and tested for 10% over pressure. Unless specified, the Bellows shall be of SS316L. However, Inconel or any other material can be offered based on the customer requirement.

Various Options and Accessories Available

- Cap : Screwed or Bolted
- Manual Lever : Plain or Packed
- Test Gag



R020 Series Pilot Operated Safety Relief Valves are provided with considered if the superimposed backpressure is variable and higher than 10% of set pressure and or where the built up back pressure is too high for conventional and bellow type pressure relief valves.

Pilot operated relief valve may also used when back pressure exceeds 50% of set pressure

A Pressure Relief Valve in which the major relieving device or main valve is combined with and controlled by a self actuated auxiliary pressure relief valve (pilot) is called Pilot Operated Safety Relief Valve.

TECHNICAL DATA

Model	Sizes	Orifices	Inlet Rating	Temperature Range	Set Pressure
R012	1" x 2" to 8" x 10"	0.11 to 36 In² 0.71 to 232.26 cm²	ANSI 150# to 2500#	(-)238 to 538 °C	0.5 to 400 Barg
R014	1" x 2" to 8" x 10"	0.11 to 26 In² 0.71 to 167.7 cm²	ANSI 150# to 300#	(-)65 to 190 °C	0.5 to 10 Barg
R015	1½" x 3" to 6" x 10"	0.994 to 19.29 In² 6.4 to 124.4 cm²	ANSI 300# to 2500#	upto 530 °C	upto 150 Barg
R019	1" x 2" to 8" x 10"	0.11 to 36 In² 0.71 to 232.26 cm²	ANSI 150# to 2500#	(-)238 to 538 °C	1.0 to 100 Barg
R020	1" x 2" to 8" x 10"	0.11 to 26 In² 0.71 to 167.7 cm²	ANSI 150# to 2500#	(-)204 to 260 °C	1.0 to 318 Barg

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SIZING AND SELECTION

REGPORT design team follows the following formulae to design the Safety Relief Valves

Vapors :

$$A = \frac{W * \sqrt{TZ}}{C * K * P_1 * K_b * \sqrt{M}}$$

Where,

W = Relieving Capacity in lb/Hr

T = Abs Temp of Fluid @ Inlet in $^{0}F + 460$

C = Flow Constant determined by ratio of Specific Heats (Cp/Cv), if k is unknown C=315

P_1 = Upstream Pressure (set pressure + over pressure + atm pressure)

M = Molecular Weight of gas / vapor

Z = Compressibility Factor or Gas / Vapor, if unknown Z=1

K = Coefficient of discharge = 0.975

K_b = 1, if the back pressure < 40% of set pressure

Steam :

$$A = \frac{W}{51.5 * P_1 * K * K_n * K_{sh}}$$

Where,

W = Relieving Capacity in lb/Hr

P_1 = Upstream Pressure (set pressure + over pressure + atm pressure)

K = Coefficient of discharge = 0.975

K_n = Correction Factor for Saturated Steam at set pres > 1,500 psia

K_{sh} = Correction Factor due to degree of Superheat of Steam

Liquid :

$$A = \frac{Q * \sqrt{G}}{27.2 * K_p * K_w * K_v * \sqrt{\Delta P}}$$

Where,

Q = Relieving Capacity in USGPM

G = Specific Gravity wrt Water=1.0

K_p = Relieving Capacity vs lift correction factor for liquid

K_w = Correction factor due to back pressure for bellow valves = 1.0

K_v = Capacity correction factor due to viscosity

ΔP = Differential Pressure in psi

Our experienced team Application Engineers ensure the best selection based on the provided process data and application explained by the process designer.

regport
GROUP OF COMPANIES

REGPORT TECHNOLOGIES PVT LTD

REGPORT INTERNATIONAL FZ LLC

REGPORT CONTROLS PVT LTD

Mantra BDC Enterprises

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