

# Comparison of Pressure Regulating and Relief Valves

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Our company is an authorized representative and distributor for Wanner Engineering, a manufacturer of sealless positive displacement pumps and pressure regulating valves.

The terms pressure regulating valves and pressure relief valves are often used interchangeably although actually are two different products. Following is a comparison of each valve type highlighting their differences in design and application.

## Pressure Regulating Valves

### Purpose

A pressure regulating valve provides a mechanical method of controlling flow and pressure to the downstream process by continuously bypassing excess flow (with the pump sized accordingly for this purpose).

### Mechanics

The valve body has three ports, an inlet, outlet and bypass port. The inlet ports are 180° apart and the bypass port is 90° offset from the inlet/outlet ports.

Within the machined body there is an orifice located directly over the bypass port. Located above the bypass port is a spring-loaded valve plunger, the tension of the spring is adjustable with a cap screw at the top of the valve. Spring tension dictates the pressure required to compress the spring and lift the valve off its seat.

### Setting the Pressure

With the pump running, slowly tighten the cap screw, increasing the compression of the spring against its seat until the desired maximum discharge pressure is reached.

### Operation

The pumps discharge pressure will not exceed the set pressure because any excess flow will compress the spring further, allowing excess flow to bypass. If the discharge is dead-headed the pressure regulating valve will respond accordingly bypassing 100% of the pumps flow rate, protecting the pump and system components from exceeding the set pressure. When the pressure requirements are lower than the set pressure, less fluid is bypassed.

It is possible that the set pressure is higher than the operating pressure

and in such case no flow is bypassed. The reason we suggest sizing your pump to enable some bypass flow is that the system pressure is regulated smoother then if the pressure needs to spike enough to unseat the valve before settling into bypassing flow.

If the discharge is to spray nozzles or a filter system, the amount of flow bypassed will vary. In the case of worn spray nozzles, less flow will be bypassed and spray nozzle pressure (and performance) will be maintained. In the case of clogged filtration, the pressure will not exceed the set amount and the differential pressure across the filter will increase as less flow passes through the filter and more is bypassed once the set pressure is reached.

## Pressure Relief Valves

### Purpose

A safety device to protect the pump and system from overpressure.

While a pressure regulating valve also performs this function, the pressure relief valve in normally closed and opens only when the system pressure exceeds the set pressure, opening just enough to reduce system pressure and then reset itself.



Although the basic design is very similar, the distinction is that a safety valve is used for emergency protection and not designed for continuous regulation of pressure because the flow through it is not proportional, rather "opened or closed".

### Related Articles

- [Comparison of Pressure Regulating Valves to Back Pressure Regulating Valves](#)
- [Comparison of Models C20 and C60 Pressure Regulating Valves](#)

### Key Differences

Feature	Pressure Regulating Valve (Model 62)	Pressure Relief Valve
Primary Function	Maintain constant discharge/system pressure	Protect against accidental overpressure
Duty Cycle	Continuous bypass/regulation	Intermittent, only during fault/overpressure
Flow Handling	Proportional, modulates with demand	Full-open/closed, non-modulating
Setpoint Relation	Set at desired <i>operating</i> pressure	Set above normal pressure as <i>safety margin</i>
Bypass Path	Usually to pump inlet or tank	Usually to tank/safe discharge
Consequence if Misapplied	Relief valve used in place of regulator → pump deadheads, system damage	Regulator used without relief valve → no backup protection if regulator fails