

# How To Specify Safety and Pressure Relief Valves — Full Transcript

Selecting the right safety or pressure relief valve is important for protecting your process, personnel, and facility.

In this video, we'll cover all the information you need to specify a safety or pressure relief valve — plus some “bonus” details that will expedite the process.

Are you replacing an existing valve? If yes, you probably have all the information you need for reordering.

Every valve comes with a nameplate that provides a snapshot of details you'll need when making an order, including the manufacturer name, model number, set pressure, size, code stamp, service, and capacity.

If you have this information — especially the model number — you're all set.

If you don't, keep working your way through this list.

First up is inlet and outlet size and type.

If you're replacing an existing valve, you may be able to tell whether your valve's connections are flanged or threaded just by looking at them.

If you can safely remove the valve from your system, you can measure the valve inlet and outlet to determine the diameter of each.

If you can't remove the valve, your dimensions will likely be determined by your required capacity, which we'll cover a little later in this video.

Let's start with trim, which is the material the seating surface is made of.

Bronze and stainless steel are some of the most common choices for trim material, but some industrial processes require different types of alloys.

Next up is bonnet material. Just like the trim, bonnet material — or body material — will depend on your service.

There are a range of materials available, including bronze, stainless steel, carbon steel, and cast iron.

Ultimately, the end user or process owner needs to make all material selections. After that, an expert will review your selection to ensure that it's a suitable choice.

Your service determines the type of valve you need, your valve material, and more. There are thousands of fluids used in industrial processes — molasses, water, hydrogen, and ethylene glycol, just to name a few — but most of them can fit under one of these categories:

- Steam
- Liquid, and
- Air or gas

If you don't know everything about your process fluid but can describe it as a steam, liquid, and air or gas service, our sales representatives will point you in the right direction.

They'll also help you determine any codes or standards that apply to your service.

Set pressure is at the heart of safety and pressure relief valve operation, so it's a vital detail to provide during the specification process.

Set pressure is the point at which the safety or pressure relief valve opens.

Your valve's set pressure should never exceed the maximum allowable working pressure of the equipment you're placing the valve on.

And for the best results, the operating pressure should be at least 10% below the valves stamped set pressure.

Relief valves need to relieve pressure at a certain capacity.

The required relieving capacity of a valve should take into account all sources of pressure generation in the system, like

- Pumps, and
- Heat input, which can cause fluid to boil or expand

To keep the system pressure below acceptable limits, the valve you select must be able to relieve media faster than the worst-case scenario can generate flow.

All the information we just covered is required to purchase a valve.

Now we're going to go through some smaller details that you don't necessarily need to provide, but will help guarantee you get the best valve for your application.

Orifice size and inlet size go hand in hand. Generally, the smaller inlet size, the smaller the orifice size.

The orifice size is closely related to the valve's rated capacity. The larger the orifice, the higher the rate of relief for the associated set pressure.

The operating pressure is the pressure to which your valve will be subjected regularly. Defining this value will allow you to confirm that the gap between your operating and set pressures is large enough to allow for correct valve operation.

Determining your operating and relieving temperatures will ensure that the valve you select will stand up to everyday use as well as a relief scenario.

For instance, if your process uses superheated steam, you'll need to select a valve that can handle higher temperatures. In this case, you might choose a steel valve instead of bronze or iron.

Pressure relief valves operate differently based on the environment. For example, high ambient temperatures can affect the set pressure of a valve.

Low ambient temperatures combined with moisture can make valves freeze, causing vibration and possible malfunction.

So if you're going to install your valve somewhere with extreme temperatures, define that too.

Your allowable overpressure helps determine the valve's code stamp, and generally depends on where you're using the valve.

There are three options for allowable overpressure — 3%, 10%, and 21%.

- 3% is for valves that are on a boiler for a steam service.
- 10% is for valves that aren't directly on a boiler, but instead on an unfired vessel.
- And finally, 21% is for valves that might see a fire.

Pressure and safety relief valves are built in accordance with one of three ASME codes: Section I, Section IV, or Section VIII.

- Section I covers fired pressure vessels, usually a boiler.
- Section IV covers low pressure steam boilers and hot water heating boilers, and
- Section VIII covers unfired pressure vessels, or anything that isn't a boiler.

Valves are compatible with different kinds of accessories designed to make your operations run safely and efficiently. A few examples include:

- Vibration dampeners
- Lifting levers
- Soft seats, and
- Pressure tight caps

If you give our valve experts some details about your process, we can suggest accessories that will be a good fit for your application.

The more details you have about your process, the faster your valve selection and purchasing will go. However, you don't need to wait to gather all the details before shopping.

If you provide three basic pieces of information — set pressure, service, and inlet size — we can help guide you in the right direction.