

ARPCO

VALVES & CONTROLS

What Are Pressure Relief Valves?

INTRODUCTION

Protection against over pressure is one of the most important design tasks in the chemical, petrochemical, oil, and gas industries. Pressure relief valves are instruments that protect the plant from an over pressure scenario. The various causes of over pressure fall into two categories: fire conditions and process conditions. The purpose of over pressure protection systems is to reduce the potential for over pressure-initiated explosions and fires. A pressure relief valve can be compared to a fuse in an electrical system.

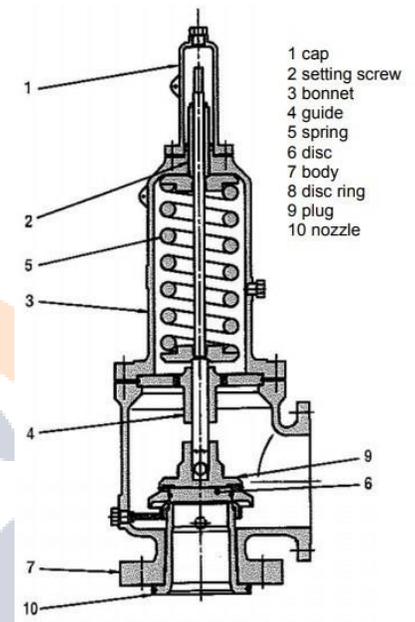


The Purpose of Pressure relief valves

Pressure relief valves are commonly installed for one or more of the following reasons:

1. To guarantee the safety of operating personnel

2. To prevent the destruction of capital investment as a result of overpressure
3. To conserve process material from loss during and after an overpressure-related accident
4. To minimize unit downtime caused by over pressure
5. To comply with local, state, national, and other court enforceable regulations
6. To avoid civil suits resulting from property or personal damage external to the plant caused by over pressure



By designing and installing reliable over pressure protection systems, the plant will not only obtain favorable insurance treatment, it will minimize pollution (primarily air pollution) by preventing the discharge of over pressure vapors.

CAUSES OF OVERPRESSURE

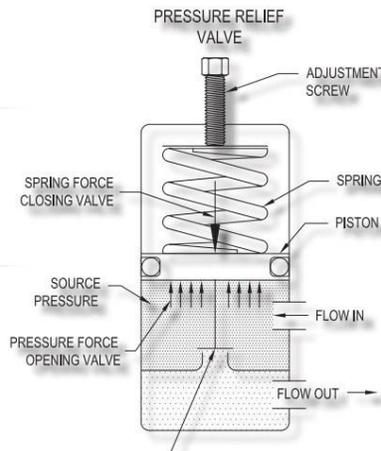
Overpressure can be caused by fire and non-fire process causes. When it comes to the latter, there can be many potential causes. The potential non-fire causes of overpressure include the following:

1. Utility failures (which can be the failure of electric power, instrument air, steam, coolant, or fuel)
2. Thermal expansion
3. Blocked outlets
4. Valve or process control failure
5. Equipment failure
6. Runaway chemical reaction
7. Human error

It is worth noting that part of the goal of a safe plant design is the goal of minimizing the opportunities for human error.

Working of Pressure relief valves

As it is shown in Figure, the conventional Pressure relief valve is a force balance device by a spring when the below its set pressure. When the inlet pressure is reached, overcomes that of the opens. When the inlet below the set pressure (this difference is the valve recloses. The spring is vented to the Pressure relief valves, operation of the valve by the backpressure. The Pressure relief valve inlet incorporates a valve seat with a disc for full closure of the inlet port. The disc is usually spring loaded, and the spring force is applied directly on the disc by means of a stem.



that is held closed inlet pressure is When the set the upward force spring, and the valve pressure drops by some percentage called blowdown), housing of the outlet of the and therefore the is directly affected

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