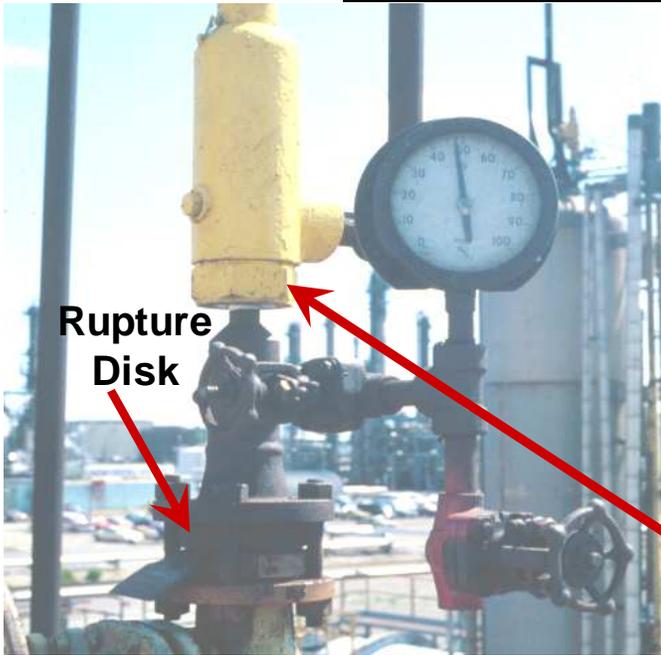


Hazards of Relief Devices in Series

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A vessel has a rupture disk and a pressure relief valve in series to protect against high pressure in the vessel. There is a pressure gage on the pipe between the rupture disk and the relief valve. As a part of your regular plant inspection, you are supposed to check the pressure gage. The gage normally reads zero. Today you observe a pressure of nearly 50 psig (~3.5 barg) as shown.

Do you understand why this is a significant hazard? How does pressure between the rupture disk and the pressure relief valve affect the performance of the vessel overpressure protection system?

Pressure Relief Valve

Did you know?

- A rupture disk bursts when the pressure on the process side of the disk exceeds the pressure on the downstream side by the design pressure of the rupture disk. So, a 100 psi (6.9 bar) rupture disk will burst when the pressure on the process side of the disk is 100 psi (6.9 bar) greater than the pressure downstream of the disk.
- The pressure might be caused by a small “pinhole” leak in the rupture disk which will allow material to slowly leak through the disk and build up pressure, or it could be the result of a burst rupture disk.
- Because there is nearly 50 psig (3.5 barg) pressure on the downstream side of this rupture disk, if the pressure was caused by a pinhole leak, the rupture disc will not burst until the pressure in the vessel is equal to the rupture disk design pressure plus 50 psi (3.5 bar). If this is a 100 psi disk, it will not burst until the vessel pressure is nearly 150 psig (~10.3 barg). This might result in failure of other equipment attached to the vessel - perhaps a sight glass, a hose, or a gasket which cannot withstand the higher pressure.

What can you do?

- Check to ensure that your training program covers this situation.
- Do you know what to look for to recognize a rupture disk and relief valve in series?
- If you have installations like this, be sure to check the pressure regularly.
- If you observe pressure between a relief valve and a rupture disk, be sure to investigate and correct the problem as soon as possible.
- Make sure you understand the reason for all process data that you are asked to observe and record, know when an observed reading warns of a hazardous situation, and know what action to take to correct the problem.

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Relief Valves

Don't just write down the data – understand what it means!