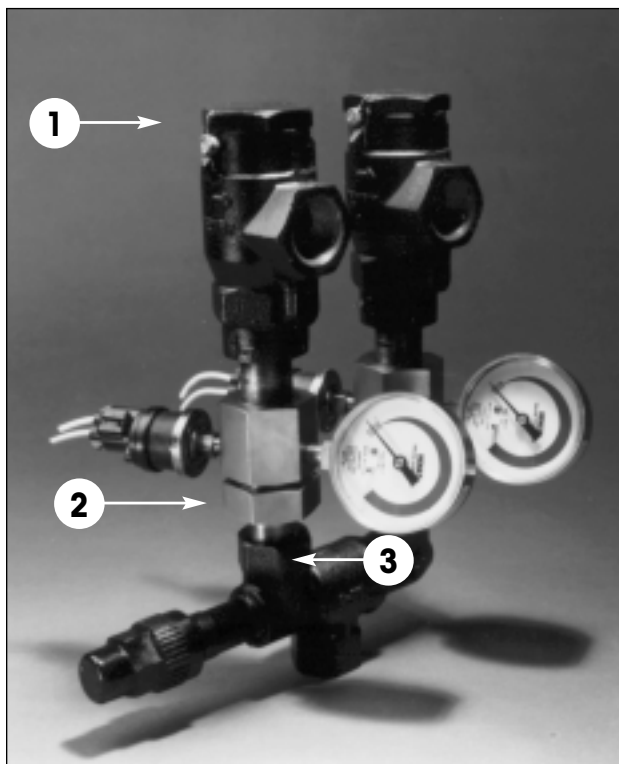


# Safety Relief Valves

Replacement, Maintenance,  
Installation Recommendations

tech  
tips



1. Relief Valve
2. "SENTRY" Rupture Disc Assembly
3. Three-Way Dual Shut-Off Valve

Safety relief valves are relatively maintenance free devices. Even so, we would recommend a periodic inspection of these devices every 6-12 months. A visual inspection should be made to verify the condition of the valves. While performing this inspection, some of the conditions to watch for are:

- A. Broken or missing seal wires.
- B. Signs of corrosion that could prevent the valve from functioning properly.
- C. Valve leakage.
- D. Missing nameplate.
- E. "Stacked" relief valves:

A common maintenance error is to add a second relief valve onto the outlet of an existing relief valve that is leaking. This "stacking" of relief valves is not permissible by code. By installing two relief valves in sequence, you add back-pressure above the first relief valve piston—causing a change in the pressure setting. For example, the estimated relieving pressure of a valve stack could be:

|                      |                   |
|----------------------|-------------------|
| First relief valve:  | 300 PSI Setting   |
| Second relief valve: | + 300 PSI Setting |
| Total valve stack:   | 600 PSI Setting   |

As the relief flow then passes through the second valve, the valve stack also experiences a change in relieving capacity.

If any of these conditions exist, the valve should be replaced.

The condition of the discharge piping should also be inspected. Valves should be piped to insure that they do not collect dirt and debris. Vent pipes should be protected to prevent the entrance of rain water

which would inhibit valve operation. Any problems with the vent line should be corrected.

After maintenance the major issue concerning relief valves is "when and how often should the system relief valves be changed?" Relief valves should be changed out after discharge to ensure safeguarding a system with a properly set relief valve. Most systems are subject to accumulations of piping debris such as metal shavings and solder impurities as the system is fitted for installation. These impurities are generally blown into the relief valve seats at the time the valve is discharged. The impinged debris then inhibits the relief valve from reseating at its originally set pressure. In addition, the valves are then found to relieve at considerably lower pressure settings than the stamped valve setting due to the force of the reclosing action.

Replacement intervals for valves that have not discharged may be dictated by city, state or federal regulations. In addition, they may also be regulated by industry standards, company policies, insurance requirements or unwritten accepted standards of good practice.

In the case of city, state or federal regulations and insurance copy regulations, there appear to be no written rules covering the replacement schedule. However, these agencies do govern by verbal requirements requesting that system operators/owners provide proof of the reliability of the existing relief valves.

The International Institute of Ammonia Refrigeration (IAR) in their Bulletin 109 "IAR Minimum Safety Criteria for a Safe Ammonia Refrigeration System" recommends that the relief valve be replaced or inspected, cleaned and tested every five (5) years.

ANSI STD K61.1-1989: "Safety Requirements for the Storage and Handling of Anhydrous Ammonia" is very specific in its requirements.

PARAGRAPH 5.8.15 STATES: "No container pressure relief devices shall be used after the replacement date as specified by the manufacturer of the device. If no date is specified a pressure relief valve shall be replaced no later than five years following the date of its manufacture etc."

In industrial refrigeration the current recommendation is to replace the relief valves on a five (5) year cycle. We fully support and recommend that the five (5) year replacement time frame be complied with. However, be sure to check with the other agencies to verify that a more stringent regulation is not applicable.

Beyond these recommendations there are a number of factors to be considered when selecting and installing relief valves.

1. Provide a pressure vessel which will permit the relief valve to be set at least 25% above the maximum system pressure. However, the relief valve setting cannot exceed the maximum allowable working pressure as stamped on the vessel the relief valve is protecting.
2. Select a relief valve to have sufficient capacity.
3. Select a relief valve suitable for the refrigerant.
4. Install the relief valve so that it will be exposed to refrigerant vapor, i.e. above the liquid level.
5. Install the relief valves where they are accessible for inspection and replacement.
6. Do not discharge relief valves prior to installation or when pressure testing the system.
7. Use the proper size and length of discharge tube or pipe. Correct sizing is required to prevent back-pressure from building up in the discharge line, preventing the relief valve from discharging at its rated capacity.
8. The use of a three-way valve with two relief devices, which comply with the code requirements for vessels 10 cubic feet or more in gross volume, is recommended for any installation containing a large quantity of expensive refrigerant.
9. When the outlets of two or more relief devices are connected to a common header, the size of the header must be large enough to remain unaffected by back-pressure—even if all the relief devices were to discharge simultaneously.

By following these simple rules and recommendations you can be assured that your system is protected by a properly functioning relief valve.