USER MANUAL INSTRUCTION

S-SCG-288.12
ISSUE STATUS: A
DATE: 08/05/2026
NO. P260137
B26021

SCG Pressure Relief Valves (PRV)

User manual and safety warning

NOTICE!

Inspection and maintenance on a periodic basis is essential.

Installation and maintenance should be performed only by qualified personnel.

Be sure all instructions are read and understood before installation, operation and service.

⚠ WARNING

What you must do

- Read This Entire Warning
- Install Properly
- Inspect Regularly

Purpose

This bulletin applies to pressure relief valves installed on stationary, portable and transportable containers and piping systems utilized with these containers. This bulletin is not intended to be an exhaustive treatment of this subject and does not cover all safety practices that should be followed in the installation and maintenance of LP-Gas systems. Each LP-Gas employee should be provided with proper training on the subject. A simple warning is:

Inspect pressure relief valves regularly. Replace unsafe or suspect valves immediately. Use common sense.

Container Pressure Relief Valves

LP-gas relief valves are intended to open only under the excessive pressure conditions indicated below. The container pressure will get high enough to open relief valves under the following conditions:

1. Filling containers not purged of air
2. Overfilled container exposed to heat, which includes radiated heat (sun)
3. Use of an incorrect product such as propane in a container with relief valve set for butane pressures (Low set pressure for service)
4. All containers if exposed to extreme heat (fire)
5. Excessive pressures created during filling

CAUTION: Never plug the outlet of a pressure relief valve. Any device used to stop the flow of a properly operating pressure relief valve that is venting an overfilled or over pressurized container - raises serious safety concerns!

Note: When replacing pressure relief valves, make sure that the setting and capacity are correct for the container or system. Check the stamping or nameplate on the container and then determine the proper pressure relief valve from SCG products.

Operation of Pressure Relief Valves

Pressure relief valves are set and sealed by the manufacturer to function at a specific “start-to-discharge” pressure in accordance with regulations. This set pressure, marked on the relief valve, depends on the design requirement of the container to be protected by the relief valve. If the container pressure reaches the start-to-discharge pressure, the relief valve will open a slight amount as the seat disc begins to move slightly away from the seat. If the pressure continues to rise despite the initial discharge through the relief valve, the seat disc will move to a full open position with a sudden “pop”. This sharp popping sound is from which the term “pop action” is derived.

Whether the relief valve opens a slight amount or pops wide open, it will start to close if the pressure in the container diminishes. After the pressure has decreased sufficiently, the relief valve spring will force the seat disc against the seat tightly enough to prevent any further escape of product. The pressure at which the valve closes tightly is referred to as the “re-seal” or “blow-down” pressure. Generally, the re-seal pressure will be lower than the start-to-discharge pressure. The re-seal pressure can be, and in most cases is, adversely affected by the presence of dirt, rust, scale or other foreign particles lodging between the seat and disc. They interfere with the proper mating of the seat and disc and the pressure in the container will usually have to decrease to a lower pressure before the spring force embeds foreign particles into the resilient seat disc material and seals leak-tight. The degree by which the presence of dirt decreases the re-seal pressure, is, of course, dependent on the size of the interfering particles.

Once particles have been trapped between the disc and seat, the start to-discharge pressure is also affected. For example, the pressure relief valve will start-to-discharge at some pressure lower than its original start to-discharge pressure. Again, the pressure at which the valve will start to discharge is dependent on the size of the foreign particles. In the case of a pressure relief valve that has opened very slightly due to a pressure beyond its start-to-discharge setting, the chances of foreign material lodging between the seat and disc is negligible although the possibility is always present. If the relief valve continues to leak at pressures below its start-to-discharge setting it must be replaced.

Relief valves which have “popped” wide open must also be checked for foreign material lodged between the seat and disc, as well as for proper reseating of the seat and disc. Continued leakage at pressures below the start-to-discharge setting indicate the relief valve must be replaced.

The pressure at which a pressure relief valve will start to discharge should never be judged by the reading of the pressure gauge normally furnished on the container.

Smaller Relief Valves

The industry’s requirement for a small full-flow safety relief valve challenged design engineers some years ago:

- The valve must be leakproof before operating and must reseat leakproof each time after each operation. The only known satisfactory seat disc materials to accomplish this have been special synthetic rubber compounds.
- Valve discharge settings are relatively high and require high spring loads to keep the valve closed.
- Because of the small interior diameter of the valve, the round metal seating area is small.

All of these parameters may result in the development of a significant indentation in the rubber seat disc after some years. The seat disc may have a tendency to cling to the metal seat. This may result in the relief valve not opening at the set pressure as the seat disc ages.

Test have been conducted on small LP-Gas relief valves of all the U.S. valve manufacturers. Valves over 10 years old were removed from service and tested to determine at what pressure the valves discharged. In many of the valves, the pressure required to open the valve exceeded the set pressure.

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Because of the critical importance of proper functioning of relief valves, common sense and basic safety practice dictate that small relief valves should be replaced in about 10 years.

Some larger relief valves on bulk storage tanks can be replaced with rebuilt valves obtained from the manufacturers. Small relief valves cannot be rebuilt economically; thus, new valves are required. Most LP-Gas dealers find it impractical and costly to test relief valves and field repairing of relief valves is not sanctioned by the manufacturers, Underwriter's Laboratories, or ASME.

Install Properly

Consult any applicable regulations governing the application and use of pressure relief valves, for example ASME BPVC.Sec VIII Div1 and ASME BPVC.Sec XIII. Make sure you are thoroughly trained before you attempt any valve installation, inspection or maintenance.

Tightening torques

Torques to be used for installing SCG pressure relief valves (PRV) are given below. These figures are based on the use of PTFE tape as a pipe lute and assuming that the coupling into which the valve is installed is within +/- 1 turn from basic.

NPT	Model	Torque (min / max) Nm	
¼"	PRV / HRV	25	30
½"	PRV	75	110
⅜"	PRV	44	55
¾"	PRV / 7545K	130	170
1"	PRV	155	200
1 ¼"	PRV	190	240

Inspect Regularly

A pressure relief valve discharges when some extraordinary circumstance causes an over pressure condition in the container. If a pressure relief valve is known to have discharged, the relief valve, as well as the entire system, should be immediately and thoroughly inspected to determine the reason for the discharge. In the case of discharge due to fire, the valve should be removed from service and replaced.

Relief valves should be inspected each time the container is filled but no less than once a year. If there is any doubt about the condition of the valve, it must be replaced.

WARNING: Under normal conditions, the useful safe service life of a pressure relief valve is 10 years from the original date of manufacture. However, the safe useful life of the valve may be shortened and replacement required in less than 10 years depending on the environment in which the valve lives. Inspection and maintenance of pressure relief valves is very important. Failure to properly inspect and maintain pressure relief valves could result in personal injuries or property damage.

Eye protection must be worn when performing inspection on relief valves under pressure. Never look directly into a relief valve under pressure or place any part of your body where the relief valve discharge could impact it. In some cases, a flashlight and a small mirror are suggested to assist when making visual inspections.

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To Properly Inspect A Pressure Relief Valve, Check For:

1. A rain cap. Check protective cap located in valve or at end of pipeaway for a secure fit. Protective caps help protect the relief valve against possible malfunction caused by rain, sleet, snow, ice, sand, dirt , pebbles, insects, other debris and contamination. *REPLACE DAMAGED OR MISSING CAPS AT ONCE AND KEEP A CAP IN PLACE AT ALL TIMES*

2. Open weep holes. Dirt, ice, paint and other foreign particles can prevent proper drainage from the valve body. *IF THE WEEP HOLES CANNOT BE CLEARED, REPLACE THE VALVE.*

3. Deterioration and corrosion on relief valve spring. Exposure to high concentrations of water, salt, industrial pollutants, chemicals and roadway contaminants could cause metal parts to fail. *IF THE COATING ON THE RELIEF VALVE SPRING IS CRACKED OR CHIPPED, REPLACE THE VALVE.*

4. Physical damage. Ice accumulations and improper installation could cause mechanical damage. *IF THERE ARE ANY INDICATIONS OF DAMAGE, REPLACE THE VALVE.*

5. Tampering or readjustment. Pressure relief valves are factory set to discharge at specified pressures. *IF THERE ARE ANY INDICATIONS OF TAMPERING OR READJUSTMENT, REPLACE THE VALVE.*

6. Seat leakage. Check for leaks in the seating area using a noncorrosive leak detection solution. *REPLACE THE VALVE IF THERE IS ANY INDICATION OF LEAKAGE.* Never force a relief valve closed and continue to leave it in service. This could result in damage to the valve and possible rupture of the container or piping on which the valve is installed.

7. Corrosion and contamination. *REPLACE THE VALVE IF THERE ARE ANY SIGNS OF CORROSION OR CONTAMINATION ON THE VALVE.*

8. Moisture, foreign particles or contaminants in the valve. Foreign material such as paint, tar or ice in relief valve parts can impair the proper functioning of the valves. Grease placed in the valve body may harden over time or collect contaminants, thereby impairing the proper operation of the relief valve. *DO NOT PLACE GREASE IN THE VALVE BODY, REPLACE THE VALVE IF THERE ARE ANY INDICATIONS OF MOISTURE OR FOREIGN MATTER IN THE VALVE*.

9. Corrosion or leakage at container connection. Check container to valve connection with a non-corrosive leak detection solution. *REPLACE THE VALVE IF THERE IS ANY INDICATION OF CORROSION OR LEAKAGE AT THE CONNECTION BETWEEN THE VALVE AND CONTAINER.*

Inspection of Relief Valves

A casual visual inspection of a relief valve may not necessarily disclose a potential hazard. On the other hand, a visual inspection will often disclose leakage, corrosion, damage, plugging and contamination.

If additional light is required, a flashlight should be used.

If there is any doubt about the condition of the valve, or if there is a suspicion that the valve has not been protected by a cap for some time, it should be replaced before refilling the container.

Eye protection must be used when examining relief valves under pressure.

Use of Protective Caps

Many of the problems that cause inoperative relief valves could be prevented if proper protective caps were kept in place at all times.

Collection of debris would be prevented. Contamination caused by corrosive atmospheres would be reduced. Water collection in the valves would be eliminated. Relief valves protected with caps from the

time of installation in the container would obviously have a much longer safe useful life, but they still should be replaced at some time because of the gradual deterioration of the rubber seat disc due to age alone.

NFPA 58 requires that protective caps must be kept in place as a protective cover on some relief valves. This is a mandatory requirement on several types of relief valves. The fact that use of caps may make inspection more time consuming should not be viewed as a reason for either not using the caps, or not making required periodic inspections.

In the event a relief valve has been used without the required cap, the relief valve should be thoroughly inspected and the required cap placed on the relief valve. If damage is noted to the relief valve, it should be replaced and the replacement valve should be capped. Relief valves with pipe-away adapters or deflectors used on lift truck containers have been found choked with debris. Inspection of relief valves with deflectors can only be accomplished by removing the deflector.

Repair and Testing

SCG Pressure Relief Valves are tested and listed by Underwriters Laboratories, Inc. in accordance with ASME authorization. The construction and performance are continuously monitored at the factory by ASME-authorized inspectors. Therefore, field testing of SCG Pressure Relief Valves is not necessary.

Any pressure relief valve which shows evidence of leakage, other improper operation or is suspect as to its performance must be replaced immediately using approved procedures.

SCG pressure relief valves are not designed to be repaired or reconditioned. Spare components for pressure relief valves are not available for sale.

Summary Recommendations

Predicting the safe useful life of a relief valve is obviously not an exact science. The conditions to which the valve is subjected will vary widely and will largely control its life. In matters of this kind, only basic guidelines can be suggested. The LP-Gas dealer must observe and determine the safe useful life of relief valves in his territory. The valve manufacturers can only make recommendations for the continuing safety of the industry:

1. Make sure proper protective caps are in place at all times. Do not release a container for service or fill a container unless it has a protective cap in place.

2. Replace relief valves periodically, at least every 10 years. Every relief valve has the month and year of manufacture stamped on the valve. This is most particularly true of small separate relief valves.

3. Carefully inspect valves each time before the container is filled. Replace valves showing any signs of contamination, corrosion, damage, plugging, leakage, or any other problem. Eye protection must be used when examining relief valves under pressure.