

1 0 Scope

1 1 This standard provides basic design requirements, and sets inspection and testing requirements for pressure relief devices

2 0 Design Requirements

2 1 Monitor valves should be used in preference to relief valves when practicable

* 2 2 A pressure relief device shall have the capacity and shall be set, to limit the pressure in a system to the level shown below, under any possible operating conditions

2 2 1 In a low pressure distribution system, the pressure may not exceed 14" w c

2 2 2 In pipelines other than a low pressure distribution system -

2 2 2 1 If the maximum allowable operating pressure is 60 psig or more, the pressure may not exceed the maximum allowable operating pressure plus 10 percent, or the pressure that produces a hoop stress of 75 percent of SMYS, whichever is lower,

2 2 2 2 If the maximum allowable operating pressure is 12 psig or more, but less than 60 psig, the pressure may not exceed the maximum allowable operating pressure plus 6 psig, or

2 2 2 3 If the maximum allowable operating pressure is less than 12 psig, the pressure may not exceed the maximum allowable operating pressure plus 50 percent

* 2 3 The pressure at which the relief valve is set to open will depend on its operating characteristics, including the pressure build up above the point to achieve full capacity and the pressure at which the system is to be operated under normal conditions. However, the setting shall not be higher than a level which would permit the pressure to reach or



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| APPROVED BY | | | | | | | | | | |
| RIS | MB | | | | | | | | | |
| RFD | PAL | 2 | 12/13/85 | Rev'd Par's. 2.2, 2.3, 2.4, 3.1 & 5.1 | | | | | BFO | |
| | CJT | 1 | 8/6/84 | Issued for Use | | | | | PAL CJT | |
| | REV | DATE | DESCRIPTION | | | GM | DWN | CHKD | SUPV | APVD |
| GM | | | | | | | | | B/M | |
| SUPV | | | | | | | | | DWG. LIST | |
| DSGN | | | | | | | | | SUPSDS | |
| DWN | | | | | | | | | SUPSD BY | |
| CHKD | | | | | | | | | SHEET NO. 1 of 9 SHEETS | |
| OK | | | | | | | | | DRAWING NUMBER | |
| DATE | SCALE | | | | | | | | | |
| 8/6/84 | | | | | | | | | | |
| | | | | GENERAL - REQUIREMENTS PRESSURE RELIEF DEVICES GAS STANDARD PACIFIC GAS AND ELECTRIC COMPANY SAN FRANCISCO CALIFORNIA | | | | | | REV |
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exceed the pressures specified in Paragraph 2 2 of this standard, taking into account the pressure build up required for the valve to reach full capacity

*2 4 The relief valve or other overpressure protection may be set just sufficiently above the MAOP of the system being protected, to permit the system to be operated at the MAOP without causing the relief valve to leak or vent gas This pressure shall be determined considering the operating characteristics and operating tolerances of the valve being used It shall not be any higher than necessary to accomplish this, and under no condition shall it be set so high that it will permit the pressure to exceed that specified in Section 2 2 of this standard

2 5 When more than one pressure regulating or compressor station feeds into a pipeline, relief valves or other protective devices shall be installed at each station to ensure that a failure of the supply devices will not impose pressure on any part of the pipeline system in excess of the pressure permitted by paragraph 2 2

2 5 1 At stations built or rebuilt after July 3, 1972, pressure relief devices shall have sufficient capacity to relieve a failure of all parallel supply devices in the final stage of pressure regulation Capacity is not to be based on the simultaneous failure of all supply devices in all stages of regulation

2 5 2 At stations built before July 3, 1972 and not rebuilt since then pressure relief devices, shall comply with the minimum requirement of the latest edition of G O 112, the relief devices shall have sufficient capacity to relieve a failure of the supply device with the largest capacity

2 5 2 1 After a station is rebuilt or the capacity of the supply devices is changed, the pressure relief devices shall have sufficient capacity to relieve a failure of all parallel supply devices in the final stage of pressure regulation Capacity is not to be based on the simultaneous failure of all supply devices in all stages of regulation

2 5 2 2 If the station has not been rebuilt and there has been no change in the capacity of the supply devices, the capacity of pressure relief devices replaced due to wear may remain unchanged However, increasing the capacity of the relief devices to comply with Paragraph 2 5 1 should be considered when relief devices with increased capacity can be installed with only minor piping changes

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2 6 The discharge piping of pressure relief valves shall be designed to prevent an accumulation of water, ice, or snow and to discharge gas to non-hazardous locations

3 0 Sizing of Relief Valves

- * 3 1 The relief valve must have adequate capacity, and must have operating characteristics, which will prevent the pressure from exceeding the limits specified in Section 2 2 (above), taking into account the set pressure, the operating tolerance of the valve and the pressure build up required to achieve full capacity
- 3 2 The capacity of the relief valve may be based on the highest anticipated supply pressure in the line feeding the regulator This may be the MOP rather than the MAOP of the line However, there must be adequate assurance that the supply pressure will not increase above that for which the relief valve is sized If it is necessary to increase the MOP of the system supplying the regulator(s), the capacity of all relief valves protecting it must first be checked to verify that there is adequate relief capacity for the new conditions Where the relief capacity is not adequate, additional capacity must be provided before the MOP is increased
- 3 3 The minimum demand on a system may be considered when sizing the relief valve, provided there is assurance that this minimum demand will always be present
- 3 4 The manufacturer's capacity rating may be used to determine the adequacy of the relief valve (subject to precautions outlined in Section 3 6) Before using the manufacturer's capacity rating, verify with Gas Operations that the latest available information is being used
- 3 5 When selecting and sizing a relief valve, consideration must be given to the following characteristics
 - 3 5 1 The pressure buildup above the point the valve first opens, which is necessary to obtain full capacity This must be compared to the maximum pressure permitted by Section 2 2
 - 3 5 2 The repeatability of operation How closely the relief valve can be set to the MAOP of the system without operating or leaking gas unintentionally
 - 3 5 3 The pressure to which the system must drop before the relief valve will close after it operates
 - 3 5 4 The relief valve should be sized small enough to prevent hammering or excessive vibration

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- 3 6 The regulator capacity against which the relief valve must protect is the failed wide open capacity. This can be calculated using the valve coefficient (CV) for a wide open valve. The tabulated capacity for the regulator shown in the Gas Standards and Specifications or the manufacturer's literature should not be used unless it is known to be the wide open capacity.
- 3 7 Piping between the system being protected and the relief valve must be sized so that it will not restrict the capacity of the relief valve.
- 3 8 Any valve between the system being protected and the relief valve must be locked open to prevent any unauthorized operation that would make the relief valve inoperative.
- 3 9 The vent stack represents a restriction against which the relief valve must discharge. The pressure drop in the vent stack must be considered when sizing the relief valve and the vent stack piping.

4 0 Inspection and Testing of Pressure Relief Devices

- 4 1 The capacity of all pressure relief devices shall be reviewed annually as required by Paragraph 192 743 of G O 112.
- 4 2 An anniversary month shall be established for the capacity check of each relief valve, as required by Paragraph 192 704 of the latest edition of G O 112. The capacity check must be performed during this anniversary month or the month before or the month after.
- 4 3 Setpoint must be verified by physically testing that the relief valve operates at the proper pressure setting. Verify, in accordance with either section 4 3 1 or 4 3 2, that the relief valve has sufficient capacity to limit pressure to the level required by Paragraph 2 2.
 - 4 3 1 Physically testing relief valve(s) to verify that the relief valve(s) has sufficient capacity to limit pressure to the required level.
 - 4 3 2 Making an office review and calculation to verify that under operating conditions, the relief valve has the proper setting and capacity to limit pressure to the required level.
- 4 4 Capacity shall be considered satisfactory if the maximum system pressure will not exceed the maximum pressure specified in Section 2 1. If the capacity at the maximum system pressure is not adequate, immediate steps shall be taken to provide adequate capacity.
- 4 5 The capacity of the relief devices at pressure limiting and regulating stations should be recorded using the form, "Capacity Review of Relief Devices G O 112," which is attached.

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4 6 In addition to the capacity verification, the relief devices shall be inspected to see that they are -

4 6 1 In good operating condition, and

4 6 2 Properly installed and protected from dirt, liquids, and other conditions that might prevent proper operations

4 7 In addition to annual capacity testing, the capacity of relief devices shall be verified immediately when changes are made which could affect the ability of the relief valve to protect the system

5 0 Responsibility

- * 5 1 The Regional Gas Operations Manager and the Manager of Pipe Line Operations are responsible for performing the inspection, operation and maintenance of the subject facilities, within their assigned geographical area

6 0 References

Sections 192 199, 192 201, 192 704, 192 731, 192 739, and 192 743 of the latest edition of G O 112

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S P 464-2

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**CAPACITY REVIEW OF RELIEF DEVICES AT
PRESSURE LIMITING AND REGULATING STATIONS AS REQUIRED
BY PAR 192 739(b) AND PAR 192 743 OF CURRENT G O 112**

PART II - To be completed only if Part I indicates that a complete review is required

Station Name _____

Division _____ District _____

Line or System Supplied by Facility (see note #1 below) _____

This capacity review is for the year _____

1 Complete capacity review was required because

- a _____ Capacity review was not performed in previous year
- b _____ The previous capacity review showed that relief device capacity was inadequate
- c _____ Changes have been made to the equipment at the station, pressure conditions, load conditions, or supply conditions which could affect the ability of the relief valves to limit the pressure to the maximum permitted by Paragraph 2 0 of Gas Standards and Specifications H-70

2 Station Pressure Conditions

- P₁ - Maximum upstream pressure (MAOP, or MOP if lower) _____ psig
- P₂ - MAOP or MOP downstream of station _____ psig
- P₃ - Maximum permissible downstream pressure (see Par 192 201) _____ psig

3 Regulator(s) Supplying Line or System Described Above

| Size | Model | Inner Valve | | Wide Open Capacity P ₁ in, P ₂ out | Indicate Catalogue Reference or Gas Standard Used for Capacity |
|------|-------|-------------|----------------|---|--|
| | | Size | Field Verified | | |
| | | | | | |
| | | | | | |
| | | | | | |

Regulator(s) installed in series _____ parallel _____

4 Maximum Supply Capability

- a Total capacity of all regulators if installed in parallel _____ scfh
- Total capacity of series regulator installation with pressure drops adjusted to give maximum flow _____ scfh

Note #1 - If there are regulating and overpressure protection facilities at the station supplying more than one line or system a separate review must be performed for the overpressure protection devices for each line or system

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PART II (Continued)

Station Name _____ Date _____

b Maximum capacity through station if limited by conditions other than regulators _____ scfh
State limiting conditions _____

5 Minimum Downstream Load

The minimum load supplied from the line or system being reviewed under any operating condition or situation _____ scfh

Note Unless it can be established that this minimum load will be present under any operating condition this load should be considered as zero

Describe load if present _____

6 Relief Capacity Required

Enter either #4a or #4b above, whichever is lower _____ scfh

Less #5 above (if any) - _____ scfh

Minimum Relief Capacity Required = _____ scfh

7 Relief Device(s) Protecting Line or System Described Above

| a | Inner Valve | | | | *Maximum Capacity at P ₃ | Capacity Reference |
|---|-------------|-------|------|------------------|-------------------------------------|--------------------|
| | Size | Model | Size | Field Verified | | |
| | | | | Pressure Setting | | |
| | | | | | | |

b Total capacity restrictions from valves piping, silencers, etc _____ scfh
Describe _____

c Relief capacity available Total of 7(a), less total of 7(b) _____ scfh

8 Adequacy of Relief Capacity

a Capacity shown in 7(c) is equal to or greater than relief capacity required (Item #6) Capacity adequate See #9 _____ scfh

b Capacity shown in 7(c) is less than relief capacity required (Item #6) Capacity not adequate See Part III _____ scfh

9 The relief device(s) described above have adequate capacity

Verified by _____

Approved by _____

Date _____

Date _____

This form is to be retained as specified in appropriate standard practices

*Refer to Section 3 0 of the Gas Standard, Pressure Relief Device Requirements

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PRESSURE LIMITING AND REGULATING STATIONS AS REQUIRED
BY PAR 192 739(b) AND PAR 192 743 OF CURRENT G O 112**

PART III - To be completed only if Part II indicates that relief capacity is inadequate

Station Name _____

Division _____ District _____

Line or System Supplied by Facility _____

1 Additional relief capacity required (from Part II #6, less #7(c)) _____ scfh

2 Corrective action to be taken

a Increase relief capacity (see #3) _____ scfh

b Replace relief facilities with a monitor _____ scfh

c Other Describe _____ scfh

3 If relief capacity is increased by adding an additional relief device or replacing the existing relief facilities with a relief device with a larger capacity, a copy of the design calculations should be attached to this form

4 Date capacity was found to be inadequate _____

5 Work to provide adequate overpressure protection completed

Job No _____ Completed on _____

Verified by _____ Approved by _____

Date _____ Date _____

This form is to be retained as specified in appropriate standard practices

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