

Gas Pressure Regulation and Overpressure Protection



Protection Against Accidental Overpressure

§192.195(a)

- A Pipeline Connected to a Gas Source that could exceed **MAOP** as the result of Failure, must have Relieving or Limiting Devices meeting §192.199 & §192.201



Protection Against Accidental Overpressure

§192.195(b)

➤ Additional Requirements for Distribution

✓ Regulation Devices that Meet:

- ✓ Pressure
- ✓ Load
- ✓ Other Service Conditions
- ✓ During Normal Operation



Protection Against Accidental Overpressure

§192.195(b)

- ✓ and that could be activated in the event of failure of some portion of the system; *and*
- ✓ Be designed to prevent accidental overpressuring.



Control of Pressure from High-Pressure Distribution

§192.197(a)

MAOP < 60#

- Service Regulators have the Following Characteristics - **No Other Protection Required**
 - ✓ 1) Capable of reducing pressure for household appliances.

§192.197(a)

MAOP < 60#

- ✓ 2) Single Port Valve with Proper Orifice for Maximum Pressure @ Reg. Inlet.
- ✓ 3) Seat Made of Resilient Material.
- ✓ 4) Pipe Connections not Exceeding 2" Diameter.



§192.197(a)

MAOP < 60#

- ✓ 5) Capable of Accurately limiting during Normal and No-flow Conditions.
- ✓ 6) Self-Contained without External Static or Control Lines.



§192.197(b)

Protection Required

- If the Regulators used do not meet *ALL* Requirements
- Or the Gas Contains Materials that Interferes with the Operation of Regulators
 - ✓ Must be Suitable Devices to Prevent Overpressure of Connected Appliances

Control of Pressure from High-Pressure Distribution

§192.197(c)

MAOP > 60#

- One of the following Methods *must* be Used to Regulate and Limit, to the Maximum Safe Value, the Pressure Delivered to the Customer:

§192.197(c)

MAOP > 60#

➤ (1) A Regulator Meeting the Six Requirements and:

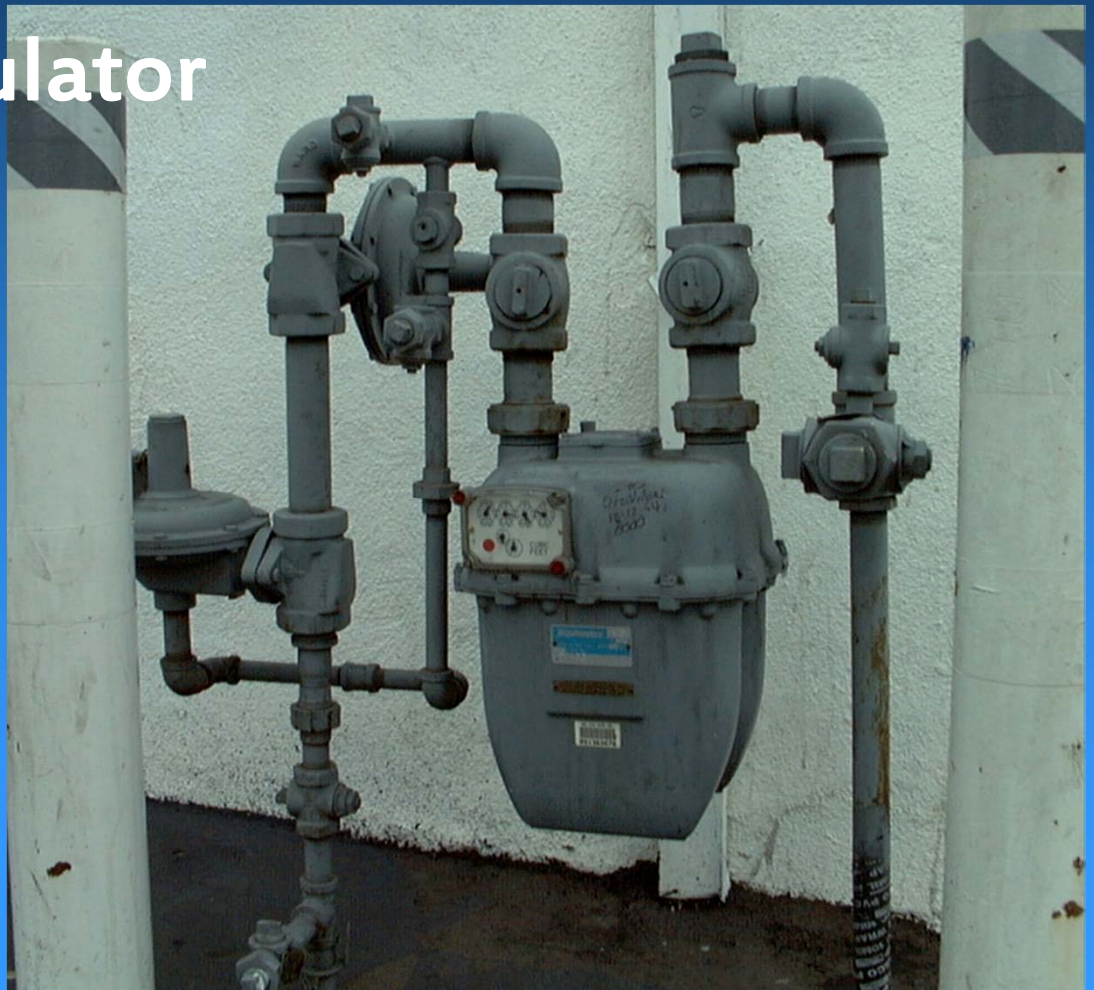
- ✓ Another Regulator installed Upstream from the Service Regulator and a device installed between the Two Regulators to limit Inlet Pressure on the Service Regulator less than 60 psig during Failure.



§192.197(c)

MAOP > 60#

- (2) A Service Regulator and Monitor



§192.197(c)

MAOP > 60#

- (3) A service regulator with *sufficient* Internal Relief Capacity
 - ✓ or Additional Device to limit delivery pressure to a Safe Value
 - ✓ Used when inlet pressure does not exceed Manufacturer's rating or 125 psig, whichever is Lower.

§192.197(c)

MAOP > 60#

- (4) A Service Regulator and an Automatic Shutoff device requiring Manual Reset.



Design of Pressure Relief and Limiting Devices

§192.199

➤ Each device must:

- ✓ a) Not be Impaired by Corrosion;
- ✓ b) Have Valves and Seats designed not to Stick in a Position Rendering the Device Inoperative;
- ✓ c) Designed and Installed so it can be Readily Operated;

Design of Pressure Relief and Limiting Devices

§192.199

- ✓ d) Supports made of non-combustibles
- ✓ e) Discharge Stacks prevent Accumulations and Discharge without Hazard;
- ✓ f) Prevent Hammering of the Valve and Impairment of Capacity;



Design of Pressure Relief and Limiting Devices

§192.199

- ✓ g) Installed to Prevent Single Incident from affecting Regulator and Device; and
- ✓ h) Prevent unauthorized Operation of a stop valve Rendering a Device Inoperative





Required Capacity of Pressure Relieving and Limiting Stations

§192.201(a)

➤ Each station or group of stations must have enough capacity, and set to operate and insure the following:

- ✓ 1) Low pressure distribution, protect connected utilization equipment.



Required Capacity of Pressure Relieving and Limiting Stations

§192.201(a)

- 2) Pipelines other than low pressure distribution systems:

MAOP > 60 #	MAOP + 10% or 75% SMYS, whichever is lower;
MAOP > 12 # < 60 #	MAOP + 6 #
MAOP < 12#	MAOP + 50%

Required Capacity of Pressure Relieving and Limiting Stations

§192.201

- a) Multiple feeds must have Devices installed At each station to insure Against Failure of the Largest Capacity Component.
- b) Devices must be Installed at or Near Each Station in a Low Pressure Distribution System, with capacity to Limit Main Pressure at Safe Values.

Instrument, Control, and Sampling Pipe and Components

§192.203(b)

- **Materials and Design.** All materials and Components must be Designed to meet Service Conditions and the Following:
 - ✓ 1) Takeoff fittings, bosses, or Adapters must withstand Temperatures, Pressures and Stresses without Fatigue Failure.

Instrument, Control, and Sampling Pipe and Components

§192.203(b)

- ✓ 2) Except for takeoff lines that can be isolated from sources of pressure by other valving, a shutoff valve installed in each takeoff line and blowdown valves installed where necessary.
- ✓ 3) Brass or copper may not be used at temperatures $> 400^{\circ}\text{F}$



Instrument, Control, and Sampling Pipe and Components

§192.203(b)

- ✓ 4) Pipe or Components containing Liquids must be Protected from Freezing
- ✓ 5) Pipe or Components containing liquids must have Drains or Drips
- ✓ 6) Pipe or Components subject to Clogging must have Provisions for Cleaning



Instrument, Control, and Sampling Pipe and Components

§192.203(b)

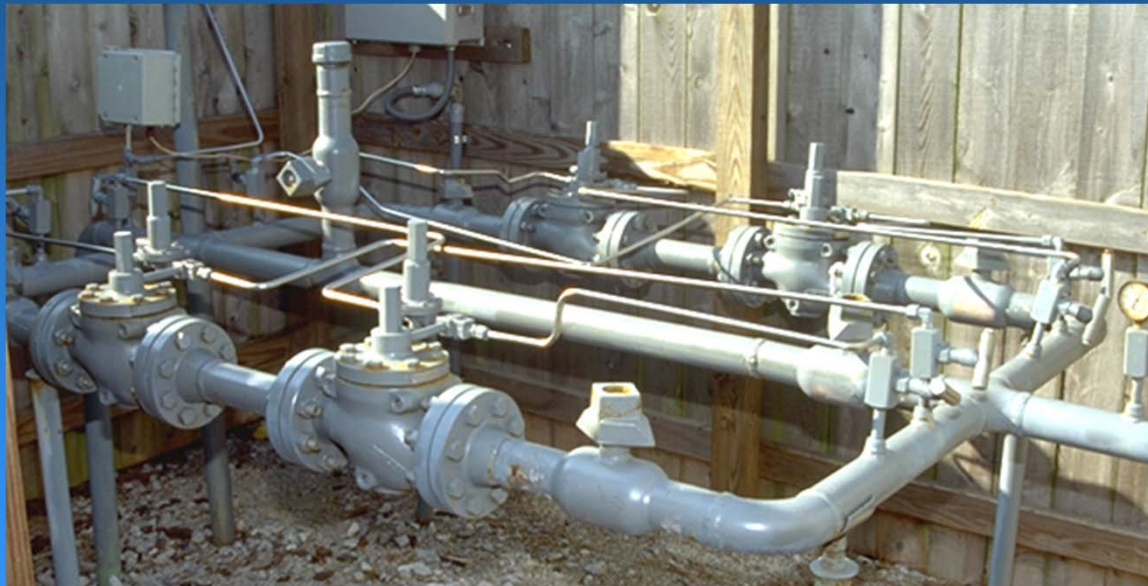
- ✓ 7) Provide safety under Anticipated Operating Stresses



Instrument, Control, and Sampling Pipe and Components

§192.203(b)

- ✓ 8) Expansion joints may not be slip type



- ✓ 9) Damage to Any One Control Line may not make both the Regulator and Protective Device Inoperative.

Procedural Manual for Operations, Maintenance, and Emergencies

§192.605(b)

- Maintenance and normal operations. The manual *must* include procedures for the following:

Operating, Maintaining, and Repairing the Pipeline in accordance with each of the requirements of this Subpart and Subpart M of this Part

Compressor Stations: Inspection and Testing Relief Devices

§192.731

- a) Except for rupture discs, each Pressure Relieving Device in a Compressor Station must be Inspected and Tested per §§192.739 & 192.743, *and* be Operated Periodically.
- b) Defective or Inadequate Equipment found must be Repaired or Replaced.

Compressor Stations: Inspection and Testing Relief Devices

§192.731

- c) Each Remote Control Shutdown Device must be Inspected ... to Determine that it Functions Properly.



Pressure Limiting and Regulating Stations: Inspection and Testing

§192.739

- (a) Each limiting device and regulating station and its equipment must be tested each calendar year not exceeding 15 mo. intervals to determine -
 - ✓ 1) In good mechanical condition;

Pressure Limiting and Regulating Stations: Inspection and Testing

§192.739

- 2) Adequate from the standpoint of capacity and reliability of operation for the service in which it is employed;



Pressure Limiting and Regulating Stations: Inspection and Testing

§192.739

- ✓ 3) Except as provided by par. (b) of this section, set to *control or relieve* at the correct pressure consistent with the limits of §192.201(a); and
- ✓ 4) Properly installed and protected from dirt, liquids, or other conditions that might prevent proper operation.

Pressure Limiting and Regulating Stations: Inspection and Testing

§192.739

- (b) For steel pipelines whose MAOP is determined under §192.619(c), if the MAOP is 60 psi or more, the control or relief pressure limit is as follows:

If the MAOP produces a hoop stress that is:	Then the pressure limit is:
Greater than 72% SMYS	MAOP + 4%
Unknown as a percentage of SMYS	A pressure that will prevent the unsafe operation

Pressure Limiting and Regulating Stations:

§192.741 Telemetering or Recording Gages

- a) Each distribution system supplied by more than one regulating station must be equipped with telemetering or recording gages...



Pressure Limiting and Regulating Stations:

§192.741 Telemetering or Recording Gages

- b) Single feed systems; the operator shall determine the necessity ... taking into consideration the number of customers supplied, the operating pressures, the capacity of the installation, and the operating conditions.

Pressure Limiting and Regulating Stations:

§192.741 Telemetering or Recording Gages

- c) If there are indications of high or low pressure, equipment must be inspected and necessary corrective actions taken.



Pressure Limiting and Regulating Stations: Testing of Relief Devices

§192.743

- Pressure relief devices at pressure limiting stations and pressure regulating stations must have sufficient capacity to protect the facilities to which they are connected consistent with the pressure limits of §192.201(a). This capacity must be determined at intervals not exceeding 15 months, but at least once each calendar year, by testing the devices in place or by review and calculations.

Pressure Limiting and Regulating Stations: Testing of Relief Devices

§192.743(b)

- If review and calculations are used to determine if a device has sufficient capacity, the calculated capacity must be compared with the rated or experimentally determined relieving capacity of the device for the conditions under which it operates.

Pressure Limiting and Regulating Stations: Testing of Relief Devices

§192.743(b)

- After the initial calculations, subsequent calculations need not be made if the annual review documents that parameters have not changed to cause the rated or experimentally determined relieving capacity to be insufficient.



Pressure Limiting and Regulating Stations: Testing of Relief Devices

§192.743

- c) If the capacity is insufficient, a new or additional device must be installed to provide the additional capacity required by paragraph (a) of this section.

