



Meter Installation

Scott Crocker

Vermont Gas Systems

COVERED TOPICS

- Meter and Regulator Installation
- Code Compliance
- Meter Protection
- Atmospheric Corrosion
- Abnormal Operating Conditions

GOVERNING AGENCIES

- Department of Transportation (CFR 49)
- Public Utility Commission
- Operating and Maintenance Manual
- Department Installation Standards
- National Fuel Gas Code (NFPA 54)

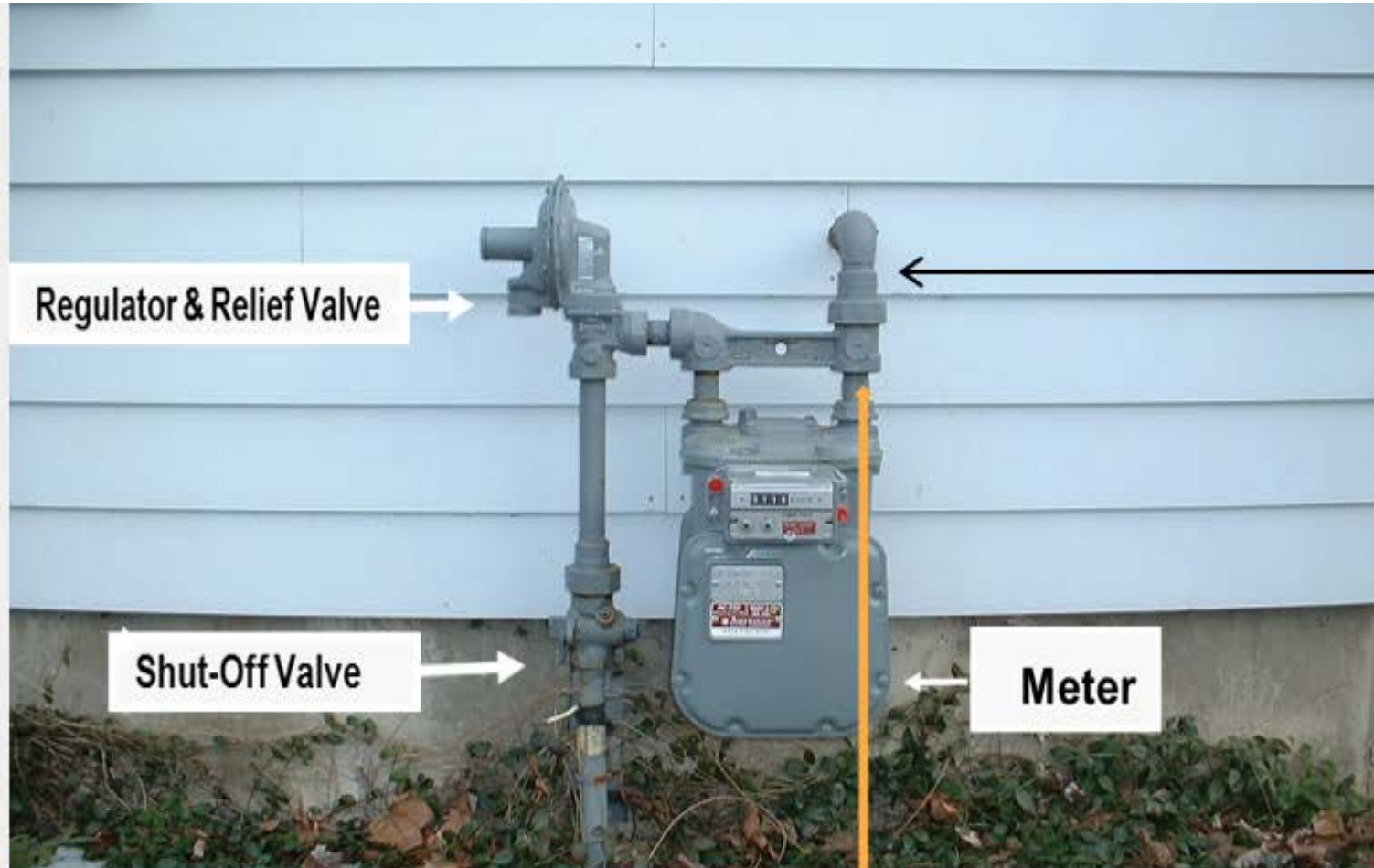
Meter and Regulator Jurisdiction

CODE OF FEDERAL
REGULATIONS

49

Parts 178 to 199
Revised as of October 1, 2013

Transportation



Regulator & Relief Valve

Shut-Off Valve

Meter

Customer Piping:

Above ground
piping beyond
the outlet of the
meter.

- * Federal/State pipeline regulations cover pipeline system to outlet of meter.
- * NFPA regulations cover customer piping and appliances.

The Code of Federal Regulations (CFR) Part 192 prescribes minimum requirements for installing customer meters and regulators. Specific State Regulations may specify additional installation clearance distances. Technicians **MUST** be familiar with company specific installation standards that address these requirements.

Subpart – H

- Locations
- Protection from Damage
- Installation
- Operating Pressure

Subpart – I

- Atmospheric Corrosion - external
- Atmospheric Corrosion - internal
- Electrical Isolation

§ 192.353 **Customer meters and regulators: Location** requires each meter and service regulator, whether inside or outside a building, to be installed in a readily accessible location and be protected from corrosion and other damage, including, if installed outside a building, vehicular damage that may be anticipated. However, the upstream regulator in a series may be buried. Each service regulator installed within a building must be located as near as practical to the point of service line entrance. Each meter installed within a building must be located in a ventilated place and not less than 3 feet from any source of ignition or any source of heat which might damage the meter. Where feasible, the upstream regulator in a series must be located outside the building, unless it is located in a separate metering or regulating building.

§ **192.357 Customer meters and regulators: Installation** requires each meter and each regulator to be installed so as to minimize anticipated stresses upon the connecting piping and the meter. When close all thread nipples are used, the wall thickness remaining after the threads are cut must meet the minimum wall thickness requirements of this part. Connections made of lead or other easily damaged material may not be used in the installation of meters or regulators. Each regulator that might release gas in its operation must be vented to the outside atmosphere.

§ **192.355 Customer meters and regulators: Protection from damage** - states that if the customer's equipment might create either a vacuum or a back pressure, a device must be installed to protect the system. Service regulator vents and relief vents must terminate outdoors, and the outdoor terminal must be rain and insect resistant, be located at a place where gas from the vent can escape freely into the atmosphere and away from any opening into the building, and be protected from damage caused by submergence in areas where flooding may occur. Each pit or vault that houses a customer meter or regulator at a place where vehicular traffic is anticipated must be able to support that traffic.

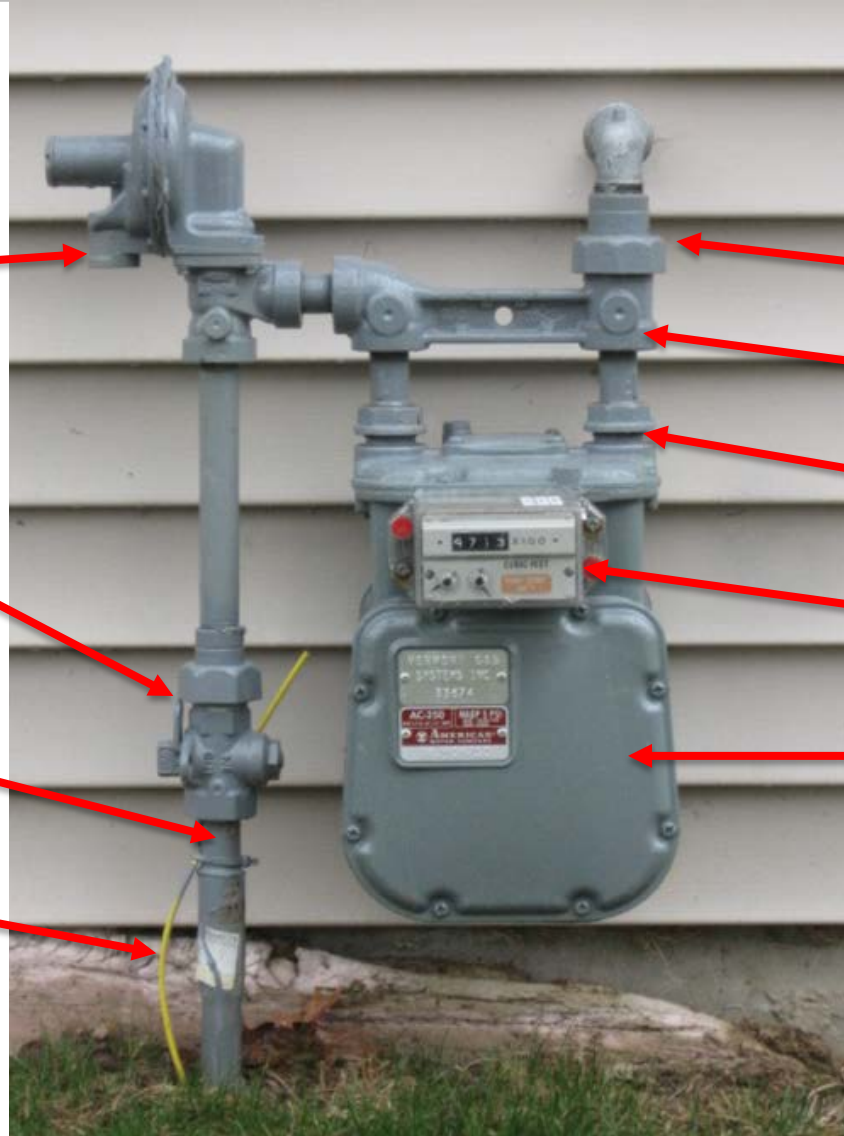
Typical Residential Meter Set Components

Service Regulator

Insulated Service Riser Valve

Service Riser

Tracer Wire



Meter Bar Outlet

Meter Bar

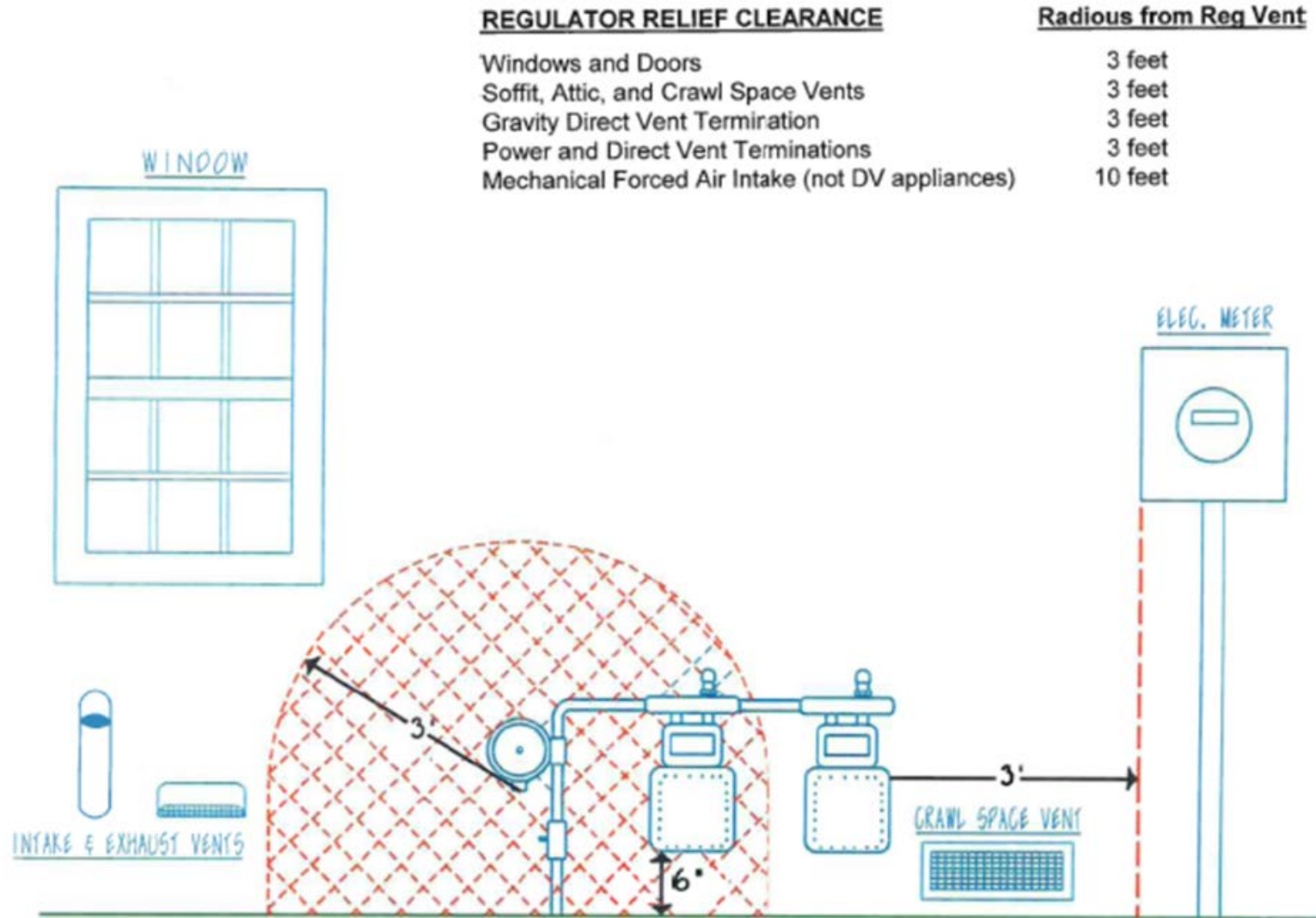
Meter Swivel

Meter Index & ERT

Gas Meter

Meter and Regulator Clearance

VGS Facility Installation Standards



METER SET PROTECTION STARTS WITH A GOOD LOCATION

- Meters shall not be installed under decks, porches or stairs where adequate clearance cannot be achieved for purposes of maintenance, repair, or access.
- Meters or regulators should not be installed within 3 feet of the edge of a driveway or parking lot; closer installation is allowed only with the installation of barriers to protect the meter and regulator.
- At least six (6) inches clear space shall be available, if possible, on all sides of the meter and not less than thirty (30) inches in front of it. When installed within a building, a meter shall be located in a ventilated area.
- Regulator vents or discharge port (if piped away) shall terminate:
 - outside in a well ventilated area with a downward facing screened termination (water and insects free).
 - 3 feet clearance from a source of ignition, an opening into a build, an air intake into a building, or any electrical source not intrinsically safe.
 - 10 feet from mechanical forced air inlet used for makeup air (not direct vent appliances).

- Meters and regulators shall be sized for the total combined input of all connected appliances.
- Regulators shall be set to deliver 7" wc (1/4 psig) at the outlet of the meter (except elevated pressure sets).
- Gas pressure shall not be elevated to compensate for undersized piping.
- Exceeding the maximum capacity of the meter will result in excessive pressure drop across the meter.

- Meters must be secured, carried, and transported in an upright position.
- The inlet and outlet connections shall be capped when the meter is not in use.
- Any meter that has been dropped, damaged, or received a severe jar must be returned for testing.
- Any meter set or removed from the field must be documented on a service order.
- Meters returned to the shop for the Random Test Program, Damage, High Bill Complaint, or any other issue must be properly marked.
- Meter installations should avoid direct contact with soil or concrete walls. Alkali in concrete as well as corrosive elements in soil can cause premature corrosion to casing.

Corrosion

192.479 Atmospheric Corrosion & 192.481 Soil to Air Interface

Category 1 Corrosion – Heavy scale or pitting, Compromised wall strength, needs immediate replacement.



Category 2 Corrosion – minor scale or pitting, needs to be wire brushed and painted. Paint during service visit or document on service order.



Category 3 Corrosion – slight rust usually from wrench marks, no action needed at this time.



Anodeless Service Risers (Plastic Service Only)

192.481 Soil to Air Interface

Tag on riser must be above final grade to protect riser from corrosion.



This Line Must be above final grade



Steel Service Risers

192.479 Atmospheric Corrosion & 192.481 Soil to Air Interface



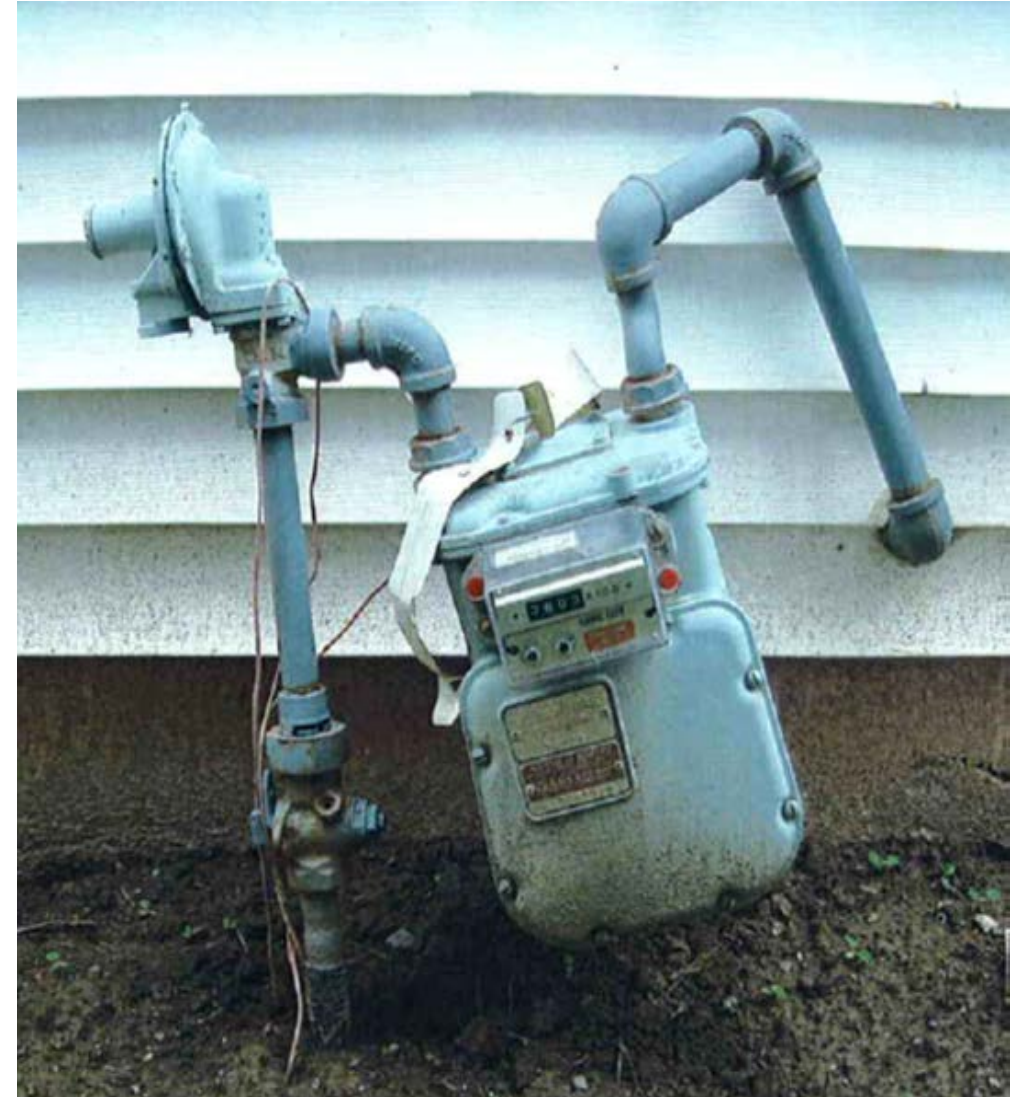
- Steel service risers shall not have any bare metal exposed to soil.
- Tar Tape should be sealed tight to repel water or moisture.
- Damaged or peeling tar tape shall be documented for repair.
- Riser valve must be above grade and readily accessible.

Pipe Stress

192.357 Minimize Anticipated Pipe Stress

Skewed (crooked) meters can add additional stress to meters or fittings.

Action - Rebuild meter set or document to rebuild meter set on service order.



Foliage Hazard

192.613 Continuing Surveillance

Predatory vegetation interferes with access to meter and shutoff and can create stress on fittings.



Vegetation obstructing shut off

Regulator Hoods

192.353 Protection of Meters & 192.357 Minimize Stresses

Buildings with metal roofs may shed excessive amounts of ice and snow, potentially causing meter and regulator to be damaged or encased in ice.



Regulator Hoods

192.353 Protection of Meters & 192.357 Minimize Stresses

Buildings with metal roofs may shed excessive amounts of ice and snow, potentially causing meter and regulator to be damaged or encased in ice. **If encased in ice, immediately check for abnormal down stream pressure.**

Technician should look for meters in the drip line, install a regulator hood (if required) and note condition on the service order if further action is required.

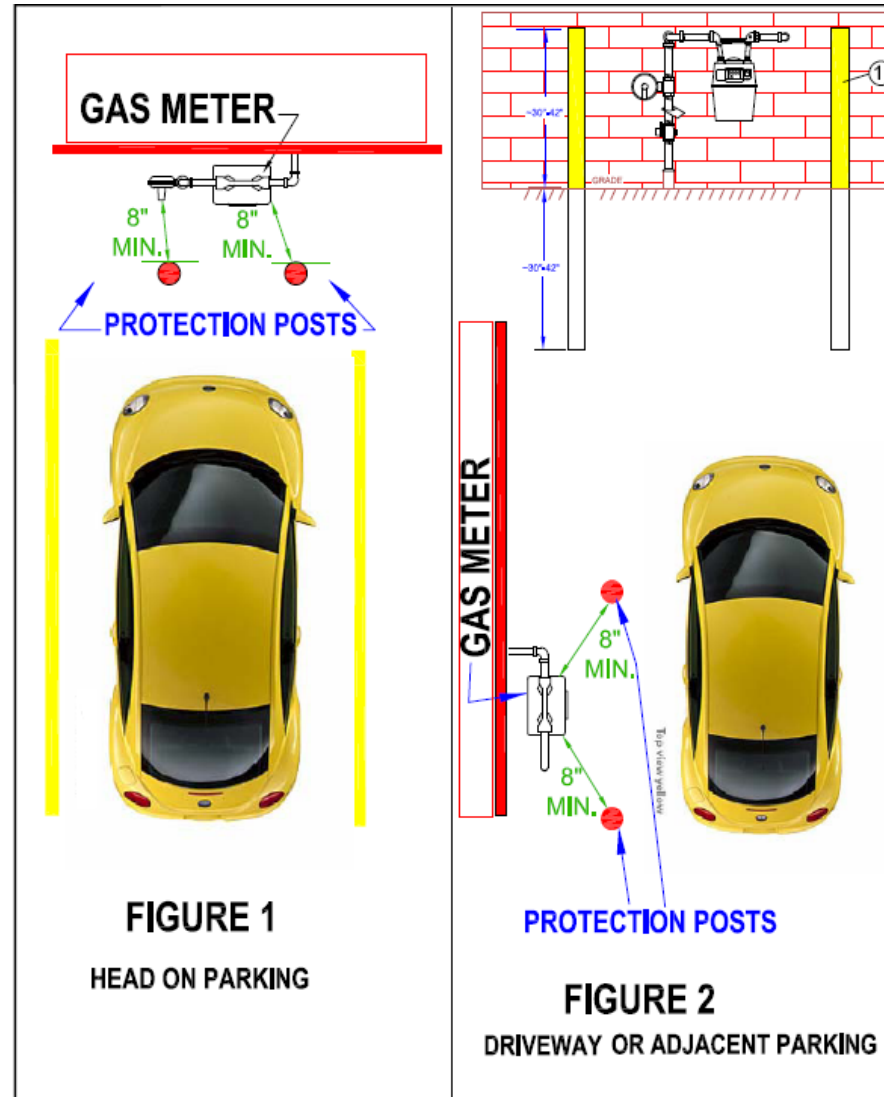
If possible - place meters and regulators outside of drip line.



Meter Protection - Barricades

192.353 Protection of Meters

- Barricades are required on installations at risk of vehicular damage.
- Barricades are required if meter is within 3 feet of vehicular traffic.
- Barricades should not be spaced more than 4 feet apart.



Abnormal Operating Conditions

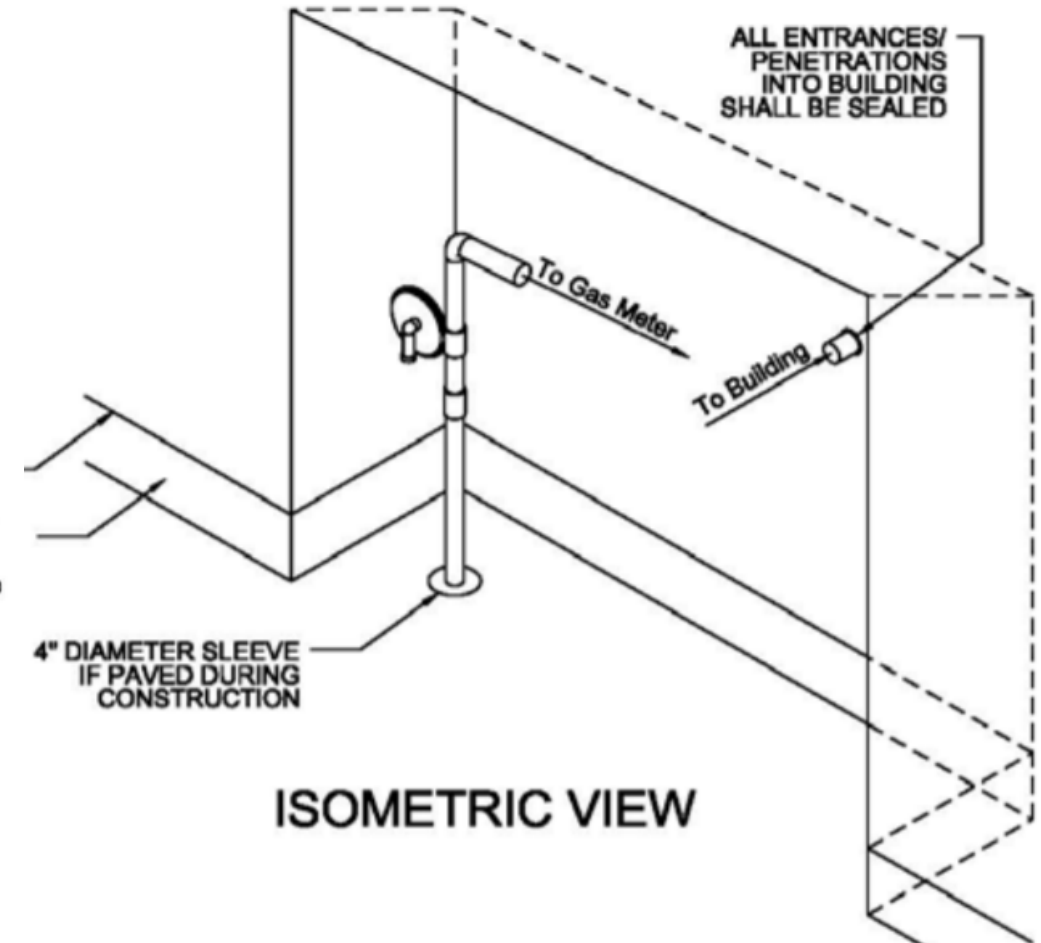
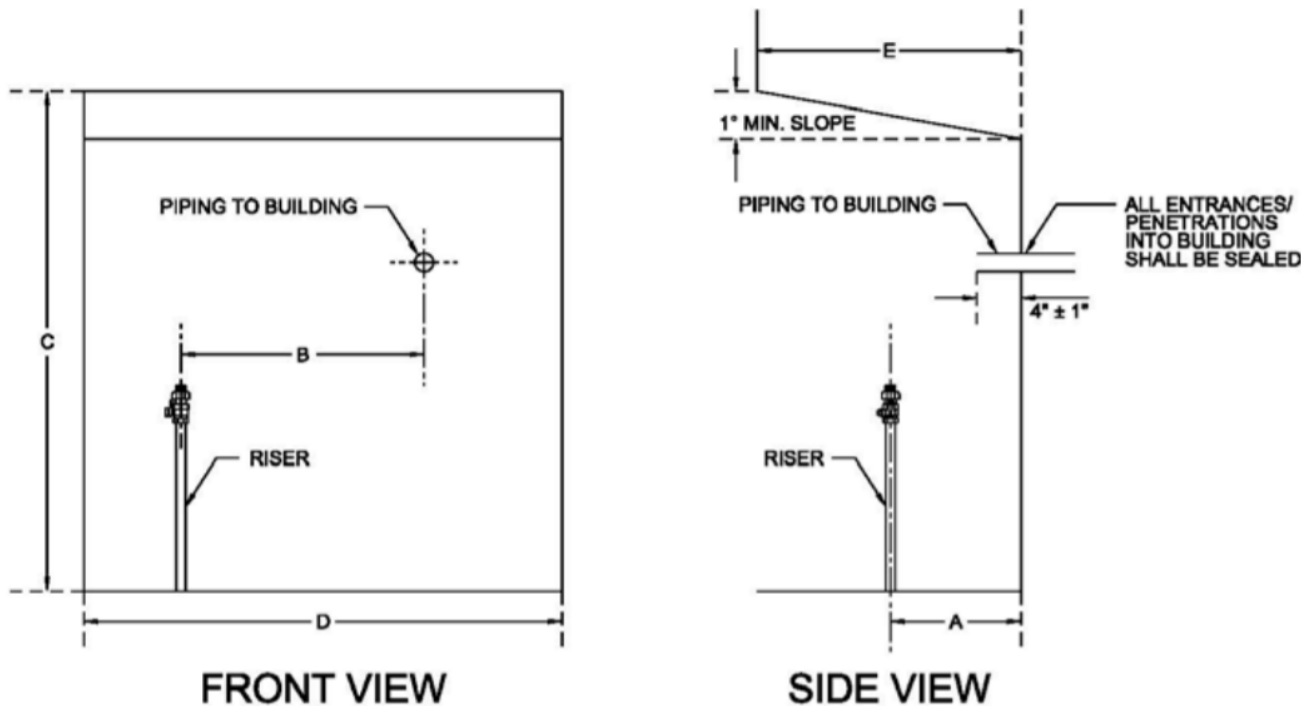


Abnormal Operating Conditions



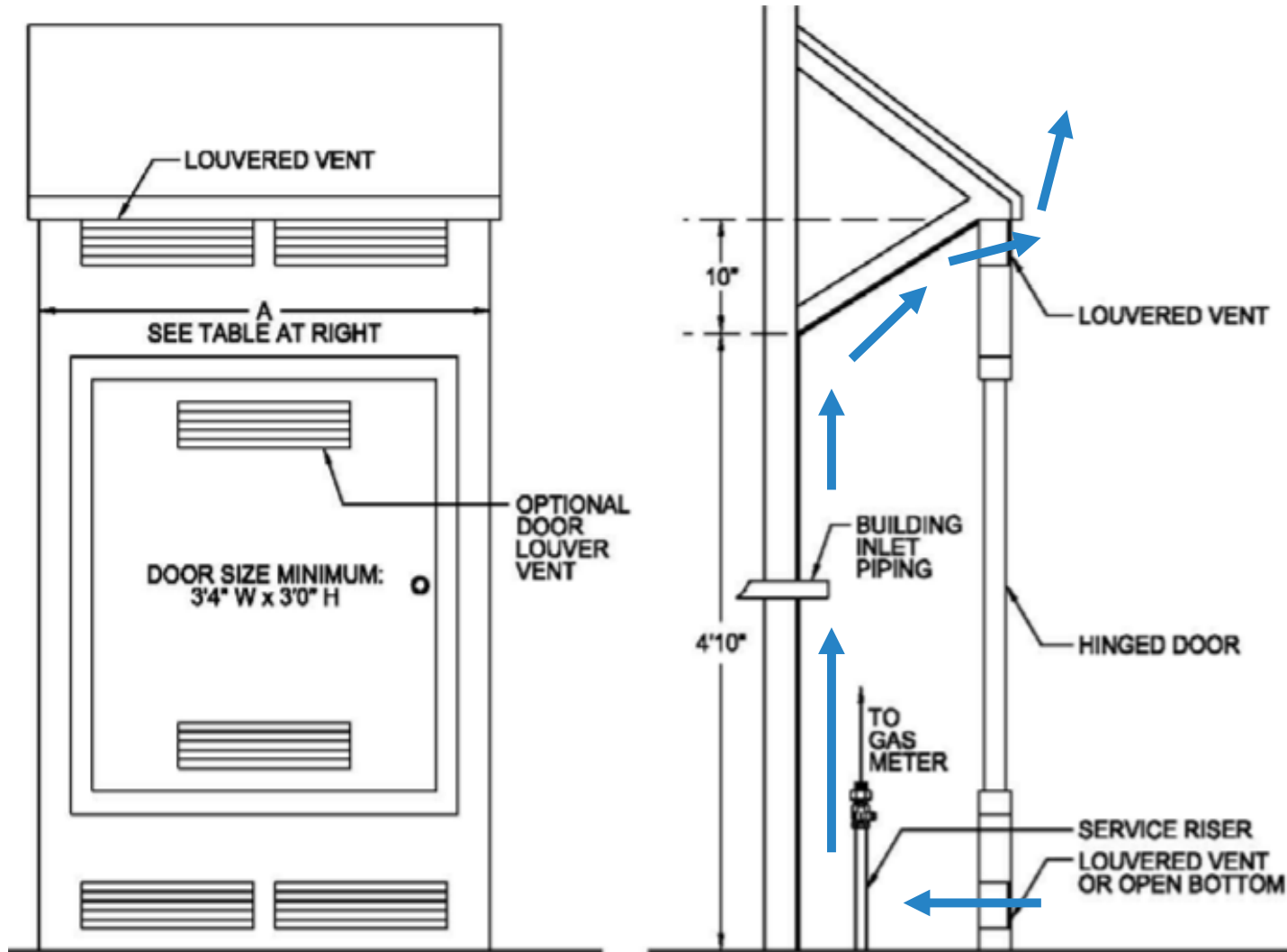
Meter Recess

- All pipe penetrations into the building shall be sealed.
- Depth of recess must be 24 inches
- Top of recess sloped a minimum of 1" away from building.



Meter Enclosures

VGS Facility Installation Standards

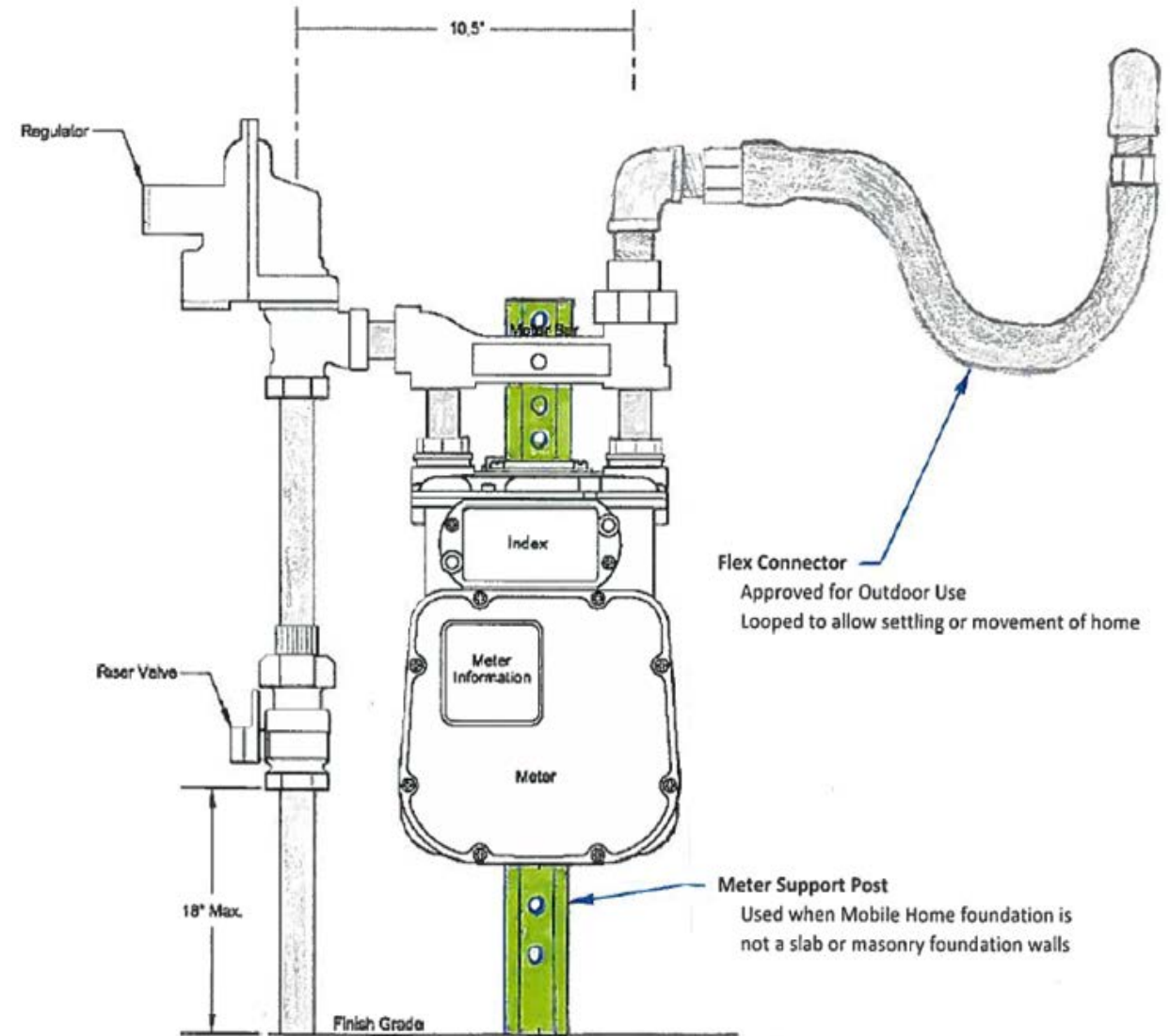


All enclosure sides against building shall be sealed gas tight as to prevent gas migration into building. Provide a minimum of 120 sq. in. of free air space at the top and bottom of enclosure (if free air space of louver is unknown, use 75% of calculated surface area). Enclosure shall be readily accessible for access and maintenance. Either single or double door is allowed. All pipe penetrations into the building shall be sealed. Minimum depth of recess must be 24 inches and the top of recess sloped a minimum of 1" away from building.

Mobile Home Meter Support

VGS Facility Installation Standards

Mobile homes installed on a slab or masonry foundation walls shall follow standard residential meter set standards. If a pad or masonry foundation is not present, the meter assembly shall be supported by a **meter support post** and the connection from the meter outlet to the mobile home shall utilize a **flexible connector approved for outdoor use**. Flexible connectors shall be no more than 6 feet in length, rated for outdoor use, sized adequately for the connected load, be installed completely outside the skirting to allow visual inspection, and installed with a loop to allow for settling or movement of the home.



Meter & Regulator Sizing

VGS Facility Installation Standards

ELEVATED PRESSURE – approved commercial or industrial customers that require greater pressure, VGS will provide 5 psig downstream of a rotary meter. Customer piping must be labeled to indicate elevated pressure according to ANSI/ASME A13.1 pipe marking.



Multiple Gas Services

Hazard Mitigation

Signs for Buildings that are fed by more than one gas service.
Helps emergency responders.





Thank You

Scott Crocker

Vermont Gas Systems