TRAINING GUIDE FOR OPERATORS OF

SMALL LP GAS SYSTEMS

Prepared for
United States Department of Transportation,
Research and Special Programs Administration,
Office of Pipeline Safety
by the
National Association of Regulatory Utility Commissioners
Staff Subcommittee on Pipeline Safety

TO THE READER

The U.S. Office of Pipeline Safety promotes the safe transportation by pipeline of natural gas, LP gas, liquefied natural gas and hazardous liquids. This guidance manual for operators of small LP gas systems is part of our commitment to pipeline safety. This manual was developed to provide a broad overview of pipeline compliance responsibilities under federal pipeline safety regulations. It has been designed for the non-technically trained person who operates a master meter system, a small municipal system or a small independent system.

The federal government recognizes that most operators of small LP gas systems have not had extensive training in operation and maintenance of a gas system. In addition, many of the safety regulations are in technical language that addresses generic requirements for both large and small LP gas systems. Therefore, this manual attempts to simplify the technical language of the regulations.

For certain critical regulations, this manual provides specific details of methods of operation and selection of materials that will satisfy the pipeline safety regulations. However, this is often only one of several allowable options. To assure compliance in many areas of the pipeline safety regulations, this manual provides a set of examples that the operator of small systems can use to meet the minimum requirements of the pipeline safety regulations.

This training guide relies on sources representing the best opinion on the subject at the time of publication. However, it should not be assumed that all acceptable safety measures and procedures are mentioned in this manual. The LP operator is referred to 49 CFR Part 192 and NFPA 58 for additional details and other options for reaching and maintaining compliance.

Our aim is to provide basic information to LP operators of small gas distribution and master meter systems to ensure compliance with the Federal gas pipeline safety regulations.

It is hoped that this document will assist you in achieving and maintaining a safe and efficient LP system. The result will be to enhance public safety - the essential goal for the Office of Pipeline Safety.

Stacey Gerard
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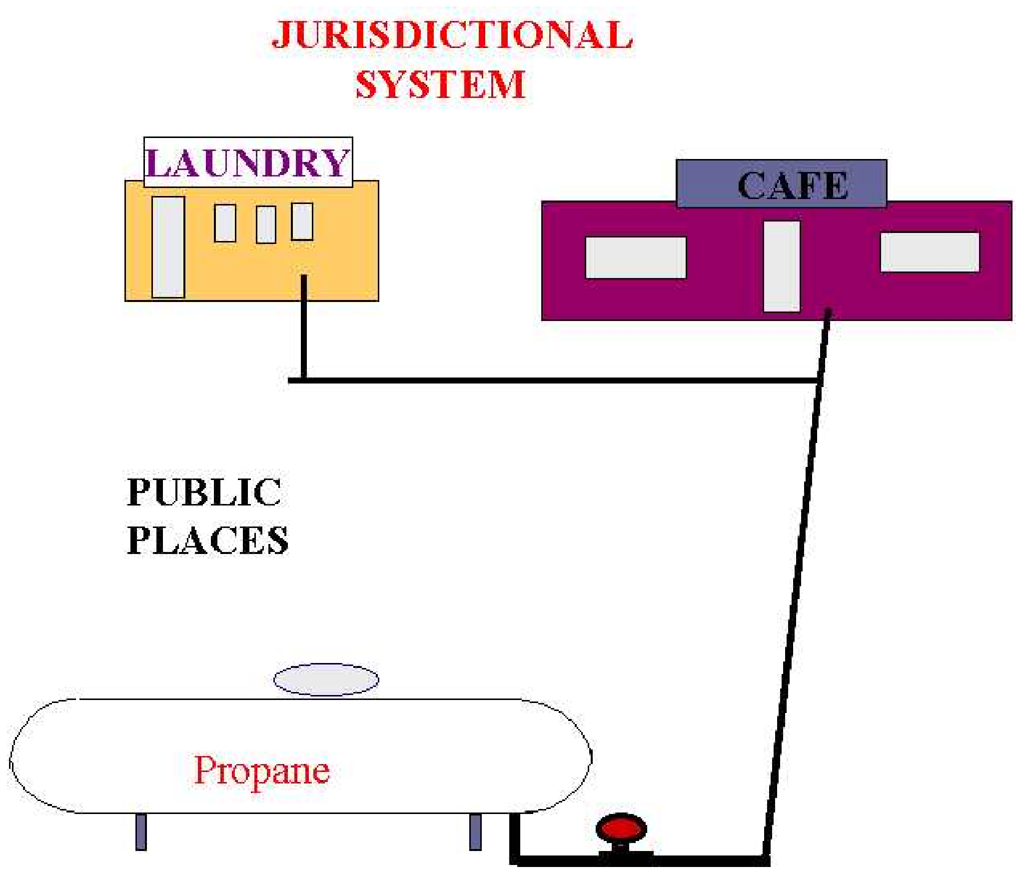
INTRODUCTION

Public Law 104-304 requires the U.S. Department of Transportation (DOT) to develop and enforce minimum safety regulations for the transportation of gases by pipeline. Safety regulations became effective in 1970, and are published in Title 49 of the Code of Federal Regulations (CFR), Parts 190, 191, 192, 199 and Part 40. The Office of Pipeline Safety (OPS) of DOT's Research and Special Programs Administration (RSPA) is charged with their enforcement.

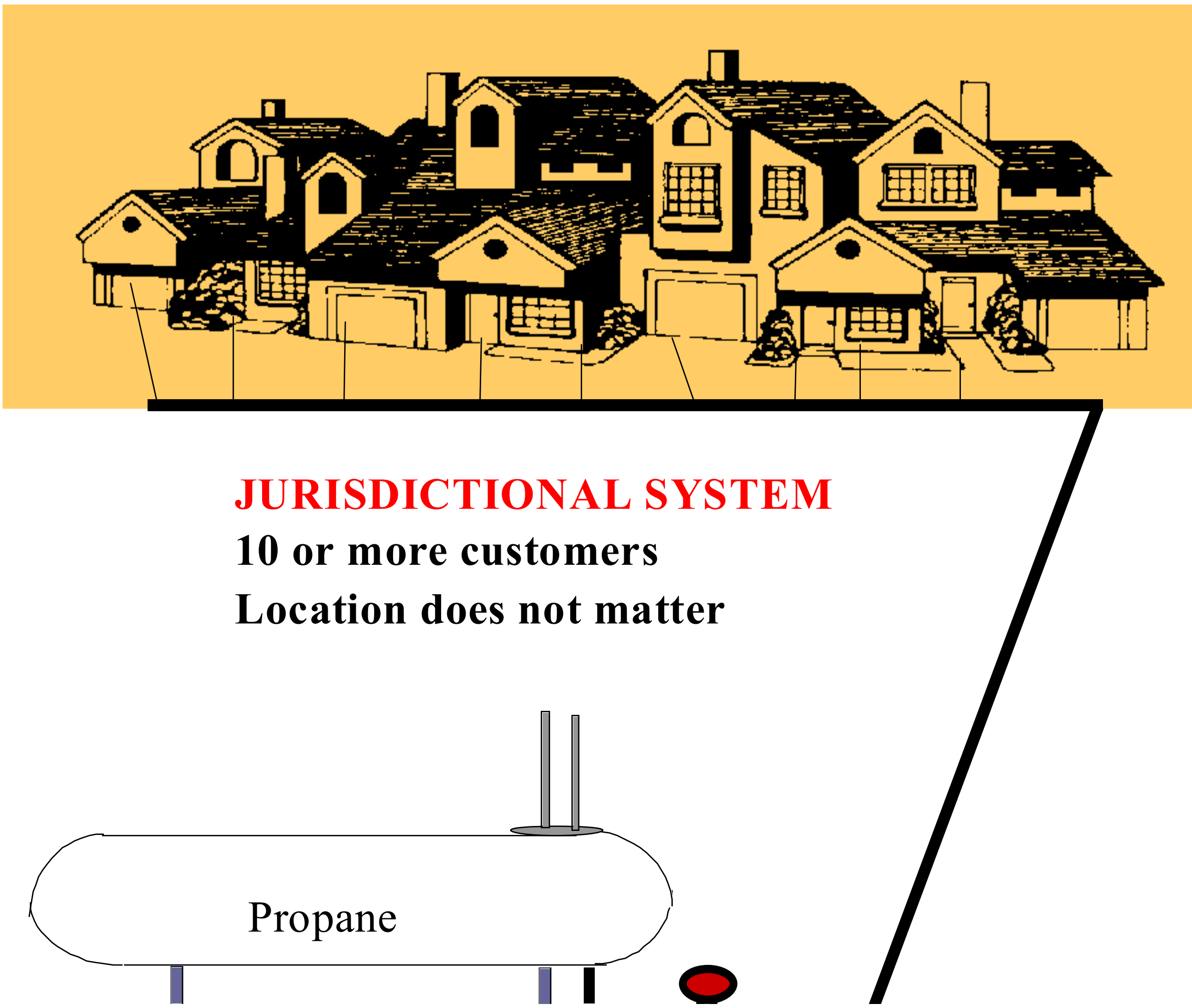
The purpose of this manual is to identify and clarify those regulations which apply to jurisdictional LP gas operators.

Jurisdictional system scenarios:

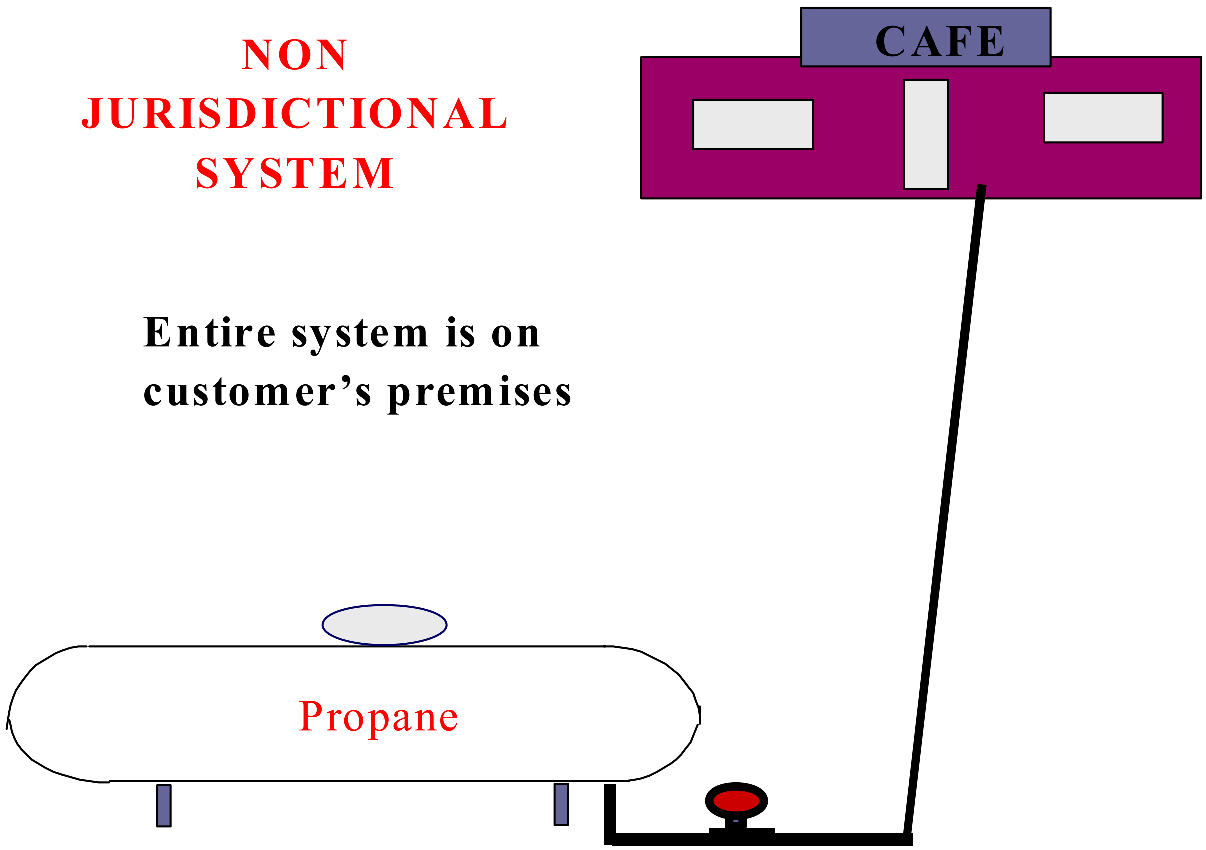
1) More than one customer from a single source in a public place (The term "public place" means a place which is generally open to all persons in a community as opposed to being restricted to specific persons. Churches, schools, and commercial buildings as well as any publicly owned rights-of-way or property which if frequented by persons are public places).



2) Ten or more customers from a single source (source can be a single tank or tanks manifolded together). The location does not matter.



3) A single customer is not jurisdictional if the system is located entirely on the customer's premises (no matter if a portion of the system is located in a public place).



The pipeline safety regulations require operators of LP gas systems to:

- deliver gas safely and reliably to customers;
- provide training and written instructions for employees;
- establish written procedures to minimize the hazards resulting from LP gas pipeline emergencies; and
- keep records of inspection and testing based on suggested forms found in Appendix B.

LP gas operators that do not comply with the safety regulations may be subject to civil penalties, compliance orders or both. If safety problems are severe, a "Hazardous Facility Order" may be issued by federal or state pipeline safety inspectors. This could result in the shutdown of the system.

Often, state agencies enforce pipeline safety regulations under certification by OPS. The state agency is allowed to adopt additional or more stringent safety regulations for intrastate pipeline transportation as long as such regulations are compatible with the federal minimum regulations. However, if a state agency is not certified, the U.S. Department of Transportation retains jurisdiction over intrastate pipeline systems.

Operators should check with the pipeline safety agency in their state (**listed in Appendix A**) to determine:

- whether a state agency has safety jurisdiction over their specific type of LP gas system;
- whether the state agency has pipeline safety requirements that exceed the federal regulations; and
- the inspection and enforcement procedures of the state agency.

DEFINITIONS AND TERMS

To understand this manual, LP gas system operators need to know the meaning of some commonly used terms in the gas industry. The terms are defined below for the purpose of this guidance manual. The reader is referred to 49 CFR Part 192 and ANSI/NFPA Standards for additional definitions.

Cathodic protection - a procedure by which underground metallic pipe is protected against rust. Basic theory, concepts and practical considerations for cathodic protection are contained in Chapter VIII.

Customer meter - a device that measures the volume of gas transferred from an operator to the consumer.

LP gas operator - an LP gas operator could be a gas utility company, a municipality, an individual or supplier operating an LP gas system in a housing project, apartment complex, condominium, mobile home park, shopping center or other systems.

Incident - an event that involves a release of gas from a pipeline facility that results in:

i. a death or personal injury necessitating in-patient hospitalization;
ii. estimated property damage of $50,000 or more; or
iii. an event that the operator deems significant.

LP gas – liquefied petroleum gas. A product in either a liquid or vapor form, depending upon the product pressure and temperature, composed primarily of propane, propylene, butane and butylene either by themselves or as a mixture.

Main – an LP gas distribution line that serves as a common source of supply for more than one service line.

Municipality - a city, county or any other political subdivision of a state.

Operating and maintenance plan - written procedures for operations and maintenance on LP gas systems.

Pipeline - all facilities through which gas moves in transportation. This includes pipes, valves and other items attached to the pipe, meter stations, regulator stations, delivery stations and fabricated assemblies.

psig - an abbreviation for pounds per square inch gauge pressure. See Chapter IX for more information on psig.

Pressure regulator - automatically reduces and controls the gas pressure in a pipeline downstream from a higher pressure source of LP gas.

Service line - a gas distribution line that transports gas from a common source of supply to a customer's meter or to the connection to a customer's piping if the piping is farther downstream or if there is no meter.

Service regulator - a device designed to reduce and limit the gas pressure provided to a customer.

Service riser - the section of a service line which extends out of the ground and is often near the wall of a building. This usually includes a shutoff valve and a service regulator.

Shutoff valve - a valve installed to allow the gas supply to a building to be shut off. The valve may be located upstream of the service regulator or belowground at the property line or where the service line connects to the main.

49 CFR - Title 49 of the Code of Federal Regulations (CFR). This document contains the actual safety regulations that must be complied with by the LP gas operator. Parts 190, 191 and 192 of 49 CFR contain the federal pipeline safety regulations relevant to operators of LP gas pipeline systems.

COMMONLY ABBREVIATED ORGANIZATIONS

AGA - American Gas Association.

ANSI - American National Standards Institute, formerly the United States of America Standards Institute (USASI). All current standards issued by USASI and ASA have been re-designated as American National Standards Institute and continue in effect.

API - American Petroleum Institute.

ASME - American Society of Mechanical Engineers.

ASTM - American Society for Testing and Materials.

DOT - U.S. Department of Transportation.

OPS - Office of Pipeline Safety. The pipeline safety division of the DOT's Research and Special Programs Administration.

MSS - Manufacturers Standardization Society of the Valve and Fittings Industry.

NACE - National Association of Corrosion Engineers.

NARUC - National Association of Regulatory Utility Commissioners.

NFPA - National Fire Protection Association.

NPGA – National Propane Gas Association.

RSPA - Research and Special Programs Administration. A major subdivision of the DOT, it is responsible for development and enforcement of the pipeline safety regulations. For addresses of RSPA regional offices, see the attached list of agencies and organizations.

CHAPTER I
REPORTS REQUIRED BY THE FEDERAL GOVERNMENT

The federal government requires every LP gas operator to telephone a report of any "incident" and, for some operators, to follow it up with a written report. The federal government may also require the LP gas operator to file a "safety related condition" report and an "annual report". This chapter describes briefly each of these reports.

INCIDENT REPORTS

NOTE: Check with your state agency for any additional state reporting requirements. These can include lower dollar amounts of damage, media covering the incident, response by local emergency responders, road closure or evacuation.

It is required to telephone an incident report at the earliest possible moment, **but in any case within two hours:**

- of a release of LP gas from a system and:
- a death or personal injury requiring hospitalization or damage, including the cost of LP gas lost of $50,000.
- an event that is significant in the judgment of the operator, even though it was not described above.

This telephone report of an incident should include:

- identity of reporting operator;
- name and phone number of individual reporting the incident;
- location of the incident (city, county, state and street address);
- time of the incident (date and hour);
- number of fatalities and personal injuries, if any;
- type and extent of property damage;
- description of the incident.

The telephone incident report is made to the National Response Center at:

TOLL FREE (800) 424-8802
IN WASHINGTON, D.C. (202) 267-2675
24 HOURS EVERY DAY

REMEMBER, WHEN IN DOUBT MAKE THE CALL! See 49 CFR 191.5 for further information.

With the exception of master meter systems, operators of LP gas systems making a telephone report of an incident must follow it up with a written report.

Address for Incident Reports

All required incident reports must be submitted on Form RSPA F7100.1 to:

Information Resources Manager
Office of Pipeline Safety
Research and Special Programs Administration
USDOT, Room 7128
400 Seventh Street, SW
Washington, D.C. 20590

See 49 CFR 191.7 and 191.9 for further information.

SAFETY-RELATED CONDITION REPORTS

OPS may require operators of LP gas systems to report certain safety-related conditions.

A written report must be filed within five working days after the operator first determines that a safety-related condition exists, but not later than ten working days after the day the operator discovers the condition.

Each operator who is required to file a safety-related condition report is also required to update the operations and maintenance plan to include instructions enabling personnel who perform operation and maintenance activities to recognize conditions that may be safety-related conditions.

Typical conditions that would need to be reported by an LP gas operator include:

- unintended movement or abnormal loading of pipeline facilities by environmental causes such as earthquakes, landslides or floods, that impairs the serviceability of a pipeline;
- any malfunction or operating error that causes the pressure of a pipeline to rise above its maximum allowable operating pressure plus the pressure build-up allowed for operation of pressure limiting or control devices;
- a leak that constitutes an emergency and is not repaired within five days of determination;

Safety-related conditions that do not require a report include:

- condition on a customer-owned service line;
- a condition resulting in an incident, as defined in 49 CFR 191.3.;
- a condition on a pipeline more than 220 yards from any building or outdoor place of assembly, unless it is within the right-of-way of an active railroad, paved road or highway;

- a condition that is corrected before the report filing deadline, except for certain corrosion related conditions.

See 49 CFR 191.23(b) for further information.

Address for Safety-Related Condition Reports

All required written reports must be submitted to:

Information Resources Manager
Office of Pipeline Safety
Research and Special Programs Administration
USDOT, Room 7128
400 Seventh Street, SW
Washington, D.C. 20590

In addition, an LP gas system operator may be required to file a report with the state agency participating in the pipeline safety program. For further details on the filing requirements refer to 49 CFR 191.7. However, an operator must file a written report that contains all the information as specified in 49 CFR 191.25(b).

ANNUAL REPORTS

Operators of LP gas systems serving 100 or more customers from a single source must submit an annual report for that system. This report must be submitted on DOT Form RSPA F 7100.1-1. This report must be submitted each year, not later than March 15, for the preceding calendar year.

Address for Annual Reports

All required annual reports must be submitted to:

Information Resources Manager
Office of Pipeline Safety
Research and Special Programs Administration
USDOT, Room 7128
400 Seventh Street, SW
Washington, D.C. 20590

CHAPTER II
PLANS REQUIRED BY THE FEDERAL GOVERNMENT

All operators of LP gas systems are required to maintain plans for operations, maintenance and emergency response activities. Most operators comply with this requirement by developing and maintaining a manual that incorporates these plans. The manual must be prepared before operation of an LP gas system commences and must be reviewed and updated once a year. The manual must be available at locations where operations and maintenance activities are conducted. This manual fulfills the requirements of 49 CFR Part 192.605.

NOTE: The Federal DOT/OPS or the state agency certified under the Pipeline Safety Act may after due process require the LP gas operator to amend its plans and procedures as necessary to provide a reasonable level of safety.

<u>OPERATIONS AND MAINTENANCE PLAN</u>

An operations and maintenance plan is required of all LP gas operators by the pipeline safety regulations. The operations and maintenance plan must be written and followed to help the operator comply with the pipeline safety regulations. See 49 CFR 192.603 for further information.

OPERATIONS PLANS

Each operator shall include in its written plan, procedures for all operations which may be performed on the LP gas system by the operator or on behalf of the operator.

The following is a discussion of some of the operations procedures which may be encountered in a typical LP gas distribution system.

The operations topics covered here are:

- operating pressure
- pressure testing
- tapping and purging of the LP gas pipeline distribution facilities
- odorization
- testing for reinstating a service line
- abandonment or deactivation of pipeline or LP gas distribution facilities
- construction records, maps and operating history
- unaccounted for gas

<u>Operating Pressure</u>

Per the NFPA 58 (LP-Gas Code), first stage regulators shall have an outlet pressure up to 10.0 psig and incorporate an integral pressure relief valve, all in accordance with the <u>Standard for LP-Gas Regulators</u>, UL 144. These are typically factory set and non adjustable. This would limit the operating pressure of a typical newly installed system to a maximum of 10 psig.

In cases where the regulators in use are other than the 10 psig or less standard, further consideration must be given to setting an operating pressure, such as using an adjustable high pressure regulator with a 10 psig regulator between it and the second stage regulator(s). These situations might include a system put in service prior to the adoption of the 10 psig standard or where special order adjustable regulators are used.

The LP-Gas Code states that polyethylene piping systems shall be limited to vapor service not exceeding 30 psig. As discussed in Chapter III concerning materials, steel piping must be designed at either 125 psig, 250 psig or 350 psig.

These types of factors, based on material design and LP gas properties, can be used in conjunction with a pressure test conducted to verify the integrity of the piping system to arrive at an operating pressure. However, it is recommended operators of the small LP gas systems stay within the 10 psig standard for their distribution piping.

Operating pressure determination should be documented in the operator's written plan.

<u>Pressure Testing</u>

Pressure testing must be performed to verify the integrity of the piping system prior to placing it into service, when newly constructed or upon subsequent modification. The LP-Gas Code states that this pressure test can be done at not less than the normal operating pressure. Most operators test at a higher pressure than operating pressure. It is recommended that all operators follow this practice.

Pressure tests should be documented by the personnel performing the test and copies should be maintained for the life of the system.

Information documented should include:

- description of facilities
- date, time and location of test
- time on and off, duration of test
- initial and final pressure or recording chart if available
- test medium
- person conducting the test
- ambient conditions, temperature, weather

Tapping and Purging

Tapping and purging operations should be performed in accordance with written procedures by personnel with documented qualification in the use of those procedures (i.e. the LP gas distribution system operator should obtain and maintain copies of the qualifications of the individuals performing this operation). A good source of procedural information is the American Gas Association (AGA) Operating Section Report entitled Purging Principles and Practice. It is recommended that a purge medium, such as nitrogen, be used, if practical, or as a slug between air and gas. Water may also be used where the system will not be placed back in service. If air is used, care should be exercised to ensure that a flammable mixture of LP gas and air is not created. An instrument, such as a combustible gas indicator, should be used to verify gas purged in or out of the system. Points of introduction of purge medium and venting should be chosen to thoroughly purge the piping system.

Information documented should include:

- date and time of purge
- time on and off, duration of purge
- purge medium
- person conducting the purge
- ambient conditions
- further documentation discussed below in the case of facility abandonment

Odorization

The LP-Gas Code specifies that LP gas be odorized prior to delivery to the bulk plant. It goes on to require verification by "sniff-testing or other means, **and the results shall be documented**" when gas is delivered to the bulk plant or in the case where a delivery bypasses the bulk plant. If the documentation required by the LP-Gas Code is not available to the LP gas system operator, then the operator will need to do his own sniff tests to verify odorization and document the results.

Testing for Reinstating Service Lines

The written plan must contain a provision for testing (before placing in service) each service line that is disconnected from the main in the same manner as a new service line (49 CFR 192.725). Test procedure and documentation are discussed above.

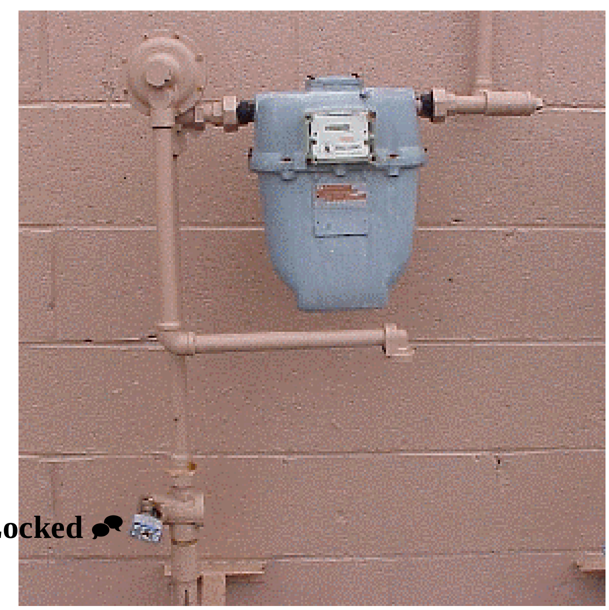
Abandonment or Deactivation of Facilities

The written plan must include provisions for shutdown, abandonment or deactivation of facilities (49 CFR 192.727). When a gas main or service line is abandoned, it must be physically disconnected from the piping system and open ends effectively sealed. In addition, the operator must determine the necessity of purging the line. Note: Take into consideration the location and size of the main or service. As a recommendation, pipe two inches and larger should be purged.

In cases where the main and all the service lines connected to it are abandoned, the service line(s) must be capped at the customer's end. Also, the abandoned main must be sealed at both ends.

When service to a customer is temporarily or permanently discontinued, one of the following must be done:

- The valve must be closed to prevent the flow of gas to the customer. This valve must be secured with a lock or some other device to prevent opening of the valve by unauthorized people. There are numerous locking devices designed for this purpose.
- A mechanical device or fitting that will prevent the flow of gas must be installed in the service line or in the meter assembly.
- The customer's piping must be physically disconnected from the gas supply and the open ends sealed. (49 CFR 192.727).



Construction Records, Maps and Operating History

Construction records should include detailed construction plans, modified as appropriate to show the as-built condition of the facilities. These plans and maps should show in detail, the location of all facilities and date of installation. Maps should have enough detail to accurately determine the physical location of all facilities.

A detailed bill of materials should be included. This should provide specifications of the materials used, including manufacturer, size (diameter, wall thickness, etc.), pressure rating, manufacturing standard, etc.

Additional construction records may include:

- joining procedure qualifications
- pipe joiner and other personnel qualification records
- inspection records for visual, destructive and non-destructive testing
- pressure test
- date of cathodic protection application for steel

All system modifications should be recorded in detail.

Operating history should include records of all system modifications and repairs, areas of active corrosion, history of areas susceptible to damage and operating pressure records.

Unaccounted For Gas

LP gas systems serving 100 or more customers from a single source are required to file an annual report. Part of this report must be the system's percentage of unaccounted for gas. Unaccounted for gas is the difference between the amount of propane delivered into the system and the amount that is recorded through the customers' meters. Unaccounted for gas can be caused by measurement and control errors, system leakage and theft.

Temperature and pressure affect gas density. For this reason, temperature-compensating meters are widely used. For customers with high gas usage, the meter can be located upstream of the second stage pressure regulator so that a smaller (less costly) meter can be used. Where the meter is located upstream of the second stage pressure regulator, a constant pressure must be maintained. Otherwise meter readings will not be accurate and can lead to an amount of unaccounted for gas. Pressure-compensating meters are available.

The better the control on gas measurement, the easier it is to spot problems in other areas that affect unaccounted for gas.

MAINTENANCE PLANS

During the required periodic maintenance checks that are required by the Federal Pipeline Safety Regulations, operators should observe the system to ensure that there are no violations of NFPA 58.

Some of the areas to check are:

- Loose combustible materials are not stacked within ten feet of the LP gas tank.

- If a security fence is required, it is in adequate repair. All necessary gates are accessible in case of an emergency. Gates are locked when operator personnel are not present.

- Important buildings have not been added closer to the tank(s) than permitted in NFPA 58.

- Signs that are required on some installations are being maintained.

Maintenance plans must contain the following components:

<u>Pressure Limiting Devices</u>

It is important that all systems operate within their intended acceptable pressure limits. Devices must be maintained annually to ensure that they are:

- in good mechanical condition
- capacity is adequate
- set to function at correct pressure
- properly installed and protected from vehicular traffic, dirt, liquids, icing and other conditions that might prevent proper operation

Lock up testing and/or the use of pressure recording devices are ways to prove regulator stability. First stage regulators are now required to have built-in pressure relief devices per NFPA 58, unless the capacity of the regulator is more than 500,000 Btu/hr. In this case a separate pressure relief valve may be used.

Some LP gas systems use vaporizers in their systems. Hydrostatic relief valves and vaporizer relief valves are normally part of a system that uses vaporizers. The O&M plan should include the methods in which all pressure limiting devices are maintained.

<u>Patrolling</u>

Although this is normally not necessary for small LP gas systems, if a condition exists in the area of an LP gas system where anticipated movement of the pipeline could cause failure or leakage (e.g., weight from construction, area prone to wash out, etc.), then the pipeline shall be periodically patrolled until the condition no longer exists. The frequency of the patrolling must be determined by the severity of the conditions which could cause failure or leakage and consequent hazards to safety, but no fewer than four times each calendar year in the business district or twice each calendar year outside of the business district.

<u>Example of a washout area found by patrol</u>.

<u>Key Valves</u>

Key valves, or critical valves, are the valves needed to shut down the LP system, or part of the LP system, in the event of an emergency. For many LP gas systems, this would be the container main valve. Key valves should be checked at least once per year to <u>ensure that they are operable</u>. Procedures for maintaining these valves must be included in the maintenance section of the O&M Manual.

Accidental Ignition of Gas

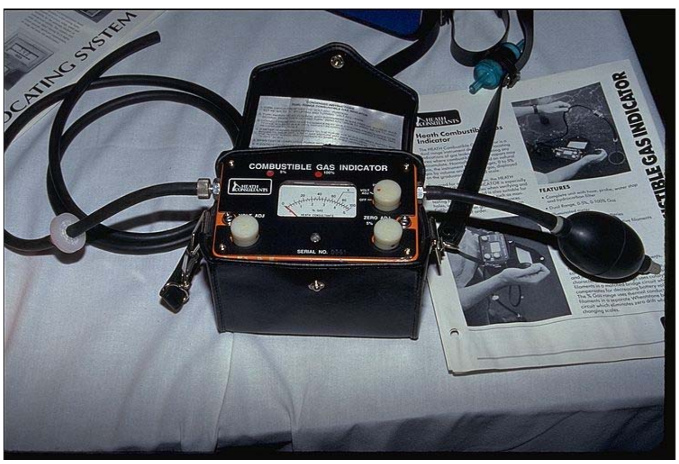
The plan must include provisions to prevent the accidental ignition of gas. LP gas alone is not explosive but when mixed with air in a concentration of 2.15% to 9.6% for propane, it can ignite or explode. Every precaution should be taken to prevent unintentional ignition of LP gas. When venting gas to the air a fire extinguisher must be available and positioned for immediate use.

Leak Survey

A survey of an LP gas distribution system must be made as frequently as necessary, but at intervals not exceeding **five years**. If part or all of the system is located in a business district, a gas leakage survey must be conducted at least **once every year.** Procedures on how to conduct leak surveys must be included in the maintenance section of the O&M manual.

Some LP gas operators use contractors to leak survey their systems. It is the responsibility of the operator to ensure that the survey is conducted in accordance with the pipeline safety regulations. The operator must retain a report describing the results of each survey.

LP gas operators must do a subsurface type of survey when using gas detection equipment to perform their survey. Although an FI (Flame Ionization) unit may be used to assist in the survey, a CGI (Combustible Gas Indicator), must be used for pinpointing leaks and classifying them.



Many LP gas operators opt to do a pressure drop test to prove the integrity of their pipeline. This is normally done on smaller systems, where shutting off the customers is not a problem. **A very important thing to consider is, if you do have any drop in pressure, then you must do a subsurface survey using a CGI meter.** A pressure drop test tells you if you have a leak. It does not tell you the location of the leak or its classification.

Other things to consider when doing a pressure drop test are:

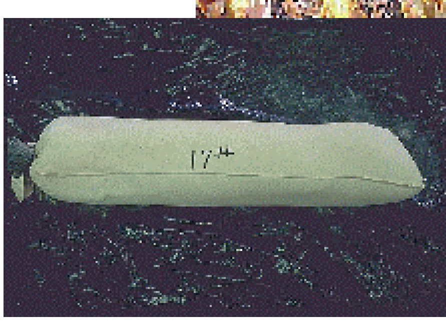
- Pressure used during the test should be at least equal to the operating pressure.
- Time duration of the test should consider the volume of the pipeline being tested; the time for the test medium to become temperature stabilized and the sensitivity of the instrument being used.

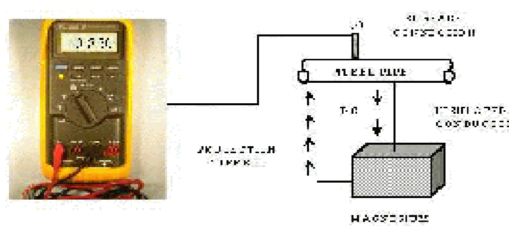
An advantage of doing this type of test is that the first stage regulator can be tested for lock up at the same time. Some operators use a portable supply tank on certain systems, and temporarily connect it into a tee just before the second stage regulator. With the proper valving installed ahead of time, they can perform a leak test of the piping and lock up on the regulator without shutting down the system.

For more information on performing leak surveys see Chapter X. This chapter includes useful information from **AGA** and the **Gas Pipeline Technology Committee.**

<u>Corrosion Testing</u>

Underground steel mains, including underground tanks must be tested annually to prove that the systems are being cathodically protected. Although there are five acceptable methods of testing, the most common method being used for small systems is the negative 0.85 dc volt criteria. Aboveground piping and tanks must be inspected for atmospheric corrosion at no longer than three year intervals, although for many LP gas systems it is easy and good practice to observe the condition of the aboveground piping during other annual maintenance. For more information on corrosion and compliance refer to 49 CFR Part 192 Subpart I and CHAPTER VIII of this manual.





EMERGENCY PLANS

Each operator is required to maintain a written plan of procedures and other necessary information to meet LP gas emergency situations. The federal regulations for emergency plans are contained in 49 CFR Part 192.615 of the federal Pipeline Safety Regulations. It is also the responsibility of the LP gas operator to be familiar with all state and local regulations as they apply to emergency situations regarding their piping systems.

The written emergency plan should contain the following information:

1. Emergency notification list.
2. Map of key valve locations.
3. Description and location of emergency equipment.
4. Plan for responding to gas leak reports and interruption of service.
5. Checklist for a major emergency.
6. Reporting requirements; both telephonic and written reports.
7. Plan for restoration of service after an outage.
8. Accident investigation procedures.
9. Education and training plan.

1. EMERGENCY NOTIFICATION LIST – The telephone numbers of the LP gas system operator, local fire department, emergency ambulance service, local law enforcement agencies, LP gas distributor, state and local regulatory agencies and any other entity whose service may be necessary in an emergency must be readily accessible to all operator personnel who may be involved in emergency situations. For master meter operators, a copy of this list should be posted in a public area and the tenants should be made aware of its location. This notification list must be kept current.

   All operating personnel and customers should be familiar with local 911 calling procedures.

2. MAP OF KEY VALVE LOCATIONS – A map of the LP gas system indicating the location of key valves and master meters must be included in the emergency plan. An easily recognizable legend should be used on the map for quick identification of the key valves and master meters.

3. DESCRIPTION AND LOCATION OF EMERGENCY EQUIPMENT – Emergency equipment must be available. A description of the equipment and its location must be specified in the emergency plan. The list should include any equipment that would be available from the LP gas distributor and contractors. Agreements with the local distributor and contractors on the use of their equipment should be in place before the emergency occurs.

4. PLAN FOR RESPONDING TO GAS LEAK REPORTS AND INTERRUPTION OF SERVICE – The operator must have written procedures to be followed in response to gas leaks reported by customers. It is the responsibility of the LP gas operator to ensure that

all employees are familiar with the procedures for responding to gas leak calls and reports.

- The employee receiving a report of a gas leak must get as much information as possible to assist in completing a leak report. A typical leak report is included in Appendix B, Form 10. Use common sense; saving human life is the first priority followed by preserving property.

- All reports of leaks on customer premises get priority. LEAKS INSIDE A BUILDING GET TOP PRIORITY.

- Upon determining that a hazardous leak exists inside a building, remind the person initiating the leak call of the following:

    - Do not turn on or off any electrical switches.
    - Do not ring doorbells or use the telephone. If the call is being made from the telephone within the building, inform the person not to hang up the telephone receiver.
    - Do not light matches or cigarettes.
    - Do not use the garage door opener or start any automobile engines within or near the building.
    - If possible, extinguish all open flames. Note: Evacuation time is important.

- Evacuate the building to a safe distance (about a city block). Walk away – do not use a vehicle.
- If possible, turn off the gas supply. Remember: Evacuation time is important.

- Dispatch necessary personnel to the location of the reported leak. This could include local emergency responders such as fire and police personnel.

- It is the responsibility of the first company employee on the scene to take whatever corrective action is necessary to protect life and property (in that order). As required, the person in charge must:

    - Set up communications.
    - Coordinate the on-scene emergency response operation.
    - Make decisions concerning operation of emergency valves, isolating the area and use of emergency equipment.
    - Implement the emergency checklist.

  It is important for all responders to know their limitations. They should not take undue risks that may endanger their personal safety.

- Operator responses for leaks near buildings include as a minimum:

    - Assess danger to building occupants, to the public and to property.
    - Extinguish all open flames.
    - If necessary, notify fire, police and LP-gas personnel who are prepared to respond to emergencies.
    - Cordon off the area and initiate traffic control. Note: This may be a police responsibility.
    - Notify the supervisor or other responsible personnel.
    - Bar hole next to the foundation of the building and perform an instrument leak survey.
    - Check neighboring buildings for the presence of gas.
    - Implement the checklist for emergency situations.
    - Repair the leak.
    - Return occupants to the building only when positively certain that the area is safe.

- Operator responses for leaks inside a building include as a minimum:

    - Make an immediate evaluation to determine the concentration of gas and the source of the leak.
    - Evacuate the building if necessary.
    - Do not use any electrical devices including the telephone.

  - Shut off the gas at the meter or at another valve (curb valve or a key valve).
  - Bar hole around the foundation and perform an instrumented leak survey. Check near water meters, other openings and in depressions.
  - If house and surrounding area are gas free, turn on gas valve. Check all gas piping and appliances for leaks. Check for meter movement – is it moving normally or at a faster rate?
  - Conduct a soap bubble test with an approved solution.
  - Repair any leaks.
  - If leak cannot be repaired at the time, notify the customer. Turn off and lock the meter. Tag the meter.

- Operator responses for gas burning inside a building include as a minimum:

  - Call the fire department.
  - Master meter operators should also call the LP-gas distributor.
  - If the fire is at an appliance, shut off the gas to the appliance. If possible, this should be done at the appliance valve.
  - If it is not possible to shut off the appliance valve, it may be necessary to shut off the service valve on the riser, a curb valve or a key valve.
  - Implement the checklist for emergency situation

5. <u>CHECKLIST FOR A MAJOR EMERGENCY</u> – Every item may not be necessary.

______ 1. Has the fire department been called?
______ 2. Have persons been evacuated and the area cordoned off?
______ 3. Has police department been notified?
______ 4. Has repair crew been notified?
______ 5. Has company call list been implemented?
______ 6. Has communication been established?
______ 7. Has outside assistance been requested?
______ 8. Have ambulances been requested?
______ 9. Have emergency valves to shut down or reroute the gas been identified and located?
______ 10. Has leak been shut off or brought under control?
______ 11. Has civil defense or local emergency response crew been notified?
______ 12. Has the radio and/or television station been given emergency broadcast instructions?
______ 13. If an area has been shut off, have the individual services in the area been shut off?
______ 14. Is the situation under control and has the possibility of recurrence been eliminated?
______ 15. Has the surrounding area, including adjacent buildings been probed for the possibility of further leakage?
______ 16. Have tags been placed on the necessary meters?

______ 17. Have telephonic reports been made to the state or local regulatory agencies?

______ 18. Has a telephonic report been made to the federal Office of Pipeline Safety National Response Center?

Date ________________________________

6. REPORTING REQUIREMENTS; BOTH TELEPHONIC AND WRITTEN REPORTS - In the case of an incident, a telephonic report must be made within two hours to the National Response Center (1-800-424-8802). In Washington, DC, the telephonic report is made to 267-2675.

An incident is an event involving the release of gas from a pipeline system and:

1. A death or an injury requiring in-patient hospitalization, or
2. Estimated property damage of $50,000 or more.

A written report must be submitted on USDOT Form RSPA F7100.1 as soon as practicable, but not more than 30 days after detection of an incident. Master meter systems must make the telephonic report but are exempted from the written report.

The address for written incident reports to the federal government is:

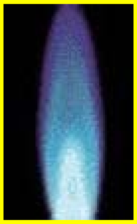
Information Resources Manager
Office of Pipeline Safety
Research and Special Programs Administration
USDOT, Room 7128
400 Seventh Street, SW
Washington, DC 20590

NOTE: LP gas operators should check with state regulatory agencies for additional reporting requirements.

7. PLAN FOR RESTORATION OF SERVICE AFTER AN OUTAGE – Qualified persons must follow proper written procedures to safely restore service after an outage. The procedures must include details for re-lighting appliances.

Gas service must be restored on a building-by-building basis throughout the affected area. First, service to each customer must be shut off, either at the meter or at a curb valve. If this cannot be done, the gas flow can be shut off by squeezing off the line.

Before restoring service to an affected area, all gas piping and meters must be purged of air. Then re-lights can be accomplished. Never turn on the gas at the meter unless access is available to all appliances on the customer piping. If the operator cannot get access to a customer's building facilities, notification must be left in a conspicuous location requesting the customer to call the LP gas operator to schedule the restoration of service.



Ahlgas Propane Service

CGI

Couldn't **G**et **I**n

Your gas service was interrupted due to:

1. out of gas
2. other

We could not get in to safety check your gas appliances so we have left the gas turned off.

Please call 234-9804 so that we can make arrangements to turn your gas back on.

The person in charge of the restoration of service must accept the entire responsibility for following the written procedures.

A written record of the incident with all necessary information, including the information on restoration of service, must be kept in a permanent file.

8. ACCIDENT INVESTIGATION PROCEDURES – Each operator must establish written procedures for analyzing accidents and failures to determine the cause of the failure and minimize the possibility of recurrence. The procedures must include:

- Evaluation of the situation.
- Secure the area to protect evidence.
- Review of applicable operating and maintenance plans.
- Review of equipment specifications.
- Review of emergency procedures.
- Conduct leak survey, pressure tests of piping and equipment, meter tests and regulator checks.

- Interviewing of persons at the scene.
- Examination of burn and debris patterns.
- Checking odorization levels.
- Review of meter and gauge readings.
- Notation of weather conditions.
- Selection of samples of failed facility or equipment for laboratory analyses to determine the causes of the failures.

9. EDUCATION AND TRAINING PLAN – Operating personnel and other emergency responders must be qualified to ensure understanding of emergency procedures and equipment. It is the responsibility of the operator to conduct adequate training and to keep records of the training. Training should include:

- Updating of the written emergency plans.
- Review of personal responsibilities in emergency situations.
- Review of location and use of emergency equipment.
- Properties of LP gas.
- Review the locations and use of system maps and records, maintenance records, valve records and operating procedures.
- Review of typical emergency situations to reinforce the step-by-step actions to be followed in emergencies. This includes methods of contacting public officials, firefighters, police and LP gas distributors.
- Review of record keeping requirements.
- Review the procedures for making telephonic and written reports.

PUBLIC EDUCATION PLAN

The operator also has a responsibility to conduct a continuing education program that enables customers, the public and excavators to recognize and respond to emergency situations. The education program can include:

- Information about the properties of LP gas.
- Recognition of the odorants used in LP gas.
- Actions to take when a strong gas odor is present.
- Applicable one-call procedures prior to excavation.
- 24-hour telephone numbers for reporting gas leaks.

Scratch and Sniff

Ahlgas Propane Company

Propane is an odorless gas, so an odor has been added to warn you if there is a leak.

Please scratch in the circle below and smell that area to familiarize yourself with the odor.

Whenever you smell that odor please call us at 234-9804.

This educational information may be conveyed to the interested parties by a number of means, including:

- Radio and television.
- Newspapers and newsletters.
- Public meetings and one-on-one encounters.
- Bill stuffers, mailings and handouts.
- Billboards and bulletin boards.

If a significant percentage of the population in the operator's area does not speak English, the education and training must be conducted in a language understood by the non-English speaking community.

The operator must maintain records of the public education program.

Many excellent educational pamphlets and other training aids are available from the National Propane Gas Association. Their address is:

National Propane Gas Association
1600 Eisenhower Lane, Suite 100
Lisle, IL 60532

CHAPTER IV
CONSTRUCTION AND REPAIR

This chapter is designed to help the LP gas operator meet the construction and repair requirements set by the pipeline safety regulations. It outlines construction, pipe handling and pressure testing requirements for installation of a safe system. It explains the procedures to qualify a person to make a pipe joint. It gives directions for finding "qualified persons" to do construction and repair work on a gas system. Remember, it is always the operator's responsibility to see that a contractor follows all requirements.

Manufacturers of pipe, valves, fittings and other gas system components must design and test them to mandatory industry specifications. The specifications are incorporated in NFPA 58 by reference into 49 CFR Part 192, the gas pipeline safety regulations. Components meeting the requirements are qualified for gas service and are marked with the "approved" markings (See Chapter III). In addition, manufacturers usually develop procedures for joining their products and joining other materials to their products. Manufacturers' product manuals provide procedures for installation and operation that should be incorporated in the operator's operations and maintenance plans.

PLANNING AHEAD

It is essential that an LP gas operator knows the types of material and various elements of the gas piping system. A piping system consists of pipe, tanks, valves, fittings, regulators, relief devices and meters. The operator must select components for the system that meet all applicable standards and that comply with the pipeline safety regulations. For example, to develop a cathodic protection program, it is necessary to know the type of metal piping in the system.

Records of the types and locations of system components are critical for planning purposes. Operators who are uncertain of the type of material in their gas piping system must identify the materials. This may be done in one of the following ways:

- Contact previous owners of the system.
- Contact the contractor who installed and/or maintained the system.
- Check state, city or county permits.
- Carefully expose the pipe in certain locations to determine the type of materials and components.

Operators unfamiliar with the types of materials must rely on a qualified person to identify the components. These investigations may require the operator to engage a consultant if adequate in-house expertise is lacking.

PIPE INSTALLATION, REPAIR AND REPLACEMENT: GENERAL COMMENTS

Gas lines must be installed with at least 18 inches of cover. This can be reduced to 12 inches where damage to the pipe is not likely. If the minimum buried depth cannot be met, the pipe must be installed in conduit or bridged (shielded).

Installation of gas pipes must be conducted by qualified personnel. Local gas utilities and local gas associations may be able to recommend qualified persons/contractors who have the necessary background for gas pipe installation. However, contractor work must be supervised carefully. The following sections list the minimum requirements for joining and construction activities.

METALLIC PIPE INSTALLATION

All the conditions listed below must be met when installing metallic pipe:

- Make each joint in accordance with written procedures that have been proven by test or experience to produce strong, gas tight joints.
- Obtain and follow the manufacturer's recommendations for each specific fitting used. See Figure IV-1 for examples of manufacturer's instructions for a mechanical coupling. Include the manufacturer's procedures in the operations and maintenance plans.
- Handling pipe properly without damaging the outside coating is imperative. If the coating is damaged, accelerated corrosion can occur in that area.
- Coat or wrap steel pipe at all welded and mechanical joints before backfilling as well as all areas of damaged coating.
- Test new pipe for leaks before backfilling.
- Support the pipe along its length with proper backfill. Make certain that backfill material does not contain any large or sharp rocks, broken glass or other objects which could scrape the coating or dent the pipe.
- Cathodically protect steel pipes.
- Electrically insulate dissimilar metals. (See Chapter VIII for illustrations.)

If welding steel is necessary in a pipeline, review NFPA 58 which requires that welding must be performed in accordance with ASME Section IX of the Boiler and Pressure Vessel Code. Welders must be qualified in accordance with ASME IX. Some states have special welding certification programs.

Welding of steel pipe is difficult. Both the procedures and the personnel must be qualified for the type of weld performed. If welding is done on a gas system, qualified welders can be referred by:

- the local gas utility;
- local gas associations;
- consultants.

PLASTIC PIPE INSTALLATION

Plastic pipe is commonly used for distribution mains and services by the gas industry. Polyethylene pipe is the only plastic pipe that can be used for LP gas piping. PE plastic pipe must be manufactured according to standard ASTM D2513 and marked with that number.

Plastic pipe is not permitted for aboveground installation. Plastic pipe must be buried or inserted. The operator must include written joining procedures in the operations and maintenance plan. Each joint must be made in accordance with written procedures that have been proven by test or experience to produce strong gas tight joints. Plastic pipe joining procedures can be obtained from qualified manufacturers. Do not purchase a product if it is not certified by the manufacturer or supplier for qualified joining procedures.

If a contractor installs PE plastic pipe, the operator is still responsible to ensure that only PE pipe manufactured according to ASTM D2513 is installed. In addition, the operator must verify that the contractor follows written joining procedures which meet the manufacturers' recommended joining procedures for each type of pipe and fitting used.

According to the pipeline safety regulations, a person making and inspecting joints must be qualified. No person may make a plastic pipe joint unless that person has been qualified under the applicable joining procedure by making a specimen joint from pipe sections joined according to the procedure that passes inspection and test.

The specimen joint must be visually examined during and after joining and found to have the same appearance as a joint or photograph of a joint that is acceptable under the procedure. In the case of heat fusion, the specimen must be cut into at least three longitudinal straps, each of which is:

- Visually examined and found not to contain voids or discontinuities on the cut surfaces of the joint area;
- Deformed by bending, torque or impact and if failure occurs, it must not initiate in the joint area.

A person must be re-qualified under an applicable procedure, if during any 12-month period that person:

- Does not make any joints under the procedure;
- Has 3 joints or 3 percent of the joints made, whichever is greater, that are found unacceptable by testing.

Figure IV-1

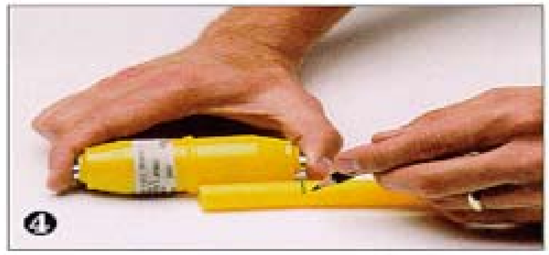
Easy-to-install Permasert system

In addition to saving time and money, using a Perfection Gas Distribution System instills the confidence of knowing you will repeatedly achieve a safe gas-tight connection. Our easy five-step installation procedure assures you of consistent positive connections that prevent pull-out of the pipe or tubing.

Cut the PE piping so that the end is square.

Wipe with a clean dry cloth. Inspect the last several inches of PE piping for damage. If any, cut again to remove damaged area.

Use the Perfection chamfering tool for a proper O.D. chamfer. This chamfer permits the PE piping to be completely stabbed without affecting the internal seals.



Use a soft felt tip pen, crayon or grease pencil to mark the stab depth as indicated on your Permasert package instructions. The stab depth is the approximate distance from the edge of the fusion bead to the end of the fitting body.

Stab the PE piping into the Permasert fitting so that the stab depth mark is visible:

- Within 1/8" of moisture seal on 1/2" CTS and 1" CTS sizes
- Within 1/4" on all other sizes through 1-1/4" CTS
- Approximately 3/8" on 1-1/4" IPS and 2" IPS sizes

The PE piping must bottom out in the fitting. Pressure test the joint in accordance with your standard procedures. The reference mark can move outward up to an additional 3/8" during pressure testing.

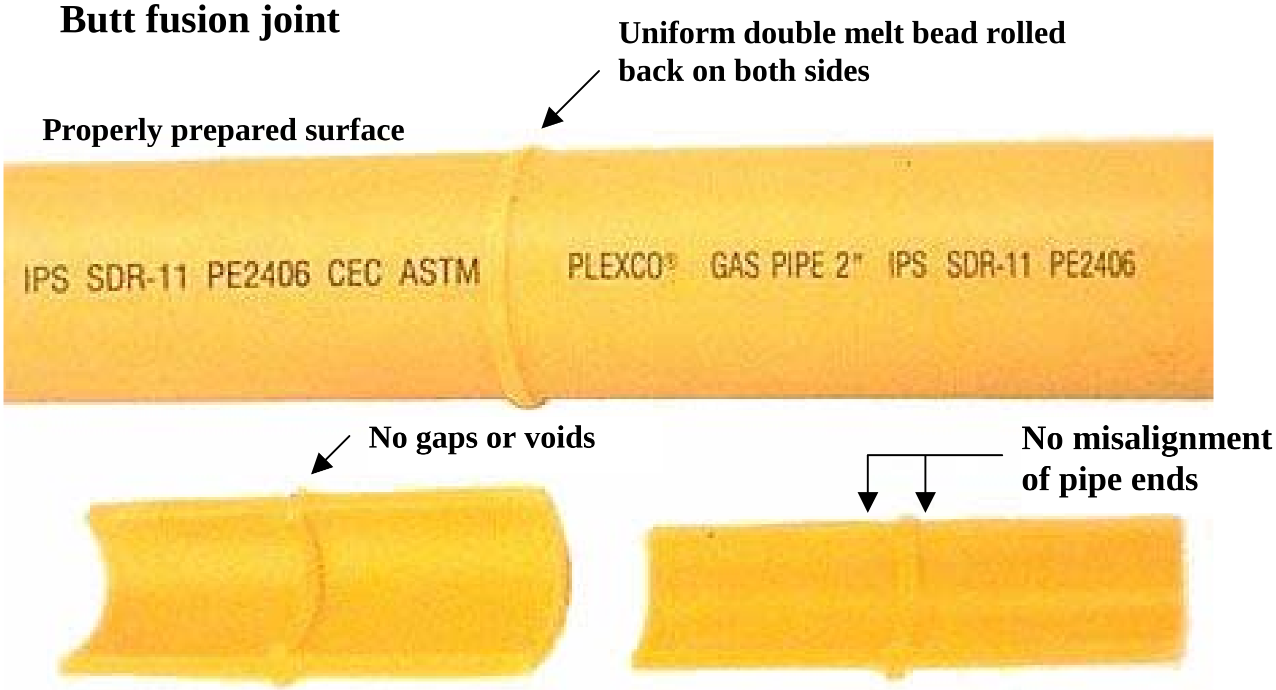
Perfection Corporation
A Subsidiary of American Meter Company
222 Lake St. • Madison, Ohio 44057-3189 USA
Phone: 216-428-1171 • Fax: 216-428-7325
800-544-6344

COUPLING/AHA/5M/0696

Figure IV-2

These are two types of fusion joints.

Butt fusion joint



Saddle fusion joint

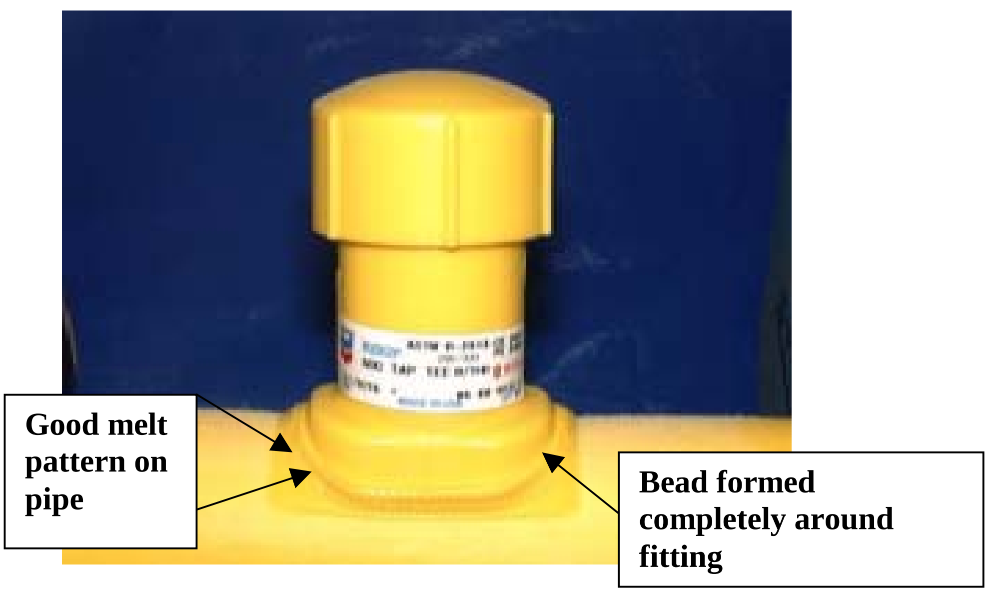


Figure IV-3

Bead (melted and fused portion of plastic pipe)

Note: This for illustration purposes only. Use picture and instructions in pipe manufacturer's manual.

Figure IV-4
An example of a socket fused joint with polyethylene pipe listed in ASTM D2513.

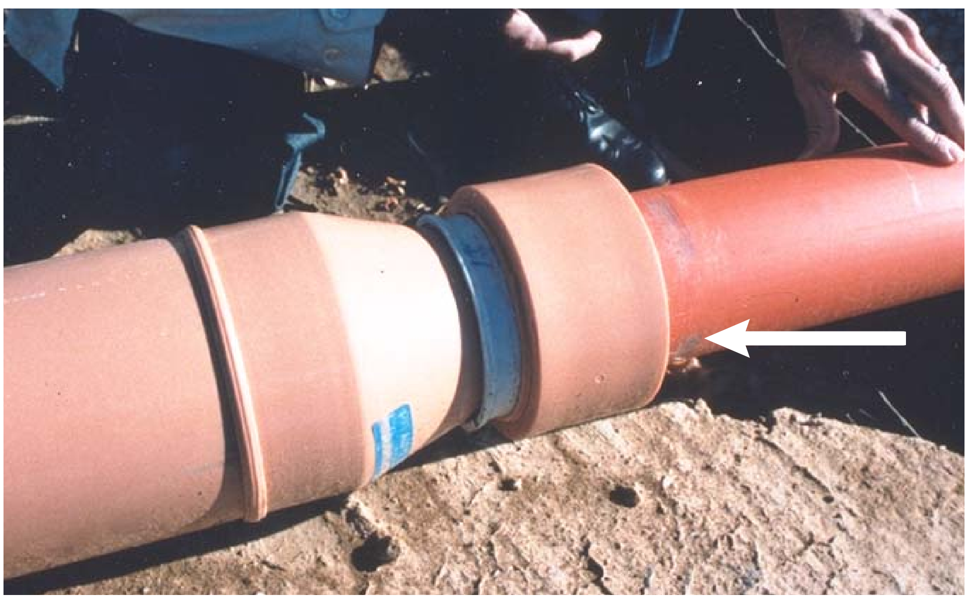


Figure IV-5

An example of a saddle service tee joint made with PE pipe listed in ASTM D2513.

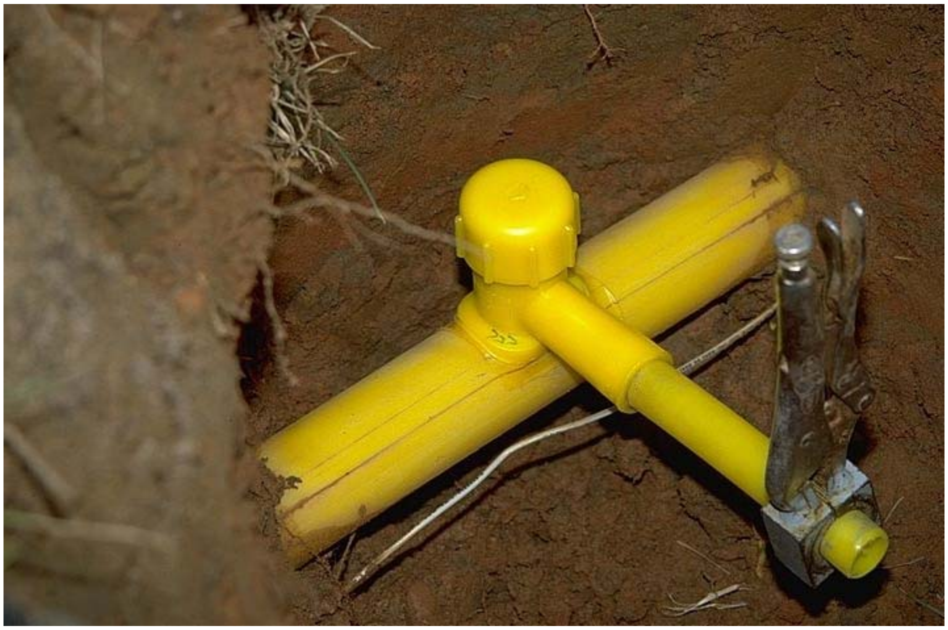


Figure IV-6

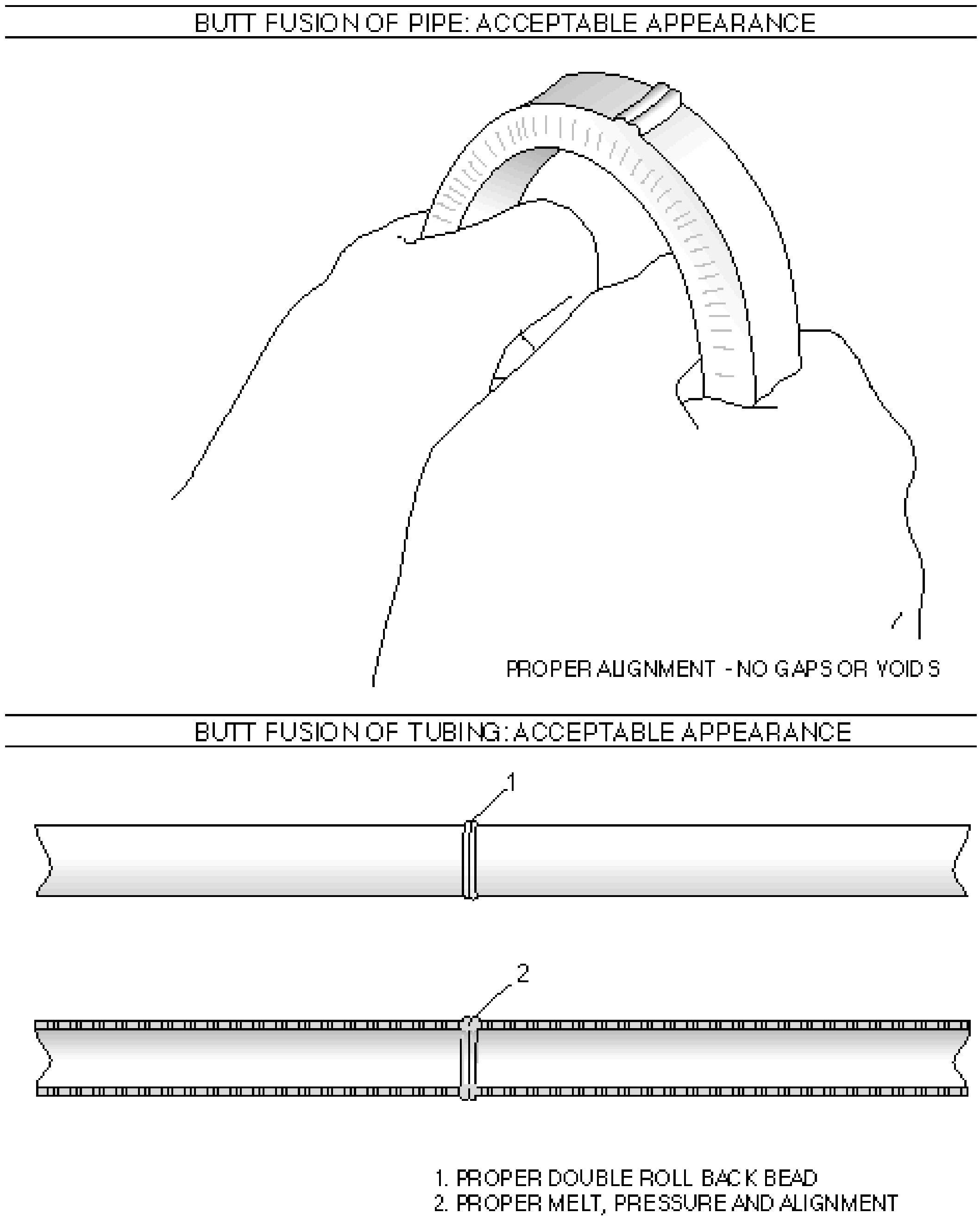
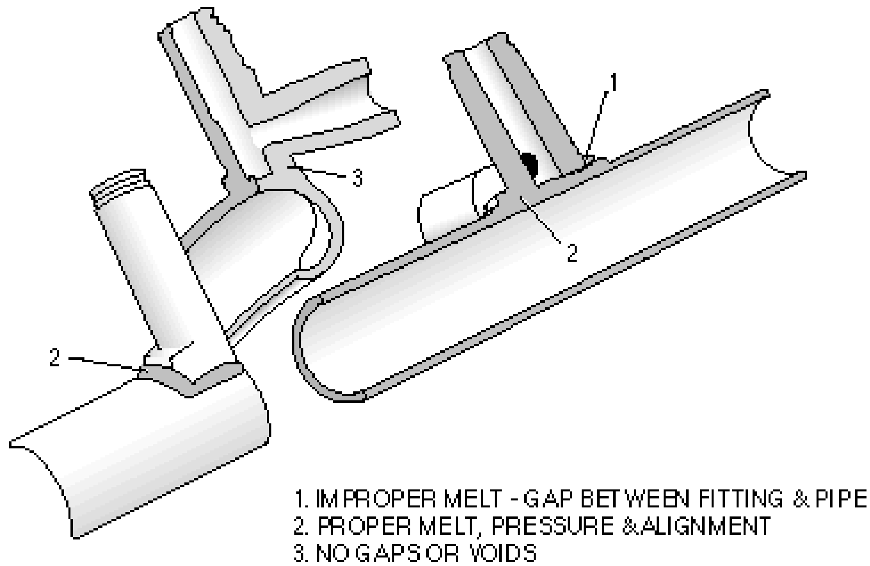
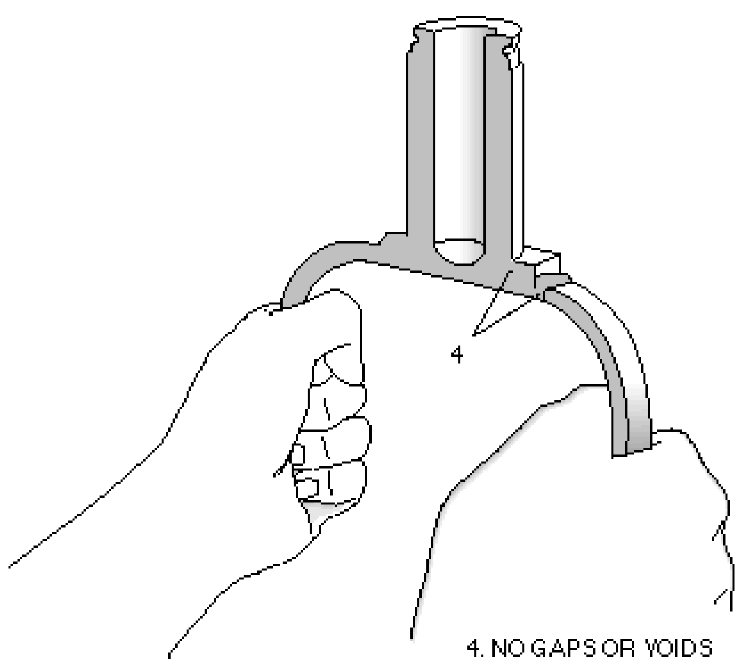

BUTT FUSION OF PIPE: ACCEPTABLE APPEARANCE
PROPER ALIGNMENT - NO GAPS OR VOIDS
BUTT FUSION OF TUBING: ACCEPTABLE APPEARANCE
1
2
1. PROPER DOUBLE ROLL BACK BEAD
2. PROPER MELT, PRESSURE AND ALIGNMENT

Figure IV-7

SIDEWALL FUSION: ACCEPTABLE APPEARANCE



SIDEWALL FUSION: ACCEPTABLE APPEARANCE



The general guidelines to follow when installing plastic pipe are listed below:

1. Install plastic pipe manufactured under the ASTM D2513 specification. The pipe must have ASTM D2513 marked on it.

Figure IV-8

This is a properly marked PE pipe. ASTM D2513 is clearly marked on the pipe. If ASTM D2513 is not marked on a pipe, do not purchase it.

Figure IV-9

An example of pipe not qualified for gas piping. This is PVC pipe. It was manufactured according to ASTM D2241. The pipe is qualified for use as water pipe, not gas piping. Remember to look for the ASTM D2513 marking on the pipe.

2. Make each joint in accordance with written procedures that have been proven by test to produce strong gas tight joints.

   The manufacturer of the pipe or fitting should supply the operator with the procedures for each product in the manufacturer's manual. When installing the pipe, make certain that these procedures are followed. All joints must be made by a qualified person.

3. Install properly designed valves in a manner which will protect the plastic material. Protect the pipe from excessive twisting, shearing or cutting loads when the valve is operated. Protect from any secondary stresses which might be induced through the valve or its enclosure.

4. Prevent pullout and joint separation. Plastic pipe must be installed in such a manner that expansion and contraction of the pipe will not cause pullout or separation of the joint. Operators unfamiliar with plastic pipe should have a qualified person perform all joining procedures.

5. When inserting plastic pipe in a metal pipe, make allowance for thermal expansion and contraction. Make an allowance at lateral and end connections on inserted plastic pipes, particularly those over 50 feet in length. End connections must be designed to prevent pullout caused by thermal contraction. Fittings used must be able to restrain a force equal to or greater than the strength of the pipe. To minimize the stresses caused by thermal contraction, pipes inserted in the summer should be allowed to cool to ground temperature before tie-ins are made. Inserted pipes, especially those pulled in, should be relaxed, mechanically compressed or cooled to avoid initial tensile stress. Operators unfamiliar with proper insertion techniques must have a qualified person develop the procedures.

6. Repair or replace imperfections or damages before placing the pipe in service.

7. Install all plastic mains and service lines below ground level. Where the pipe is installed in a vault or other below-grade enclosure, it must be completely encased in gas tight metal pipe with fittings that are protected from corrosion. Plastic pipe installation must minimize shear and other stresses. Plastic mains and service lines that are not encased must have an electrically conductive wire or other means of locating the pipe. NFPA 58 requires that the wire not be in direct contact with the pipe. It is recommended that a 6" separation be maintained. Plastic lines must not be used to support external loads.

Figure IV-10

This is an example of an illegal installation which does not meet federal safety regulations. This is a picture of PVC plastic pipe installed aboveground. Remember: **BURY PLASTIC PIPE!**

Figure IV-11

This is an example of another improper installation. Note that a trench was dug but the operator never buried the pipe. Keep in mind that plastic pipe loses some of its strength when exposed to sunlight for a long period of time.

Figure IV-12

An example of metallic wire used to help locate buried plastic pipe. Pipe locators can detect metal but not plastic. Therefore, metallic wire must be buried along with the plastic pipe. A pipe locator can then detect the buried metallic wire and the adjacent plastic pipe.

8. Ensure that plastic pipe is continually supported along its entire length by properly tamped and compacted soil. To prevent any shear or other stress concentrations, use external stiffeners at connections to mains, valves, meter risers and other places where compression fittings might be used.

9. In laying plastic pipe, ensure adequate slack (snaking) in the pipe to prevent pullout due to thermal contraction.

10. Lay plastic pipe and backfill with material that does not contain any large or sharp rocks, broken glass or other objects which could cut or puncture the pipe. Where such conditions exist, suitable bedding (sand) and backfill must be provided.

11. Take special care to prevent coal tar type coatings or petroleum base tape from contacting the plastic pipe. It can cause plastic pipe to deteriorate.

12. Static electricity can ignite a flammable gas-air atmosphere. When working with plastic pipe of any kind where there is (or there may be) the possibility of a flammable gas-air atmosphere, take the following precautions:

    - Use a grounded wet tape conductor wound around or laid in contact with the entire section of the exposed piping.

- If gas is already present, wet the pipe starting from the ground end with an approved solution recommended by the pipe manufacturer. Apply tape immediately and leave it in place.
- Wet the tape occasionally with water. Where temperatures are below freezing (O°C/32°F), add glycol to the water to maintain tape flexibility. Ground the tape with a metal pin driven into the ground.
- Do not vent gas using an ungrounded plastic pipe or tubing. Even with grounded metal piping, venting gas with high scale or dust content could generate an electric charge in the gas and an arc could result from the dusty gas cloud back to the pipe and ignite the gas. Vent gas only at a downwind location remote from people or flammable material.
- NOTE: Dissipating the static charge buildup with wet rags, a bare copper wire or other similar techniques may not be as effective as the above procedure. In all cases, use appropriate safety equipment such as flame resistant and static free clothing, breathing apparatus, etc.

13. After installation, ensure that adequate and appropriate maps and records are retained.

REPAIR METHODS - PLASTIC AND METAL

Replacement of gas lines and repair of leaks are highly specialized and potentially hazardous operations. They should be attempted only by persons with adequate LP gas pipeline qualifications.

Leaks in service lines or mains may be repaired by cutting out a short length of pipe containing the leak and replacing it with a new segment of pipe. The pipe segment is commonly attached to the existing line with mechanical couplings, welds, PE fusion, etc. at each end. NFPA 58 requires, if PE pipe is used to replace a section of steel pipe, a tracer wire should be installed to connect the steel pipe ends in order to maintain continuity. Remember that written procedures are required to be followed for each joint. The procedures can be obtained from the manufacturer of the mechanical coupling. If the operator intends to make the repair with a mechanical coupling, then the written procedures must be incorporated into the operations and maintenance plan.

Small leaks in steel service lines or mains, such as those resulting from corrosion pitting, must be repaired with an appropriate leak clamp applied directly over the leak, by replacing a section of pipe or by another acceptable engineering method that can restore the serviceability of the pipe. All steel pipe and fittings installed below ground must be properly coated and cathodically protected before backfilling.

If several leaks are found and extensive corrosion has taken place, the most effective solution is to replace the entire length of deteriorated pipe. The normal installation practices must be followed. They include priming and wrapping of all steel piping, fittings, cathodic protection, etc.

Leaking metal pipe can often be replaced by inserting polyethylene pipe manufactured according to ASTM D2513 in the existing line and making the appropriate connections at both ends. Again, operators are cautioned that allowance for thermal expansion and contraction must be made at lateral and end connections. Operators unfamiliar with insertion techniques, including proper anchoring and offset connections should have a qualified contractor perform this work. Some of the polyethylene pipe manufacturers provide procedures for installation of their products by insertion.

One source of failure in plastic pipe is breaks associated with the transitions between plastic and metal pipes at mechanical fittings. The primary source of the problem is inadequate support of the plastic pipe. It is critical to firmly compact soil under plastic pipe to provide proper support. In practice, however, it is laborious, time consuming and difficult to achieve adequate compaction under such joints. Further, as the soil settles, stress may build and the insert sleeve will cut through the pipe. For example, an insert sleeve must be used in the plastic pipe to provide proper resistance to the clamping pressure of mechanical fittings. This internal tubular sleeve must extend beyond the end of the mechanical fitting. If the pipe is not properly supported at that point, the end of the insert sleeve will act as a shear. This source of failure in plastic pipe can be reduced or eliminated by using a properly designed outer sleeve to prevent stress concentrations at the point where the plastic pipe leaves the mechanical fitting.

The most prevalent cause of breaks or leaks in plastic pipe is "third-party" damage. This is usually caused by an excavator breaking or cutting the pipe. Plastic pipe is more vulnerable to such breaks than steel pipe. The lower strength of plastic pipe, however, is not necessarily a disadvantage. For example, if digging equipment hooks and pulls a steel pipe it may not break, but may be pulled loose from a connection at some distance from the digging. The resulting leaks could go undetected for a period of time and may result in a serious incident. Although there is no assurance that the plastic pipe will not also pull out, it is more likely to break at the point of digging. Then, the break can be detected and repaired. After a leak has been repaired with a coupling or a clamp, a soap-bubble test must be conducted. A CGI/barhole survey of the piping in the vicinity may be considered to ensure no remote pullouts/leaks have occurred.

IT SHOULD BE EMPHASIZED THAT ALL SOURCES OF IGNITION SHOULD BE KEPT AWAY FROM THE LEAK REPAIR AREA. OPEN FLAMES SHOULD NEVER BE USED TO DETECT A GAS LEAK OR TO TEST THE ADEQUACY OF A REPAIR JOB.

CHAPTER VI
ONE-CALL DAMAGE PREVENTION PROGRAM

ONE-CALL SYSTEMS

A one-call notification system provides a telephonic communication link between excavators and operators of underground pipeline and facilities. The heart of the system is an operational center whose main function is to transfer information from excavators about their intended excavation activities to the operators of underground pipelines and facilities participating in the system. Excavators have to make only a single call to an operational center to start the process, thus the name "one-call." Upon receipt of the information, operators of pipelines and facilities that could be affected by the excavation activity arrange for the timely identification and marking of underground facilities that are in the vicinity of the intended activity. When necessary the underground operators inspect the site being excavated and advise the excavator of the need for special measures to protect buried or exposed facilities. One-call notification systems may perform various other functions relevant to protecting underground pipelines and facilities from damage, such as record keeping and public awareness programs.

It is required that LP Gas operators be members of and participate in a qualified one-call damage prevention system. It is recommended that LP operators check with their state one-call systems to determine the laws and regulations that would apply to them.

EXCAVATION

Excavation activities must not be conducted without first ascertaining the location of all underground facilities which could be affected by the excavation.

Excavation activities include excavation, blasting, boring, tunneling, backfilling, the removal of aboveground structures by either explosive or mechanical means and other earth moving operations.

Prior to any excavation, each excavator must serve notice of intent to excavate to the One-Call Center serving the area in which the proposed excavation will occur. Notice must be given to the local One-Call Center in accordance with state regulations in advance of excavation. This requirement may vary from 24 – 72 hours excluding weekends and holidays.

EMERGENCY EXCAVATION

An emergency excavation is an excavation performed to eliminate an imminent danger to life, health or property. Telephonic notice of the emergency excavation must be given as soon as possible to the One-Call Center. If necessary, emergency assistance should be requested from each operator to locate and protect its underground facilities.

PRECAUTIONS TO AVOID DAMAGE

Each person responsible for an excavation activity must:

- Plan the excavation to avoid damage to underground facilities in and near the construction area.
- Perform excavations with procedures and equipment that shall ensure the facility does not sustain damage.
- Provide support for underground facilities in and near the construction area during excavation and backfilling operations to protect the facility.
- Dig test pits as necessary to determine the actual location of LP gas facilities if these facilities or utilities are to be exposed or crossed.

REPAIR OF EXCAVATION DAMAGE

Each person responsible for excavation operations which results in damage to an underground facility must, immediately upon discovery of the damage, notify the operator of the facility of the location and nature of the damage. The operator must be given reasonable time to make the necessary repairs before the excavation or backfilling in the immediate area of damage is continued.

Each person responsible for an excavation activity that damages an underground facility and permits the escape of any flammable or toxic gas shall, immediately upon discovery of the damage, analyze the situation to determine if anyone is in immediate danger and then take necessary action to protect that person. Remember, the one providing the assistance must not perform any actions which would endanger himself. If all people are out of immediate danger, then the person must notify the operator, local police and the local fire department. Then take any actions necessary to protect persons, first, and then property from possible further danger and to minimize the hazards until arrival of the operator personnel or police and fire department personnel.

Partial exemption is granted to operators of pipeline systems, other than municipal systems, where the primary responsibility of the operator does not include the transportation of LP gas.

An example of a partial exemption is an operator of a master meter LP gas system. An operator with this partial exemption does not need a written damage prevention program nor is a current list of local excavators necessary. It is not necessary for the partially exempted operator to notify the public in the vicinity of the excavation nor the local excavators of an operator's damage prevention program. But this operator must still be involved in the One-Call Center program in all other aspects.

CHAPTER VII
OPERATOR QUALIFICATION

All operators of jurisdictional LP gas systems must have a written operator qualification program in place by April 27, 2001. By October 28, 2002, all employees performing covered tasks must be qualified to meet the requirements of 49 CFR Part 192, Subpart N of the federal pipeline safety regulations.

GENERAL REQUIREMENTS

It is the responsibility of the operator to:

- Identify covered tasks
- Determine who must be qualified
- Determine the method of qualification
- Determine re-qualification procedures
- Keep records

COVERED TASK

A covered task is an activity identified by the operator that fulfills all of the following four characteristics:

- Is performed on a pipeline facility.
- Is an operations or maintenance task (Note: This includes an emergency response task.).
- Is performed as a requirement of 49 CFR Part 192 of the federal pipeline safety regulations.
- Affects the operation or integrity of the pipeline.

OPERATOR QUALIFICATION PROGRAM

The written qualification program must include provisions to:

- Identify covered tasks.
- Ensure that individuals are qualified.
- Allow unqualified individuals to perform a covered task while under the observation of a qualified individual.
- Evaluate the individual's qualifications in the event of an incident.
- Evaluate the individual if there is reason to believe that the individual is no longer qualified.
- Inform the qualified individual of any changes affecting the covered task.
- Determine intervals for re-qualification.

RECORDKEEPING

Qualification records must be maintained as long as the individual is performing the covered task. Records of individuals no longer performing a covered task must be kept for five years.

Records must include:

- Identification of qualified individuals.
- Covered tasks the individual is qualified to perform.
- Date of current qualification.
- Qualification method.

CHAPTER IX
LP GAS REGULATORS

BASIC CONCEPTS FOR LP GAS REGULATORS

LP gas regulators reduce container pressure which can range from 8 to 220 psig to intermediate pressures of 10 psig or typical appliance pressure, nominal 11" w.c. They must be installed in accordance with the National Fuel Gas Code NFPA 54, Standard for the Storage and Handling of Liquefied Petroleum Gases Code NFPA 58 and any local requirements.

There are a few terms, units and concepts that are useful when discussing LP gas regulating equipment. These are described as follows:

psig - pounds per square inch gauge. The unit of measure that uses the actual atmospheric pressure as a zero point in a specific geographic area. It is used to describe container pressure and delivery pressure from first-stage and high pressure regulators.

Psig is typically measured with a spring loaded gauge that can be attached to a container outlet connection and downstream of first-stage or high pressure regulators.

w.c. - inches of water column. Unit of measure for delivery pressure from single, second and integral twin stage regulators (27.71"w.c.=1.0 psig). Inches of water column are measured with the use of a U-Tube device called a water manometer (see Figure IX-1) that is filled with water with 1" markings typically up to 16". As pressure is introduced in one side of the tube, the water is forced up the other side; the end reading is then doubled to get the measured delivery pressure.

Inches of water column are typically measured at regulator pressure ports and inlet ports at appliance control valves.

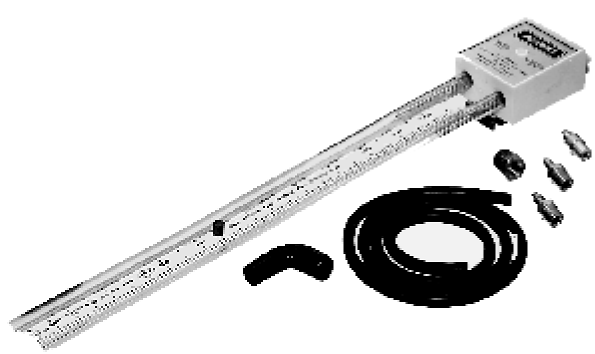


Figure IX-1 Water manometer

Btu - British thermal unit. Measure of heat value. One Btu will raise the temperature ofone pound of water one degree Fahrenheit. Btu is used to describe gas input to an appliance and the capacity of the LP gas regulator. Regulators are rated at the amount of Btu's per hour they can deliver at a specific inlet and outlet pressure. See Figure IX-2.

Set point - a point where the regulator is set for a specific pressure, either psig or inches of water column at a specific inlet pressure and a Btu delivery to downstream appliance(s). See Figure IX-2.

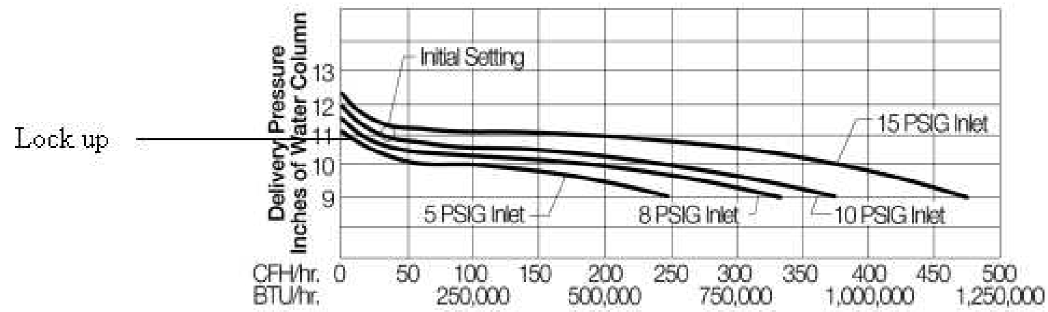


Figure IX-2

Lock up- a point where there is no demand from the appliances and the regulator stops flow. It will always be higher than the set point. On single, second and integral twin stage regulators, it is 120% of the set point, i.e., set point of 10 psig inlet, 11"w.c. at 75,000 Btu/hr is 13.2"w.c. See Figure IX-2.

<u>Components of a Typical Regulator</u>

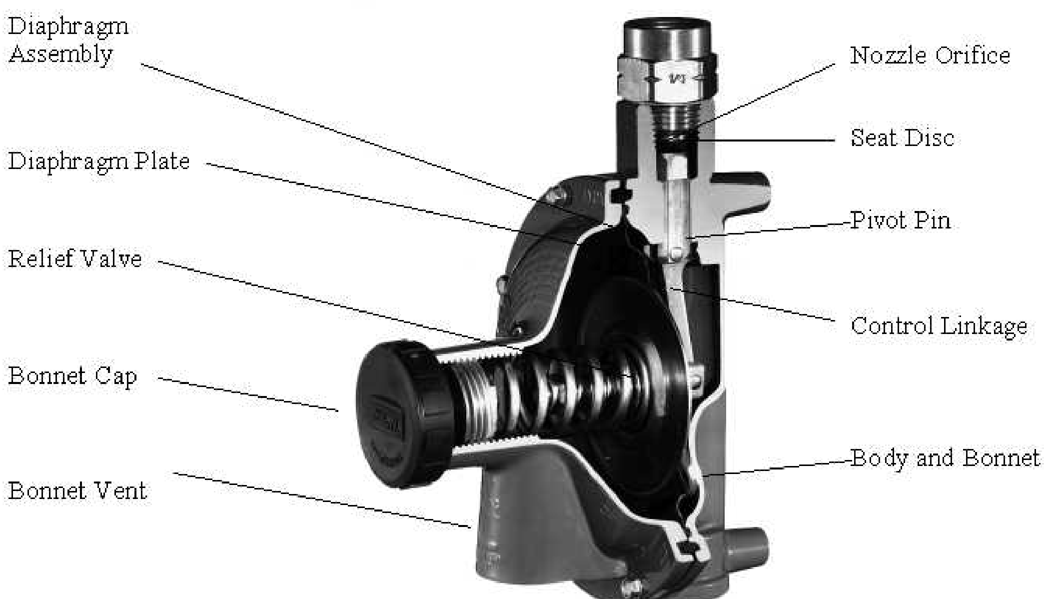


Figure IX-3 LP regulator

<u>Underwriters Laboratories – Listing</u> - Underwriter Laboratories (UL) is a not-for-profit organization that maintains laboratories for the examination and testing of devices, systems and materials to determine their relation to hazards to life and property. They also publish standards for materials, devices, products, equipment, etc. that affect the above described hazards.

UL-144 is the Standard for LP-Gas Regulators. It defines temperature/pressure ratings, relief valve performance, materials of construction, lock-up ranges, adjustment range, operation/performance and marking requirements to name a few items covered. UL listed regulators conform to the requirements of NFPA 58. Look for the UL mark before installing on a system. On large commercial or industrial systems, UL listed regulators are not always available. The local authority having jurisdiction acts as final approval in these cases.

<u>How a Regulator Works</u>

Typical positive back pressure regulator

Gas enters through the inlet and flows through an orifice **A.** As pressure builds under the diaphragm **B**, which moves upward, the adjustment spring compresses **C** and pushes the seat disc attached to the lever assembly **D** against the inlet nozzle or orifice **A**. If there is no gas demand, the seat disc will stay against the nozzle and gas flow will stop. This is called **lock-up**. When gas demand from the appliance begins, pressure under the diaphragm **B** is reduced, the adjustment spring pushes the lever/seat disc away from the seat and gas flow is allowed through the seat. The diaphragm will continue to sense the pressure under it, and will compress or relax the adjustment spring, which will move the seat lever/seat disc assembly against or away from the seat. This constant movement controls the pressure to downstream regulators or appliances. The design of the adjustment spring determines the pressure setting. See Figure IX-4.

Relief operation

A relief valve is installed in all first, second and integral twin-stage regulators and operates with the requirements of UL-144. It is designed to protect downstream equipment and appliances from overpressure.

When gas enters through orifice **A**, as described above, and downstream demand is reduced or stops, the lever/seat disc **D** will move toward the nozzle to the lock-up position. If the regulator seat disc cannot fully contact the orifice **A**, pressure will continue to build until diaphragm **B** moves up to the point where relief spring **E** begins to compress, allowing gas flow through the relief area into the bonnet and out through the vent **G**. The relief valve will automatically close once the pressure under the diaphragm is reduced to a nominal pressure. See Figure IX-4.

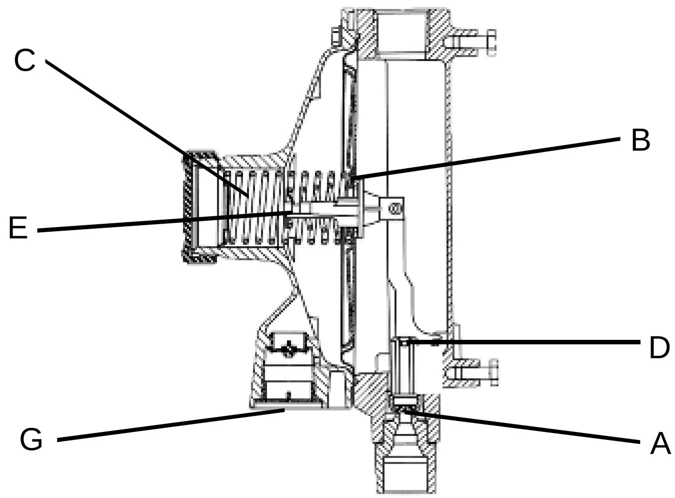


Figure IX-4

There are two designs of LP-gas regulators typically used in systems across the country:

Positive back pressure regulators

This style is a positive back pressure regulator, Figures IX-3 and IX-4**.** It is used as a first stage, second stage, single stage, integral twin-stage and, in some cases, a high pressure regulator. The positive back pressure regulator provides good flow characteristics over a wide range of inlet pressures. LP-Gas vapor pressures change based on temperature. Figure IX-2.

The regulator delivery pressure is affected by the changes in inlet pressure, as well as demand from a downstream appliance(s)**.** The seat disc is on the downstream side of the seat. As inlet pressure rises, the delivery pressure rises; as inlet pressure drops, delivery pressure drops. See Figure IX-2.

Negative direct acting regulators

This style is a negative direct acting regulator. See Figure IX-5**.** It may be used as a high pressure, first stage or even a second stage regulator. The negative acting regulator provides high flow through a large orifice area and a smaller diaphragm area. The seat disc is on the upstream side of the seat. As inlet pressure increases, delivery pressure decreases a small amount; as inlet pressure decreases, delivery pressure increases. The seat disc retainer assembly is directly attached to the stem.

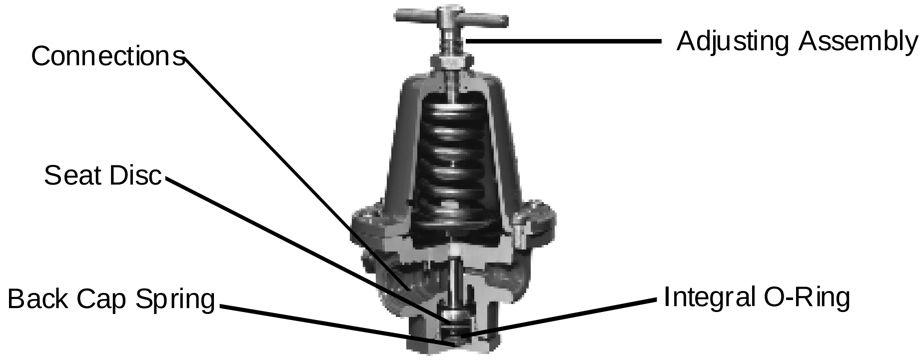


Figure IX-5

TYPES OF REGULATOR SYSTEMS

Regulators and systems control gas pressure from the container to the appliance, reducing the tank pressure which can range from 10-250 psig to the required outlet pressure. There are several types that can range in style and combinations of regulators that can be used to accomplish this task.

Single Stage : One regulator mounted on a container with a line running directly to the appliance(s) (limited to small portable appliances and outdoor cooking appliances with input ratings of 100,000 Btu/hr maximum per NFPA 58, 1995 Edition.) This single regulator is designed for LP gas vapor service to reduce container pressure to 1.0 psig or less (typically 11" water column.) Figure IX-6. These regulators are listed by Underwriters Laboratory or equivalent for use in LP gas with an inlet pressure rating of 250 psig. They utilize a type I relief valve which has a limited capacity; operating range is from 18.7" to 33" w.c.

Per the 1995 Edition of NFPA 58, single stage regulators may no longer be installed on fixed piping systems.

Figure IX-6

First stage : A pressure regulator for LP gas vapor service designed to reduce container pressure to 10 psig or less. It is used as the container regulator in a two stage system. See Figure IX-7A. This regulator can be either of the two styles described above and is UL listed for use as a first stage regulator with an inlet pressure rating of 250 psig. This regulator utilizes a type I relief valve which is a limited capacity; operating range is from 14 psig to 25 psig.

Second Stage : A pressure regulator for LP gas vapor service designed to reduce first stage regulator outlet pressure to 14" water column or less (typically 11" w.c.) See Figure IX-7B. This may be either of the two styles and is UL listed for use in LP gas with an inlet pressure marked at 10 psig, but a rating of 250 psig. This regulator utilizes a type II relief valve - a high capacity type for final stage regulators; operating range is from 18.7" to 33" WC.

Figure IX-7A

Figure IX-7B

High pressure regulator - a pressure regulator for either LP gas vapor or liquid service designed to reduce pressure in excess of 1 psig. The liquid regulating style is usually negative direct acting; the vapor style can be either. Both are usually UL listed with at least a 250 psig inlet pressure rating. This regulator may utilize a type I relief valve or may not. In some cases an additional external relief valve might be required. See NFPA 58 for more information. See Figure IX-5.

Integral two-stage regulator - a pressure regulator that combines both a high pressure and a second stage regulator into a single unit. It is UL listed with a 250 psig inlet pressure rating, no relief in the high pressure section and a type II relief valve in the second stage section. High capacity type for final stage regulators have an operating range from 18.7 inches w.c. to 33 inches w.c. See Figure IX 8.

Figure IX-8

Automatic Changeover : An integral two stage regulator that combines two high pressure regulators and a second stage regulator into a single unit. There are two inlet connections and a service/reserve indicator designed for use with dual- or multiple-cylinder installation. The system automatically changes the LP gas vapor withdrawal from empty designated service cylinder(s) to the designated reserve cylinders, without interruption of service. The service/reserve indicator gives a visual indication of which cylinders are supplying the system. The second stage in an UL listed automatic changeover contains a type II relief valve with the same setting parameters as in the integral twin-stage unit. See Figure IX-9.

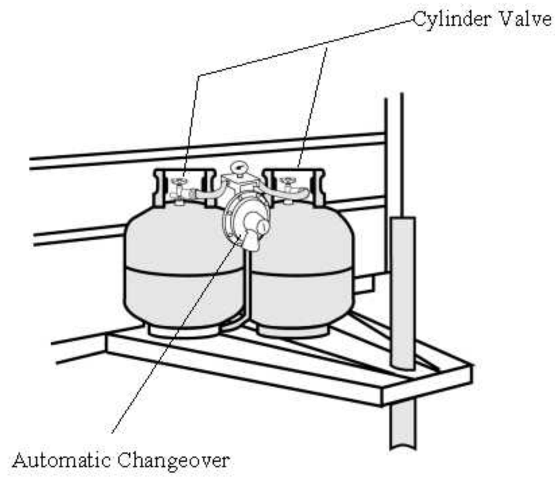


Figure IX-9

Two-Stage Regulator System : An LP gas vapor delivery system that combines a first stage regulator and second stage regulator, Figure IX-10, integral two stage regulator, Figure IX-8, or an automatic changeover regulator Figure IX-9**.**

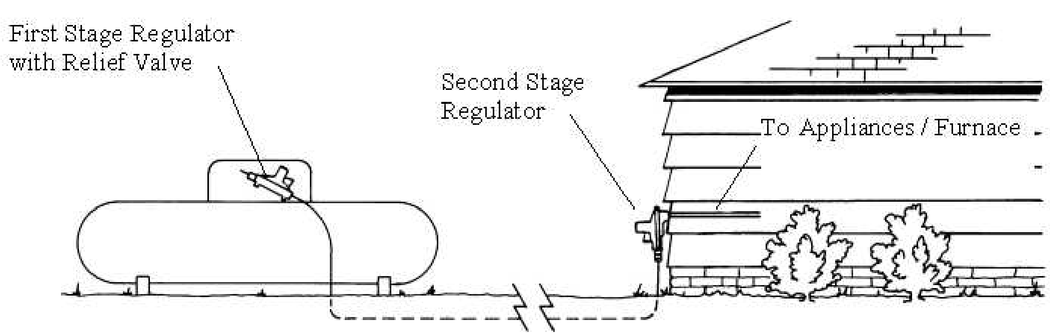


Figure IX-10

Two stage regulator system, Figure IX-11, with a first stage regulator rated at more than 500,000 BTU/HR set at 10 psig or less, with no integral relief valve. In this case the first stage regulator is permitted to have a separate relief valve. It must operate within specified start-to-discharge limits of UL #144 (140%-200%) of the regulator set pressure.

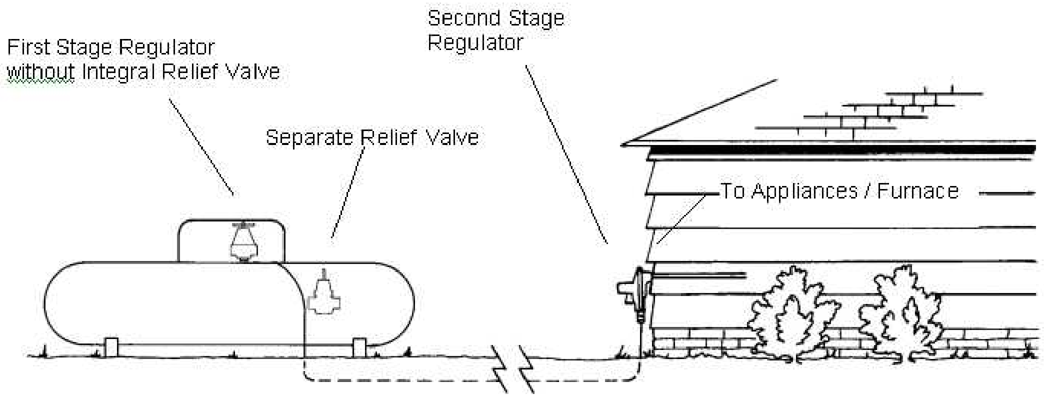


Figure IX-11

Two stage regulator system, Figure IX-12, with a first stage regulator rated at more than 500,000 BTU/HR, set at a pressure higher than 10 psig with no integral relief valve supplying second stage regulator(s). **Note: These systems are usually found where a number of second stage regulators are connected to a single container utilizing one first stage regulator.** In order to comply with NFPA 58 overpressure requirements for second stage regulators, an integral twin-stage regulator can be used for the second stage regulator. This will reduce the higher delivery pressure from the first stage regulator to 10 psig or less. The second stage will supply the required appliance pressure.

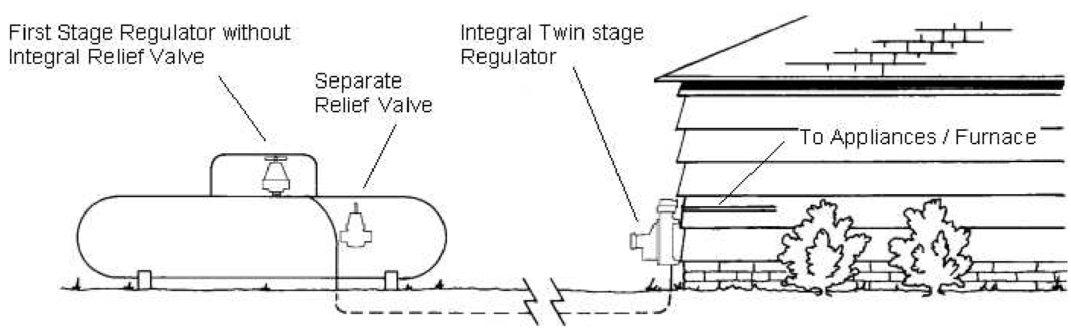


Figure IX-12

REGULATOR SELECTION

1. Determine the total Btu load that the system will require. This can be accomplished by reading the Btu input from each appliance and adding them up. This information can be found on the appliance name plate or from the manufacturers' literature. For example:

Range	65,000 Btu/HR
Water heater	30,000 Btu/HR
Furnace	150,000 Btu/HR
Total	245,000 Btu/HR

2. Determine regulator system type: integral twin stage or two stage? As a general guideline, if the container is going to be over 20 feet from the building, a two stage system is generally used, due to ability to use a smaller line between the first and second stage regulators. When installing containers near or next to the building, integral twin stage are typically used, since this reduced distance does not call for as large a diameter line from the outlet of the integral twin stage regulator. Proper pipe sizing is critical; refer to NFPA 58 1998 edition chapter 11 or the regulator manufacturers' pipe sizing instructions.

3. To select the correct size first stage, second or integral twin stage regulator, refer to the published information in the regulator manufacturers' catalogs. Always select a regulator that meets or exceeds the system demand; if in doubt, go to the next larger size.

In the example of the system requiring 245,000 Btu/HR, selecting a integral twin stage with 300,000 to 500,000 Btu/HR capacity or a first and second stage regulator of 500,000 to 700,000 Btu/HR would be typical.

INSTALLATION

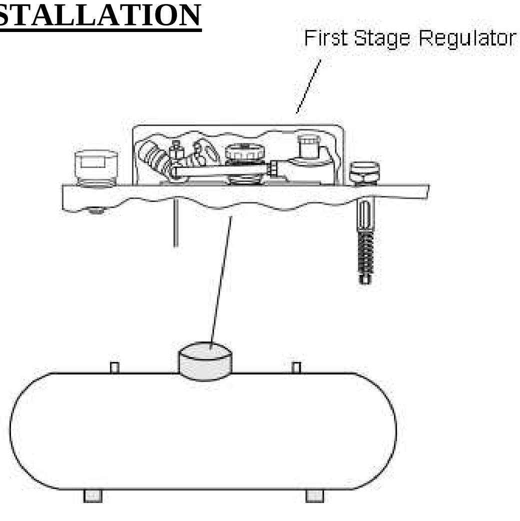


Figure IX-13

LP gas regulators must be installed in conformance with NFPA 54 National Fuel Gas Code, NFPA 58 Liquefied Petroleum Gas Code and any local requirements.

First stage/high pressure/integral twin stage/automatic changeover regulators may not be installed inside buildings unless specifically permitted by NFPA 58, such as certain buildings under construction. When installed outdoors the vent should be down and/or under a protective cover. See Figure IX-13.

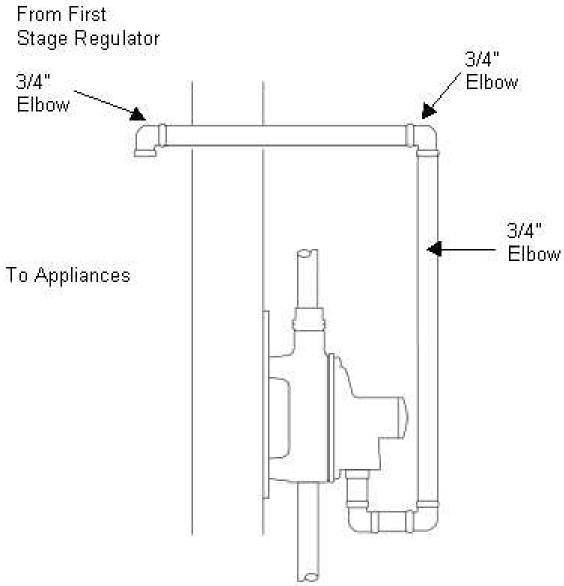


Figure IX-14

Second stage regulators may be installed indoors if the vent is piped to the outside of the building, the vent termination point is down and the outlet is protected by a vent screen, Figure IX-14. When installing second stage regulators outdoors, make sure the vent is pointed down and/or under protective cover. See Figure IX-10.

For more information on LP gas regulator installation, consult the National LP-Gas Association Safety Handbook, the manufacturers' catalogs, servicemen's handbooks, installation instructions and warning information, NFPA 54 and NFPA 58.

APPENDIX A

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APPENDIX A

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APPENDIX B

FORMS

LP GAS UNDERGROUND TANK AND GAS LINE INSPECTION

COMPANY: ____

This form is to be completed each time an LP gas line is uncovered for inspection or any other reason, such as making service connections, main extensions, replacements, etc.

DATE: _______________________

01. Location:____

02. Name of Inspector:____

03. Designation: Tank _________________ Main ______________ Service ______________

04. Age of Pipe/Tank: ___________ Years Line/Tank Size: inches/gals. __________________

05. Maximum Operating Pressure: ____

06. Pipe Specification: Steel _____________ Plastic _____________ Copper _______________

07. Cathodic Protection Tank/Line: Yes ________________ No ________________

08. Coating: Yes ______________________ No _____________________

09. External Condition: Smooth ______ Pitted ________ Depth of Pits ________

10. Internal Condition: Smooth ______ Pitted ________ Depth of Pits ________

Name any existing conditions that could cause harm to the LP gas system.

____

Corrective Measures Taken if Needed:

____

____

Anodes Installed: How many? ______________ Size _______________ Location _______________

Soil conditions surrounding tank/pipe: ____

LP GAS SYSTEM LEAK SURVEY REPORT

COMPANY: ____

Receipt of Report: ____

Date: ______________________________ Time: ______________________________

Location of Leak: ____
(address, intersection, etc.)

Reported by: ____

____
(Name) (Address)

Description of Leak: ____
(inside/outside)

Leak Detected by: ____

Leak Reported by: ____

Report Received by: ____

Dispatched
Date: ______________________ Time: ______________________

Investigation Assigned to: ____
(Name)

Assigned as Immediate Action Required? Yes ________________ No ________________

Investigation
Date: ______________________ Time: ______________________

Investigation by: ______________ Leak Found? Yes __________ No ______________

CGI Used? Yes ______________ No ______________ Leak Grade: 1 2 3

Location of Leak: ____

Cause of Leak: ____

Condition Made Safe: Date: ________________ Time: ________________
Repair
See form 3

LP GAS SYSTEM REPAIR REPORT

COMPANY: ____ Grade of Leak

ADDRESS: ____ Grade I _____
____ Grade II _____
____ Grade III _____

SKETCH SHOWING LEAK/S LOCATED | METER SET

	Meter No. ______________ (if inspected)

LEAK DATA

Detected By		Collecting		Probable Source		C.G.I. Test	
CGI Meter/ Bar Hole		In Building		Mainline		Gas Percent (%)	
Odor		Near Building		Service Line		L.E.L.	
Flame Pack		In Manhole		Tank/s			
Visual/Vegetation		In Soil		Valve			
Other		In Air		Meter Set			
		Other		Service Tap			

Pressure at leak		Surface		Leak Course	
Tank pressure		Lawn		Corrosion	
1st stage piping pressure		Soil		Outside Force	
2nd stage piping pressure		Paved		Construction Defect	
		Other		Material Failure	
				Other	

Component	Explanation	Part of System		Material Type	Size	Year Installed
Pipe		Main		Steel		
Valve		Service		Plastic		
Fitting		Meter Set		Copper		
Regulator		Customer Piping		Other		
Other		Tank/s				
		Other				

Pipe/Tank/s Condition: Good: ______________ Fair: __________________ Poor: ________________

Coating Condition: Good: ______________ Fair: __________________ Poor: ________________

Date Repaired: ______________________________Date Rechecked: ____________________________

Remarks: ____

Signed:____

PATROLLING OF LP GAS SYSTEM

An LP gas system must be patrolled where anticipated physical damage might occur on the system resulting in failure or leakage to that portion of the system. Extreme weather conditions might cause conditions on systems that would require patrolling.

Frequency: When patrolling is required then the frequency of the patrol is as often as necessary, but no less than :

Business district; 4 times each calendar year, not exceeding intervals of 4½ months.
Outside business district; 2 times each calendar year, not exceeding intervals of 7½ months.

COMPANY: ______________________________

Period Covered: Began: ______________________________

Ended: ______________________________

Areas Covered: ______________________________

Map References: ______________________________

Leakage Indications Discovered (describe locations and indications, such as a condition of vegetation):

____

____

Describe any unusual conditions and their locations in the system: ______________________________

____

Other Factors noted which could affect present or future safety or operations of the gas system:

____

____

Follow-up (repairs, maintenance or test resulting from this inspection): ______________________________

____

Comments: ______________________________

____

Signature of person in charge of patrol: ______________________________

Date: ______________________________

REGULATOR INSPECTION REPORT

COMPANY: ____

Location: ____

Regulator # 1

Make: ______________ Model: ____________________

Size: ______________ Orifice Size: ________________

Pressure at inlet:____________________ Pressure at outlet:__________________________

M.A.O.P. of System to which it is connected: ______________________

Regulator # 2

Make: ______________ Model: ____________________

Size: ______________ Orifice Size: ________________

Pressure at inlet: ____________________ Pressure at outlet: _________________________

M.A.O.P. of System to which it is connected: ______________________

Regulator # 3

Make: ______________ Model: ____________________

Size: ______________ Orifice Size: ________________

Pressure at inlet: ____________________ Pressure at outlet: _________________________

M.A.O.P. of System to which it is connected: ______________________

Does regulator have an internal relief valve? Yes_____________ No _____________

Was regulator checked for lock up? Yes_____________ No _____________

Is regulator protected against damage from outside forces? Yes_____________ No _____________

Was vent and screen checked for blockage? Yes_____________ No _____________

Signature: ____

Date: ______________________

External Relief Valve Inspection Report

COMPANY: ______________________________

Location: ______________________________

Relief Valve Information

Make: ______________________ Type: ______________________

Size: ______________________ Orifice Size: ______________________

Type of Loading:

Spring: ____________ Pilot: ____________ Other: ____________

Range: ______________________________

Pressure Setting: ______________________________

Connecting Pipe Size: ______________________________

Vent Stack Size: ______________________________

Capacity:

General Condition of:

Relief Valve: ______________________________

Support Piping: ______________________________

Weather Protection: ______________________________

General Area: ______________________________

Repairs Required: ______________________________

____

____

Repairs Made: ______________________________

____

Remarks: ______________________________

____

Inspector: ______________________________

Signature: ______________________________ Date: ____________

KEY VALVE INSPECTION REPORT

Frequency: - annually

System: Name: ____

Location: ____

Number of Valves: __________

Location /Type / Use	**Results / Actions**
______________________________	____________________________________
______________________________	____________________________________
______________________________	____________________________________
______________________________	____________________________________
______________________________	____________________________________
______________________________	____________________________________

General Comments: ____

____

____

____

Signed:_____________________________

Dated: _____________________________

PLOT PLAN

Prepared By: _________________________ Date Prepared: _________________

System: Name:____

Location:____

(System map showing tanks, mains and service lines with tank and pipe sizes and distances, key valve locations, cathodic protection system, regulators and pressures and other utility lines.)

SNIFF TEST REPORT

Frequency: At a minimum, each time LP gas is delivered to an operator's plant or when LP gas by-passes the plant. Note: In large systems it may be necessary to use instrumentation to verify the odorant at certain locations of the system.

System: Name ____

Location: ____

Test Point: ____

Date: ________________ Time: ________________ Test Person: _________________

Odor Level: Nil: _____ Barely Detectable: _____ Readily Detectable: _____ Strong: _____

Test Point: ____

Date: ________________ Time: ________________ Test Person: ________________

Odor Level: Nil: _____ Barely Detectable: _____ Readily Detectable: _____ Strong: ____

Test Point:
Date: Time: Test Person:

Odor Level: Nil: Barely Detectable: Readily Detectable: Strong:

Remarks:____

____

____

Signed:____

TELEPHONIC REPORT OF CUSTOMER LEAK

COMPANY: ____

Customer Leak Information

Time Call Received: __________________ a.m./p.m. Date: ______________________

Name of Caller: ______________________ Caller's Phone Number: ________________

Name of Customer if not Caller: ____

Address of Leak: ____

____

____

Nature of Complaint: Odor ( ) Blowing Gas ( ) Dead Vegetation ( )

Other (describe): ____

____

Is the gas odor or sound inside the residence? Yes ________ No _________

If so, where is it located? (at the water heater, at the heating system, at the stove, in the hall, in the

kitchen, etc.): ____

____

Is the gas odor or sound outside the residence? Yes __________ No __________

If so, where is it located? (at the meter, near the street, at the house, at the tank/s, at the pool, at the gas grill, etc.): ____

____

How long have you been smelling or hearing the gas? ____________________________

Will someone be home for us to check the leak? Yes __________ No __________

Leak Response Information

Time Dispatched Investigator: __________ am/p.m. Date: ______________________

Name of Investigator: ____

Time of Investigator's Arrival at Scene of Leak: _____________________________ a.m./p.m.

Action Taken: ____

____

____

____

Time of Investigator Completion at Scene of Leak: ___________________________ a.m./p.m.

Additional Follow-up (if needed): Yes __________ No __________

If so, what type of follow-up: ____

____

____

Additional Remarks:____

____

Signature of Investigator: ____

Signature of Supervisor: ____

ATMOSPHERIC CORROSION CONTROL INSPECTION

Frequency: A minimum of every three years although it is recommended to inspect the system for atmospheric corrosion annually during other annual inspection requirements.

System: Name____

Location: ____

Type of Structure: Tank / size and age: __________ Main / size and age: __________

Service / size and age: ______________ Operating Pressure: ______________

Condition of paint and surface of:

Tanks: ____

Piping: ____

Meters: ____

Fittings: ____

Vaporizers: ____

Other: ____

Corrective Measures to be taken: ______________________________

____

Signed: ______________________

Dated: ______________________

Cathodic Protection Survey

Frequency: Annually

System Name: ____

Location: ____

Surveyed By: _______________________ Date Surveyed: ________________________

Starting Location of Survey: ____

Ending Location of Survey: ____

Underground Tank/s : Yes ___________ No ___________

Readings Around Tank(s) Remote From Anodes:

Reading #1 ________________

Reading #2 ________________

Reading #3 ________________

Reading #4 ________________

Take copper sulfate half-cell readings at approximately 20 foot intervals along the mains and service lines.

FT	RDG	FT	RDG	FT	RDG	FT	RDG

Signed: ____ Date: ____________________

CORROSION CONTROL – RECTIFIER INSPECTION

COMPANY: ____

LOCATION: ____

BRAND OF RECTIFIER: ____

RECTIFIER SERIAL NUMBER: ____

Date	Supply Voltage	Output Volts	Output Amps	Rectifier Condition	Remarks

Signature:__________________________ Date: ________________

PIPELINE TEST REPORT

OPERATING COMPANY: ____

Testing Company: ____

This form must be completed for each section of newly installed section of pipe or service line and on each service line that is disconnected from the main for any reason.

Test Data

Type of Pipe: ____

Size of Pipe: ____________________ inches Length of Line: ____________________

Location of Line: ____

____

____

____

Tested with: Nitrogen ( ) Air ( ) Propane Vapor ( ) Water ( )

Other (describe): ____

Time Started: ____________________ a.m./p.m. Time Ended: ________________ a.m./p.m.

Test Pressure Start: ____________________ psig

Test Pressure Stop: ____________________ psig

Line Loss noted? : Yes ______________ No ______________

Reason for Line Loss: ____

____

____

____

Corrective Measures Taken: ____

____

____

____

Remarks: ____

____

____

Company Representative: ____

Signature: ______________________________ Date: ____________________