

## CHAPTER VI

### REPAIRS AND NEW CONSTRUCTION

This chapter is designed to help the operators of small natural gas systems meet the construction and repair requirements set by the pipeline safety regulations. It outlines construction, pipe handling, and pressure testing requirements for installation of safe natural gas systems. It explains the procedures to qualify a person to make a pipe joint. It gives directions for locating "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 by reference into 49 CFR Part 192, the gas pipeline safety regulations. Components meeting the requirements are qualified for gas service and marked with the "approved" markings. In addition, manufacturers usually develop procedures for joining their products and joining other materials to their products. Manufacturers produce manuals and provide procedures for installation and operation that must be incorporated in the operator's operations and maintenance plans.

#### PLANNING AHEAD

It is essential that a natural gas operator know the types of material and various elements of its gas piping system. A piping system consists of pipes, 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 type and location 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 material must rely on a qualified person to identify the components. These investigations may require the operator to engage a consultant if in-house expertise is lacking.

## **EXCAVATION**

Excavation must not be conducted in and near the location of an underground facility without first ascertaining the location of all underground facilities which could be affected by the excavation.

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 local state regulations in advance of excavation. This requirement may vary from 24-72 hours.

## **EMERGENCY EXCAVATION**

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

## **PRECAUTIONS TO AVOID DAMAGE**

Each person responsible for an excavation or demolition operation must:

- Plan the excavation to avoid damage to underground facilities in and near the construction area.
- Maintain a safe clearance between the underground facilities and the cutting edge of any mechanized equipment, taking into account the known limit of control of the cutting edge to avoid damage to facilities.
- Provide support for underground facilities in and near the construction area during excavation and backfilling operations to protect the facility.
- Dig test pits to determine the actual location of gas facilities if these facilities or utilities are to be exposed or crossed.

## **EXCAVATION: REPAIR OF DAMAGE**

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

Each person responsible for an excavation operation that damages an underground facility and permits the escape of any flammable or toxic gas shall, immediately upon discovery of that

damage, notify the operator, local police, and the local fire department. Then take any actions necessary must be taken to protect persons and property and to minimize the hazards until arrival of the operator's personnel or police and fire departments.

### **RECOMMENDATION**

It is in the public interest to promote the protection of citizens, workers, and property in the vicinity of underground facilities. Also, it is in the public interest to promote the health and well being of the community by preventing the interruption of essential services that may result from damage to underground facilities. It is recommended that all underground (gas) utility operators become members of, participate in, and share in the cost of their area's One Call Center.

### **PIPE INSTALLATION, REPAIR, AND REPLACEMENT: GENERAL COMMENTS**

Gas service lines must be installed with at least 12 inches of cover in private property and at least 18 inches of cover in streets and roads. Gas mains must have at least 24 inches of cover.

Qualified personnel must conduct installation of gas pipes. 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 pipe 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 VI-1 for examples of manufacturer's instructions for a mechanical coupling. Include the manufacturer's procedures in the operations and maintenance plans.
- Handle pipe without damaging the outside coating. 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.
- Pressure test new pipe for leaks before backfilling. Mains and services to be operated at 60 psig or less must be tested to 100 psig. This test must be maintained for at least 1 hour. When performing maintenance, short sections of pipe may be pre-tested prior to installation.
- 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 that could scrape the coating or dent the pipe.
- Cathodically protect steel pipes.

- Electrically insulate dissimilar metals (see CHAPTER III for illustrations).

If welding steel is necessary in a pipeline, review the pipeline safety regulations in Subpart E of 49 CFR Part 192. Remember: welding must be performed in accordance with established written welding procedures that have been qualified and tested to produce sound ductile welds, and must be performed by welders who are qualified for that welding procedure. 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 (PE) pipe is recommended as the most suitable plastic pipe for natural gas piping. Acceptable PE plastic pipe is manufactured according to standard ASTM D2513 and is marked with that number.

Plastic pipe is unsuitable for aboveground installation. Plastic pipe must be buried or inserted. The operator must include written joining procedures in its 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 the manufacturer or supplier does not certify it for qualified joining procedures.

If a contractor installs PE plastic pipe, the operator is 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 that meet the manufacturers' recommended joining procedures for each type of pipe and fitting used. No person may make a plastic pipe joint unless that person has been qualified under the applicable joining procedure by making a specimen joint 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 requalified 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 VI-1

An example of a manufacturer's instruction for a mechanical coupling.

## 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.



Use a soft felt 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.



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



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/0596

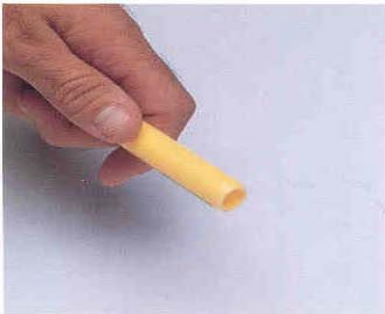
FIGURE VI-2

Example of a manufacturer's procedure for installing a specific coupling.

### ASSEMBLY INSTRUCTIONS



**1** Check the pipe being used to be certain of correct pipe size. Cut pipe ends square.



**2** Chamfer end of pipe using a chamfering tool.



**3** Clean pipe thoroughly to assure there is no dirt, grease or oil in assembly area. Also, assembly area must be free of severe scratches.



**4** Holding the end of the pipe against the collar on the fitting, mark pipe at the entrance of the fitting (this stab length is 1 7/8").



**5** Stab pipe completely into fitting so that the mark on the pipe is flush or less from the fitting entrance.

**6** Repeat steps 1 thru 5 for the other end of coupling to complete the joint.

**7** Pressure test the joint before putting it into service.