

PROCEDURES

METHODS OF INSTALLATION

3.0 PURPOSE

Four methods of installation are presented in this section. The installation methods are open trench, common trench, boring and suspended.

Every effort will be made to protect customer property and vegetation from undue damage.

3.1 SCOPE

- A. Open Trench
- B. Common trench
- C. Boring
- D. Suspended

3.2 OPEN TRENCH

The majority of pipeline installations are made in open trench excavations. This section outlines the procedure to be followed during excavating.

A. Preparation

1. The size and depth of the excavation will be determined by the nature of the job; however, the overall objective shall be to make the excavation as small and shallow as will permit the job to be safely and efficiently completed.
2. Field crews shall not start excavations or pavement cuts until the best location for the installation has been obtained from the available data.
3. All underground utility structures and obstructions should be located, marked and exposed ahead of trenching and digging equipment. Adequate and proper support shall be provided for other structures encountered in order to eliminate the possibility of resulting damage.
4. Trench bottoms should be smooth and free of rocks and debris that could damage the pipe or tubing. The pipe or tubing must be continuously supported on undisturbed or well compacted material.
5. Bedding material shall be used where rocky areas exist.

B. Barricading

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Effective barricading is the primary means of both protecting the crew members at all construction sites and protecting the public from hazards incurred by the excavations. The crew leader will be responsible for placing barricades, signs, flagman, etc., in compliance with the governing body to:

1. Maintain as free a flow of traffic as practical.
2. Protect the crew from traffic.
3. Protect motorists and pedestrians.
4. Protect excavations, which are left open and unattended during darkness.

C. Drainage

1. During wet weather, provisions must be made for proper flow of drainage water. The flow of water should be directed to follow its natural course and away from the trench. Implement Best Management Practices (BMP's).
2. Drainage runoff should not be allowed to accumulate in an excavation.

D. Sloping and Shoring

1. Shoring or sloping the sidewalls of the trench or excavation is required under certain conditions to protect individuals entering the excavation from cave-ins and personal injury
Refer to Section B-8.

3.3 COMMON TRENCH

This section provides the specifications that will meet Operator requirements for providing a trench, which would accommodate gas mains and other utilities. Gas mains may be installed with other utilities provided the trench is located within a dedicated street or recorded easement. The gas mains may be installed in a joint trench with the following utilities: electric (primary or secondary), telephone, television or water, provided the stated clearances are maintained.

Gas lines installed in the same trench as sewer lines should be avoided. When this is not possible a minimum vertical clearance of 24" should be maintained between the gas line and sewer line. The sewer line must be on the bottom.

A. Installation Procedure

1. All trench depths shown on Figures 1 through 3 will be from finished or final grade.
2. There shall be a minimum clearance, either vertical or horizontal, of 8" between the gas line and any underground utilities that are parallel with or

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crossing the gas facilities (6" or larger line shall be 12" min.). This applies to all crossings of other utilities. Less than 8" clearance is allowed if gas lines are protected by a sleeve, but gas lines and sleeves must never come in contact with other underground utilities.

3.4 **BORED**

A. Installation

This section presents the methods for bore installation.

1. Prior to any boring operations, all underground structures must be located and exposed where necessary. Site holes shall remain open throughout the entire bore process to ensure safe installation is completed.
2. There shall be a minimum clearance, either vertical or horizontal, of 8" between the gas pipe and any other underground utilities (6" or larger line shall be 12" min.)
3. The section of existing main shall be located and exposed prior to boring. The bell hole at the main should be of sufficient size to allow for the tie-in.
4. Bore pits should be spaced so as to permit the job to be efficiently completed.
5. The borehole should be reamed to provide easier pipe installation.
6. When wrapped pipe is to be installed in a bore, care must be exercised to prevent damage to the coating during installation.
7. Installation of polyethylene pipe by the boring method, where soil conditions do not meet the requirements of **Section E-5** for bedding and shading material must be inserted in a protective sleeve. **Refer to Section E-6, Sleeving Requirements.**
8. Precautions shall be taken to prevent damage or undue stress on plastic pipe when the pipe is pulled through a bore with the aid of a bore machine or other mechanical pulling devices. A break link must be used with mechanical boring equipment.
9. It is good practice to install two (2) locator wires with plastic pipe through the protective sleeve.
10. Only individuals qualified in the operation of the equipment shall use such equipment. Refer to manufacturer's operation manual.
11. The aiming, alignment and leveling of the equipment is very important in assuring an accurate bore shot.
12. During the bore operation, some method should be used to allow the leading end of the bore equipment to be located by measurements, or instrumentation.
13. For push-pull type equipment, special care should be taken if an expander is

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used to enlarge a borehole. The expander can damage other utilities, when pulled back through due to the larger size.

B. Safety

1. Prior to making any underground boring, tunneling, or piercing operation the work area shall be marked for other utilities that may be in conflict with the path of proposed boring operation. These crossings shall be potholed to expose the facilities in question to ensure no contact or damage is inflicted by boring equipment. Potholes or sight holes shall remain open during the entire boring process to ensure that no damage is caused and that backfill is adequate.
2. All hydraulic supply hoses and fittings shall be inspected periodically while in use to guard against failure.
3. Boring equipment shall be maintained and lubricated per manufacturer's operator's manual.
4. Entry and receiving excavations shall comply with the requirements set forth in the excavation safety section of this manual. (Section CS B-7)
5. Crew members shall avoid entering the receiving excavation while the boring equipment is in operation if in the judgment of the crew leader the force of the equipment may subject the excavation to excessive vibration.
6. Upon completion of the bore, the equipment shall be examined prior to being handled to ensure that it has not been subjected to voltage by contacting underground electric cables. Personnel shall check for voltage by using a voltage meter before handling boring equipment after the bore.
7. Due to the weight of hydraulic boring equipment, care should be taken to avoid personal injury during handling.
8. Appropriate verbal and hand signals shall be established prior to starting the boring operation should the need for emergency shutdown arise. To avoid confusion, only one person should give signals.
9. Proper personal protective equipment shall be utilized anytime boring equipment is in operation.
10. Avoid placing tools and supply lines across traffic areas to help reduce tripping hazards.

3.5 SUSPENDED

- A. There are occasions when it is necessary to suspend gas facilities from existing or newly constructed above ground facilities to facilitate the best possible installation.

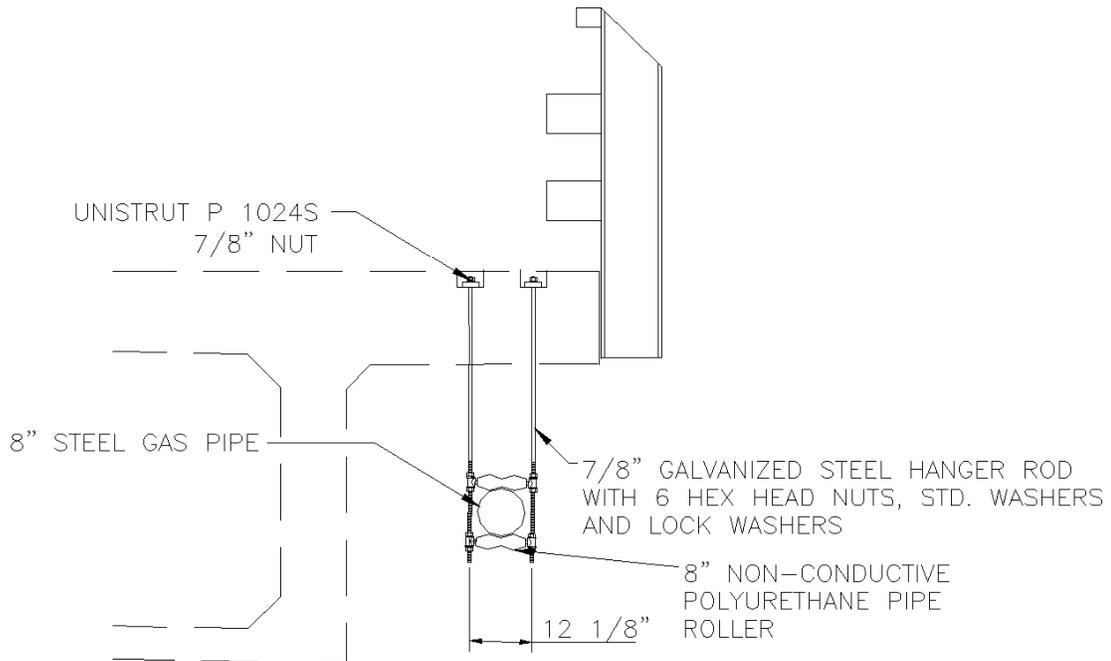
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- B. Steel facilities may be permanently suspended in an above ground location. Approved for above ground UV protective coating shall be applied. Suspended pipe shall be installed in a way to allow for movement caused by expansion and contraction of the pipe caused by temperature changes.

- C. Plastic facilities may be temporarily suspended in an above ground location for a maximum of 2 years not to exceed 24 months. Precautions shall be taken to protect the plastic pipe for damages caused by outside forces.

PIPE HANGER DETAIL

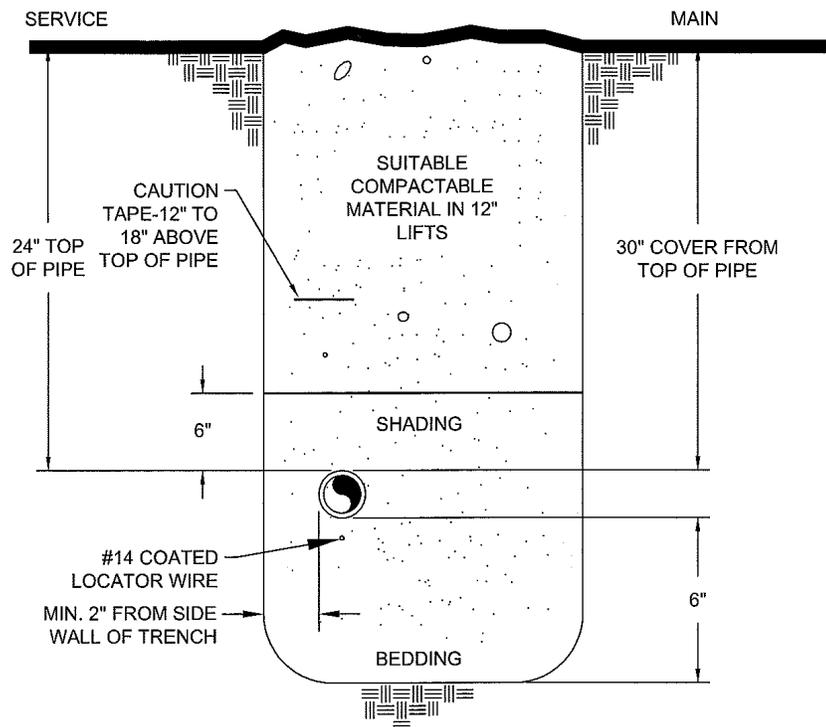


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FIGURE #1

(TYPICAL) GAS
ONLY



NOTE:

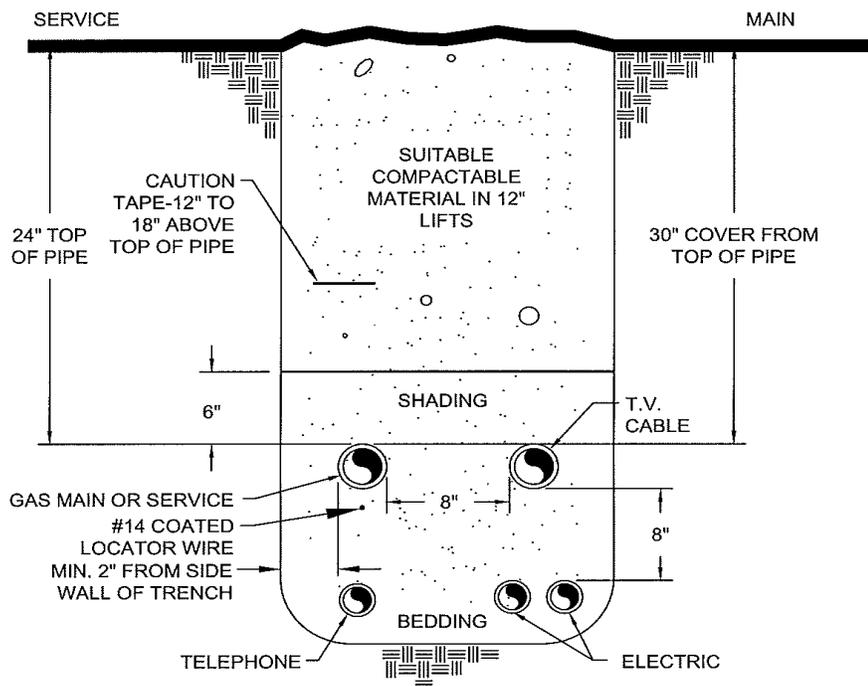
- Nominal cover for gas main-30". Nominal cover service 24".
- 24" Minimum cover from top of service tee.
- Minimum clearance of 8" between gas main and nearest utility.
- All compaction will comply with the government agency involved.

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FIGURE #3

(TYPICAL) GAS,
ELECTRIC, TEL. &
T.V.



NOTE:

- Nominal cover for gas main-30". Nominal cover service 24".
- 24" Minimum cover from top of service tee.
- Minimum clearance of 8" between gas main and nearest utility.
- All compaction will comply with the government agency involved.
- Electric must be below or to the side of gas pipe.