

SECTION 33 51 00

NATURAL GAS PIPING

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Work Specified in this Section: Furnish materials and perform labor required to install a complete natural gas system as indicated, as specified and as necessary to complete the Contract, including, but not limited to these major items:
1. Coordinate the work of this Section with other trades.
 2. Gas piping and appurtenances.
 3. Trenching, backfilling and compaction.
 4. Staking and layout.
 5. Connect to existing facilities.
 6. Testing.
 7. All miscellaneous items of work and materials required for the proper operation and maintenance of the system.
- B. Related Work Specified Elsewhere:
1. Interior building systems.

1.02 REFERENCE STANDARDS

- A. General: Conform to the latest editions, unless otherwise indicated, of the following reference standards to the extent specified.
- B. California Plumbing Code (indicated hereinafter as CPC Spec).
- C. Public Works Construction Specifications (indicated hereinafter as PWC Spec.): Standard Specifications for Public Works Construction, including all amendments thereto, except where noted otherwise in this section.
- D. American Society for Testing and Materials (ASTM):
1. D2513 - Specification for Thermoplastic Gas Pressure Pipe Tubing and Fittings.
 2. D2683 - Specification for Socket-Type Polyethylene Fittings for Outside Diameter Controlled Polyethylene Pipe and Tubing.
 3. D3261 - Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing.
- E. Ordinances, Codes and Regulations: All work shall be installed in accordance with all of the requirements of all legally constituted authorities having jurisdiction, including all local ordinances, codes and the Construction Safety Orders and General Industry Safety Orders of the State Division of Occupational Safety and Health (Cal/OSHA), CCR, Title 8.
- F. American Public Works Association (APWA).

1.03 QUALITY ASSURANCE

- A. General: Use adequate numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and methods needed for proper performance of the work in this Section.
- B. Manufacturer's Qualifications: Firms regularly engaged in manufacture of gas piping products of types, materials, and sizes required, whose products have been in satisfactory use in similar service for not less than five years.
- C. Installer's Qualifications: A firm with at least two years of successful installation experience on projects with gas piping work similar to that required for the project.
- D. Comply with the requirements of the utility supplying natural gas.

1.04 SUBMITTALS

- A. Comply with pertinent provisions of Division 01.
- B. The Developer Design/Builder shall allow ample time for checking and processing and to allow the work to be accomplished in accordance with the accepted Schedule, and shall assume all responsibility for delays incurred due to rejected items. No installation of the material concerned shall be made until written approval has been obtained from the County's Representative. Approval of materials and equipment shall in no way obviate compliance with the plans and specifications.
- C. Insofar as possible, all materials and equipment used in the installation of this work shall be of the same brand or manufacturer throughout for each class of material or equipment.
- D. Record Drawings:
 - 1. Comply with provisions of Division 01.
 - 2. All buried piping and indicated future connections, exterior of any building shall be located both by depth and by accurate measurement from a permanently established landmark. All notations on record drawings of buried piping shall be made before any backfilling is started.
 - 3. At completion of the work, these record drawings shall be signed by the Developer Design/Builder, dated and returned to the County's Representative.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Delivery and Storage: Inspect materials delivered to the site for damage. Store materials with minimum handling on site in enclosures or under protective coverings. Do not store materials directly on the ground. Keep inside of pipes and fittings free of dirt and debris.
- B. Handling: Handle pipe, fittings and other accessories in such a manner as to ensure delivery to the trench in sound undamaged condition. Take special care not to injure fittings and pipe coatings. Pipe shall be carried into position and not dragged.

1.06 SEQUENCING AND SCHEDULING

- A. Coordinate installation of gas meter with utility company.
- B. Coordinate with pipe materials, sizes, entry locations, and pressure requirements of building natural gas piping systems.
- C. Coordinate with other utility work.
- D. Notification of Interruption of Service: Notify each affected user when gas supply will be turned off.

- E. Work Interruptions: Leave natural gas distribution systems in a safe condition when interruptions in work occur while alterations or repairs are being made to existing gas piping systems.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Buried Warning and Identification Tape: Shall be polyethylene plastic tape with metallic core manufactured specifically for warning and identification of buried utility lines. Tape shall be provided in rolls, three inches minimum width, APWA color coded for intended service with warning and identification imprinted in bold black letters continuously and repeated over the entire tape length. Warning and identification shall be "CAUTION BURIED GAS LINE BELOW" or similar wording. Code and letter coloring shall be permanent, unaffected by moisture and other substances contained in trench backfill material.
- B. Pipe and Pipe Fittings:
 - 1. Above Grade Construction:
 - a. Pipe: All pipe used for the installation, extension, alteration, or repair of any above grade gas piping shall be standard weight wrought iron or steel (galvanized or black), yellow brass (containing not more than 75 percent copper). All pipe shall be new and be in good condition and free of internal obstructions. Burred ends shall be reamed to the bore of the pipe.
 - b. Fittings: All fittings shall be of malleable iron or yellow brass (containing not more than 75 percent copper).
 - c. Pipe shall have an approved machine applied coating or wrapping to prevent corrosion. Zinc coatings (galvanizing) shall not be deemed adequate protection.
 - 2. Below Grade Construction:
 - a. Pipe: All pipe used for the installation, extension, alteration, or repair of below grade gas piping shall be Polyethylene Plastic conforming to Appendix I, CPC, IS 12-93, paragraph 301.1.1. All pipe shall be new and be in good condition and free of internal obstructions. Burred ends shall be reamed to the bore of the pipe.
 - b. Fittings: Fittings shall conform to ASTM D2683 and D3261.
 - 3. Risers: Risers, including prefabricated risers inserted with plastic pipe, shall be metallic and shall be wrapped or coated to a point at least six inches above grade or protected in an approved manner. When a riser connects underground to plastic pipe, the underground horizontal metallic portion of the riser shall extend at least thirty inches before connecting to the plastic pipe by means of an approved transition fitting or adapter.
- C. Valves: All valves and appurtenances shall be of a type designed and approved for use with fuel gas.
- D. Transition Fittings: Type, material and end connections to match piping being joined.
- E. Valve Boxes: Cast-iron two-section box. Top section includes cover with "GAS" lettering. Bottom section includes base of size to fit over valve and barrel approximately five inches in diameter. Valve box includes adjustable cast-iron extension of length required for depth to bury valve. Furnish one steel operating wrench with each valve box. Include tee-handle with one pointed end, stem of length required to operate valve, and socket fitting valve-operating nut.

- F. Pressure Regulators: ANSI Z21.18 or ANSI Z21.18a, single-stage, steel-jacketed, corrosion-resistant pressure regulators. Include atmospheric vent, elevation compensator, with threaded ends for 2 inches (50 mm) and smaller, and flanged ends for 2-1/2 inches (65 mm) and larger. Regulator pressure ratings, inlet and outlet pressures, and flow volume in standard cubic feet per hour (mL/s) of natural gas at specific gravity, are as indicated. Pressure rating is not less than gas distribution system inlet pressure.
- G. Seismic Gas Shut-off Valve:
 - 1. The valve shall activate within 5 seconds when subject to a horizontal, sinusoidal oscillation having a peak acceleration of 0.3G and a period of 0.4 seconds.
 - 2. The valve shall conform to the following standards:
 - a. State of California Standard No. 12-23-1.
 - b. ANSI Z 21.70, 1981.
 - c. Uniform Plumbing Code.
 - d. Underwriters Laboratories Listed.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Site and Drawings: Carefully examine the site and compare the drawings with existing conditions. By the act of submitting bids, the Developer Design/Builder shall be deemed to have made such examination and to have accepted such conditions, and to have made allowance therefore in preparing his figure.
- B. Verification of Dimensions: Before proceeding with any work, the Developer Design/Builder shall carefully check and verify all dimensions, sizes, etc., and shall assume full responsibility for the fitting-in of his equipment into the structure. Where apparatus and equipment have been taken from typical equipment of the class indicated, the Developer Design/Builder shall carefully check the drawings to see that the equipment he contemplates installing will fit into the spaces provided.

3.02 INSTALLATION

- A. General: Conform to CPC Spec. Section 1211, unless modified herein.
- B. Cover Over Pipe: The minimum cover over all gas piping shall be 24 inches.
- C. Plastic Line Markers: During back-filling of gas lines, install a continuous underground-type plastic line marker, located on the center-line of the buried line at 6 to 8 inches below finished grade.
- D. Detection of Leaks: Conforming to CPC Spec. Section 1214.
- E. Building Service Lines:
 - 1. Install gas service lines from the gas meter to a point of connection within approximately 5 feet outside of buildings to which such service is to be connected and make connections thereto.
 - 2. If building services have not been installed, provide temporary plugs or caps and mark location of the service in approved manner.
 - 3. Coordinate the installation of the gas service lines with the gas company.

F. Valve Installation:

1. Install valves where indicated and on each branch connection to existing gas main. Install buried valves with valve boxes.
2. Install valves in accessible locations, protected from physical damage. Tag valves with metal tag attached with metal chain indicating piping systems supplied.
3. Install seismic gas shut-off valve in accordance with manufacturer's recommendations.

G. Pressure Regulator Installation:

1. Install gas pipe, valves, and pressure regulators in the arrangement indicated.
2. Install valve upstream of each gas pressure regulator. Manual valve is not required at second regulator where two gas pressure regulators are installed in series.
3. Install pressure-relief or pressure-limiting devices so they can be readily operated to determine if valve is free; tested to determine pressure at which they will operate; and examined for leakage when closed.

H. Excavation, Pipe Laying and Backfilling:

1. Trench excavation: Conforming PWC Spec. Subsection 306-1.1 and in accordance with Cal/OSHA, CCR, Title 8.
2. Pipe laying: Conforming to the applicable sections PWC Spec. Subsection 306-1.2, bedding as indicated.
3. Backfill and Densification: Conforming to the applicable sections of PWC Spec. Subsection 306-1.3. Jetting of backfill will not be allowed.
4. Trench resurfacing: Conforming PWC Spec. Subsection 306-1.5.

3.03 INSPECTIONS

- A. All inspections shall conform to CPC Spec. Section 1206.
- B. Repair leaks and defects with new materials and retest system until satisfactory results are obtained.
- C. Report test results promptly in writing to the County's Representative and the authorities having jurisdiction.
- D. Verify capacities and pressure ratings of gas meters, regulators, valves, and specialties.
- E. Verify correct pressure settings for pressure regulators.
- F. Verify that specified piping tests are complete.

3.04 CLEANING

- A. Removal of Debris: Upon completion and before final acceptance of work, remove all debris, rubbish, left-over materials, waste test water, tools and equipment from site in accordance with regulatory requirements and in an environmentally responsible manner.

END OF SECTION