

SECTION 33 51 00
NATURAL-GAS DISTRIBUTION

PART 1 - GENERAL

1.1 DESCRIPTION:

Outside underground gas distribution system for natural gas, complete, ready for operation, including cathodic protection if required, all appurtenant structures, and connections to new building structures and to existing gas supply.

1.2 RELATED WORK:

- A. Maintenance of Existing Utilities: Section 01 00 00, GENERAL REQUIREMENTS.
- B. Excavation, Trench Widths, Pipe Bedding, Backfill, Shoring, Sheeting, Bracing: Section 31 20 11, EARTH MOVING (short form).
- C. Section 03 30 00, CAST-IN-PLACE CONCRETE.

1.3 DEFINITIONS:

- A. Gas Distribution Main: The Southwest Gas Corp. distribution main including all piping and fittings to, and including, the gas meter set at the project site. This main will be installed, maintained and operated by Southwest Gas Corporation. Reference these specifications and the drawings for trenching and earthwork to be complete by the contractor, as part of the construction of the Southwest Gas distribution main.
- B. Gas Service Line: A distribution line that transports gas from the common meter set assembly, to each of the generators.

1.4 QUALITY ASSURANCE:

- A. Approval by Contracting Officer is required of products or services of proposed manufacturers, suppliers and installers, and will be based upon submission by Contractor for certification that:
 - 1. Manufacturers regularly and currently manufacture piping, fittings shutoff valves and accessories.
 - 2. The design and size of each item of equipment provided for this project is of current production and has been in satisfactory and efficient operation on at least three installations for approximately 3 years. If elements of equipment lack a substantial experience record, such lack shall be brought to the attention of the Contracting Officer at the time of submission of shop drawings, with full information included to permit proper evaluation.

- B. Apply and install materials, equipment, and specialties in accordance with manufacturer's written instructions. Conflicts between the manufacturer's instructions and the contract drawings and specifications shall be referred to the Resident Engineer (RE) or Contracting Officers Technical Representative (COTR) for resolution. Provide copies of installation instructions to the RE or COTR prior to commencing installation of any item.
- C. All equipment shall be free from defects which would adversely affect the performance, maintainability and appearance of individual components or overall assembly.
- D. Assembly of Plastic Piping: Installation personnel shall have been trained, tested and certified under a procedure approved by the manufacturer of the piping. Proof of certification, in writing, shall be provided to the COTR or RE.
- E. Contractor shall conform to applicable local codes, American Society of Mechanical Engineers Gas Transmission and Distribution Piping Systems, publications of the Underwriters' Laboratories, Inc., National Fire Protection Association, Federal Specifications, American Society of Testing Materials, and current safety standards, all as defined in the Article of the Specifications relating to Applicable Publications.
- F. Comply with rules and regulations of the Southwest Gas Corporation having jurisdiction for gas distribution mains and meters.

1.5 SUBMITTALS:

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Piping:
 - 1. ASTM Compliance.
 - 2. Grade, class or type, schedule number.
 - 3. Manufacturer's Certification of Compliance with specified standards.
- C. Pipe Coatings:
 - 1. Manufacturer's Certification of Compliance with specified standards.
 - 2. Federal Specification Compliance.
- D. Pipe Fittings and Flanges:
 - 1. ASTM Compliance.
 - 2. Grade, class or type, schedule number.
 - 3. Catalog Cuts.
 - 4. Pressure and Temperature Rating.
- E. Manual Valves:
 - 1. Type and service.
 - 2. Catalog Cuts.
 - 3. Pressure and Temperature Ratings.

F. Valve Boxes:

1. Catalog Cuts.

G. Certificate to indicate compliance with pressure tests on gas system.

1.6 APPLICABLE PUBLICATIONS:

A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.

B. Federal Specifications (Fed. Spec.):

L-C-530C.....Coating, Pipe, Thermoplastic Resin

L-T-1512A.....Tape, Pressure Sensitive Adhesive, Pipe Wrapping

WWP-521.....Malleable-Iron Threaded Fittings

WW-U-531.....Unions

C. American National Standards Institute (ANSI):

B1.20.1.....Malleable-Iron Threaded Fittings: Threads

B16.3-98.....Malleable-Iron Threaded Fittings: Dimensions and
Pressure Rating

B16.5-03.....Pipe Flanges and Flanged Fittings, NPS 1/2
Through NPS 24

B16.9-03.....Factory-Made Wrought Steel Buttwelding Fittings

B16.11-01.....Forged Steel Fittings, Socket-Welding and
Threaded

B16.34-97.....Valves-Flanged, Threaded, and Welding End

B31.8-95.....Gas Transmission and Distribution Piping Systems

D. American Petroleum Institute (API):

API Spec 6D-94.....Pipeline Valves (Gate, Plug, Ball, and Check
Valves)

E. American Society for Testing and Materials (ASTM):

A197.....Malleable Threaded Fittings, classes 150 and
300, and Unions.

A53M-04a.....Pipe, Steel, Black and Hot-Dipped, Zinc-Coated
Welded and Seamless

A126-04.....Gray Iron Castings for Valves, Flanges, and Pipe
Fittings

F. American Water Works Association (AWWA):

C213.....Fusion bonded epoxy coatings

G. National Fire Protection Association (NFPA):

54-02.....National Fuel Gas Code

PART 2 - PRODUCTS

2.1 PIPE:

- A. Black Steel: Seamless or ERW, ASTM A53, Grade B, Schedule 40.
 - 1. Shop-applied pipe coating shall be one of the following types:
 - a. Fusion Bonded Epoxy (FBE) meeting the requirement of AWWA C213 coating thickness shall be a minimum of 15 mil base coat and 15 mil top coat. Repair of the coating shall be per the coating manufacturer's written instructions.
 - b. Adhesive-Thermoplastic Resin Coating: Fed. Spec. L-C-530, Type I.
 - c. Adhesive-thermosetting Resin Coating: Fed. Spec. L-C-530, Type II.
 - 2. Field-applied plastic tape material for use on pipe joints and for repairing damaged areas of shop-applied coatings shall conform to Fed. Spec. L-T-1512, Type I, 250 μm (10 mils) nominal thickness for pipe joints, and Type II, 500 μm (20 mils) nominal thickness for coating repairs.

2.2 FITTINGS:

- A. Steel Pipe:
 - 1. Butt weld fittings shall be wrought steel, ANSI B16.9.
 - 2. Socket weld fittings shall be forged steel, 13.8 MPa (2000 Psi class), ANSI B16.11.
 - 3. Threaded fittings shall be malleable iron, ANSI 16.3 or forged steel, ANSI B16.11.
 - 4. Flanges shall be steel, Class 150, ANSI B16.5.
- B. Polyethylene Plastic Pipe Fittings: ASTM D2513.

2.3 JOINTS:

Socket or butt welded for steel pipe, ANSI B31.8. Threaded joints not permitted except at connections.

2.4 VALVES:

All types of valves shall be accessible, labeled and specified for use for controlling multiple systems.

- A. Manual: Valves shall be suitable for shutoff or isolation service.
 - 1. Lubricated plug type for gas service shall be cast steel. Valves shall have capacity to operate in lines with 690 kPa (100 psi) working pressure. Steel valves 40 mm (1-1/2 inches) and smaller installed underground and shall conform to ASME B16.34, carbon steel, socket weld ends. Steel valves 40 mm (1-1/2 inches) and smaller, installed above ground, shall conform to ASME B16.34, carbon steel, socket weld or threaded ends. Steel valves 50 mm (2 inches) and

larger shall conform to API spec 6D, carbon steel, buttweld ends, Class 125 for underground installations. Above ground steel valves 50 mm (2 inches or larger) shall conform to API Spec 6D, carbon steel, buttweld or flanged ends, Class 125.

- a. Underground: 50 mm (2 inch) nut for socket wrench operation.
- b. Above Ground and In Pits: Lever operation, locking type. Provide one lever for each valve.

2.5 VALVE BOXES:

- A. Cast iron extension box with screw or slide type adjustment and flared base. Minimum thickness of metal, 5 mm (3/16 inch). Box shall be of such length as can be adapted, without full extension, to depth of cover required over pipe at valve location.
- B. Cast the word "GAS" in cover.
- C. Provide 1 "T" handle socket wrenches of 16 mm (5/8 inch) round stock long enough to extend 600 mm (2 feet) above top of deepest valve box.
- D. Provide box with heavy coat of bituminous paint, paint cover yellow.

2.6 PIPE SLEEVES:

Schedule 40 PVC.

2.7 GAS PRESSURE REGULATORS:

Pressure regulator at the gas meter shall be furnished and installed by Southwest Gas Corporation.

2.8 METERS:

Gas meter shall be furnished and installed by Southwest Gas Corporation.

2.9 WARNING TAPE:

Standard, 4-Mil polyethylene 76 mm (3 inch) wide tape, non-detectable type, yellow with black letters, and imprinted with "CAUTION BURIED GAS LINE BELOW".

2.10 TRACER WIRE

Tracer wire shall be 12 AWG, solid copper conductor, PVC insulated, type UF, listed for direct burial.

PART 3 - EXECUTION

3.1 GAS DISTRIBUTION MAINS:

Pipe and fittings for gas distribution mains up to and including the meter set, shall be furnished and installed by Southwest Gas. The contractor shall be responsible for trenching, bedding, shading, and backfill per Southwest Gas standards, and as indicated on the plans.

3.2 SERVICE LINES:

- A. Install gas service lines to point of connection at the outside of the generator enclosure or buildings to which such service is to be connected and make connections thereto. The point of delivery is the new Southwest Gas meter set assembly.
- B. Where building or equipment services have not been installed, provide temporary caps.
- C. Connect branch service lines to top of mains by coupling (socket) welded to main and into which is screwed a street tee and street elbow swing, joint assembly.
- D. The gas lines shall be as short and as straight as practicable between the point of delivery and the gas meter and shall not be bent or curved laterally unless necessary to avoid obstructions or otherwise permitted. Lines shall be laid with as few as joints as practicable using standard lengths of pipe. Polyethylene service lines shall not be installed aboveground.

3.3 PIPE INSTALLATION, GENERAL:

- A. Gas service line system and equipment shall be installed in accordance with the manufacturer's recommendations and applicable sections of B31.8 and NFPA 54.
- B. Excavation and backfilling shall be as specified in Section 31 20 11, EARTH MOVING, and in accordance with Southwest Gas Standards.
- C. Heating trenches, storm and sanitary sewer lines, and water mains shall have right of way.
- D. Warning tape shall be continuously placed 300 mm (12 inches) above buried gas lines.
- E. Make branch service connections at the top of the line, whenever the depth of the main is sufficient to allow top connections. When service connections cannot be made at the top of the main, they shall be made on the side of the main as close to the top as possible. Branch service connections shall not be made lower than the horizontal midpoint of the gas line.
- F. Before entering a generator enclosure or building, underground service line shall rise above grade close to the enclosure or building to permit possible gas leaks to vent themselves.
- G. Gas services and service shut off valves shall have a 600 mm (24 inch) minimum cover or as recommended by local utility.
- H. Where indicated, the main shall be concrete-encased or sleeved. The sleeve shall be sloped and vented to atmosphere at the highest point or where shown.

3.4 APPLICATION OF PLASTIC TAPE:

- A. Field apply plastic tape to steel pipe joints and damaged areas of coatings after pressure tests.
- B. Clean and free of burrs and rust, joint areas before taping. Damaged coating shall be smoothed down or cut away if not firmly bonded to the pipe.
- C. Wrap spirally with a two-layer wrapping system, overlapping the coating surface at least 75 mm (3 inches). Initially stretch tape sufficiently to conform to the surface to which it is applied, using one layer half-lapped for tape 50 mm (2 inches) or less in width, or one layer lapped at least 25 mm (1 inch) for tape more than 50 mm (2 inches) wide.
- D. A second layer lapped as above, with a tension as it comes off the roll shall then be applied and pressed to conform to the shape of the component.

3.5 SETTING VALVES:

- A. Do not install valves under pavement unless shown on drawings.
- B. Clean valve interior before installation.

3.6 VALVE BOXES:

- A. Set cover flush with finished grade.
- B. Protect boxes against movement by a concrete slab at least 900 mm (3 foot) square by 150 mm (6 inches) deep.
- C. All exposed portions of valve boxes shall be painted "Traffic Yellow."

3.7 PIPE SLEEVES:

- A. Pipe shall be continuous through sleeves. Set sleeves in place before concrete is poured.
- B. Seal between sleeve/core opening and the pipe with modular mechanical type link seal.
- C. Provide where gas lines pass through equipment pads.

3.8 PIPE CLEANING:

- A. All pipe sections shall be blown down with 690 kPa (100 psi) air to remove all sand, soil and debris. All piping should be swabbed.
- B. Blow down procedure shall be done after system is complete, but before valves are installed.

3.9 FILTER, PRESSURE REGULATOR AND METER INSTALLATION:

Pressure regulator and meter installation shall be by Southwest Gas Corporation.

3.10 CATHODIC PROTECTION:

Buried metallic gas pipe, fittings, and accessories shall be shop coated as previously specified.

3.11 TESTS:

Piping System: Inspection, testing and purging shall be in accordance with NFPA 54 and B31.8. Maximum working pressure will be 103 kPa (15 psi).

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