

**SECTION 33 51 00
NATURAL GAS DISTRIBUTION**

SPEC WRITER NOTES:

1. Use this section only for NCA projects.
2. Delete between // // if not applicable to project. Also delete any other item or paragraph not applicable in the section and renumber the paragraphs.

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section covers supplying all labor, equipment, materials, and appliances, and the performance of all other procedures necessary for the construction or improvements for outside an underground gas distribution system for natural gas, complete, ready for operation, including connections to building structures and to gas supply. The distribution system includes the distribution mains, valves, pipeline markers, service valves, service regulators, and meters. This specification does not apply to LPG distribution systems.
- B. Definitions:
 1. Gas Service Line: A distribution line that transports gas from a utility source of supply to the meter set assembly.

1.2 RELATED WORK

SPEC WRITER NOTE: Retain one of two paragraphs below.

- A. //Section 01 00 01, GENERAL REQUIREMENTS (Major NCA Projects).//
- B. //Section 01 00 02, GENERAL REQUIREMENTS (Minor NCA Projects).//
- C. Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- D. Section 01 42 19, REFERENCE STANDARDS.
- E. Section 01 81 13, SUSTAINABLE DESIGN REQUIREMENTS.
- F. //Section 01 91 00, GENERAL COMMISSIONING REQUIREMENTS.//

SPEC WRITER NOTE: If Section 13 05 41 is included in this project the section shall be obtained from VA Masters.

- G. //Section 13 05 41, SEISMIC RESTRAINT REQUIREMENTS FOR NON-STRUCTURAL COMPONENTS: Seismic restraints for piping.//
- H. Section 31 20 00, EARTH MOVING: Excavation, Trench Widths, Pipe Bedding, Backfill, Shoring, Sheeting, Bracing.

1.3 APPLICABLE PUBLICATIONS

SPEC WRITER NOTE: Make material requirements agree with requirements specified in the referenced Applicable Publications. Verify and update the publication list to that which applies to the project, unless the reference applies to all mechanical systems. Publications that apply to all mechanical systems may not be specifically referenced in the body of the specification, but, shall form a part of this specification.

- 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. American Petroleum Institute (API):
Spec 6D-2014 (R2015)....Specification for Pipeline and Piping Valves
- C. American Society for Civil Engineers (ASCE):
25-2006.....Earthquake-Actuated Automatic Gas Shutoff
Devices
- D. American Society of Mechanical Engineers (ASME):
B16.34-2013.....Valves Flanged, Threaded and Welding End
B16.40-2013.....Manually Operated Thermoplastic Gas Shutoffs
and Valves in Gas Distribution Systems
B31.8-2014.....Gas Transmission and Distribution Piping
Systems
- E. American Society for Testing and Materials (ASTM):
D2513-2014e1.....Standard Specification for Thermoplastic Gas
Pressure Pipe, Tubing, and Fittings
D3350-2014.....Standard Specification for Polyethylene
Plastics Pipe and Fittings Materials
- F. National Fire Protection Association (NFPA):
54-2015.....National Fuel Gas Code

1.4 SUBMITTALS

- A. Submittals, including number of required copies, shall be submitted in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Information and material submitted under this section shall be marked "SUBMITTED UNDER SECTION 33 51 00, NATURAL GAS DISTRIBUTION", with applicable paragraph identification.

- C. Manufacturer's Literature and Data including: Full item description and optional features and accessories. Include dimensions, weights, materials, applications, standard compliance, model numbers, size, and capacity.
- D. Piping:
 - 1. ASTM Compliance.
 - 2. Grade, class or type, schedule number.
 - 3. Manufacturer's Certification of Compliance with specified standards.
- E. Manual Valves:
 - 1. Type and service.
 - 2. Catalog Cuts.
 - 3. Pressure and Temperature Ratings.
- F. //Earthquake Automatic Gas Shut-off:
 - 1. UL Listing and ANSI Compliance.
 - 2. Certification of ASCE 25 Compliance.
 - 3. Pressure and Temperature Ratings.
 - 4. Pressure Loss and Flow Rate Data.//
- G. Valve Boxes:
 - 1. Catalog Cuts.
- H. Gas Pressure Regulator:
 - 1. UL Listing.
 - 2. Pressure and Temperature Rating.
 - 3. Flow Capacities.
 - 4. Catalog Cuts.
- I. Meter:
 - 1. ANSI Compliance.
 - 2. Pressure and Temperature Rating.
 - 3. Certification of Compliance with local utility requirements.
- J. Complete operating and maintenance manuals including wiring diagrams, technical data sheets, information for ordering replacement parts, and troubleshooting guide:
 - 1. Include complete list indicating all components of the systems.
 - 2. Include complete diagrams of the internal wiring for each item of equipment.
 - 3. Diagrams shall have their terminals identified to facilitate installation, operation and maintenance.
- K. //Completed System Readiness Checklist provided by the Commissioning Agent and completed by the contractor, signed by a qualified technician

and dated on the date of completion, in accordance with the requirements of Section 01 91 00, GENERAL COMMISSIONING REQUIREMENTS.//

- L. //Submit training plans and instructor qualifications in accordance with the requirements of Section 01 91 00, GENERAL COMMISSIONING REQUIREMENTS.//

1.5 QUALITY ASSURANCE

- A. Comply with rules and regulations of the local utility having jurisdiction in all cases where gas lines are connected to public utility services.

1.6 AS-BUILT DOCUMENTATION

SPEC WRITER NOTE: Coordinate O&M Manual requirements with Section 01 00 01, GENERAL REQUIREMENTS (Major NCA Projects) or Section 01 00 02, GENERAL REQUIREMENTS (Minor NCA Projects). O&M manuals shall be submitted for content review as part of the close-out documents.

- A. Submit manufacturer's literature and data updated to include submittal review comments and any equipment substitutions.
- B. Submit operation and maintenance data updated to include submittal review comments, substitutions and construction revisions shall be //in electronic version on CD or DVD// inserted into a three ring binder. All aspects of system operation and maintenance procedures, including applicable piping isometrics, wiring diagrams of all circuits, a written description of system design, control logic, and sequence of operation shall be included in the operation and maintenance manual. The operations and maintenance manual shall include troubleshooting techniques and procedures for emergency situations. Notes on all special systems or devices shall be included. A List of recommended spare parts (manufacturer, model number, and quantity) shall be furnished. Information explaining any special knowledge or tools the owner will be required to employ shall be inserted into the As-Built documentation.
- C. The installing contractor shall maintain as-built drawings of each completed phase for verification; and, shall provide the complete set at the time of final systems certification testing. As-built drawings are to be provided, and a copy of them in Auto-CAD version //____// provided on CD or DVD. Should the installing contractor engage the testing company to provide as-built or any portion thereof, it shall

not be deemed a conflict of interest or breach of the 'third party testing company' requirement.

- D. Certification documentation shall be provided to COR 10 working days prior to submitting the request for final inspection. The documentation shall include all test results, the names of individuals performing work for the testing agency on this project, detailed procedures followed for all tests, and certification that all results of tests were within limits specified.

PART 2 - PRODUCTS

2.1 PIPE

- A. Polyethylene Pipe: Pipe and tubing shall conform to ASTM D3350 AND ASTM D2513, pipe designations PE 2708 and PE 4710, rated DR // //. Minimum wall thickness shall conform to ASME B31.8. PE pipe is for underground use only. Polyethylene pipe shall be marked "GAS" and it is not to be used where gas pressures are above 690 kPa (100 psi) or with operating temperatures below minus 7 degrees C (20 degrees F) or above 60 degrees C (140 degrees F).

2.2 FITTINGS

- A. Polyethylene Plastic Pipe Fittings: ASTM D2513.

2.3 JOINTS

- A. Polyethylene pipe joints shall be heat fusion, either butt fusion or socket fusion.

2.4 VALVES

- A. All types of valves shall be accessible, labeled and specified for use for controlling multiple systems.
- B. Manual: Valves shall be suitable for shutoff or isolation service.
 1. Lubricated plug type for gas service shall be cast iron, semi-steel, or 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 aboveground, shall conform to ASME B16.34, carbon steel, socket weld or threaded ends. Steel valves 50 mm (2 inches) and greater shall conform to API Spec 6D, carbon steel, butt-weld ends, Class // // for underground installations. Aboveground steel valves 50 mm (2 inches) or greater shall conform to API Spec 6D, carbon steel, butt-weld or flanged ends, Class // //.

- a. Underground: 50 mm (2 inch) nut for socket wrench operation.
 - b. Aboveground and In Pits: Lever operation, locking type. Provide one lever for each valve.
- C. Polyethylene Valves: Valves shall conform to ASME B16.40. Polyethylene valves, in sizes 15 mm to 150 mm (1/2 inch to 6 inches) may be used with polyethylene distribution and service lines, in lieu of steel valves, for underground installation only.

SPEC WRITER NOTE: Provide earthquake valve only for Seismic Area "A". If seismic criteria was not provided in A/E Package, delete paragraph below.

- D. //Earthquake Automatic Gas Shutoff:
1. Automatically stops gas flow when actuated by earth tremor.
 2. Type: Single seated, manual reset. Do not provide manual shut-off attachments.
 3. Performance: Shall automatically shut bubble tight within five seconds when subjected to a horizontal sinusoidal oscillation having a peak acceleration of 0.3 gravity with a period of 0.4 seconds. The valve shall not shut-off when subjected for five seconds to horizontal, sinusoidal oscillations having: A peak acceleration of 0.4 gravity with a period of 0.1 second; a peak acceleration of 0.08 gravity with a period of 0.4 second or 1.0 second.
 4. Service: Natural gas.
 5. Construction: Cast iron or aluminum body, rated for 850 kPa (123 psi) ANSI flanged ends for pipe sizes above 50 mm (2 inches). Threaded ends for pipe sizes 50 mm (2 inches) and under.
 6. Approvals: UL listed, State of California Standards for Earthquake Actuated Automatic Gas Shut-Off Systems and compliance with ASCE 25.//

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 box with heavy coat of bituminous paint.

2.6 PIPE SLEEVES

- A. Ductile iron or coated steel.

SPEC WRITER NOTES:

1. Include meters and gas regulators in this specification as required.
2. For gas pressure regulators, consider separate relief devices if not integral to the regulator.

2.7 GAS PRESSURE REGULATORS

- A. Pressure regulators for individual service lines shall be capable of reducing distribution line pressure to pressures required for users. Regulators shall have ferrous bodies. Pressure relief shall be set at a lower pressure than would cause unsafe operation of any connected user. Gas valve shall be installed immediately upstream of each pressure regulator and regulator shall have a single port with orifice diameter no greater than that recommended by manufacturer for the maximum gas pressure at the regulator inlet. Regulator vent valve shall be of resilient materials designed to withstand flow conditions when pressed against valve port. Regulator shall be capable of limiting build-up of pressure under no-flow conditions to 50 percent or less of the discharge pressure maintained under flow conditions. Demonstrate to COR that the regulator does not leak after final inspection.

2.8 METERS

- A. Gas meters shall be furnished and installed by local gas Utility and be of type approved by local gas Utility.

2.9 WARNING TAPE

- A. Standard, 4-mil polyethylene 75 mm (3 inch) wide tape, non-detectable type, yellow with black letters, and imprinted with "CAUTION BURIED GAS LINE BELOW".

PART 3 - EXECUTION

3.1 GENERAL

- A. If an installation is unsatisfactory to the COR, the Contractor shall correct the installation at no additional cost or time to the Government.

3.2 GAS MAINS

- A. Pipe for gas service lines shall be polyethylene. Polyethylene mains shall not be installed aboveground.

3.3 BUILDING SERVICE LINES

- A. Install gas service lines to point of connection within approximately 1500 mm (5 feet) outside of buildings to which such service is to be connected and make connections thereto. The point of delivery is the meter set assembly.

3.4 PIPE INSTALLATION, GENERAL

- A. Gas distribution system and equipment shall be installed in accordance with the manufacturer's recommendations and applicable sections of ASME B31.8 and NFPA 54.
- B. Excavation and backfilling shall be as specified in Section 31 20 00, EARTH MOVING.
- C. 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. Before entering building, underground service line shall rise above grade close to building.
- F. Service lines shall have a 450 mm (18 inch) minimum cover or as recommended by local utility.
- G. Connections between metallic and plastic piping shall be made only outside, underground, and with approved transition fittings.

3.5 NON-METALLIC PIPE INSTALLATION

- A. Install pipe in trench in accordance with recommendations of the pipe manufacturer. Provide sufficient slack to allow for expansion and contraction.
- B. Joints: Fusion welds shall be made in accordance with the recommendations of the polyethylene pipe manufacturer.
- C. All offsets in piping shall be made with manufactured fittings. Bending of piping to form offsets is prohibited.
- D. Connections between plastic pipe and metal pipe shall be made in accordance with recommendations of the pipe manufacturer.
- E. Copper Tracer Wire: Copper tracer wires consisting of No. 14 AWG solid, single conductor, insulated copper wire shall be installed in the trench with all piping to permit location of the pipe with electronic detectors. The wire shall not be spiraled around the pipe nor taped to the pipe. Wire connections are to be made by stripping the insulation from the wire and soldering with rosin core solder. Solder joints shall be wrapped with rubber tape and electrical tape. At least every 300 m (984 feet), provide a 2.3 kg (5 pound) magnesium anode attached to the main tracer wire by solder joint shall be wrapped with rubber tape and with electrical tape. An anode shall be attached at the end of each line.

3.6 SETTING VALVES

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

3.7 VALVE BOXES

- A. Set cover flush with finished grade.
- B. Protect boxes located in roadway against movement by a concrete slab at least 900 mm (3 foot) square by 150 mm (6 inches) deep.
- C. Set other valve boxes with a concrete slab 450 mm (18 inches) by 450 mm (18 inches) by 150 mm (6 inches) deep and set flush with grade.
- D. All exposed portions of valve boxes shall be painted "Traffic Yellow."

3.8 PIPE SLEEVES

- A. Pipe shall be continuous through sleeves. Set sleeves in place before concrete is poured.
- B. //Provide where gas lines pass through retaining walls, foundation walls or floors. Split sleeves may be installed where existing lines pass thru new construction.//

3.9 PRESSURE REGULATOR AND METER INSTALLATION

- A. Pressure regulator and meter installation shall be installed per manufacturer's recommendations and per NFPA 54.

3.10 STARTUP AND TESTING

- A. Make tests as recommended by product manufacturer and listed standards and under actual or simulated operating conditions and prove full compliance with design and specified requirements. Tests of the various items of equipment shall be performed simultaneously with the system of which each item is an integral part.
- B. When any defects are detected, correct defects and repeat test at no additional cost or time to the Government.
- C. Piping System: Inspection, testing and purging shall be in accordance with NFPA 54.
- D. //The Commissioning Agent will observe startup and contractor testing of selected equipment. Coordinate the startup and contractor testing schedules with the COR and Commissioning Agent. Provide a minimum notice of 10 working days prior to startup and testing.//

3.11 //COMMISSIONING

- A. Provide commissioning documentation in accordance with the requirements of Section 01 91 00, GENERAL COMMISSIONING REQUIREMENTS.
- B. Components provided under this section of the specification will be tested as part of a larger system.//

3.12 DEMONSTRATION AND TRAINING

- A. Provide services of manufacturer's technical representative for //four// // // hour//s// to instruct each VA personnel responsible in the operation and maintenance of units.
- B. //Submit training plans and instructor qualifications in accordance with the requirements of Section 01 91 00, GENERAL COMMISSIONING REQUIREMENTS.//

- - - E N D - - -