

## SECTION 15195

### NATURAL GAS PIPING

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section

##### 1.2 SUMMARY

- A. Section Includes
  - 1. Pipes, tubes, and fittings
  - 2. Piping and tubing joining materials
  - 3. Valves

##### 1.3 DEFINITIONS

- A. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms
- B. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations
- C. Natural Gas: Liquefied-petroleum gas

##### 1.4 PERFORMANCE REQUIREMENTS

- A. Minimum Operating-Pressure Ratings
  - 1. For piping containing only vapor
    - a. Piping and valves: 125 psig unless otherwise indicated
- B. Natural Gas System Pressure within Buildings: 11-inch W.C.

##### 1.5 QUALITY ASSURANCE

- A. Steel Support Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel"
- B. Pipe Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Handling Flammable Liquids: Remove and dispose of liquids from existing NATURAL GAS piping according to requirements of authorities having jurisdiction
- B. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture
- C. Store pipes and tubes with protective PE coating to avoid damaging coating and protect from direct sunlight
- D. Protect stored PE pipes and valves from direct sunlight

## 1.7 PROJECT CONDITIONS

- A. Perform site survey, research public utility records, and verify existing utility locations. Contact utility-locating service for area where Project is located

## 1.8 COORDINATION

- A. Coordinate sizes and locations of concrete bases with actual equipment provided
- B. Coordinate requirements for access panels and doors for valves installed concealed behind finished surfaces. Comply with requirements in Division 8 Section "Access Doors and Frames"

## PART 2 - PRODUCTS

### 2.1 PIPES, TUBES, AND FITTINGS

- A. Steel Pipe: ASTM A53/A53M, black steel, Schedules 40 and 80, Type E or S, Grade B
  - 1. Unions: ASME B16.39, Class 150, malleable iron with brass-to-iron seat, ground joint, and threaded ends
  - 2. Forged steel flanges and flanged fittings: ASME B16.5, minimum Class 150, including bolts, nuts, and gaskets of the following material group, end connections, and facings
    - a. Material group: 1.1
    - b. End connections: Threaded or butt welding to match pipe
    - c. Lapped face: Not permitted underground
    - d. Gasket materials: ASME B16.20, metallic, flat, asbestos free, aluminum O-rings, and spiral-wound metal gaskets
    - e. Bolts and nuts: ASME B18.2.1, carbon steel aboveground, and stainless steel underground
- B. PE Pipe: ASTM D2513, SDR 11
  - 1. PE fittings: ASTM D2683, socket-fusion type or ASTM D 3261, butt-fusion type with dimensions matching PE pipe

2. PE transition fittings: Factory-fabricated fittings with PE pipe complying with ASTM D2513, SDR 11; and steel pipe complying with ASTM A53/A53M, black steel, Schedule 40, Type E or S, Grade B

## 2.2 PIPING SPECIALTIES

### A. Flexible Piping Joints

1. Approved for natural gas service
2. Stainless steel bellows with woven, flexible, bronze, wire-reinforcing protective jacket
3. Minimum working pressure of 250 psig and 250 deg F operating temperature
4. Flanged- or threaded-end connections to match equipment connected and shall be capable of minimum  $\frac{3}{4}$ -inch misalignment

### B. Wye Pattern Strainers

1. Body: ASTM A126, Class B, cast iron with bolted cover and bottom drain connection
2. End connections: Threaded ends for NPS 2 and smaller; flanged ends for NPS 2½ and larger
3. Strainer screen: 60-mesh startup strainer and perforated stainless-steel basket with 50 percent free area
4. CWP rating: 125 psig

## 2.3 JOINING MATERIALS

### A. Joint Compound and Tape: Suitable for natural gas service

### B. Welding Filler Metals: Comply with AWS D10.12/D10.12M for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded

### C. Brazing Filler Metals: Alloy with melting point greater than 1000 deg F complying with AWS A5.8/A5.8M

## 2.4 MANUAL GAS SHUTOFF VALVES

### A. General Requirements for Metallic Valves, NPS 2 and Smaller for Vapor Service: Comply with ASME B16.33

1. CWP rating: 125 psig
2. Threaded ends: Comply with ASME B1.20.1
3. Dryseal threads on flare ends: Comply with ASME B1.20.3
4. Tamperproof feature: Locking feature for valves indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles
5. Listing: Listed and labeled by an NRTL acceptable to authorities having jurisdiction for valves 1 inch and smaller
6. Service mark: Valves 1¼-inch to NPS 2 shall have initials "WOG" permanently marked on valve body

B. Two-Piece, Full-Port, Bronze Ball Valves with Bronze Trim: MSS SP-110

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following
  - a. BrassCraft Manufacturing Company; a Masco company
  - b. Conbraco Industries, Inc.; Apollo Div.
  - c. Lyall, R. W. & Company, Inc.
  - d. McDonald, A. Y. Mfg. Co.
  - e. Perfection Corporation; a subsidiary of American Meter Company
2. Body: Bronze, complying with ASTM B584
3. Ball: Chrome-plated bronze
4. Stem: Bronze; blowout proof
5. Seats: Reinforced TFE; blowout proof
6. Packing: Threaded-body packnut design with adjustable-stem packing
7. Ends: Threaded, flared, or socket as indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" articles
8. CWP rating: 600 psig
9. Listing: Valves NPS 1 and smaller shall be listed and labeled by an NRTL acceptable to authorities having jurisdiction
10. Service: Suitable for natural gas service with "WOG" indicated on valve body

C. Bronze Plug Valves: MSS SP-78

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following
  - a. Lee Brass Company
  - b. McDonald, A. Y. Mfg. Co.
2. Body: Bronze, complying with ASTM B584
3. Plug: Bronze
4. Ends: Threaded, socket, or flanged as indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" articles
5. Operator: Square head or lug type with tamperproof feature where indicated
6. Pressure class: 125 psig
7. Listing: Valves NPS 1 and smaller shall be listed and labeled by an NRTL acceptable to authorities having jurisdiction
8. Service: Suitable for natural gas service with "WOG" indicated on valve body

## 2.5 ESCUTCHEONS

A. General Requirements for Escutcheons: Manufactured wall and ceiling escutcheons and floor plates, with ID to fit around pipe or tube, and OD that completely covers opening

B. Tracer Wire

1. Refer to Section 02708
2. Tracer wire specified in Section 02708 is required in addition to detectable warning tape

## 2.6 LABELING AND IDENTIFYING

- A. Detectable Warning Tape: Acid and alkali-resistant PE film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored yellow
- B. Tracer Wire
  - 1. Refer to Section 02708
  - 2. Tracer wire specified in Section 02708 is required in addition to detectable warning tape

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine roughing-in for natural piping system to verify actual locations of piping connections before equipment installation
- B. Proceed with installation only after unsatisfactory conditions have been corrected

### 3.2 EARTHWORK

- A. Comply with requirements in Section 02200 for excavating, trenching, and backfilling

### 3.3 PREPARATION

- A. Close equipment shutoff valves before turning off natural gas to premises or piping section
- B. Inspect natural gas piping according to NFPA 58 and the International Fuel Gas Code to determine that natural gas utilization devices are turned off in piping section affected
- C. Comply with NFPA 58 and the International Fuel Gas Code requirements for prevention of accidental ignition

### 3.4 OUTDOOR PIPING INSTALLATION

- A. Comply with NFPA 58 and the International Fuel Gas Code requirements for installation and purging of natural gas piping
- B. Install underground, natural gas piping buried at least 18" below finished grade. Comply with requirements in Section 02200 for excavating, trenching, and backfilling
- C. Install underground, PE, natural gas piping according to ASTM D2774
- D. Steel Piping with Protective Coating

1. Repair damage to PE coating on pipe as recommended in writing by protective coating manufacturer
- E. Install fittings for changes in direction and branch connections
- F. Joints for connection to inlets and outlets on vaporizers, air mixers, regulators, and valves may be flanged or threaded to match the equipment
- G. Underground, Exterior-Wall Pipe Penetrations: Install cast iron "wall pipes" for sleeves. Seal pipe penetrations using mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals
- H. Install pressure gage downstream from each service regulator

### 3.5 INDOOR PIPING INSTALLATION

- A. Comply with the International Fuel Gas Code for installation and purging of natural gas piping
- B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings
- C. Arrange for pipe spaces, chases, slots, sleeves, and openings in building structure during progress of construction, to allow for mechanical installations
- D. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas
- E. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise
- F. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal
- G. Locate valves for easy access
- H. Install piping free of sags and bends
- I. Install fittings for changes in direction and branch connections
- J. Install escutcheons for penetrations of interior walls, ceilings, and floors
  1. New piping
    - a. Piping at wall and floor penetrations in finished spaces: One-piece, cast-brass type with polished chrome-plated finish
    - b. Piping at ceiling penetrations in finished spaces: One-piece or split-casting, cast-brass type with polished chrome-plated finish

- c. Piping in unfinished service spaces: One-piece, cast-brass type with polished chrome-plated finish
  - d. Piping in equipment rooms: One-piece, stamped-steel type
- K. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Comply with requirements in Division 7 Section "Through-Penetration Firestop Systems" for materials
- L. Verify final equipment locations for roughing-in
- M. Comply with requirements in Sections specifying gas-fired appliances and equipment for roughing-in requirements
- N. Drips and Sediment Traps: Install drips at points where condensate may collect, including service-meter outlets. Locate where readily accessible to permit cleaning and emptying. Do not install where condensate is subject to freezing
  - 1. Construct drips and sediment traps using tee fitting with bottom outlet plugged or capped. Use nipple a minimum length of 3 pipe diameters, but not less than 3 inches long and same size as connected pipe. Install with space below bottom of drip to remove plug or cap
- O. Extend relief vent connections for service regulators, line regulators, and overpressure protection devices to outdoors and terminate with weatherproof vent cap
- P. Conceal pipe installations in walls, pipe spaces, utility spaces, above ceilings, below grade or floors, and in floor channels unless indicated to be exposed to view
- Q. Concealed Location Installations: Except as specified below, install concealed natural gas piping and piping installed under the building in containment conduit constructed of steel pipe with welded joints as described in Part 2. Install a vent pipe from containment conduit to outdoors and terminate with weatherproof vent cap
  - 1. Above accessible ceilings: Natural gas piping, fittings, valves, and regulators may be installed in accessible spaces without containment conduit
  - 2. In floors: Install natural gas piping with welded or brazed joints and protective coating in cast-in-place concrete floors. Cover piping to be cast in concrete slabs with minimum of 1½ inches of concrete. Piping may not be in physical contact with other metallic structures such as reinforcing rods or electrically neutral conductors. Do not embed piping in concrete slabs containing quick-set additives or cinder aggregate
  - 3. In floor channels: Install natural gas piping in floor channels. Channels must have cover and be open to space above cover for ventilation
  - 4. In walls or partitions: Protect tubing installed inside partitions or hollow walls from physical damage using steel striker barriers at rigid supports
    - a. Exception: Tubing passing through partitions or walls does not require striker barriers
  - 5. Prohibited locations:

- a. Do not install natural gas piping in or through circulating air ducts, clothes or trash chutes, chimneys or gas vents (flues), ventilating ducts, or dumbwaiter or elevator shafts
  - b. Do not install natural gas piping in solid walls or partitions
- R. Use eccentric reducer fittings to make reductions in pipe sizes. Install fittings with level side down
  - S. Connect branch piping from top or side of horizontal piping
  - T. Do not use natural gas piping as grounding electrode

### 3.6 PIPING JOINT CONSTRUCTION

- A. Ream ends of pipes and tubes and remove burrs
- B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly
- C. Flanged Joints: Install gasket material, size, type, and thickness appropriate for LPG service. Install gasket concentrically positioned

### 3.7 HANGER AND SUPPORT INSTALLATION

- A. Install hangers for horizontal steel piping with the following maximum spacing and minimum rod sizes
  1. NPS 1 and Smaller: Maximum span, 96 inches; minimum rod size,  $\frac{3}{8}$  inch
  2. NPS 1 $\frac{1}{4}$ : Maximum span, 108 inches; minimum rod size,  $\frac{3}{8}$  inch
  3. NPS 1 $\frac{1}{2}$  and NPS 2: Maximum span, 108 inches; minimum rod size,  $\frac{3}{8}$  inch
  4. NPS 2 $\frac{1}{2}$  to NPS 3 $\frac{1}{2}$ : Maximum span, 10 feet; minimum rod size,  $\frac{1}{2}$  inch
  5. NPS 4 and Larger: Maximum span, 10 feet; minimum rod size,  $\frac{5}{8}$  inch

### 3.8 CONNECTIONS

- A. Connect to utility's gas main according to utility's procedures and requirements
- B. Install natural gas piping electrically continuous, and bonded to gas appliance equipment grounding conductor of the circuit powering the appliance according to NFPA 70
- C. Install piping adjacent to appliances to allow service and maintenance of appliances
- D. Connect piping to appliances using manual gas shutoff valves and unions. Install valve within 72 inches of each gas-fired appliances and equipment. Install union between valve and appliances or equipment
- E. Sediment Traps: Install tee fitting with capped nipple in bottom to form drip, as close as practical to inlet of each appliance

### 3.9 LABELING AND IDENTIFYING

- A. Install detectable warning tape directly above gas piping, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs

### 3.10 PAINTING

- A. Comply with requirements of Section 09900

### 3.11 OUTDOOR PIPING SCHEDULE

- A. Aboveground natural gas piping shall be the following
  - 1. NPS 2 and Smaller: Schedule 80 steel pipe, malleable-iron threaded fittings and threaded joints. Coat pipe and fittings with protective coating for steel piping
- B. Underground natural gas piping shall be the following
  - 1. PE pipe and fittings joined by heat-fusion, or mechanical couplings; service-line risers with tracer wire terminated in an accessible location

### 3.12 INDOOR PIPING SCHEDULE

- A. Aboveground, branch piping NPS 1 and smaller shall be one of the following
  - 1. Schedule 40, steel pipe with malleable-iron fittings and threaded joints
- B. Aboveground, distribution piping shall be the following
  - 1. Schedule 40, steel pipe with malleable-iron fittings and threaded joints

### 3.13 ABOVEGROUND MANUAL GAS SHUTOFF VALVE SCHEDULE

- A. Aboveground Liquid Piping
  - 1. Two-piece, regular-port, bronze ball valves with bronze trim
- B. Valves for pipe NPS 2 and smaller at service meter shall be one of the following
  - 1. Bronze plug valve
- C. Distribution piping valves for pipe NPS 2 and smaller shall be one of the following
  - 1. Bronze plug valve
- D. Valves in branch piping for single appliance shall be one of the following
  - 1. Bronze plug valve

END OF SECTION