

SECTION 15190  
NATURAL GAS PIPING SYSTEMS

PART 1 - GENERAL

1.01 PROVISIONS INCLUDED

- A. The general provisions of the Contract, including General and Supplementary General Conditions, and Division 1 General Requirements, apply to work specified in this Section.
- B. Requirements of Section 15050, "Basic Mechanical Materials and Methods," apply to this Section.

1.02 SUMMARY

- A. This Section includes piping, specialties, and accessories for natural gas systems from point of connection to the outlet side of the Utility Company provided meter/regulator set to:
  - 1. Within the building to points indicated.
- B. Approximate values of natural gas that will be supplied for these systems are the following:
  - 1. Heating Value: 1000 Btu/cu. ft.
  - 2. System Operating Pressure: Less than 1/2 psig.
  - 3. Specific Gravity: 0.6
- C. Related Work Specified in Other Sections:
  - 1. Fire rated sealants: Section 07270, "Firestopping."
  - 2. Pipe supports: Section 15060, "Hangers and Supports."
  - 3. Pipe Identification: Section 15075, "Mechanical Identification."
  - 4. Pressure gages and fittings: Section 15120, "Meters and Gauges."

1.03 DEFINITIONS

- A. Gas Piping System: Pipe within the building that conveys gas from point of delivery to points of usage. Piping includes dielectric fitting and gas valve immediately downstream from point of delivery.
- B. Low Pressure Natural Gas Piping System: Operating at pressure of 0.5 psig or less.

1.04 SYSTEM PERFORMANCE REQUIREMENTS

- A. Minimum Working Pressure Ratings: Except where otherwise indicated, systems shall be rated for 1/2 psig.

1.05 SUBMITTALS

- A. General: Make submittals in accordance with requirements of Section 01300-Submittals.
- B. Product data for each type of natural gas specialty and special-duty valve. Include pressure rating in psig, rated capacity in cu. ft. per hour (CFH), and settings of selected models.

- C. Coordination drawings for gas piping systems, including required clearances and relationship to other services that serve the same work areas.
- D. Maintenance data for gas special ties and special-duty valves for inclusion in Operating and Maintenance Manuals specified in Division 1 Section "Project Closeout."
- E. Test reports specified in "Field Quality Control" Article in Part 3.

#### 1.06 QUALITY ASSURANCE

- A. Comply with NFPA 54 "National Fuel Gas Code" for gas piping materials and components; installations; and inspection, testing, and purging.
- B. Provide listing/approval stamp, label, or other marking on equipment made to specified standards.
- C. Listing and Labeling: Provide equipment and accessories that are listed and labeled.
  1. Terms "Listed" and "Labeled": As defined in the National Electrical Code, Article 100.
  2. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" (NRTL) as defined in OSHA Regulation 1910.7.

#### 1.07 DELIVERY, STORAGE, AND HANDLING

- A. Handling Flammable Liquids: Remove and legally dispose of liquids from drips in existing gas piping. Handle cautiously to avoid spillage and ignition. Notify the gas supplier. Handle flammable liquids used by the Installer with proper precautions, and do not leave on the premises from end of one day to beginning of next day.

### PART 2 - PRODUCTS

#### 2.01 MANUFACTURERS

- A. Gas Valves, 2 Inches and Smaller: Subject to compliance with requirements, provide products by one of the following:
  1. Homestead by Olson Technologies, Inc.
  2. Milliken Valve Co., Inc.
  3. Mueller Co., A Grinnell Co.
  4. Mueller Steam Specialty Div., Core Industries, Inc.
  5. Nordstrum Valves, Inc.
- B. Gas Valves, 2-1/2 Inches and Larger: Subject to compliance with requirements, provide products by one of the following:
  1. Homestead by Olson Technologies, Inc.
  2. Milliken Valve Co., Inc.
  3. Mueller Steam Specialty Div., Core Industries, Inc.
  4. Nordstrum Valves, Inc.

## 2.02 PIPES AND TUBES

- A. General: Refer to "Pipe Applications" Article in Part 3 for identification of systems where the following materials are used.
- B. Steel Pipe: ASTM A 53, Type E, Electric-Resistance Welded or Type S, Seamless, Grade B, Schedule 40, black.

## 2.03 PIPE AND TUBE FITTINGS

- A. Malleable-Iron Threaded Fittings: ASME B16.3, Class 150, standard pattern, with threads conforming to ASME B1.20.1.
- B. Unions: ASME B16.39, Class 150, black malleable iron; female pattern; brass-to-iron seat; ground joint.
- C. Steel Fittings: ASME B16.9, wrought steel, butt-welding type; and ASME B16.11, forged steel.
- D. Steel Flanges and Flanged Fittings: ASME B16.5.
- E. Transition Fittings: Type, material, and end connections to match piping being joined.

## 2.04 JOINING MATERIALS

- A. Common Joining Materials: Refer to Division 15 Section "Basic Mechanical Materials and Methods" for joining materials not included in this Section.
- B. Gasket Material: Thickness, material, and type suitable for propane gas use.

## 2.05 VALVES

- A. Manual Valves: Conform to standards listed, or where appropriate, valves according to ANSI Z21.15 and ANSI Z21.15a.
- B. Gas Valves, 2 Inches and Smaller: ASME B16.33, 125 psi WOG, cast-iron body, bronze plug, straightaway pattern, square head, tapered-plug type, with threaded ends.
- C. Gas Valves, 2-1/2 Inches and Larger: MSS SP-78, Class 125 or 175 WOG, lubricated plug type, semisteel body, wrench operated, with flanged ends.

## PART 3 - EXECUTION

### 3.01 PREPARATION

- A. Precautions: Close equipment shutoff valves before turning off gas to the premises or section of piping. Perform leakage test as specified in "Field Quality Control" Article to determine that all equipment is turned off in the piping section to be affected.
- B. Comply with NFPA 54 "Prevention of Accidental Ignition."

### 3.02 PIPE APPLICATIONS

- A. General: Flanges, unions, transition and special fittings, and valves with pressure ratings same or higher than system pressure rating may be used in applications below, except where specified otherwise.
- B. Low-Pressure Natural Gas Systems, above Ground within Building: Use the following:
  - 1. 2 Inches and Smaller: Steel pipe, malleable-iron, threaded fittings, and threaded joints.
  - 2. 2-1/2 Inches and Larger: Steel pipe, butt-welding fittings, and welded joints.

### 3.03 VALVE APPLICATIONS

- A. Use gas valves of sizes indicated for gas service piping, meters, mains, and where indicated.

### 3.04 JOINT CONSTRUCTION

- A. Refer to Division Section 15050, "Basic Mechanical Materials and Methods" for basic piping joint construction.

### 3.05 PIPING INSTALLATIONS

- A. Refer to Section 15050, "Basic Mechanical Materials and Methods" for basic piping installation requirements.
- B. Drips and Sediment Traps: Install drips at points where condensate may collect. Include outlets of gas meters. Locate where readily accessible to permit cleaning and emptying. Do not install where condensate would be subject to freezing.
  - 1. Construct drips and sediment traps using tee fitting with bottom outlet plugged or capped. Use minimum-length nipple of 3 pipe diameters, but not less than 3 inches long, and same size as connected pipe. Install with space between bottom of drip and floor for removal of plug or cap.
- C. Install gas piping at a uniform grade of 1/4 inch in 15 feet, upward toward risers. Install piping upward from service risers to meters, service regulator when meter is not provided, and equipment.
- D. Make reductions in pipe sizes using eccentric reducer fittings installed with the level side down.
- E. Connect branch piping from top or side of horizontal piping.
- F. Install unions in pipes 2 inches and smaller, adjacent to each valve, at final connection to each piece of equipment, and elsewhere as indicated. Unions are not required on flanged devices.
- G. Install dielectric fittings (unions and flanges) with 1 ferrous and 1 brass or bronze-end connections, separated by insulating material, where piping of dissimilar metals are joined.
- H. Install dielectric fittings (unions and flanges) with 2 ferrous end connections, separated by insulating material, at outlet from gas meter and, where indicated, for ferrous piping.

- I. Install flanges on valves, specialties, and equipment having 2-1/2-inch and larger connections.
- J. Install strainers on the supply side of each control valve, gas pressure regulator, solenoid valve, and elsewhere as indicated.
- K. Anchor piping to ensure proper direction of piping expansion and contraction. Install expansion joints, expansion loops, and pipe guides as indicated.
- L. Install vent piping for gas pressure regulators and gas trains, extend outside building, and vent to atmosphere. Terminate vents with turned-down, reducing elbow fittings with corrosion-resistant insect screens in large end.
- M. Seismically restrain all piping systems per NFPA-54, and local codes.
- N. Underground piping shall be installed with plastic corrosion resistive wrapping, sealed tightly around piping and at joints to prevent direct contact of the surrounding soil with the metallic pipe and fittings.

### 3.06 HANGER AND SUPPORT INSTALLATION

- A. Refer to Section 15060, "Hangers and Supports" for hanger and support devices.
- B. Install hangers for horizontal piping with following maximum spacing and minimum rod sizes:

Nominal Pipe Size (Inches)	Steel Pipe Max. Span (Feet)	Min. Rod Diameter (Inches)
3/8	-	3/8
1/2	6	3/8
5/8	-	3/8
3/4	8	3/8
7/8	-	3/8
1	8	3/8
1-1/4	9	3/8
1-1/2 to 2	10	3/8
2-1/2 to 3-1/2	10	1/2
4	-	1/2
4 and Larger	10	5/8

- C. Support vertical steel pipe at each floor.

### 3.07 VALVE INSTALLATION

- A. Install valves in accessible locations, protected from physical damage. Tag valves with a metal tag attached with a metal chain indicating the piping systems supplied.
- B. Install a gas valve upstream of each gas pressure regulator. Where two gas pressure regulators are installed in series in a single gas line, a manual valve is not required at the second regulator.

- C. Install pressure-relief or pressure-limiting devices so they can be readily operated to determine if valve is free; test to determine pressure at which they will operate; and examine for leakage when in closed position.

### 3.08 CONNECTIONS

- A. Install gas piping next to gas-utilizing equipment and appliances to allow servicing and maintenance.
- B. Connect gas piping to gas-utilizing equipment and appliances with shutoff valves and unions. Make connections downstream of valves and unions, with flexible connectors where indicated.

### 3.09 TERMINAL EQUIPMENT CONNECTIONS

- A. Install a gas valve upstream and within 6 feet of each gas-utilizing appliance. Install a union or flanged connection downstream from the valve to permit removal of controls.
- B. Sediment Traps: Install tee fittings forming drips, as close as practical to gas appliance inlets. Cap or plug bottom outlet.

### 3.10 ELECTRICAL BONDING AND GROUNDING

- A. Install above-ground portions of gas piping systems that are upstream from equipment shutoff valves, electrically continuous and bonded to a grounding electrode according to NFPA 70.
- B. Do not use gas piping as a grounding electrode.

### 3.11 FIELD QUALITY CONTROL

- A. Inspect, test, and purge natural gas systems according to NFPA 54, Part 4 "Gas Piping Inspection, Testing, and Purging" and local gas utility requirements.
- B. Repair leaks and defects with new materials, and retest system until satisfactory results are obtained.
- C. Report test results promptly and in writing to the Architect and the authority having jurisdiction.
- D. Verify capacities and pressure ratings of gas meters, regulators, valves, and specialties.
- E. Verify that specified piping tests are complete.

### 3.12 ADJUSTING

- A. Adjust controls and safety devices. Replace damaged and malfunctioning controls and safety devices.

END OF SECTION 15190