

## SECTION 15194 - FUEL GAS PIPING

## PART 1 - GENERAL

## 0.1 RELATED DOCUMENTS

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

## 0.2 SUMMARY

- A. This Section includes fuel gas piping, specialties, and accessories within the building.

## 0.3 PROJECT CONDITIONS

- A. Design values of fuel gas supplied for these systems are as follows:
  - 1. Nominal Heating Value: 1000 Btu/cu. ft..
  - 2. Nominal Specific Gravity: 0.6.

## 0.4 QUALITY ASSURANCE

- A. Electrical Components and Devices: Listed and labeled as defined in NFPA 70, Article 100, by testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. ANSI Standard: Comply with ANSI Z223.1, "National Fuel Gas Code."
- C. UL Standard: Provide components listed in UL's "Gas and Oil Equipment Directory" if specified to be UL listed.

## PART 2 - PRODUCTS

## 0.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. Gas Valves, NPS 2 and Smaller:
    - a. BMI Canada, Inc.
    - b. Crane Valves.
    - c. Dungs: Karl Dungs, Inc.

- d. Flow Control Equipment, Inc.
  - e. Grinnell Corp.
  - f. Honeywell, Inc.
  - g. Jomar International, Ltd.
  - h. Kitz Corp. of America.
  - i. Legend Valve and Fitting, Inc.
  - j. Lyall: R. W. Lyall & Co., Inc.
  - k. McDonald: A. Y. McDonald Mfg. Co.
  - l. Milwaukee Valve Co., Inc.
  - m. Mueller Co.; Mueller Gas Products Div.
  - n. Nibco, Inc.
  - o. Red-White Valve Corp.
  - p. Velan Valve Corp.
  - q. Watts Industries, Inc.; Water Products Div.
2. Plug Valves, NPS 2-1/2 and Larger:
- a. Flow Control Equipment, Inc.
  - b. Milliken Valve Co., Inc.
  - c. Nordstrom Valves, Inc.
  - d. Olson Technologies, Inc.; Homestead Valve Div.
  - e. Walworth Co.
3. [UL-Listed Earthquake Valves:
- a. Energy Pacific.
  - b. Safe T Quake Corp.
  - c. Seismic Safety Products, Inc.
  - d. Seismic Valve Co., Inc.
  - e. Trembler-Tech, Inc.
  - f. Westcoast Seismic Protection Co., Ltd.]
4. Service Pressure Regulators:
- a. American Meter Co.
  - b. Equimeter, Inc.
  - c. Fisher Controls International, Inc.
  - d. National Meter.
  - e. Richards Industries, Inc.; Jordan Valve Div.
  - f. Schlumberger Industries; Gas Div.
5. Line Pressure Regulators:
- a. American Meter Co.
  - b. Donkin: Bryan Donkin RMG Canada, Ltd.
  - c. Eclipse Combustion, Inc.
  - d. Equimeter, Inc.
  - e. Fisher Controls International, Inc.
  - f. Maxitrol Co.
  - g. National Meter.
  - h. Richards Industries, Inc.; Jordan Valve Div.

- i. Schlumberger Industries; Gas Div.

## 0.2 PIPING MATERIALS

- A. Refer to Part 3 "Piping Applications" Article for applications of pipe, tube, fitting, and joining materials.

## 0.3 PIPES, TUBES, FITTINGS, AND JOINING MATERIALS

- A. Steel Pipe: ASTM A 53; Type E or S; Grade B; Schedule 40; black.
  - 1. Malleable-Iron Threaded Fittings: ASME B16.3, Class 150, standard pattern, with threaded ends according to ASME B1.20.1.
  - 2. Unions: ASME B16.39, Class 150, malleable iron with brass-to-iron seat, ground joint, and threaded ends according to ASME B1.20.1.
  - 3. Cast-Iron Flanges and Flanged Fittings: ASME B16.1, Class 125.
  - 4. Steel Welding Fittings: ASME B16.9, wrought steel or ASME B16.11, forged steel.
  - 5. Steel Threaded Fittings: ASME B16.11, forged steel with threaded ends according to ASME B1.20.1.
  - 6. Joint Compound and Tape: Suitable for natural gas.
  - 7. Steel Flanges and Flanged Fittings: ASME B16.5.
  - 8. Gasket Material: Thickness, material, and type suitable for natural gas.

## 0.4 PIPING SPECIALTIES

- A. Flexible Connectors: ANSI Z21.24, copper alloy.
- B. Quick-Disconnect Devices: ANSI Z21.41, convenience outlets and matching plug connector.

## 0.5 SPECIALTY VALVES

- A. Valves, NPS 2 and Smaller: Threaded ends according to ASME B1.20.1 for pipe threads.
- B. Valves, NPS 2-1/2 and Larger: Flanged ends according to ASME B16.5 for steel flanges and according to ASME B16.24 for copper and copper-alloy flanges.
- C. Gas Stops: Bronze body with AGA stamp, plug type with bronze plug and flat or square head, ball type with chrome-plated brass ball and lever handle, or butterfly valve with stainless-steel disc and fluorocarbon elastomer seal and lever handle; 2-psig minimum pressure rating.
- D. Gas Valves, NPS 2 and Smaller: ASME B16.33 and IAS-listed bronze body and 125-psig pressure rating.
  - 1. Tamperproof Feature: Include design for locking.

- E. Plug Valves, NPS 2-1/2 and Larger: ASME B16.38 and MSS SP-78 cast-iron, lubricated plug valves, with 125-psig pressure rating.
  - 1. Tamperproof Feature: Include design for locking.
- F. **[Earthquake Valves: FM approved or listed in IAS Directory as complying with ANSI Z21.70 and UL listed. Include mechanical operator.]**

#### 0.6 SERVICE METERS

- A. Service Meters: Positive-displacement type suitable for fuel gas service. Include metal case, temperature compensation, corrosion-resistant internal components, and flow registered in cubic feet per hour.
  - 1. NPS 2 and Smaller: Threaded ends according to ASME B1.20.1 for pipe threads.
  - 2. NPS 2-1/2 and Larger: Flanged ends according to ASME B16.5 for steel flanges and according to ASME B16.24 for copper and copper-alloy flanges.
  - 3. Type: ANSI B109.3, rotary.

#### 0.7 PRESSURE REGULATORS

- A. Description: Single stage and suitable for fuel gas service. Include steel jacket and corrosion-resistant components, elevation compensator, and atmospheric vent.
  - 1. NPS 2 and Smaller: Threaded ends according to ASME B1.20.1 for pipe threads.
  - 2. Appliance Pressure Regulators: ANSI Z21.18. Regulator may include vent limiting device, instead of vent connection, if approved by authorities having jurisdiction.
- B. Pressure Regulator Vents: Factory- or field-installed, corrosion-resistant screen in opening if not connected to vent piping.

### PART 3 - EXECUTION

#### 0.1 SERVICE ENTRANCE PIPING

- A. Extend fuel gas piping and connect to fuel gas distribution for service entrance to building.
  - 1. Exterior fuel gas distribution system piping, service pressure regulator, and service meter will be provided by gas utility.
- B. Install dielectric fitting downstream from and adjacent to each service meter unless meter is supported from service-meter bar with integral dielectric fitting. Install shutoff valve downstream from and adjacent to dielectric fitting.

## 0.2 PIPING APPLICATIONS

- A. Flanges, unions, transition, and special fittings with pressure ratings same as or higher than system pressure rating may be used in applications below, unless otherwise indicated.
- B. Fuel Gas Piping, 0.5 psig or Less: Use the following:
  - 1. NPS 1/2 and Smaller: NPS 3/4 steel pipe, malleable-iron threaded fittings, and threaded joints.
  - 2. NPS 3/4 and NPS 1: Steel pipe, malleable-iron threaded fittings, and threaded joints.
  - 3. NPS 1-1/4 to NPS 2: Steel pipe, malleable-iron threaded fittings, and threaded joints.
  - 4. NPS 2-1/2 to NPS 4: Steel pipe, steel welding fittings, and welded joints.
  - 5. Larger Than NPS 4: Steel pipe, steel welding fittings, and welded joints.
- C. Fuel Gas Piping 2 to 5 psig: Use the following:
  - 1. NPS 2 and Smaller: Steel pipe, steel welding fittings, and welded joints.
  - 2. NPS 2-1/2 to NPS 4: Steel pipe, steel welding fittings, and welded joints.
  - 3. Larger Than NPS 4: Steel pipe, steel welding fittings, and welded joints.
- D. Underground Fuel Gas Piping: Steel pipe, steel welding fittings, and welded joints. Encase in containment conduit.
- E. Gas Service Piping at Meters and Regulators, Above 5 psig: Steel pipe, steel welding fittings, and welded joints.

## 0.3 VALVE APPLICATIONS

- A. Appliance Shutoff Valves for Pressure 0.5 psig or Less: Appliance connector valve or gas stop.
- B. Appliance Shutoff Valves for Pressure 0.5 to 2 psig: Gas stop or gas valve.
- C. Appliance Shutoff Valves for Pressure 2 to 5 psig: Gas valve.
- D. Piping Line Valves, NPS 2 and Smaller: Gas valve.
- E. Piping Line Valves, NPS 2-1/2 and Larger: Plug valve or general-duty valve.

## 0.4 PIPING INSTALLATION

- A. Refer to Division 15 Section "Basic Mechanical Materials and Methods" for basic piping installation requirements.
- B. Concealed Locations: Except as specified below, install concealed gas piping in airtight conduit constructed of Schedule 40, seamless, black steel pipe with welded joints. Vent conduit to outside and terminate with screened vent cap.

1. Above-Ceiling Locations: All welded gas piping may be installed in accessible spaces, subject to approval of authorities having jurisdiction, whether or not such spaces are used as plenums. Do not locate valves above ceilings.
  2. In Walls: Gas piping with welded joints and protective wrapping specified in "Protective Coating" Article in Part 2 may be installed in masonry walls, subject to approval of authorities having jurisdiction.
  3. Prohibited Locations: Do not install gas piping in or through circulating air ducts, clothes or trash chutes, chimneys or gas vents (flues), ventilating ducts, or dumbwaiter or elevator shafts.
    - a. Exception: Accessible above-ceiling space specified above.
- C. Drips and Sediment Traps: Install drips at points where condensate may collect. Include outlets of service meters. Locate where readily accessible for 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.
- D. 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.
- E. Install fuel gas piping at uniform grade of 0.1 percent slope upward toward risers.
- F. Use eccentric reducer fittings to make reductions in pipe sizes. Install fittings with level side down.
- G. Connect branch piping from top or side of horizontal piping.
- H. Install unions in pipes NPS 2 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.
- I. Install strainer on inlet of each line pressure regulator and automatic and electrically operated valve.
- J. Install flanges on valves, specialties, and equipment having NPS 2-1/2 and larger connections.
- K. 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.
- 0.5 HANGER AND SUPPORT INSTALLATION
- A. Refer to Division 15 Section "Hangers and Supports" for pipe hanger and support devices.

- B. 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, 3/8 inch.
  - 2. NPS 1-1/4: Maximum span, 108 inches; minimum rod size, 3/8 inch.
  - 3. NPS 1-1/2 and NPS 2: Maximum span, 108 inches; minimum rod size, 3/8 inch.
  - 4. NPS 2-1/2 to NPS 3-1/2: Maximum span, 10 feet; minimum rod size, 1/2 inch.
  - 5. NPS 4 and Larger: Maximum span, 10 feet; minimum rod size, 5/8 inch.

#### 0.6 CONNECTIONS

- A. Connect piping to appliances using gas with shutoff valves and unions. Install valve upstream from and within 72 inches of each appliance. Install union downstream from valve.
- B. Sediment Traps: Install tee fitting with capped nipple in bottom to form drip, as close as practical to inlet of each appliance using gas.
- C. Ground equipment.
  - 1. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.
  - 2. Do not use gas pipe as grounding electrode.

#### 0.7 FIELD QUALITY CONTROL

- A. Inspect, test, and purge piping according to ANSI Z223.1, Part 4 "Inspection, Testing, and Purging," and requirements of authorities having jurisdiction.

END OF SECTION 15194