

SECTION 231123 – FACILITY FUEL 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.
- B. Related Sections include the following:
 - 1. Division 2 Sections.
 - 2. Division 23 Section "Common Work Results for HVAC"
 - 3. Division 23 Section "Hangers and Supports" for pipe supports, product descriptions, and installation requirements.

1.2 SUMMARY

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

1.3 PROJECT CONDITIONS

- A. Gas System Pressure: Coordinate with gas supplier.

1.4 SUBMITTALS

- A. Product Data: For the following:
 - 1. Corrugated, stainless-steel tubing systems. Include associated components.
 - 2. Specialty valves. Include pressure rating, capacity, settings, and electrical connection data of selected models.
 - 3. Pressure regulators. Include pressure rating, capacity, and settings of selected models.
- B. Maintenance Data: For natural gas specialties and accessories to include in maintenance manuals specified in Division 1.

1.5 QUALITY ASSURANCE

- A. All work shall be performed by technicians holding a Maine Propane and Natural Gas Technician License: "Large Equipment Connection and Service Technician"
- B. Installations of natural gas must also comply with all other applicable statutes or rules of the State and all applicable ordinances, orders, rules, and regulations of local municipalities.
- C. 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.

- D. All work shall be per the following codes. Year edition of code shall be as recognized by the authority with jurisdiction
 - 1. NFPA 54 "National Fuel Gas Code".
 - 2. NFPA 30, Flammable and Combustible Liquids Code
 - 3. NFPA 211, Chimneys, Fireplaces, Vents, and Solid Fuel Appliances
- E. FM Standard: Provide components listed in FM's "Fire Protection Approval Guide" if specified to be FM approved.
- F. IAS Standard: Provide components listed in IAS's "Directory of A. G. A. and C. G. A Certified Appliances and Accessories" if specified to be IAS listed.
- G. UL Standard: Provide components listed in UL's "Gas and Oil Equipment Directory" if specified to be UL listed.
- H. American Society of Mechanical Engineers (ASME) Code CSD-1 Controls and Safety Devices for Automatically Fired Boilers, 2002 edition

1.6 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 fuel gas supplier. Handle flammable liquids used by Installer with proper precautions and do not leave on premises from end of one day to beginning of next day.

1.7 COORDINATION

- A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
 - 1. Notify Architect not less than two days in advance of proposed utility interruptions.
 - 2. Do not proceed with utility interruptions without Architect's written permission.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Valves:
 - a. American Valve.
 - b. B&K Industries, Inc.
 - c. Brass Craft Manufacturing Co.
 - d. Conbraco Industries, Inc.; Apollo Div.
 - e. Crane Valves.
 - f. Grinnell Corp.
 - g. Honeywell, Inc.
 - h. Key Gas Components, Inc.

- i. McDonald: A. Y. McDonald Mfg. Co.
- j. Milwaukee Valve Co., Inc.
- k. Nibco, Inc.
- l. Mueller Co.; Mueller Gas Products Div.
- m. Watts Industries, Inc.

2. Pressure Regulators:

- a. American Meter Co.
- b. Equimeter, Inc.
- c. Fisher Controls International, Inc.
- d. Maxitrol Co.
- e. National Meter.
- f. Richards Industries, Inc.; Jordan Valve Div.
- g. Schlumberger Industries; Gas Div.

2.2 PIPING MATERIALS

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

2.3 PIPES, TUBES, FITTINGS, AND JOINING MATERIALS

- A. Steel Pipe: ASTM A 106, ANSI/ASME B36.10, ASTM A 53; 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.
- B. Transition Fittings: Type, material, and end connections to match piping being joined.
- C. Common Joining Materials: Refer to Division 23 Section "Common Work Results for HVAC" for joining materials not in this Section.

2.4 PIPING SPECIALTIES

- A. Appliance Flexible Connectors:
- 1. Dormont, or approved equal.
 - 2. Indoor, Fixed-Appliance Flexible Connectors: Comply with ANSI Z21.24.
 - 3. Indoor, Movable-Appliance Flexible Connectors: Comply with ANSI Z21.69.
 - 4. Corrugated 304 stainless-steel tubing with yellow antimicrobial PVC coating
 - 5. Operating-Pressure Rating: 0.5 psig
 - 6. Elbow: Malleable iron
 - 7. Valve: Full port, brass body

8. Tubing: Annealed, 304 stainless steel
9. End Fittings: Carbon steel with zinc trivalent chromate, 45° degree flare design
10. Provide restraining device and hardware.

- B. Quick-Disconnect Devices: ANSI Z21.41, convenience outlets and matching plug connector.

2.5 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. Tamperproof Feature: Include design for locking.
- E. General-Duty Valves, NPS 2-1/2 and Larger: ASME B16.38, cast-iron body, suitable for fuel gas service, with "WOG" indicated on valve body, and 125-psig pressure rating.

2.6 PRESSURE REGULATORS

- A. Regulators may include vent limiting device, instead of vent connection to outside, if approved by authorities having jurisdiction. Provide venting as required by code.
- B. Line Pressure Regulators: ANSI Z21.80 with 10-psig inlet pressure rating, unless otherwise indicated.
- C. Appliance Pressure Regulators: ANSI Z21.18.
- D. Pressure Regulator Vents: Factory- or field-installed, corrosion-resistant screen in opening if not connected to vent piping.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Close equipment shutoff valves before turning off fuel gas to premises or section of piping. Perform leakage test as specified in "Field Quality Control" Article to determine that all equipment is turned off in affected piping section.
- B. Comply with ANSI Z223.1, "Prevention of Accidental Ignition" Paragraph.

3.2 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: Use the following:
 - 1. NPS 1 and Smaller: steel pipe, malleable-iron threaded fittings, and threaded joints. Option: Corrugated, stainless-steel tubing may be used for runouts at individual appliances.
 - 2. NPS 1-1/4 to NPS 2: Steel pipe, malleable-iron threaded fittings, and threaded joints.
 - 3. NPS 2-1/2 and Larger: Steel pipe, steel welding fittings, and welded joints.
- C. In-slab (within building) Fuel Gas Piping: Not permitted.
- D. Commercial Cooking Appliances. Commercial cooking appliances shall be connected in accordance with the connector manufacturer's installation instructions using an appliance flexible connector.
- E. Cooking fire suppression: Coordinate with Sheet FS-9. Install the gas shutoff valve (furnished by food service supplier) in the gas piping per NFPA 96 and food service plans.
- F. Underground Fuel Gas Piping: Not permitted.

3.3 PIPING INSTALLATION

- A. Refer to Division 22 Section "Common Work Results for HVAC" for basic piping installation requirements.
 - 1. 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. 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.
 - 2. Install fuel gas piping at uniform grade of 1/4" per 15 feet.
 - 3. Use eccentric reducer fittings to make reductions in pipe sizes. Install fittings with level side down.
 - 4. Connect branch piping from top or side of horizontal piping.
 - 5. 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.
 - 6. Install flanges on valves, specialties, and equipment having NPS 2-1/2 and larger connections.
 - 7. Install strainer on inlet of each line pressure regulator and automatic and electrically operated valve.
 - 8. 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.
 - 9. Refer to Division 23 Section "Common Work Results for HVAC" for basic piping joint construction.
- 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: 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 Floors: not permitted.
 - 3. In Walls or Partitions: Protect tubing installed inside partitions or hollow walls from physical damage using steel striker barriers at rigid supports. Exception: Tubing passing through partitions or walls does not require striker barriers.

3.4 HANGERS AND SUPPORTS

- A. Hanger, support, and anchor devices are specified in Division 23 Section "Hangers and Supports."
- B. Support gas piping in accordance with NFPA 54. Steel pipe spacing of supports: ½" pipe = 6 feet; ¾" or 1" = 8 feet; 1-1/4" and larger = 10 feet.

3.5 CONNECTIONS

- A. Drawings indicate general arrangement of fuel gas piping, fittings, and specialties.
- B. Install piping adjacent to appliances to allow service and maintenance.
- C. 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.
- D. Sediment Traps: Install tee fitting with capped nipple in bottom to form drip, as close as practical to inlet of each appliance using gas.

3.6 LABELING AND IDENTIFYING

- A. Equipment Nameplates and Signs: Install engraved plastic-laminate equipment nameplate or sign on or near each service meter, pressure regulator, and specialty valve.
 - 1. Text: In addition to name of identified unit, distinguish between multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations.
 - 2. Refer to Division 23 Section "Identification for HVAC" for nameplates and signs.

3.7 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.
- 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 Architect and authorities having jurisdiction.
- D. Verify capacities and pressure ratings of service meters, pressure regulators, valves, and specialties.
- E. Verify correct pressure settings for pressure regulators.
- F. Verify that specified piping tests are complete.
- G. Verify that the gas piping has been grounded by Division 26 in accordance with NFPA requirements.

END OF SECTION 231123