

SECTION 23 11 23

NATURAL GAS PIPING

PART 1 GENERAL

1.01 SUBMITTALS

- A. Quality Assurance Data:
 - 1. Welding: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code, Section IX.
 - 2. Electrical Components and Devices: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
 - 3. NFPA Standard: Comply with NFPA 54, "National Fuel Gas Code."
- B. Project Record Documents:
 - 1. As-Built Shop Drawings:
 - a) Gas piping system layout including each gas load connected to the system.
 - b) Certified elevation and outline drawings with dimensions.
 - c) Certified plan view drawings with dimensions.
 - d) Wiring and termination drawings.
- C. Operation and Maintenance Data:
 - 1. Include documentation of inspections and tests performed, including logs, curves, and certificates.
 - 2. Documentation shall note replacement of equipment or components that failed during testing.

1.02 COMMISSIONING

- A. Provide record of commissioning and tests for automatic gas solenoid safety valve operation.

PART 2 PRODUCTS

2.01 PIPING MATERIALS

- A. Interior Exposed or Accessible:
 - 1. Size 1/2" thru 1-1/2":
 - a) Pipe: Schedule 40, ASTM A53/A53M or most current.
 - b) Fittings: Threaded malleable iron.
 - c) Joint seal: Rector seal or teflon paste.
 - d) Unions: Black malleable iron ground joint, bronze to iron seat, 150 lb. class, ANSI B2.1 and ASTM A197.
 - 2. Size 2" and over:
 - a) Pipe: Schedule 40, ASTM A53, Type S Grade B.
 - b) Fitting: Butt weld ASTM A234.
 - c) Unions: 150 lb. forged steel weld neck flange, ANSI/B16.5 and ASTM A105.
- B. Interior concealed non accessible and air plenums:
 - 1. Pipe and fittings welded.

2.02 GAS SOLENOID SAFETY VALVES

- A. Manufacturer: Automatic Switch Company (ASCO).

2.03 GAS SAFETY VALVE CABINETS

- A. #4 stainless steel finish fully recessed, Series S construction, Style K stainless steel door with cylinder lock, four keys each cabinet, all cabinets keyed alike.
- B. Modify cabinets for 6" maximum depth for valve sizes 1/2" thru 1-1/2", and 8" maximum depth for valve size 2" thru 3".
- C. Manufacturer: Croker Model 9100 modified for valve depth.

2.04 FLEXIBLE HOSE GAS CONNECTORS AND QUICK COUPLERS

- A. Flexible Connector – Kitchen Equipment:
 - 1. Corrugated type 304 stainless steel flexible pipe with stainless steel braid and heavy flexible armor shield.
 - 2. Manufacturers:
 - a) Dormont “Blue Hose” kit w/restraint or equal
 - b) Thermo Tech Co., braided flexible connectors with armor shield, approved for gas, and of lengths required for fixed or movable equipment.
 - 3. Couplings: Provide at each end of flexible connector, "Hanson Gas Mate" 2-way shut-off couplers and plugs.

2.05 PRESSURE REGULATORS

- A. Single stage and suitable for fuel gas service.
- B. Include steel jacket and corrosion-resistant components, elevation compensator, and atmospheric vent.
- C. Manufacturers:
 - 1. American Meter Company.
 - 2. Donkin, Bryan RMG Canada, Ltd.
 - 3. Eclipse Combustion, Inc.
 - 4. Fisher Controls International, Inc.; Division of Emerson.
 - 5. Invensys.
 - 6. Maxitrol Company.
 - 7. National Meter Industries, Inc.
 - 8. Richards Industries, Inc.; Jordan Valve Div.
 - 9. Schlumberger Limited; Gas Div.
- D. Line Pressure Regulators: ANSI Z21.80 with 2-psig- minimum inlet pressure rating.

2.06 VALVES

- A. Non-Lubricated Eccentric Plug Valve acceptable manufacturers:
 - 1. Keystone
- B. Lubricated Plug Valves:
 - 1. Not recommended.
 - 2. Acceptable manufacturers, if allowed:
 - a) Homestead
 - b) Nordstrom
 - c) Powell
 - d) Walworth
- C. Gas Cock approved manufacturers:
 - 1. Crane
 - 2. Hammond

3. Peter Healy
4. Alternate: Milwaukee "Butterball"

PART 3 EXECUTION

3.01 SERVICE ENTRANCE PIPING

- A. 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. Dielectric fittings are specified in Division 23.

3.02 INSTALLATION

- A. Utility Company will provide gas service up to and including the meter.
 1. Exterior fuel gas distribution system piping, service pressure regulator, and service meter will be provided by gas utility.
 2. Natural gas distribution system piping, service pressure regulator, and service meter are specified in elsewhere.
- B. Concealed Locations: Except as indicated otherwise, install concealed gas piping in airtight conduit constructed of Schedule 40, seamless, black steel pipe with welded joints. Vent conduit to exterior and terminate with screened vent cap.
- C. Above-Ceiling Locations: Gas piping may be installed in accessible spaces, subject to approval of the Authorities Having Jurisdiction (AHJ), whether or not such spaces are used as plenums. Do not locate valves above ceilings.
- D. In Floors: Gas piping shall not be installed in floors.
- E. In Floor Channels: Gas piping may be installed in floor channels, subject to approval of the AHJ. Channels must have covers and be open to space above cover for ventilation.
- F. In Partitions: Do not install concealed piping in solid partitions. Protect tubing from physical damage when installed inside partitions or hollow walls.
 1. Exception: Tubing passing through partitions or walls.
- G. In Walls: Do not install gas piping in exterior walls.
 1. Exception: Tubing passing through partitions or walls.
- H. 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.
- I. 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.
- J. 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.
 1. Install fuel gas piping at uniform grade of 0.1 percent slope upward toward risers.
 2. Use eccentric reducer fittings to make reductions in pipe sizes. Install fittings with level side down.
 3. Connect branch piping from top or side of horizontal piping.
 4. 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.
 5. Install strainer on inlet of each line pressure regulator and automatic and electrically operated valve.
 6. Select location of gauges from options in paragraph below or delete.
 7. Install flanges on valves, specialties, and equipment having NPS 2-1/2 and larger connections.

8. Piping to be threaded schedule 40 steel pipe. Each regulator vent to terminate separately.
9. Install containment conduits for gas piping below slabs, within building, in gastight conduits extending minimum of 4 inches outside building, and vented to atmosphere. Prepare and paint outside of conduits with coal-tar, epoxy-polyamide paint.
10. Terminate vents with turned-down, reducing-elbow fittings with corrosion-resistant insect screens in large end.

K. Pipe Identification

1. Paint atural gas piping located outside the building.
2. Natural gas piping located inside the building shall be identified as required by Specification Section 230553 Mechanical Identification.

3.03 JOINT CONSTRUCTION

- A. Basic piping joint construction is specified in Division 23.
- B. Use materials suitable for fuel gas.
- C. Brazed Joints: Make with brazing alloy with melting point greater than 1000°F. Brazing alloys containing phosphorus are prohibited.
- D. Patch factory-applied protective coating as recommended by manufacturer at field welds and where damage to coating occurs during construction.

3.04 Valve Schedule

A. Gas Solenoid Safety Valves:

1. Provide for classroom laboratories and kitchens.
2. Kitchen valve de-energized when fire suppression system is activated.
3. Reset of kitchen valve only possible after fire suppression system has been reset, re-charged and in "ready " mode.
4. Gas solenoid safety valves shall not be located in plenums .
5. Gas solenoid valves shall be mounted in a horizontal position only.
6. Valve bonnet shall be up, in the vertical position with unions on each side of the valve.

B. Flexible Hose Gas Connectors and Quick Couplers except at Science classrooms.

1. Provide flexible stainless steel connectors with full size quick coupler for kitchen and heavy movable gas appliance equipment.
2. Connectors of lengths required to displace equipment for complete cleaning under and around gas appliance.
3. Provide plug valve at service connection on equipment branch and quick coupler at service end of flexible hose connector.
4. Provide union connection on appliance or manifold end of hose connection.

C. Gas (small appliance isolation only):

- a) All sizes: A.G.A. rated ball valves or gas cocks

END OF SECTION 23 11 23