SECTION 23 11 23
FACILITY NATURAL-GAS PIPING

PART 1 - GENERAL

1.1 DESCRIPTION

Fuel gas systems, including piping, equipment and all necessary accessories as designated in this section. Fuel gas piping for central boiler plants is not included.

1.2 RELATED WORK

A. Section 07 84 00, FIRESTOPPING: Penetrations in rated enclosures.
B. Section 09 91 00, PAINTING: Preparation and finish painting and identification of piping systems.
C. Section 22 05 11, COMMON WORK RESULTS FOR PLUMBING.
D. Section 22 05 23, GENERAL DUTY VALVES FOR PLUMBING PIPING
E. Section 23 07 11, HVAC and BOILER PLANT INSULATION: Pipe Insulation.
F. Section 23 21 11, BOILER PLANT PIPING SYSTEMS: Fuel Gas Piping For Boiler Plants.
G. Section 23 08 00, COMMISSIONING OF HVAC SYSTEMS: Requirements for commissioning, systems readiness checklists, and training.
H. Section 23 51 00 – BREECHINGS, CHIMEYS, and STACKS

1.3 SUBMITTALS

A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, and SAMPLES.
B. Manufacturer's Literature and Data:
   1. Pipe & Fittings.
   2. Valves.
   3. Strainers.
   4. All items listed in Part 2 - Products.
C. Detailed shop drawing of clamping device and extensions when required in connection with the waterproofing membrane.

1.4 APPLICABLE PUBLICATIONS

A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
B. Federal Specifications (Fed. Spec.):

A-A-59617.....Unions, Brass or Bronze Threaded, Pipe Connections and Solder-Joint Tube Connections

C. American National Standards Institute (ANSI):
American Society of Mechanical Engineers (ASME): (Copyrighted Society)
A13.1-(2007) .....Scheme for Identification of Piping Systems
B16.3-(2006).....Malleable Iron Threaded Fittings: Classes 150 and 300 ANSI/ASME
B16.9-2007.....Factory-Made Wrought Steel Buttwelding Fittings ANSI/ASME
B16.11-2009.....Forged Steel Fittings, Socket-Welding and Threaded ANSI/ASME
B16.15-2006.....Cast Copper Alloy Threaded Fittings: Classes 125 and 250 ANSI/ASME
B31.8-2010 .....Gas Transmission and Distribution Piping Systems ANSI/ASME

D. American Society for Testing and Materials (ASTM):
A47-99(2009) .....Standard Specification for Ferritic Malleable Iron Castings
A53-10.....Standard Specification for Pipe, Steel, Black And Hot-Dipped, Zinc-coated Welded and Seamless
A183-09.....Standard Specification for Carbon Steel Track Bolts and Nuts
A536-09.....Standard Specification for Ductile Iron Castings
A733-03(2009)e1.....Standard Specification for Welded and Seamless Carbon Steel and Austenitic Stainless Steel Pipe Nipples
B687-99(2005)e1.....Standard Specification for Brass, Copper, and Chromium-Plated Pipe Nipples

E. National Fire Protection Association (NFPA):
54-2009 .....National Fuel Gas Code

F. International Code Council
IPC 2009 .....International Plumbing Code
IFGC 2009.....International Fuel Gas Code

G. International Association of Plumbing and Mechanical Officials (IAPMO):
Uniform Plumbing Code – 2009
IS6-06.....Installation Standard

H. Manufacturers Standardization Society of the Valve and Fittings Industry, Inc. (MSS):

SP-72-2010 .....Ball Valves with Flanged or Butt-Welding For General Service

SP-110-2010.....Ball Valve Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends

1.5 SYSTEM PRESSURE

The natural gas systems shall be designed and materials and equipment selected to prevent failure under gas pressure of 690 kPa (100 psi). The operating pressure of the natural gas system entering the building is approximately 103.42 kPa (15 psi) at downstream side of pressure regulator.

PART 2 - PRODUCTS

2.1 FUEL GAS PIPING

A. Pipe: Black steel, ASTM A53, Schedule 40.

B. Nipples: Steel, ASTM A733, Schedule 40.

C. Fittings:

1. Sizes 50 mm (2 inch) under ANSI B 16.3 threaded malleable iron.
2. Over 50 mm (2 inch) and up to 100 mm (4 inch) ANSI B16.11 socket welded.
3. Over 100 mm (4 inch) ANSI 16.9 butt welded.

D. Joints: Provide welded or threaded joints.

E. Paint piping systems as specified in Section 09 91 00, PAINTING

2.2 VALVES

A. Floating Ball Valve, 4” (Main Gas Shut-Off Service to Boiler Plant): Full-port, carbon steel body, 150 psi flanged, 316 stainless steel ball and steam, NACE option, multi-seal seats, fire safe design for natural gas shut off services (Balon Series F or approved equal).

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B. Ball Valve: Bronze body, rated for 1025 kPA at 185°C (150 psi at 365°F), 1725 kPa at 121°C (250 psi at 250°F), reinforced TFE seat, stem seal and thrust washer; end entry, threaded ends, UL-listed for natural or LP gas shut off service when used on those services.

C. Gas Vent Cocks: Type 701: Bronze body, tee handle, rated for 205 kPa at 38°C (30 psi at 100°F), ground plug, rated for tight shut-off on fuel gas service.

2.3 STRAINERS

A. Provide on high pressure side of pressure reducing valves, on inlet side of indicating and control instruments and equipment subject to sediment damage and where shown on drawings. Strainer element shall be removable without disconnection of piping.

B. Gas Lines: "Y" type with removable mesh lined brass strainer sleeve.

C. Body: Smaller than 80 mm (3 inches), brass or bronze; 80 mm (3 inches) and larger, cast iron or semi-steel.

2.4 DIELECTRIC FITTINGS

Provide dielectric couplings or unions between ferrous and non-ferrous pipe.

2.5 GAS EQUIPMENT CONNECTORS

Flexible connectors with teflon core, interlocked galvanized steel protective casing, AGA certified design.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Comply with the International Fuel Gas Code and the following:

1. Install branch piping for fuel gas and connect to all fixtures, valves, cocks, outlets, casework, cabinets and equipment, including those furnished by the Government or specified in other sections.
2. Pipe shall be round and straight. Cutting shall be done with proper tools. Pipe, shall be reamed to full size after cutting.
3. All pipe runs shall be laid out to avoid interference with other work.
4. Install valves with stem in horizontal position whenever possible. All valves shall be easily accessible.
5. Install union and shut-off valve on pressure piping at connections to equipment.
6. Pipe Hangers, Supports and Accessories:
   a. All piping shall be supported per the International Fuel Gas Code, Chapter No. 4.
   b. Shop Painting and Plating: Hangers, supports, rods, inserts and accessories used for Pipe supports shall be shop coated with red

lead or zinc Chromate primer paint. Electroplated copper hanger rods, hangers and accessories may be used with copper tubing.

c. Floor, Wall and Ceiling Plates, Supports, Hangers:

1) Solid or split unplated cast iron, chrome plated in finished areas.

2) All plates shall be provided with set screws.

3) Pipe Hangers: Height adjustable clevis type.

4) Adjustable Floor Rests and Base Flanges: Steel.

5) Concrete Inserts: "Universal" or continuous slotted type.

6) Hanger Rods: Mild, low carbon steel, fully threaded or Threaded at each end with two removable nuts at each end for positioning rod and hanger and locking each in place.

7) Riser Clamps: Malleable iron or steel.

8) Rollers: Cast iron.

9) Self-drilling type expansion shields shall be "Phillips" type, with case hardened steel expander plugs.

10) Miscellaneous Materials: As specified, required, directed or as noted on the drawings for proper installation of hangers, supports and accessories.

7. Install cast chrome plated escutcheon with set screw at each wall, floor and ceiling penetration in exposed finished locations and within cabinets and millwork.

8. Penetrations:

a. Fire Stopping: Where pipes pass through fire partitions, fire walls, smoke partitions, or floors, install a fire stop that provides an effective barrier against the spread of fire, smoke and gases as specified in Section 07 84 00, FIRESTOPPING. Completely fill and seal clearances between piping and openings with the fire stopping materials.

b. Waterproofing: At floor penetrations, completely seal clearances around the pipe and make watertight with sealant as specified in Section 07 92 00, JOINT SEALANTS.

B. Piping shall conform to the following:

1. Fuel Gas:

a. Entire fuel gas piping installation shall be in accordance with requirements of NFPA 54.

b. Provide fuel gas piping with plugged drip pockets at low points.

3.2 CLEANING OF SYSTEM AFTER INSTALLATION

Clean all piping systems to remove all dirt, coatings and debris. Remove all valves, controls etc., and reinstall after piping system has been cleaned.

3.3 TESTS

A. General: Test system either in its entirety or in sections after system is installed or cleaned.

B. Test shall be made in accordance with Section 406 of the International Fuel Gas Code. The system shall be tested at 100 psig (690 kPa).

3.4 COMMISSIONING

A. Provide commissioning documentation in accordance with the requirements of Section 23 08 00 – COMMISSIONING OF HVAC SYSTEMS for all inspection, start up, and contractor testing required above and required by the System Readiness Checklist provided by the Commissioning Agent.

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