SECTION 23 11 23
FACILITY NATURAL-GAS PIPING

SPEC WRITER NOTES:
1. Use this section only for NCA projects.
2. Delete between //----// if not applicable to project. Also delete any other item or paragraph not applicable in the section and renumber the paragraphs.

PART 1 - GENERAL
1.1 DESCRIPTION
Fuel gas systems, including piping, equipment and all necessary accessories as designated in this section.

1.2 RELATED WORK
A. Penetrations in rated enclosures: Section 07 84 00, FIRESTOPPING.
B. Preparation and finish painting and identification of piping systems: Section 09 91 00, PAINTING.
C. Section 22 05 11, COMMON WORK RESULTS FOR PLUMBING.

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. Piping.
   2. Strainers.
   3. All items listed in Part 2 - Products.
C. Detailed shop drawing of clamping device and extensions when required in connection with the waterproofing membrane or the floor drain.

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. American National Standards Institute (ANSI):
   American Society of Mechanical Engineers (ASME): (Copyrighted Society)
   A13.1-07...............Scheme for Identification of Piping Systems
   B16.3-06...............Malleable Iron Threaded Fittings ANSI/ASME
   B16.9-07...............Factory-Made Wrought Steel Buttwelding Fittings ANSI/ASME
B16.11-05 ............... Forged Steel Fittings, Socket-Welding and Threaded ANSI/ASME  
B16.15-06 ............... Cast Bronze Threaded Fittings ANSI/ASME  
B31.8-07 ............... Gas Transmission and Distribution Piping Systems ANSI/ASME  

C. American Society for Testing and Materials (ASTM):  
A47-04 ............... Ferritic Malleable Iron Castings  
A53-07 ............... Pipe, Steel, Black And Hot-Dipped, Zinc-coated Welded and Seamless  
A183-03 ............... Carbon Steel Track Bolts and Nuts  
A536- E1-R05 ........... Ductile Iron Castings  
A733-03 ............... Welded and Seamless Carbon Steel and Austenitic Stainless Steel Pipe Nipples  
B687-E1-R05 ............ Brass, Copper, and Chromium-Plated Pipe Nipples  

D. National Fire Protection Association (NFPA):  
54-2002 ............... National Fuel Gas Code  

E. Manufacturers Standardization Society of the Valve and Fittings Industry, Inc. (MSS):  
SP-72-99 ............... Ball Valves With Flanged or Butt Welding For General Purpose  
SP-110-96 ............... Ball Valve Threaded, Socket Welding, Solder Joint, Grooved and Flared Ends  


SPEC WRITER NOTES: Make material requirements agree with applicable requirements specified in the referenced Applicable Publications. Update and specify only that which applies to the project.  

PART 2 - PRODUCTS  

2.1 FUEL GAS SERVICE CONNECTIONS TO BUILDING  
A. From inside face of exterior wall to a distance of approximately 1.5 m (5 feet) outside of building, use coated piping.  
B. Pipe: Black steel, ASTM A53, Schedule 40. Shop-applied pipe coating shall be one of the following types:  
1. Coal Tar Enamel Coating: Exterior of pipe and fittings shall be cleaned, primed with Type B primer and coated with hot-applied coal tar enamel with bonded layer of felt wrap in accordance with AWWA C203. Asbestos felt shall not be used; felt material shall be
fibrous glass mat as specified in Appendix Section A2.1 of AWWA C203.

3. Thermosetting Epoxy Coating: Fed. Spec. L-C-530, Type II.
4. Field-applied plastic tape material used on pipe joints and for repairing damaged areas of shop-applied coatings, Fed. Spec. L-T-1512, Type I, 10 mils nominal thickness for pipe joints, and Type II, 20 mils nominal thickness for coating repairs.

C. Fittings:
2. Socket weld and threaded fittings forged steel, ANSI B16.11.
3. Grooved End: Ductile iron (ASTM A536, Grade 65-45-12), malleable iron (ASTM A47, Grade 32510), or steel (ASTM A53, Type F or Type E or S, Grade B).


E. Earthquake Valve:
2. Valve actuator: Actuated by one stainless steel ball, incorporated with a bubble level, vertically mounted and have a single step manual reset level.
3. Operating ambient temperature range: minus 40°C (minus 40°F) to 65.5°C (150°F)
4. Maximum allowable pressure: 414 Kpa (60 psi)./

2.2 FUEL GAS PIPING

B. Nipples: Steel, ASTM A733, Schedule 40.
C. Fittings:
1. Steel Welded: Schedule 40
   a. Up to 100 mm (4 inch), ANSI B16.11, Socket welded.
   b. Over 100 mm (4 inch), ANSI B16.9, Butt welded.
3. Grooved End: Ductile iron (ASTM A536, Grade 65-45-12), malleable iron (ASTM A47, Grade 32510), or steel (ASTM A53, Type F or Type E or S, Grade B).
D. Joints: Provide welded or threaded joints.
2.3 EXPOSED FUEL GAS PIPING
A. Unfinished Rooms and Mechanical Rooms: Chrome-plated brass piping is not required. Paint piping systems as specified in Section 09 91 00, PAINTING.

2.4 WATERPROOFING
A. Provide at points where pipes pass through membrane waterproofed floors or walls in contact with earth.
B. Floors: Provide cast iron stack sleeve with flashing device and an underdeck clamp. After stack is passed through sleeve, provide a waterproofed caulked joint at top hub.
C. Walls: See detail shown on drawings.

2.5 STRAINERS
A. Provide on high pressure side of pressure reducing valves, on suction side of pumps, 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.

2.6 DIELECTRIC FITTINGS
A. Provide dielectric couplings or unions between ferrous and non-ferrous pipe.

2.7 GAS EQUIPMENT CONNECTORS
A. 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, except for plastic and glass, 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 International Fuel Gas Code.
   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.
      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) Hangers and supports utilized with insulated pipe and tubing shall have 180 degree (min.) metal protection shield Centered on and welded to the hanger and support. The shield shall be 4 inches in length and be 16 gauge steel. The shield shall be sized for the insulation.
     11) Miscellaneous Materials: As specified, required, directed or as noted on the drawings for proper installation of hangers, supports and accessories. If the vertical distance exceeds 6 m (20 feet) for cast iron pipe additional support shall be provided in the center of that span. Provide all necessary auxiliary steel to provide that support.

7. Install cast 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 raceways 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 and International Fuel Gas Code.
   b. Install fuel gas piping with plugged drip pockets at low points.

SPEC WRITER NOTES: Use the following paragraph only in Seismic Area A.

c. //Install automatic shutoff valve (earthquake valve) on building side of meter. Valve shall positively shut off supply of gas in case of pressure failure, remain shut off until manually reopened, and be provided with outside adjustment for reset.//

3.2 TESTS

A. General: Test system either in its entirety or in sections in accordance with International Fuel Gas Code.

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