

**SECTION 23 11 23**  
**FACILITY NATURAL-GAS PIPING**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. 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 13 05 41, SEISMIC RESTRAINT REQUIREMENTS FOR NON-STRUCTURAL COMPONENTS: Seismic requirements for non-structural equipment
- D. Section 22 05 11, COMMON WORK RESULTS FOR PLUMBING.
- E. Section 22 05 23, GENERAL DUTY VALVES FOR PLUMBING PIPING
- F. Pipe Insulation: Section 23 07 11, HVAC AND PLUMBING INSULATION.
- G. Section 23 08 00, COMMISSIONING OF HVAC SYSTEMS: Requirements for commissioning, systems readiness checklists, and training.

**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. 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

Department of Veteran Affairs  
Renovate Research Lab Phase 3  
Nashville, TN  
V.A. Project Number: 626-11-101

- 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

## **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. 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.
  - 2. Malleable Iron, Threaded: ANSI B16.3.
- D. Joints: Provide welded or threaded joints.
- E. Fittings:
  - 1. Butt weld fittings, wrought steel, ANSI B16.9.
  - 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).
- F. Joints: Welded, ANSI B31.8.

### **2.2 EXPOSED FUEL GAS PIPING**

- A. Finished Room: Use full iron pipe size chrome plated brass piping for exposed fuel gas piping connecting fixtures, casework, cabinets, equipment and reagent racks when not concealed by apron including those furnished by the Government or specified in other sections.
  - 1. Pipe: Fed. Spec. WW-P-351, standard weight.
  - 2. Fittings: ANSI B16.15 cast bronze threaded fittings with chrome finish, (125 and 250).
  - 3. Nipples: ASTM B 687, Chromium-plated.
  - 4. Unions: 50 mm (2 inches and smaller) Mss SP-72, SP-110, Brass or Bronze threaded with chrome finish. Unions 65 mm (2-1/2 inches) and larger shall be flange type with approved gaskets.
  - 5. Valves: Mss SP-72, SP-110, Brass or bronze with chrome finish.
- B. Unfinished Rooms, Mechanical Rooms and Kitchens: Chrome-plated brass piping is not required. Paint piping systems as specified in Section 09 91 00, PAINTING.

### **2.3 VALVES**

- A. 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.
- B. 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.

### **2.4 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 a 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. Gas Lines: "Y" type with removable mesh lined brass strainer sleeve.
- B. 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**

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

### **2.7 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, 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 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) 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 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. Install 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 a minimum of 1.5 times maximum working pressure, but not less than 3 psig (20 kPa) gage).

### **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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