

SECTION 22 12 00 - FACILITY FUEL SYSTEMS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. The requirements of this section apply to the fuel storage, handling, and distribution systems for the facility.
- B. Related Work: The requirements of Section 22 05 00, Common HVAC Materials and Methods, also apply to this section.

1.2 CODES AND STANDARDS

- A. General
- B. NFPA 30, 31
- C. UL-142

1.3 SUBMITTALS

- A. Required for all items.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

- A. Black Steel Pipe:
 - 1. Applications: Above ground only.
 - a. Natural Gas, indoors.
 - 2. Pipe: Schedule 40, standard black steel pipe ASTM A-120 or A-53.
 - 3. Threaded Fittings: For above ground installations only. Banded class 150 malleable iron fittings, ANSI B16.3 to 150 psi.
 - 4. Welding Fittings: Standard weight, seamless steel, beveled end fittings, ANSI B16.9.
 - 5. MegaPress Fittings: ½-inch through 2-inch shall conform to ASME B31.1, ASME B31.3, or ASME B31.9. Fittings shall have zinc and nickel coating, an HNBR sealing element, 420 stainless steel grip ring, separator ring, and an un-pressed fitting leak identification feature. Sealing elements shall be verified for the intended use. Viega MegaPress or Engineer approved equal.
- B. Galvanized Steel Pipe:
 - 1. Applications: Above ground only.
 - a. Natural gas, outdoors.
 - 2. Pipe: Schedule 40, standard galvanized steel pipe, ASTM A-53 or A-106.
 - 3. Fittings: Banded class 150 galvanized malleable iron threaded fittings, ANSI B16.3.
- C. Flexible Fuel Gas Piping (CSST):

1. Application: 2 psi or less for final connection of equipment.
 - a. Natural gas
2. Pipe: Corrugated 300 series stainless steel tubing with yellow polyethylene jacketing.
3. Fittings: Fittings shall be yellow brass and provide a self-flaring connection to the tubing. Systems incorporating gaskets or o-rings are not acceptable.
4. Underground Installations: CSST pre-sleeved with heavy wall internally ribbed polyethylene secondary venting conduit with end seals and vent connection fittings.
5. Approvals: System shall be listed by an approved independent laboratory and approved for use by the local code officials. TracPipe, Gastite, or approved.

2.2 PIPING ACCESSORIES

- A. Fuel Gas Valves: UL listed or AGA approved valves.
 1. 10 psig or Less:
 - a. Ball: NIBCO bronze body T/S 585-70-UL, brass body FP-600.
- B. Strainers: Threaded bronze or iron body for 175 working pressure, Y pattern with 1/32" stainless steel perforated screen.
- C. Gas Pressure Regulators: Size based on pressures indicated on the drawings and for 1.5 times connected load. Style and model as approved by Serving Gas Company. Regulators for systems operating above 2 PSI shall be rated for 60 PSI minimum. The size of the orifice shall be clearly marked on the valve. Maxitrol, Rockwell, Fisher, Reliance, or approve substitute.
- D. Gas Appliance Connectors: For low pressure gas connection to indoor or outdoor stationary appliances, AGA approved corrugated stainless steel tubing with zinc plated steel end fittings. Brasscraft or approved substitute.
- E. Gas Connection Hose: For low pressure gas connection to moveable appliances including cooking equipment, flexible hose consisting of inner tube, stainless steel braid, and outer protective jacket with swivel steel threaded end fittings. T & S Brass HG series, or approved substitute.
- F. Lab Gas Shut-off Panels: U.L. listed, recessed, wall mounted panel with locked and hinged door. Manual shut-off valve and solenoid operated normally closed valve. Provide with label "Laboratory Gas Service" panel 120V powered. Isimet S series. See Division 26 for control button.

PART 3 - EXECUTION

3.1 EQUIPMENT INSTALLATION

- A. Locating and Positioning Equipment: Observe all Codes and Regulations and good common practice in locating and installing mechanical equipment and material so that complete installation presents the least possible hazard. Maintain adequate clearances for repair and service to all equipment. Installation of any equipment with less than minimum clearances shall not be accepted.
- B. Anchorage: Anchor and/or brace mechanical equipment, piping and ductwork to resist displacement due to seismic action; include snubbers on equipment mounted on spring isolators.

3.2 PIPE INSTALLATION

- A. General: Install pipe, tube and fittings in accordance with recognized industry practiced for each indicated service without piping failure. Install each run with a minimum of joints and couplings, but with adequate and accessible unions and flanges for disassembly, maintenance and/or replacement of valves and equipment. Reduce sizes (where indicated) by use of reducing fittings. Align piping accurately at connections.
- B. Ferrous Threaded Piping: Thread pipe in accordance with ANSI 82.1; cut threads full and clean using sharp dies. Ream threaded ends to remove burrs and restore full inside diameter. Apply pipe joint compound where recommended by pipe/fitting manufacturer, on male threads at each joint and tighten joint to leave no more than 3 threads exposed.
- C. Flexible Gas Piping (CSST): Comply with manufacturer's recommendations for system installation. Provide striker plates and supports as required. All penetrations of finished walls, including mechanical room walls, shall be accomplished using surface or recessed termination fittings. Where installed underground below a building, vent the conduit to outdoors per Code.
- D. Changes in Direction: Use fittings for all changes in direction. Run lines parallel with building surfaces.
- E. Unions and Flanges: At all equipment to permit dismantling and elsewhere as consistent with good installation practice.
- F. Expansion: Provide loops, swing joints, anchors, runouts and spring pieces to prevent damage to piping or equipment.
- G. Compression Fittings:

3.3 GAS SERVICE

- A. Contact Cascade Natural Gas Co. service as required and pay all costs involved. Run all gas distribution piping and make final connections to all gas using equipment. Install regulators to deliver proper inlet pressures and vent regulators to outside where required.

3.4 CLEANING

- A. General: Clean all dirt and construction dust and debris from all mechanical piping systems and leave in a new condition. Touch up paint where necessary.
- B. Fuel Piping: Blow clear of debris with nitrogen or oil free air.

3.5 TEST

- A. General: Minimum duration of two hours or longer, as directed for all tests. Furnish report of test observation signed by qualified inspector. Make all tests before applying insulation, backfilling, or otherwise concealing piping or connecting fixtures or equipment. Where part of the system must be tested to avoid concealment before the entire system is complete, test that portion separately, same as for entire system.
- B. Compression Fittings.

- C. Natural Gas Piping: One half hour minimum air at 60 psig for 2 psig gas, and 15 minutes at 10 psig for 7" water gauge natural gas or as approved and certified by serving utility. Allow district personnel to witness test.

3.6 MECHANICAL PAINTING

- A. Uninsulated Piping: Paint black steel piping in moist equipment rooms, crawl spaces, inside of secondary containment piping, or exposed to weather two (2) coats black rust-inhibiting paint.

END OF SECTION 22 12 00