

SECTION 22 11 23**NATURAL GAS PIPING SYSTEM****PART 1 - GENERAL****1.1 RELATED REQUIREMENTS**

- A. Comply with Division 1 - General Requirements and referenced documents.
- B. Comply with Division 22 Sections, as applicable. Refer to other Divisions for coordination of work with other trades, as required.
- C. Comply with Local Governing Gas Codes, and the requirements of the Authorities Having Jurisdiction.

1.2 SYSTEM DESCRIPTION

- A. Provide a complete natural gas piping system as indicated herein and as illustrated on the contract drawings.
- B. Make connections to water heaters, HVAC equipment, kitchen equipment or other devices as specified here or as shown on the drawings.
- C. Provide gas cocks, pressure regulators, dirt legs, valves and unions or other devices as indicated and as required by the local authorities having jurisdiction.

1.3 SUBMITTALS

- A. Submit shop drawings and product data under provisions of Division 1.
- B. Indicate on submittal piping material and joining method for each system and for the various sizes of piping systems to be installed. This shall be in tabular form in one location.
- C. Product Data:
 - 1. Pipe.
 - 2. Fittings.
 - 3. Joining methods.
 - 4. Valves.
 - 5. Clean Gas pressure regulators.
 - 6. Vents.
- D. Certification: Submit certification that completed system complies with test requirements of municipality, State, and other public authorities having jurisdiction over system.

- E. Provide closeout documents as required in Division 1.

1.4 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with requirements in following order of precedence:
 1. Codes, laws, ordinances, rules, regulations or orders of any public authority having jurisdiction over installation, inspection, and testing, including local codes.
 2. Provisions specified in this Section.
 3. Applicable provisions of standards of National Fire Protection Association (NFPA).
 4. Applicable provisions of standards of American Gas Association (AGA).
 5. International Plumbing Code and International Fuel Gas Code.
 6. Local Gas Utility Requirements.
- B. Installer shall have been doing related work as described herein for a minimum of 5 years.

PART 2 - PRODUCTS

2.1 MASTER METER

- A. Contractor shall coordinate revised gas service requirements with the Local Natural Gas Utility Company to insure the timely provision of this service to keep up with the project requirements. Coordinate exact pipe routing, size, installation, and system pressure requirements with utility company. Contractor shall coordinate with and pay all costs to the Utility Company for all new gas piping from the off-site gas main trunk connection up to the property line, extended onto the site up to and including the gas meter installation at the proposed location. Contractor shall install gas piping from the gas meter up to the building entry point. This system shall be provided with the service pressure noted with isolation valves, test ports, and regulation components to adjust the downstream pressure to that indicated.
- B. Contractor shall furnish to the local gas utility company a detailed itemized list of all gas fired equipment including required operating supply pressure and MBTU input requirement of each piece of equipment.

2.2 ABOVE GROUND PIPE AND FITTINGS

- A. Pipe: ASTM A53, Grade A or B, seamless, Schedule 40, standard weight black steel.
 1. 2 Inches and Smaller: Threaded and coupled.
 2. 2-1/2 Inches and Larger: Butt welded joints
 3. All gas piping in sleeves shall have welded joints, regardless of size.

- B. Fittings, 2 Inches and Smaller: ASTM A197, 150 LB black malleable iron, screwed joint. Piping system with pressure of 2 psig or greater shall have socket welded joints for all sizes.
- C. Fittings, 2-1/2 Inches and Larger: ASTM A234, WPB standard weight, weld joint fittings.
- D. Unions, 2 Inches and Smaller: ASTM A197, 150 LB, black malleable iron, screwed joint, brass to iron ground joint.
- E. Flanges:
 - 1. Use for 2-1/2 Inches and larger pipe.
 - 2. ASTM A181, Grade 1, 150 LB, flat faced, weld neck.
 - 3. Gaskets:
 - a. Acceptable manufacturers:
 - 1) Manville.
 - 2) Cranite.
 - b. 150 LB, 1/16 Inch full-faced, punched sheet, 650 Deg.F. rating suitable for gas service.
 - c. Bolting: ASTM A307, Grade B, heavy hex head machine bolt with heavy hex nuts.

2.3 VALVES

- A. Acceptable Manufacturers:
 - 1. SMG Global
 - 2. Milwaukee
 - 3. Hammond
 - 4. McDonald.
- B. Valves: 125 LB iron cocks, flat head, non-lubricated plug with resilient double seal, screwed ends or flanged, for natural gas service.
- C. Acceptable Product: "Series 400", Key Port valve by SMG Global with RS49 (HYCAR) plug seals, U.L. listed for natural gas shut-off.

2.4 GAS PRESSURE REGULATORS

- A. Acceptable Manufacturers:
 - 1. Rockwell/Equimeter.
 - 2. Fisher.
 - 3. Sensus
 - 4. Itron

B. Regulators:

1. Adjustable type, with automatic loading.
2. Provide with automatic pressure relief.
3. Provide means for removing and renewing valve.
4. Adjust for outlet pressure required.
5. Outlet pressure shall not vary more than 1/2 inch water column from setting point at connected load capacity for regulator.

C. Pressure Relief: Diaphragm operated, spring loaded type with vent for relief of excess pressure on low pressure side of each main service regulator.

D. All equipment shall be furnished with final regulator.

E. Regulators shall have bugproof screened vent cap installed in vent tapping.

F. When regulators are installed inside the building and venting of the regulator is required, extend the vent full size to the outside and terminate vent with a gooseneck with a bugproof screen.

G. Acceptable Product: Rockwell Model 143, 243 or 121 as determined by inlet and outlet pressure, pipe size and CFH capacity.

H. Provide secondary regulators at individual equipment connections where required to deliver manufacturer's recommended delivery pressure to equipment. Where regulator are installed in the building, provide an individual regulator vent to the exterior of the building and terminate open sight 12" above the roof with gooseneck and bug screen.

2.5 GAS PIPE ROOF SUPPORTS:

A. Pipe supports shall have stainless steel adjustable height hard cast rubber roller w/ nylon bushing pipe supports with stainless steel pad for all roof top utility lines. Refer to manufacturer's recommendations for spacing and appropriate pipe support size of pipe. Provide, as a minimum supports as follows:

1. Within 3'-0" of all equipment connections
2. Within 2'-0" of each change in direction, elbow & tee.
3. Not more than every 10'-0" on centers beyond those indicated above.

B. Provide Mapa model MX-5RA or equal by Erico or Miro

C. Provide with Traffic Pad, Mapa model MWP1016.

2.6 VENT CAPS

- A. Caps shall be weatherproof with bugproof screened vent.
- B. Caps shall be double outlet vent cap, slip-on type with set screw or threaded, with aluminum body and 40 mesh stainless wire cloth as manufactured by Morrison Bros. Co., OPW or Universal.

PART 3 - EXECUTION

3.1 PIPING INSTALLATION

- A. Cap or plug pipe openings during installation.
- B. Cover and protect piping, fixtures and equipment against dirt, water, weather, and chemical or mechanical injury.
- C. Run Piping Concealed and Sleeved in Finished Rooms unless Indicated Otherwise:
 - 1. Terminate lower end of vertical supply piping near burners or equipment connections.
 - 2. Terminate with tee, nipple, and cap to serve as dirt trap.
 - 3. Where gas burning kitchen equipment is located adjacent to other gas burning kitchen equipment, provide manifold for battery.
 - 4. Connect each end of a manifold to gas distribution system to maintain uniform gas pressure at each piece of equipment, two (2) point service.
 - 5. All final equipment connections shall consist of a union and shut-off valve.
- D. Threaded Joints:
 - 1. Taper threads and cut evenly; make with graphite and oil.
 - 2. After cutting and before threading, ream pipe to remove burrs.
 - 3. Use appropriate pipe joint thread compound.
 - 4. Caulking of threaded joints after joining to stop or prevent leaks will not be permitted.
- E. Welded Joints:
 - 1. Fusion-weld in accordance with ANSI B31.8, make changes in direction of piping with welding fittings only.
 - 2. Mitering or notching pipe to form elbows and tees will not be permitted except for sleeves as indicated elsewhere herein.
 - 3. Make branch connections with welding tees or forged welding branch outlets except for sleeves as indicated elsewhere herein.
- F. Beveling:
 - 1. Make field and shop bevels by mechanical means or flame cutting.
 - 2. Where beveling is done by flame cutting, clean surfaces of scale and oxidation prior to welding.

G. Alignment:

1. Before welding, align component parts to be welded so no strain is placed on weld when finally positioned.
2. Set flanges and branches true.
3. Maintain alignment during welding operation.

H. Make final connection to equipment using rigid pipe and fittings.

I. Place fire stop where pipes pass through fire walls, fire partitions, or floors.

J. Sleeves:

1. Install continuous pipe sleeve around gas piping above ceilings, in vertical chases, and at all concealed piping within the building.
2. Seal all sleeves airtight inside the building except where noted, and allowed by Authorities Having Jurisdiction, to terminate in ventilated space.
3. Vent all sleeves to the outside. Terminate sleeve to prevent entrance of water and insects.
4. Size and install gas pipe sleeves to permit replacement of gas piping without damage to building structure.
5. Terminate gas sleeve vents a minimum of eight inches (8") above the roof with specified vent cap. All exposed vent piping on roof or above grade shall be Schedule 40 galvanized steel pipe.
6. Vent to have free area equal to the net free area between the sleeve and the largest gas pipe contained therein.
7. All gas piping in sleeves shall have welded joints regardless of pipe size.
8. Where the end sealing is capable of withstanding the full pressure of the gas pipe the vented sleeve shall be designed for the same pressure as the pipe.

K. Piping on roof:

1. Piping shall be supported on roof supports furnished and installed under Division 22. Refer to documents for installation requirements. Spacing not to exceed 10'-0" on center and within 3'-0" of each equipment connection or branch pipe.
2. Offset pipes to be 8" minimum above the roof at all expansion joints, roof penetrations, perimeter gravel stops/fascia and vertically flashed surfaces.
3. Unless noted otherwise, bottom of pipe shall be minimum of 4" above roof or roof ballast.
4. Do not secure piping to supports unless detailed otherwise.
5. Exposed piping shall be coated with red primer and a minimum of two coats of paint. Preparation of piping and painting shall comply with other applicable sections in Division I.
6. Pipe installer shall determine exact layout of piping and locate all required supports.

3.2 FIELD QUALITY CONTROL

- A. Set up in accessible position, where directed, test pump and mercury gauge connected to permanent gas piping.
- B. Protect pump and gauge and keep in working order until after final inspection.
- C. Remove as directed.
- D. Before appliances are connected, piping systems shall withstand a test pressure of 150 percent of the maximum working pressure or 30 PSIG, whichever is greater, for a period of not less than one (1) hour without showing a drop in pressure.
- E. Pressure calibrated instruments shall read in increments of not greater than 0.1 LB when measured with mercury manometer or slope gauge.
- F. Pressurize system, then isolate source of pressure before pressure tests are made.
- G. Test gas piping with dry air only.
- H. If test fails, repair all leaks and retest until the test passes.

END OF SECTION