

## **Design Standard**

### **Facility Natural Gas Systems**

#### **Purpose:**

The natural gas systems are an essential element of the mechanical heating and domestic water heating systems. This design standard has the purpose of creating a consistent application of natural gas system requirements throughout the East Side Union High School District therefore achieving a standard of quality for maintenance and reliability throughout all renovation and new building projects.

#### **Design Standard:**

Design and specify work to include materials, installation, and testing of piping, valves, and appurtenances for natural gas systems for a complete and operable system.

- Size gas piping for estimated maximum demand flow in CFH (using 1000 BTU per cubic foot) per code requirements. Coordinate with Food Service and Laboratory designers to include non-heating loads.
- Steel Pipe (Above Grade Installation):
  - 2 Inches and Smaller: Schedule 40, A53 black steel pipe and threaded black malleable threaded fittings.
  - 2-1/2 Inches and Larger: Schedule 40, A53 black pipe with Schedule 40 butt weld fittings.
  - ASTM A53, electric-resistance welded (Type E) or seamless (Type S), Grade B, black, Schedule 40 pipe, manufactured for threaded or welded pipe connections.
- Steel Pipe (Exterior of Building Below Grade Installations)
  - 2 Inches and Smaller: Schedule 40, A53 black steel pipe and threaded black malleable threaded fittings.
  - 2-1/2 Inches and Larger: Schedule 40, A53 black pipe with butt weld fittings.
  - ASTM A53, electric-resistance welded (Type E) or seamless (Type S), Grade B, black, Schedule 40 pipe, manufactured for threaded or welded pipe connections.
  - Underground Steel Piping Corrosion Protection: Factory wrap un-insulated underground steel piping systems with protective coating composed of a coal-tar saturated wrapping tape over a 20 mil thick coal-tar epoxy coating, equivalent to "Republic X-Tru-Coat." Wrap joints spirally with a minimum overlap of 1/2 tape width. Extend wrap not less than 3 inches above grade. Provide high voltage holiday detector test of coating to check for holidays.

Provide cathodic protection to meet requirements of NACE Standard RP0169-2002

- Polyethylene Pipe (Below Grade Installations at 30 psig and Less Only)
  - Polyethylene pipe, tubing and fittings furnished under this Specification shall conform to applicable provisions and requirements of the latest revision of the US Department of Transportation Pipeline Safety Regulations (CFR) Title 49, Part 192, "Transportation of Natural or Other Gases by Pipeline: Minimum Federal Safety Standards," and, by inclusion, appropriate standards referenced therein.
  - Piping shall be easily traced.
- Natural Gas Valves:
  - 2 Inches and Smaller: Ball valves. UL listed, two-piece construction, threaded, bronze body, conventional port, 250 PSI WOG working pressure
  - 2-1/2 Inches and Larger: 100 to 125 PSI rated, all bronze or iron body/bronze trimmed plug cock type, square head or tee/lever handle operation. CSA approved
- Natural Gas Pressure Regulators: Diaphragm and spring actuated type, with vented relief feature. Construction, pressure range and venting features suitable for intended service. Regulator to meet code and serving utility requirements. Pipe vented type to atmosphere in approved location.
- Provide shutoff valves, pressure regulators and unions at connections to gas-fired equipment. Provide dirt legs at low points.

### **Approved Manufacturers:**

- Gas seismic valves
  - Quake Master Seismic Safety
- Pressure regulators
  - American Meter Company
- Valves
  - Apollo
  - Jenkins Bros.
  - Lunkenheimer Co.
  - Nibco
  - Watts

### **Substitutes Allowed:**

Yes, if performance and quality equivalency can be evidenced.

### **Associated Design Standards and Construction Specifications**

- 22 00 00 Basic Plumbing System Design Standard
- 22 11 13 General Plumbing Piping Systems Design Standard
- 22 05 12 Plumbing Pipe And Fittings Design Standard
- 22 63 13 Gas Piping for Laboratory Facilities Design Standard
- Division 23 HVAC Design Standards

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