

SECTION 15485

NATURAL GAS SYSTEM

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. **Natural gas piping.**
2. Gas solenoid safety valves.
3. Gas safety valve cabinets.
4. Gas valve control panel.
5. Flexible connectors and quick couplers.

B. Related Sections:

1. Section 15010 - Basic Mechanical Requirements.
2. Section 15050 - Basic Mechanical Materials and Methods: Valves, pipe hangers, supports and accessories.
3. Section 15450 - Plumbing Equipment: Gas supply and run-out with drip leg and gas cock or valve to water heater connection points.
4. Section 15460 - Special Plumbing Equipment Systems: Gas supply and run-out with drip leg and gas cock or valve to connection points on all kitchen and laboratory equipment, headers or modules.

1.02 REFERENCES

- A. American Society for Testing and Materials (ASTM).
- B. American National Standards Institute (ANSI).
- C. National Fire Protection Association (NFPA).

1.03 SYSTEM DESCRIPTION

A. Design Requirements:

1. Natural Gas Piping:

- a. Utility Company will run gas service up to and including the meter.
- b. All gas piping on house side of meter will be furnished and installed under Division 15.
- c. Design system in accordance with the following standards:
 - 1) **NSI B31.2 - Fuel Gas Piping.**
 - 2) **NFPA 54 (ANSI Z223.1) - National Fuel Gas Code.**
 - 3) **ANSI Z 223.1a - Supplement to National Fuel Gas Code.**

- d. Use tapered couplings. Do not use thread protectors provided with piping.

- e. Engineer shall review all existing and new gas requirements to verify adequacy of gas supply (pressure, pipe size and meter size). Engineer shall indicate them on drawings.

2. Gas Solenoid Safety Valves:

- a. Provide for classroom laboratories and kitchens.
- b. Kitchen valve de-energized when fire suppression system is activated.
 - c. Reset of kitchen valve only possible after fire suppression system has been reset, re-charged and in "ready " mode.
- d. Not in plenums .

3. Flexible Hose Gas Connectors and Quick Couplers:

- a. Provide flexible stainless steel connectors with full size quick coupler for all kitchen and heavy movable gas appliance equipment.
- b. Connectors of lengths required to displace equipment for complete cleaning under and around gas appliance.
- c. Provide plug valve at service connection on equipment branch and quick coupler at service end of flexible hose connector.
- d. Provide union connection on appliance or manifold end of hose connection.

PART 2 - PRODUCTS

2.01 PIPING MATERIALS

A. Interior Exposed or Accessible:

1. Size 1/2" thru 1-1/2":

Pipe: Schedule 40, ASTM A120.

Fittings: Threaded malleable iron.

Joint Seal: Rector seal or teflon paste.

Unions: Black malleable iron ground joint, bronze to iron seat, 150 lb. class, ANSI B2.1 and ASTM A197.

2. Size 2" and over:

Pipe: Schedule 40, ASTM A53, Type S Grade B.

Fitting: Butt weld ASTM A234.

Unions: 150 lb. forged steel weld neck flange, ANSI/B16.5 and ASTM A105.

B. Interior concealed non accessible and air plenums:

- 1. All pipe and fittings welded.

2.02 GAS SOLENOID SAFETY VALVES

A. Manufacturer:

1. Automatic Switch Company (ASCO).

Manufacturer:

1. Croker Model 9100 modified for valve depth.

B. Cabinet:

1. #4 stainless steel finish fully recessed, Series S construction, Style K stainless steel door with cylinder lock, four keys each cabinet, all cabinets keyed alike.
2. Modify cabinets for 6" maximum depth for valve sizes 1/2" thru 1-1/2", and 8" maximum depth for valve size 2" thru 3".

Manufacturers:

Flexible Connector: Thermo-Tech Products Co.

Quick Coupler: Hansen Manufacturing Co. "Gas Mate".

B. Description:

Flexible Connector: Corrugated type 304 stainless steel flexible pipe with stainless steel braid and heavy flexible armor shield.

- C. Quick Coupler: One way quick coupler with gas rating in cubic feet per hour equal to equivalent gas appliance rating.

- A. In general, for project specifications, remove "Design Requirements" sub-paragraph A in Part 1, paragraph 1.03 "System Description" of this Design Guide and use list to expand on specific requirements of installation for each product specified.

B. Natural Gas Systems:

All fuel-gas piping installed on campus shall be installed, tested and purged per the International Fuel Gas Code (IFGC) and the following amendments to the IFGC which are mostly consistent with the City and County of Denver Amendments.

Purging of fuel-gas piping (1: prior to modification or service and 2: before placing in service) shall be in compliance with the requirements of IFGC. The purging shall be witnessed and approved in writing by the campus certified inspectors. For the first purging (prior to modification or service), contractor shall notify the campus inspector a minimum of 48 hours in advance. For the second purging (before placing the gas piping in service) or for additional purging where necessary, contractor may schedule with the inspector during the first purging inspection.

2.03 GAS SAFETY VALVE CABINETS

A.

2.04 FLEXIBLE HOSE GAS CONNECTORS AND QUICK COUPLERS

A.

PART 3 - EXECUTION

3.01 INSTALLATION

When testing a system with less than 10 cubic feet and a pressure of 14.0 in. water column or less, the test pressure shall be 10 psig for 15 minutes.

When testing a system larger than 10 cubic feet and a pressure of 14.0 in. water column or less, the test pressure shall be 10 psig for 30 minutes per each 500 cubic feet of pipe or fraction thereof.

Gas piping under pressure greater than 14 inches water column shall be tested at 60 psig for 30 minutes per each 500 cubic feet of pipe or any fraction thereof.

Welded pipe shall be tested at 60 psig for 30 minutes per each 500 cubic feet of pipe or any fraction thereof.

For higher pressures, follow the IFGC requirements.

All contractors on campus working on gas piping shall be licensed.

The contractor shall have either a State of Colorado Master Plumbing License or an International Code Council (ICC) Master Gas Pipe Fitter License.

The contractor's staff on site shall have a State of Colorado Journeyman Plumber or an ICC Journeyman Gas Fitter's License.

It shall be the design team's responsibility to establish the working gas pressure and volume of gas piping to be tested. This information needs to be on site during inspection.

Reference: The City and County of Denver 2003 Amendments to the international Fuel Gas Code, section 406.4.1.

3.02 QUALITY CONTROL

- A. Welder certification is required, and welder shall pass approval by local inspector for visual quality.

END OF SECTION