



## CITY OF NORTH MANKATO

### Gas Line Installation Requirements

This handout serves as a brief overview on gas line installation requirements and is not intended as a complete list of requirements.

- ❖ Building permits are required for the installation of all gas lines, interior and exterior.
- ❖ ***If a registered contractor is hired to complete the project, have them take out any and all required permits!***
- ❖ A completed Building Permit Application shall be submitted prior to commencing with the installation of any gas line.

#### **EXTERIOR INSTALLATIONS (underground)**

- Gas piping shall be sized in accordance with one of the following:
  - Pipe sizing tables or sizing equations in accordance with the current Minnesota Fuel Gas Code.
  - The sizing tables included in a listed piping system's manufacturer's installation instructions.
  - Other approved engineering methods
- The following are approved material types for exterior underground installations:
  - **Type L copper tubing:** continuous, seamless sections with no fittings underground. Type L copper tubing shall **not** be used if the gas contains more than an average of .3 grains of hydrogen sulfide per 100 standard cubic feet of gas.
  - **Polyethylene plastic pipe:** tubing and fittings shall conform to the 2009 edition of ASTM D2513. Such pipe shall be marked "Gas" and "ASTM D2513."
  - **Plastic pipe:** tubing and fittings, other than polyethylene, shall be identified and conform to the 2008 edition of ASTM D2513. Such pipe shall be marked "Gas" and "ASTM D2513."
  - **Aluminum-alloy tubing shall NOT be used in exterior locations or underground.**
- Plastic pipe shall be installed outdoors, underground only. Plastic pipe shall not be used within or under any building or slab or be operated at pressures greater than 100 psig for natural gas or 30 psig for LP-gas.
  - Plastic pipe shall be permitted to terminate above ground outside of buildings where installed in premanufactured anodeless risers or service head adapter risers that are installed in accordance with the manufacturer's installation instructions.
  - Plastic pipe shall be permitted to terminate with a wall head adapter within buildings where the plastic pipe is inserted in a piping material for fuel gas use in buildings.
  - Plastic pipe shall be permitted under outdoor patio, walkway and driveway slabs provided that the burial depth is a minimum of 12" below grade.
  - Connections made outdoors and underground between metallic and plastic piping shall be made only with transition fittings conforming with ASTM D2513 Category I or ASTM F1973.
  - A yellow insulated copper tracer wire or other approved conductor shall be installed adjacent to underground nonmetallic piping. Access shall be provided to the tracer wire or the tracer wire shall terminate above ground at each end of the nonmetallic piping. The

tracer wire size shall not be less than 18 AWG and the insulation type shall be suitable for direct burial.

- **Minimum Burial Depth:**
  - Underground piping systems shall be installed a minimum depth of 12 inches below grade, except:
    - Individual lines to outside lights, grills or other appliances shall be installed a minimum of 8 inches below finished grade, provided that such installation is approved and is installed in locations not susceptible to physical damage or unless noted in other sections of this handout.
  - The trench shall be graded so that the pipe has a firm, substantially continuous bearing on the bottom of the trench.
- **Sediment Traps:**
  - Drips shall be provided with ready access to permit cleaning or emptying.
  - A drip shall not be located where the condensate is subject to freezing.
  - A sediment trap shall be installed before all automatically controlled gas appliances where a sediment trap is not incorporated as part of the appliance. The sediment trap shall be installed as close to the inlet of the appliance as practical, before any regulator or automatic gas valve, and ahead of all pounds-to-inches pressure regulators. The sediment trap shall be either a tee fitting with a capped nipple, a minimum of 3 inches in length, in the bottom opening of the run of the tee, or other device approved as an effective sediment trap. If a tee fitting is used, it shall provide a 90-degree change of direction of gas flow and the cap shall be at an elevation lower than the tee fitting.
- **Shutoff Valves:**
  - Shutoff valves shall be of an approved type; shall be constructed of materials compatible with the piping; and shall comply with the standard that is applicable for the pressure and application.
  - Shutoff valves shall be prohibited in concealed locations.
  - Shutoff valves shall be located in places so as to provide access for operation and shall be installed so as to be protected from damage.
  - Each appliance shall be provided with a shutoff valve.
- **Pressure Regulators:**
  - A line pressure regulator shall be installed where the appliance is designed to operate at a lower pressure than the supply pressure.
  - Line gas pressure regulators shall be listed as complying with ANSI Z21.80.
  - Access shall be provided to pressure regulators.
  - Pressure regulators shall be protected from physical damage.
  - Regulators installed on the exterior of the building shall be approved for outdoor installation.
- **Testing (air test):**
  - Prior to acceptance and initial operation, all piping installations shall be visually inspected and pressure tested to determine that the materials, design, fabrication and installation practices comply with the requirements of this code.
  - Where new branches are installed to new appliances, only the newly installed branches shall be required to be pressure tested. Connections between the new piping and the existing piping shall be tested with a noncorrosive leak-detecting fluid or other approved leak-detecting methods.
  - Prior to testing, the interior of the pipe shall be cleared of all foreign material.
  - The test pressure to be used shall be no less than one and one-half times the proposed maximum working pressure, but not less than **25 psig**.
  - Test duration shall be not less than **one-half hour**.

- Tests which utilize dial gauges shall be performed with gauges of 2 psi incrementation or less and shall have a pressure range not greater than twice the test pressure applied. The test pressure shall be within the middle 50 percent of the test gauge pressure range.

- **Inspection:**

- Inspection shall consist of visual examination, during or after manufacture, fabrication, assembly or pressure tests.
- Inspection shall be completed prior to covering pipe(s) and can be completed at the same time as the air test of the gas line. During this inspection, all gas lines shall be labeled, indicating what appliance is being supplied by each gas line.

**INTERIOR & EXTERIOR INSTALLATIONS (above ground)**

- Gas piping shall be sized in accordance with one of the following:
  - Pipe sizing tables or sizing equations in accordance with the current Minnesota Fuel Gas Code.
  - The sizing tables included in a listed piping system's manufacturer's installation instructions.
  - Other approved engineering methods
- The following are approved material types for interior installations:
  - Type K or Type L copper tubing
  - Steel and wrought-iron pipe-Schedule 40 complying with one of the following standards:
    - ASME B36.10,10M
    - ASTM A53/A53M
    - ASTM A106
  - Aluminum-alloy tubing complying with ASTM B210 or ASTM B241 and protected against external corrosion where it is in contact with masonry, plaster or insulation or is subject to repeated wettings by such liquids as water, detergent or sewage.
  - Corrugated Stainless Steel Tubing (CSST)-Corrugated stainless steel tubing (typically yellow jacketed covering without the wording 'arc-resistant') gas piping systems shall be bonded to the electrical service grounding electrode system. The bonding jumper shall connect to a metallic pipe or fitting between the point of delivery and the first downstream CSST fitting. The bonding jumper shall be not smaller than 6 AWG copper wire or equivalent. Gas piping systems that contain one or more segments of CSST shall be bonded.
  - Maximum length of the bonding conductor between the tubing and the premise's grounding electrode system shall be installed as short as practicable and limited to no more than 75 feet.
    - Arc-resistant-jacketed CSST (typically a black-jacketed covering with the wording 'arc-resistant') is considered to be bonded where it is connected to an appliance that is connected to the appliance grounding conductor of the circuit that supplies that appliance.
- **Protection:**
  - Where in contact with material, or passing through concrete or other abrasive material or atmosphere exerting a corrosive action, metallic piping and fittings coated with a corrosion-resistant material, sleeve, or casing shall be used.
  - Steel pipe exposed in exterior locations shall be galvanized or coated with approved corrosion-resistant material.
  - In concealed locations, where piping other than black or galvanized steel is installed through holes or notches in wood studs, joists, rafters or similar members less than 1 1/2 inches from the nearest edge of the member, the pipe shall be protected by shield plates. Protective steel shield plates having a minimum thickness of 0.0575 inch (No. 16 gage) shall cover the area of the pipe where the member is notched or bored and shall extend a minimum of 4 inches above sole plates, below top plates and to each side of a stud, joist or rafter.

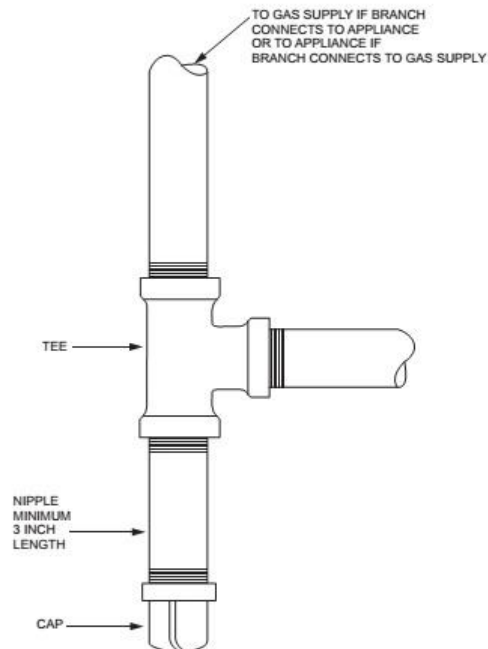
- All piping installed outdoors shall be elevated not less than 3 1/2 inches above ground and where installed across roof surfaces, shall be elevated not less than 3 1/2 inches above the roof surface. Piping installed above ground, outdoors, and installed across the surface of roofs shall be securely supported and located where it will be protected from physical damage. Where passing through an outside wall, the piping shall also be protected against corrosion by coating or wrapping with an inert material. Where piping is encased in a protective pipe sleeve, the annular space between the piping and the sleeve shall be sealed.
- Metallic pipe or tubing exposed to corrosive action, such as soil condition or moisture, shall be protected in an approved manner. Zinc coatings (galvanizing) shall not be deemed adequate protection for gas piping underground. Where dissimilar metals are joined underground, an insulating coupling or fitting shall be used. Piping shall not be laid in contact with cinders.
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## SEDIMENT TRAP



## TRACER WIRE



## TYPICAL INSTALLATION



Above diagram shows the required plastic gas line riser head adapter, yellow tracer wire for plastic gas line, and a shutoff valve. Below diagram shows the plastic gas line installed in a trench, connected to the riser head adapter and a shutoff valve. Below diagram requires a yellow tracer wire to be installed.

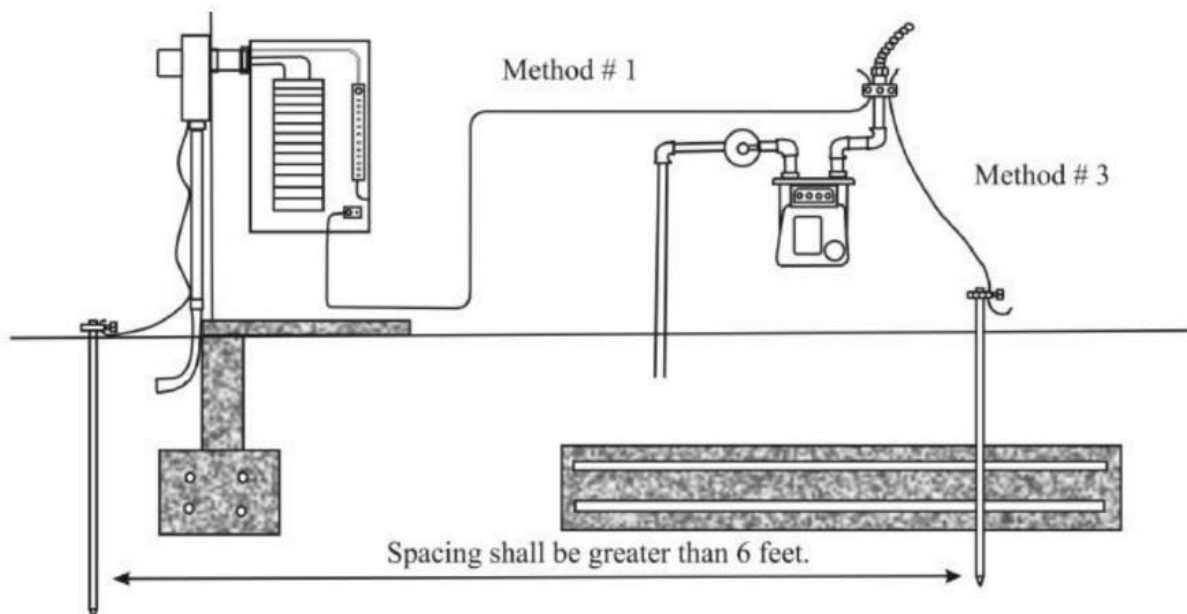


## TYPICAL AIR TEST SETUP AND GAUGE



Above diagram shows a typical air test setup, gauge shall read a minimum of 25 psig for a minimum of 30 minutes. The test pressure shall be within the middle 50 percent of the test gauge pressure range.

## **CSST GAS TUBING BONDING Corrugated Stainless Steel Gas Tubing**



## CSST GAS TUBING BONDING



## ARC-RESISTANT CSST GAS TUBING

