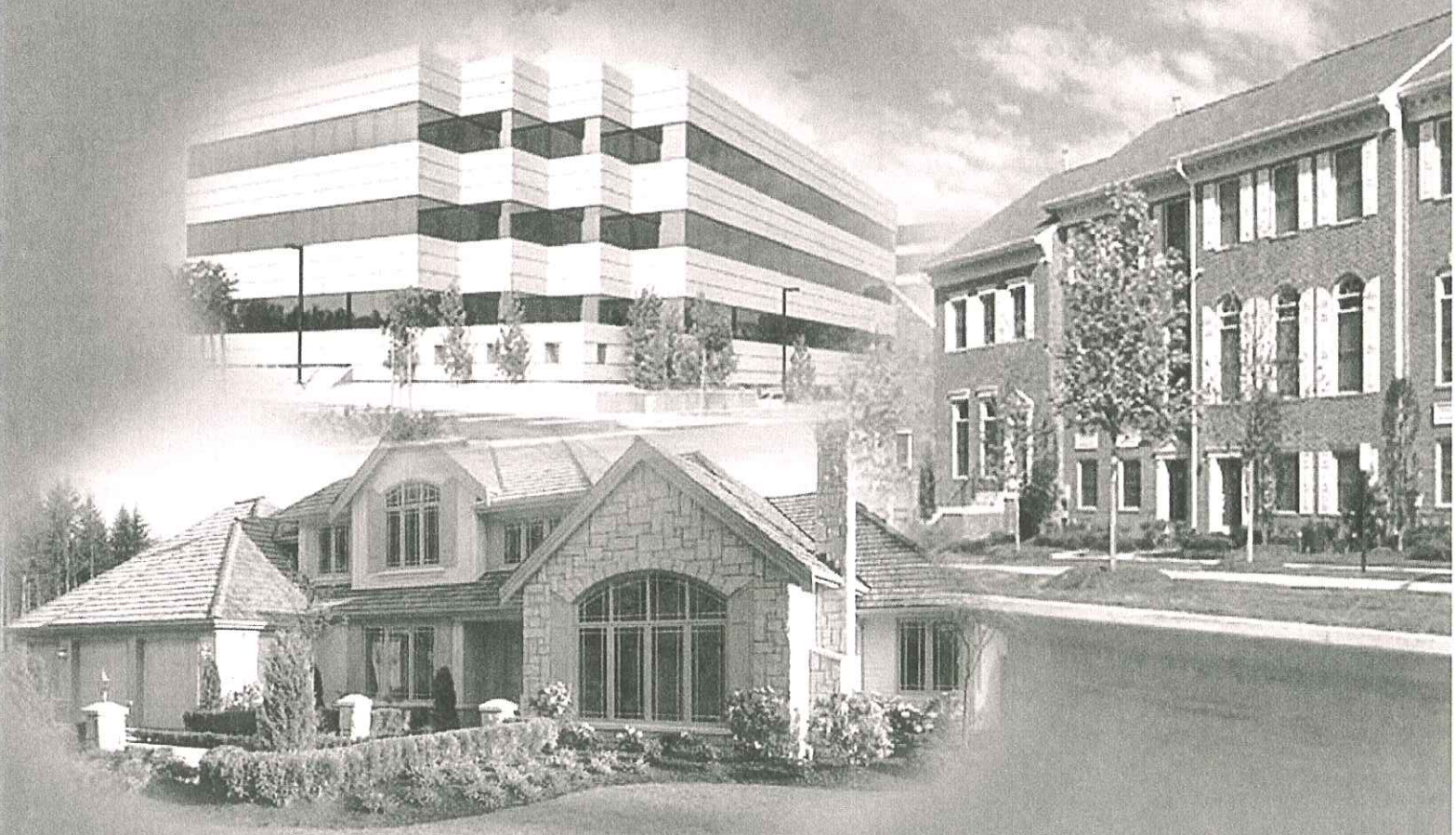


# **TracPipe**<sup>®</sup>

*Flexible Gas Piping* by *Omega Flex*<sup>®</sup>

## **FLEXIBLE GAS PIPING DESIGN GUIDE and INSTALLATION INSTRUCTIONS March 2007**



**RESIDENTIAL • COMMERCIAL • INDUSTRIAL**

# CHAPTER 1 INTRODUCTION

## WARNINGS

### SECTION 1.0 — USER WARNINGS

The **TracPipe®** gas piping material (CSST-Corrugated Stainless Steel Tubing ) must only be installed by a qualified person who has been trained or otherwise qualified through the **TracPipe Gas Piping Installation Program**. Any installer must also meet qualifications in accordance with state and/or local requirements as established by the administrative authority which enforces the plumbing or mechanical code where the gas piping is installed.

This document provides general instructions for the design and installation of fuel gas piping systems using gas piping material CSST. The guide must be used in conjunction with state and local building codes. **Local codes will take precedence in the event of a conflict between this guide and the local code.** In the absence of local codes, installation must be in accordance with the current edition of *National Fuel Gas Code, ANSI Z223.1/NFPA 54*, the National Standard of Canada, *Natural Gas and Propane Installation Code, CSA B149.1*, the *International Fuel Gas Code, the Federal Manufactured Home Construction and Safety Standards, ICC/ANSI 2.0* or the *Standard on Manufactured Housing, NFPA 501*, as applicable

Sound engineering principles and practices must be exercised for the proper design of fuel gas piping systems, in addition to compliance with local codes. The installation instructions and procedures contained in this Design Guide must be strictly followed in order to provide a safe and effective fuel gas piping system or system modification. All installations must pass customary inspections by the local official having authority prior to having the gas service turned on. All requirements of the local natural gas utility or propane supplier must also be met.

Only the components provided or specified by **OMEGAFLEX** as part of the approved piping system are to be used in the installation.

**The use of TracPipe tubing or fittings with tubing or fittings from other flexible gas piping manufacturers is strictly prohibited and may result in serious bodily injury or property damage.**

### WARNING !

If this system is used or installed improperly, fire, explosion or asphyxiation may result. The installation instructions and applicable local codes must be strictly followed.



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## SECTION 4.10 — ELECTRICAL BONDING/GROUNDING



### WARNING! FIRE / FUEL GAS PIPING

The TracPipe® flexible gas piping **MUST** be bonded to the building's grounding electrode per NFPA 54.

It is **HIGHLY RECOMMENDED** to equipotentially bond all mechanical systems to the building's grounding electrode. Refer to ANSI/NFPA 70 The National Electrical Code.

#### 1. Definitions:

**Grounding:** The process of making an electrical connection to the general mass of the earth. This is most often accomplished with ground rods, ground mats or some other grounding system. Low resistance grounding is critical to the operation of lightning protection techniques.

**Bonding:** The process of making an electrical connection between the grounding electrode and any equipment, appliance, or metal conductor: pipes, plumbing, flues, etc. Equipment bonding serves to protect people and equipment in the event of an electrical fault.

**Equipotential Bonding:** The process of making an electrical connection between the grounding electrode and any metal conductor: pipes, plumbing, flues, etc., which may be exposed to a lightning strike and can be a conductive path for lightning energy towards or away from the grounding electrode.

- The National Fuel Gas Code NFPA 54/ANSI Z223 states, "Each above ground portion of a gas piping system upstream from the equipment shutoff valve shall be electrically continuous and bonded to any grounding electrode, as defined by NFPA 70, *National Electrical Code* (ANSI/NFPA 70 1999 Edition.)"
- The **TracPipe**® gas piping system shall be bonded in accordance with the National Fuel Gas Code, NFPA 54/ANSI Z223. The piping system is not to be used as a grounding conductor or electrode for an electrical system.

- For bonding of the **TracPipe**® system, a bonding clamp must be attached to the brass AutoFlare® fitting adapter (adjacent to the pipe thread area – see Figure 4-21) or to a black pipe component (pipe or fitting) located in the same electrically continuous gas piping system as the AutoFlare® fitting. The corrugated stainless steel portion of the gas piping system **SHALL NOT** be used as the bonding attachment point under any circumstances. Bonding electrode conductor sizing shall be in accordance with Article 250 (Table 250-66) of ANSI/NFPA 70. The bonding is a requirement of the National Electrical Code.

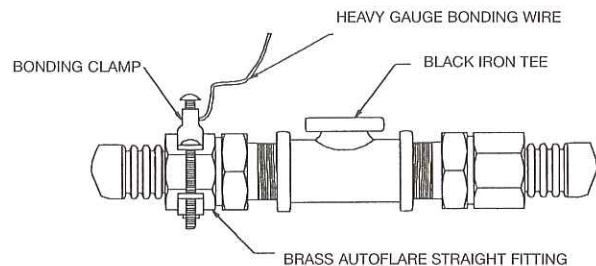


Figure 4-21

#### BRASS BONDING CLAMPS

TracPipe AutoFlare FITTING SIZE RANGE	BONDING CLAMP SIZE	PART NO. OR EQUAL (Bridge Port)
3/8" & 1/2" & 3/4"	1/2" & 3/4"	1309-B
1"	1-1/4"	1313-B
1-1/4"	2"	1314-B
1-1/2"	2-1/2"	1314-B
2"	3"	1315-B

#### IMPORTANT SAFETY PRECAUTION

- Failure to properly bond the **TracPipe**® flexible gas piping may lead to damage to the CSST system in the event of a lightning strike.
- The lightning may arc to or from another metal system, creating a hole in the wall of the **TracPipe**® CSST.
- This presents a risk of fire in the building, and could lead to serious personal injury or significant property damage.

- Lightning is a powerful and unpredictable natural force, and it has the capacity of damaging gas piping systems due to arcing between the gas piping system and other metallic systems in the building.

## EQUIPOTENTIAL BONDING

- Equipotential Bonding of the gas piping system shall be made between the fuel gas piping system and the electrical service grounding electrode using the shortest possible distance. The bonding jumper should be sized in accordance with NEC Table 250.66 (based on the main service conductor size), or in accordance with NFPA 780 Paragraphs 4.14.1.2 thru 4.14.1.4 (main-size lightning conductors) Tables 4.1.1.1(A) and (B): Class I and Class II wire size. Bonding and grounding connections are to be made by a qualified technician.

If the building to be piped is in a high lightning flash density area or a region with a high number of thunderstorm days per year, consideration should be given to utilizing the Lightning Risk Assessment method given in Annex L of NFPA 780 for a determination of the need for a lightning protection system.

### Notes:

- If possible, avoid running the bonding jumper a long distance through the building. The connection should be as short as possible. Gas meter should be near the electrical service if possible. If not, the bond can be connected at any point near the electrical service per Figure 4-21.
- Lightning induced voltages seeking ground are subject to impedance; utilize a braided or stranded bonding jumper for greater surface area, rather than solid wire.
- Upon completion of the **TracPipe**® or **CounterStrike**® Gas Piping System installation and prior to gas service

initiation, check to see if the bonding has been completed.

- Routing of gas piping should be as low in the structure as reasonably possible for best performance.
- TracPipe**® CSST runs, including **CounterStrike**®, should be installed with a bend radius of 8 inches or more whenever possible; this will reduce the possibility that energy will jump from the piping to other conductive surfaces.

## SECTION 4.10A COUNTERSTRIKE® INSTALLATION INSTRUCTIONS

- For **CounterStrike**® with BLACK outer jacket installations, the installer shall meet local building codes with respect to flame spread and smoke density regulations for non-metallic materials. If run through return air plenums, black jacket shall be removed.
- For through penetration fire stop systems per UL classification requirements, remove the BLACK outer jacket when passing through a fire stop.
- The instructions for cutting the tubing and for making fitting connections to **CounterStrike**® are identical to those for the standard yellow-jacketed **TracPipe**®.
- The use of **TracPipe**® PS-II should be considered for use as the trunk line under the building slab from the meter set to the manifold station. This practice routes the elevated pressure portion of a 2 PSI system completely away from any potential contact with other building metallic systems which can become energized in the event of a nearby lighting strike.
- Optional: Install excess flow devices (AutoTrip™ Excess Flow Valves) at the meter and appliance locations. See **TracPipe**® design and Installation Guide Section 3.3 (Mandatory where required by code.)