

1.0 INTRODUCTION



1.1 USER WARNINGS (see ANSI LC 1-CSA 6.26)

The use of fuel gas can be dangerous. Special attention must be given to the proper design, installation, testing and application of the gas piping system. Sound engineering practices and principles must be exercised, as well as diligent adherence to the proper installation procedures to ensure the safe operation of the piping system. All installed systems must pass customary installation inspections by the local building official having authority prior to being placed into service.

This document is intended to provide the user with general guidance when designing and installing a WARDFLEX®/WARDFLEX®II corrugated stainless steel tubing gas system. Its use with any other gas tubing system is inappropriate and may result in serious bodily injury and property damage. Where local gas or building codes impose greater requirements than this document, you should adhere to the local code requirements. Performance of accessory devices, such as pressure regulators and shut off valves, should be reconfirmed by contacting the accessory device manufacturer and receiving the latest technical data on sizing, installation, and performance.

Improper installation methods or procedures could lead to accidents such as explosions, fires, gas poisoning, asphyxiation, etc. This system shall be installed with strict adherence to this guide as well as local building codes. All installed systems must pass installation inspections by the authorized local building official prior to being placed in service. Ward Manufacturing, LLC shall have no responsibility for any misinterpretation of the information contained in this guide or any improper installation or repair work or other deviation from procedures recommended in this manual, whether pursuant to local building codes or engineering specifications or otherwise.

Only those components designed and made for or specified for use in this system shall be used in its installation. WARDFLEX®/WARDFLEX®II components and tubing shall not be used with other corrugated stainless steel tubing system components from other manufacturers.

WARDFLEX®/WARDFLEX®II shall be used only in gas piping systems where the operating gas pressure does not exceed 25 PSI. Accessories for systems shall be rated for the operating gas pressure used. Thus, for example, accessories for 25 PSI systems shall be rated for 25 PSI service. Performance of accessory devices, such as pressure regulators and shut-off valves should be reconfirmed by contacting the accessory device manufacturer and receiving the latest technical data on sizing, installation and performance.

Certain chemicals are corrosive to WARDFLEX®/WARDFLEX®II. See Section 4.1 of the current manual for more specific information on this topic.

A gas delivery system consisting of WARDFLEX®/WARDFLEX®II offers significant advantages over other gas delivery systems because of its wall dimensions and corrugated design. In contrast to rigid steel pipe, WARDFLEX®/WARDFLEX®II does not require intermediate joints in most installations because the tubing is capable of being installed in one continuous run, reducing not only the total number of joints, but also the potential for leaks at joints. WARDFLEX®/WARDFLEX®II's flexibility also affords more installation options because an installer can avoid existing obstacles, and it eliminates the repetitive measuring, cutting, threading and joint assembly that are common with installation of rigid steel piping systems. WARDFLEX®/WARDFLEX®II's flexibility offers even further safety advantages in geographic areas that are prone to seismic activity because the tubing provides greater flexibility to withstand certain movement of the ground or structural shifts.

Although WARDFLEX®/WARDFLEX®II provides significant advantages over more rigid gas delivery systems, its wall dimensions may make it more likely than steel pipe to be punctured by a nail or other sharp objects, or damaged by other extraordinary forces such as a lightning strike, depending on the circumstances. It is well known that lightning is a highly destructive force. Therefore, the user must ensure that the system is properly bonded. In order to maximize protection of the entire structure from lightning damage, the user should consider installation of a lightning protection system per NFPA 780 and other standards, particularly in areas prone to lightning. Note that lightning protection systems as set forth in NFPA 780 and/or other standards go beyond the scope of this manual. Users of WARDFLEX®/WARDFLEX®II should consider all of the limitations and benefits of WARDFLEX®/WARDFLEX®II for their particular situation. Installers shall provide building owners and electricians with the required WARDFLEX®/WARDFLEX®II Information Card discussing these limitations and benefits.

1.2 LIMITATIONS OF MANUAL

This document is intended to aid the user in the design, installation and testing of WARDFLEX®/WARDFLEX®II Corrugated Stainless Steel Tubing to distribute fuel gas in residential housing units and commercial structures. It would be impossible for this guideline to anticipate and cover every possible variation in housing configurations and construction styles, appliance loads and local restrictions. Therefore, there may be applications which are not covered in this guide. For applications beyond the scope of this guide, contact Ward Manufacturing's Engineering Department. The techniques included within this guide are recommended practice for generic applications. These practices must be reviewed for compliance with all applicable local fuel gas and building codes. Accordingly, where local gas or building codes impose greater requirements than this manual, you should adhere to the local code requirements. This system and related components should be used only as fuel gas piping where the operating gas pressure does not exceed 25 PSI.

In CANADA the installation of CSA-CGA certified WARDFLEX®/WARDFLEX®II flexible gas tubing for natural and propane gas piping systems must be in accordance with the applicable sections of the current CAN/CGA-B 149.1 or .2 installation codes, and the requirements or codes of the local utility or other authority having jurisdiction. All gas components used in conjunction with the gas tubing must be certified for use in Canada.

1.3 LISTING OF APPLICABLE CODES & STANDARDS *(See www.wardmfg.com for More Information)*

Standards

- ANSI LC 1, CSA 6.26 Fuel Gas Piping Systems Using Corrugated Stainless Steel Tubing (CSST)

Listings

- CSA - Canadian Standard Association Certificate #1004880
- IAPMO - International Association of Plumbing and Mechanical Officials - File Number 3353
- UL - Classified Mark File #R18357
- ICC - International Codes Council ESR-1879 & PMG 1100
- FM - Factory Mutual 3011939

Code Compliance


- BOCA - National Mechanical Code
- ANSI/CABO 2.0 - One and Two Family Dwelling Code
- ICC - International Mechanical Code
- NFPA 54- National Fuel Gas Code
- NFPA 58- Standard for the Storage and Handling of Liquefied Petroleum Gases
- SBCCI - Southern Building Code Congress International
- UMC - Uniform Mechanical Code
- C/UPC TM - California/Uniform Plumbing Code
- Canada Natural Gas and Propane Codes B149.1 and B149.2

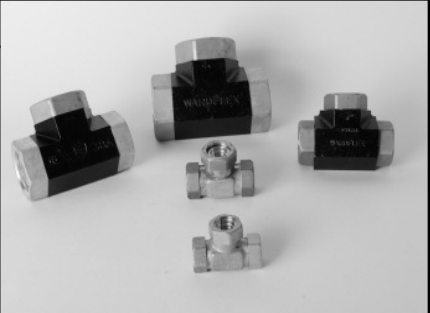


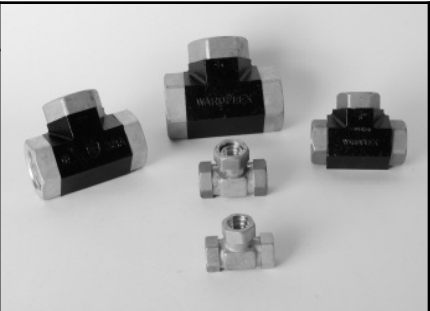
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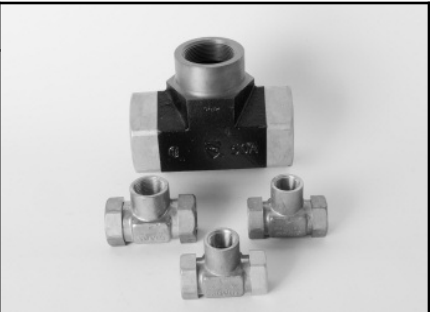


2.2.2 FITTINGS

COMPONENT	MATERIAL	CSST X CSST	
Couplings	Body: Brass Retainer: Brass Nut: Brass Gasket: Composite Fiber	10M (3/8") x 10M (3/8") 15M (1/2") x 15M (1/2") 20M (3/4") x 20M (3/4") 25M (1") x 25M (1") 32M (1 1/4") x 32M (1 1/4") 38M (1 1/2") x 38M (1 1/2") 50M (2") x 50M (2")	

COMPONENT	MATERIAL	CSST	
Mechanical Tees Straight (CSSTx CSSTxCSST)	Body: Brass/ Malleable Iron Retainer: Brass Nut: Brass Gasket: Composite Fiber	15M (1/2") 20M (3/4") 25M (1") 32M (1 1/4") 38M (1 1/2") 50M (2")	

COMPONENT	MATERIAL	CSST X CSST X CSST	
Mechanical Tees Reducing (CSSTx CSSTxCSST)	Body: Brass/ Malleable Iron Retainer: Brass Nut: Brass Gasket: Composite Fiber	15M (1/2") x 15M (1/2") x 10M (3/8") 15M (1/2") x 10M (3/8") x 10M (3/8") 20M (3/4") x 20M (3/4") x 15M (1/2") 25M (1") x 25M (1") x 20M (3/4") 25M (1") x 20M (3/4") x 20M (3/4") 25M (1") x 25M (1") x 15M (1/2")	

COMPONENT	MATERIAL	CSST X CSST X NPS	
Mechanical Tees Female Straight (CSSTx CSSTxNPS)	Body: Brass/ Malleable Iron Retainer: Brass Nut: Brass Gasket: Composite Fiber	15M (1/2") x 15M (1/2") x 1/2 20M (3/4") x 20M (3/4") x 3/4 25M (1") x 25M (1") x 1 32M (1 1/4") x 32M (1 1/4") x 1 1/4 38M (1 1/2") x 38M (1 1/2") x 1 1/2 50M (2") x 50M (2") x 2	

COMPONENT	MATERIAL	CSST X CSST X NPS	
Mechanical Tees Female Reducing (CSSTx CSSTxNPS)	Body: Brass/ Malleable Iron Retainer: Brass Nut: Brass Gasket: Composite Fiber	15M (1/2") x 15M (1/2") x 3/8 15M (1/2") x 15M (1/2") x 3/4 20M (3/4") x 20M (3/4") x 1/2 20M (3/4") x 20M (3/4") x 1/2 25M (1") x 25M (1") x 3/4	