

## ICC-ES Evaluation Report

ESR-1879

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DIVISION: 15—MECHANICAL  
Section: 15190—Fuel Piping

## REPORT HOLDER:

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## EVALUATION SUBJECT:

## WARDFLEX FLEXIBLE FUEL GAS PIPING SYSTEM

## 1.0 EVALUATION SCOPE

## Compliance with the following codes:

- 2009 *International Fuel Gas Code*® (IFGC)
- 2009 *International Mechanical Code*® (IMC)
- 2009 *International Residential Code*® (IRC)
- 2009 *IAPMO Uniform Mechanical Code*\* (IAPMO UMC)
- 2009 *IAPMO Uniform Plumbing Code*\* (IAPMO UPC)

## Properties evaluated:

- Corrugated stainless steel gas tubing, ANSI/IAS LC 1
- Surface burning characteristics

## 2.0 USES

The Wardflex gas piping system is a flexible fuel-gas piping system for conveying natural or propane gas. The system is intended for installation with fuel gas pressures not exceeding 5 psi (34 kPa), in a manifold-type arrangement and is permitted for installation in plenums. The system is limited to indoor locations and to exterior locations as permitted in IFGC Chapter 4, IMC Section 602.2.1, IRC Chapter 24, IAPMO UMC Sections 602.2 and 1312 and IAPMO UPC Chapter 12. The system conforms to ANSI/IAS LC-1.

## 3.0 DESCRIPTION

The system consists of corrugated stainless steel tubing (CSST), A- and M-style fittings, a 20M right-angle valve and mechanical all-metal components designed for use only with the Wardflex CSST. The CSST is composed of concentric, annular rings of Type 304 stainless steel with a polyethylene (PE) coating colored with the yellow used internationally to indicate fuel gas. When tested in accordance with ASTM E 84, the coating exhibits a flame-spread index of less than 25 and a smoke-developed index

of less than 50. The A-style fitting captures three corrugations and compresses the tubing against a gasket. The M-style fitting captures one corrugation and compresses the tubing against a gasket and/or inner metal seat. The system is available in nominal diameters of  $\frac{3}{8}$  inch,  $\frac{1}{2}$  inch,  $\frac{3}{4}$  inch, 1 inch,  $1\frac{1}{4}$  inches,  $1\frac{1}{2}$  inches and 2 inches (10, 15, 20, 25, 32, 38, and 50 mm). Wardflex tubing is identified as part numbers 10A (EHD 15), 15A (EHD 19), 20A (EHD 25), 25A (EHD 30), 32A (EHD 37), 38A (EHD 48) and 50A (EHD 62), corresponding to the sizes in millimeters, and the fittings are marked identically except that they have an A or an M suffix. The system capacity is based on the EHD number selected in accordance with the installation instructions.

Components include mechanical fittings, distribution manifolds, shut-off valves, termination outlet devices, pressure regulators and protection devices.

## 4.0 INSTALLATION

Installation must be in accordance with the Wardflex Design and Installation Guide, Revision 9, dated June 2009; and IFGC Chapter 4, IRC Chapter 24, IAPMO UMC Chapter 13 and IAPMO UPC Chapter 12, as applicable. The system's installation consists of individual CSST distribution lines installed within a building, between the fuel gas source, the manifold and the termination outlet fitting or the appliance. Each appliance must be equipped with an accessible shut-off valve located in the same room and within 6 feet (1828.8 mm) of the appliance upstream of the union. CSST, not in contact with the ground but exposed to the outdoors, must be installed in accordance with IFGC Section 404.7, IRC Section G2415.7, IAPMO UMC Section 1312.2, or IAPMO UPC Chapter 12, as applicable. Distribution lines must be protected from physical damage at points of support and when passing through structural members, such as studs, joists, and plates, by the installation of approved, premanufactured, mechanical devices, such as striker plates or oversized strip-wound metal conduit. The CSST must be sized in accordance with capacity tables in the manufacturer's published installation instructions.

The system must be used for low-pressure [below  $\frac{1}{2}$  psi (3.4 kPa)] and medium-pressure [2 psi (13.8 kPa)] equipment applications. Low-pressure applications with system supply pressures below  $\frac{1}{2}$  psi (3.4 kPa) do not require a line regulator. System supply pressures exceeding  $\frac{1}{2}$  psi (3.4 kPa) but less than 2 psi (13.8 kPa) must utilize a line regulator to limit downstream appliance utilization pressure to  $\frac{1}{2}$  psi (3.4 kPa). System supply pressures that exceed 2 psi but that do not exceed 5 psi (34 kPa) must utilize a line regulator to limit downstream

appliance utilization pressure to  $\frac{1}{2}$  psi (3.4 kPa), and an additional over-pressure protection device must be installed between the line regulator and the appliance to limit pressure to 2 psi (13.8 kPa). Medium-pressure equipment applications with supply pressures of 2 psi (13.8 kPa) and greater must utilize a line regulator to limit downstream appliance utilization pressure to 2 psi (13.8 kPa).

Supply pressures exceeding 2 psi (13.8 kPa) must be provided with downstream appliance controls rated for the supply pressure, or protection by some other means acceptable to the code official.

## 5.0 CONDITIONS OF USE

The Wardflex Flexible Fuel Gas Piping System described in this report complies with, or is a suitable alternative to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

- 5.1 Installation must comply with this report the manufacturer's published installation instructions and the applicable code. If there is a conflict between the installation instructions and this report, this report governs.
- 5.2 Installation must be performed by Ward Manufacturing trained and certified installers using the manufacturer's published installation instructions.
- 5.3 The product must be limited to use with natural or propane gas at operating pressures not exceeding 5 psi (34 kPa). Pressure regulators are required when fuel supply pressures exceed  $\frac{1}{2}$  psi (3.4 kPa).
- 5.4 The system shall be pressure-tested after installation in accordance with the applicable code.
- 5.5 An accessible shut-off valve must be located upstream from the union, in the same room and within 6 feet (1828.8 mm) of the appliance it serves.

5.6 Fittings listed for use in concealed spaces are permitted for use in plenum applications.

5.7 The Wardflex flexible fuel gas piping system is manufactured in Lawrence Township, Pennsylvania, under a quality control program with inspections by CSA International (AA-659).

## 6.0 EVIDENCE SUBMITTED

- 6.1 Wardflex Design and Installation Guide, Revision 9, dated June 2009.
- 6.2 Reports of testing in accordance with ANSI/AGA LC1-CSA6.26 05.
- 6.3 A quality control manual.
- 6.4 Report of testing in accordance with ASTM E 84.

## 7.0 IDENTIFICATION

### 7.1 Tubing:

Each 2 feet (610 mm) of tube must bear the Wardflex name; the date code; the part number and equivalent hydraulic diameter (EHD); the rated pressure of 5 psi (34 kPa); the words "Fuel Gas"; the evaluation report number (ESR-1879); and the logo of the inspection agency, CSA International (AA-659).

### 7.2 Components:

Fittings, valves, termination outlets and distribution manifolds must be stamped with Ward's symbol ("W", "WARD" or "WARDFLEX"); the name of the inspection agency, CSA International (AA-659); the part number; and a date stamp.



FIGURE 1—WARDFLEX LOGO