



RICK SNYDER
GOVERNOR

STATE OF MICHIGAN
DEPARTMENT OF LICENSING AND REGULATORY AFFAIRS
BUREAU OF CONSTRUCTION CODES
IRVIN J. POKE
DIRECTOR

STEVE ARWOOD
DIRECTOR

BOARD OF MECHANICAL RULES
Conference Room 3, First Floor
2501 Woodlake Circle
Okemos, Michigan 48864

AGENDA
August 14, 2013
9:00 a.m.

- | | | |
|-----|--|--------------|
| 1. | Call to Order and Determination of Quorum | K. Misiewicz |
| 2. | Approval of Agenda (Page 1) | K. Misiewicz |
| 3. | Approval of Minutes May 15, 2013 (Page 2-4) | K. Misiewicz |
| 4. | Licensing Action (Pages 5-10) | K. Kalakay |
| | a. Mark Engle | BCCM-13-002 |
| 5. | New Products (Pages 11-47) | K. Kalakay |
| | a. WardFlex II | BCCM-12-009 |
| 6. | New Business (Page 48) | K. Kalakay |
| | a. Approval of 2014 Board of Mechanical Rules schedule | |
| 7. | Unfinished Business | K. Misiewicz |
| 8. | Chiefs Report | K. Kalakay |
| 9. | Public Comment | |
| 10. | Next Meeting – November 27, 2013 | K. Misiewicz |
| 11. | Adjournment | |

The meeting site and parking is accessible. Individuals attending the meeting are requested to refrain from using heavily scented personal care products in order to enhance accessibility for everyone. People with disabilities requiring additional services (such as materials in alternative format) in order to participate in the meeting should call Dawn Canfield at (517) 241-9325 at least 10 working days before the event.

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BOARD OF MECHANICAL RULES

Conference Room 3
2501 Woodlake Circle
Okemos, Michigan 48864

MINUTES
May 15, 2013
9:00 a.m.

MEMBERS PRESENT

Mr. Kevin Carden
Mr. Richard Dvorak
Mr. Robert Fosburg
Mr. Craig Howson
Mr. Christopher Fuller
Mr. Robert Logan
Mr. Kenneth Misiewicz
Mr. Mark Riley
Ms. Catherine Gay
Mr. Daniel Grafmiller
Mr. Christopher Freeman

MEMBERS ABSENT

Mr. Gerald Philo
Mr. Richard Miller
Mr. Bruce Seiler
Mr. Matthew Marsiglio

DEPARTMENT PERSONNEL ATTENDING

Mr. Keith Lambert, Deputy Director, Bureau of Construction Codes
Mr. Kevin Kalakay, Chief, Mechanical Division
Mr. Jon Paradine, Assistant Chief, Mechanical Division
Ms. Dawn Canfield, Secretary, Mechanical Division

OTHERS IN ATTENDANCE

Mr. Lynn Briggs, Contractors Legislative Services
Mr. Brent Westover, Omega Flex Inc.
Mr. Stephen Wylie, Consumers Energy
Mr. John Burke, Burke Agency

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1. **CALL TO ORDER AND DETERMINATION OF QUORUM**

Chairman Misiewicz called the meeting to order at 9:00 a.m. A quorum was determined as 11 members were present.

2. **APPROVAL OF AGENDA**

A **MOTION** was made by Board Member Fuller and Board Member Carden seconded the motion to approve the Agenda. **MOTION CARRIED.**

3. **APPROVAL OF MINUTES**

A **MOTION** was made by Board Member Logan and Board Member Howson seconded the motion to approve the minutes of the February 5, 2013 meeting. **MOTION CARRIED.**

4. **NEW PRODUCTS**

a. Omega Flex TracPipe PS-II #BCCM-12-011, presented an application requesting approval by the Board of Mechanical Rules for the use of TracPipe PS-II. Chief Kalakay reviewed the product evaluation with the board. Brent Westover, Omega Flex, appeared before the board to discuss the product.

After discussion and questions by the board, a **MOTION** was made by Board Member Fuller, and Board Member Carden seconded the motion to approve staff's recommendation, to forward the Omega Flex TracPipe PS-II to the Construction Code Commission for acceptability. **MOTION CARRIED.**

5. **NEW BUSINESS**

a. Specialty License Classification Modifications #BCCM-13-001. Chief Kalakay reviewed with the board, staffs recommendation for altering the existing specialty classifications on the Mechanical Contractors license.

After discussion and questions by the board, a **MOTION** was made by Board Member Fuller, and Board Member Howson seconded the motion to approve staff's recommendation to modify the specialty classifications, effective immediately. **MOTION CARRIED**

6. **UNFINISHED BUSINESS**

None

7. **CHIEFS REPORT**

Chief Kalakay provided information on the following issues:

- a. 2012 Michigan Mechanical Code will tentatively go in to effect sometime in the fall of 2013.
- b. Robert Konyndyk, Chief of the Plumbing Division, retired March 28, 2013 after 27+ years of service.
- c. 2013 renewals are scheduled to be mailed early June.
- d. Bureau of Construction Codes is in the process of a software upgrade.
- e. Attended ICC IRC hearings in Dallas.
- f. House Bill 4373, House Bill 5898 and Senate Bill 235 to amend Public Act 54 were introduced.
- g. House Bill 4592 to amend PA 192 of 1984 is in committee to allow alarm/cable installers to install thermostats without a Mechanical Contractors license.
- h. New administrative rules for registration of Mechanical Inspectors became effective April 24, 2013.
- i. PA 312 of 2012 became effective exempting Veterans with an honorable discharge from examination and license fees.

8. **PUBLIC COMMENT**

None

9. **NEXT MEETING**

The next Board meeting will be held on August 14, 2013.

10. **ADJOURNMENT**

A MOTION was made by Board Member Logan and Board Member Carden seconded the motion to adjourn the meeting at 9:15 a.m. Standard Eastern Time. **MOTION CARRIED.**

APPROVED:

Kenneth Misiewicz, Chairperson

Date



RICK SNYDER
GOVERNOR

STATE OF MICHIGAN
DEPARTMENT OF LICENSING AND REGULATORY AFFAIRS
BUREAU OF CONSTRUCTION CODES
IRVIN J. POKE
DIRECTOR

STEVE ARWOOD
DIRECTOR

July 19, 2013

BCCM-13-002

TO: Members of the Board of Mechanical Rules
FROM: Kevin Kalakay, Chief, Mechanical Division 
SUBJECT: Report of Administrative Law Judge Regarding Mark Engle

AUTHORITY:

The Forbes Mechanical Contractors Act, 1984 PA 192.

APPLICABLE RULE:

MCL 338.986.

BACKGROUND:

Please refer to the attached report from the Administrative Law Judge regarding Mr. Engle.

RECOMMENDATION:

Staff recommends that the Board of Mechanical Rules accept the report of the State of Michigan Administrative Law Judge and order Mr. Mark Engle to make restitution to the Wakeman's in the amount of \$2,800.00

CC: Tom Warren

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STATE OF MICHIGAN
MICHIGAN ADMINISTRATIVE HEARING SYSTEM

IN THE MATTER OF:

Docket No.: 12-001094-BCC

Bureau of Construction Codes,
Petitioner

Case No.: 09-0076-M

v

Agency: Bureau of Construction Codes

Mark Edward Engle,
Respondent

Case Type: BCC Licensing

Filing Type: Appeal

Issued and entered
this 23rd day of April 2013
by Renee A. Ozburn
Administrative Law Judge

DEPT. OF LICENSING AND REGULATORY AFFAIRS
APR 24 2013

REPORT OF ADMINISTRATIVE LAW JUDGE

PROCEDURAL HISTORY

This is a proceeding held pursuant to Section 11(1) of 1984 PA 192, as amended, the Forbes Mechanical Contractors Act (Act 192), MCL 338.981 and Section 92 of 1969 PA 306, as amended the Administrative Procedures Act (APA), MCL 24.292.

This matter commenced with a Statement of Intent issued by the Department of Licensing and Regulatory Affairs (LARA/Department), Bureau of Construction Codes (BCC/Petitioner) on June 18, 2009, alleging that Mark Edward Engle (Respondent) violated Act 192, by failing to comply with minimum licensing and/or permit acquisition standards.

On December 1, 2009, an Order for Dismissal was issued upon request of Petitioner BCC due to settlement. Subsequently, in a Motion dated June 22, 2012, BCC sought to set aside the dismissal and reschedule a contested case hearing. A Notice of Hearing initially scheduled a hearing for August 14, 2012. The hearing was adjourned and rescheduled for March 4, 2013. The Order of Adjournment scheduling the hearing for March 4, 2013 was mailed to Respondent's last known address of record: [REDACTED]

On March 4, 2013, at the time scheduled for hearing, Assistant Attorney General Thomas Warren appeared and was ready to proceed on behalf of BCC. Respondent did not appear. The undersigned Administrative Law Judge deemed that Respondent had been duly served with notice and the hearing could proceed in Respondent's absence pursuant to Section 72 of the APA. Mr. Warren motioned to default Respondent pursuant to Section 78 of the APA. The undersigned Administrative Law Judge granted a default. A default judgment constitutes a decision that the allegations contained in the June 18, 2009 Statement of Intent are true as alleged.

SUMMARY OF EXHIBITS

Exhibit 1	Homeowner's statement of complaint
Exhibit 2	BCC Investigation Report
Exhibit 3	Correspondence from BCC to M. Engle dated 3/18/09
Exhibit 4	Correspondence from BCC to M. Engle dated 4/2/09
Exhibit 5	Estimate
Exhibit 6	Homeowner Payment Documentation
Exhibit 7	Homeowner Payment Documentation
Exhibit 8	License History
Exhibit 9	Correspondence from M. Engle to BCC received 7/09
Exhibit 10	License Application
Exhibit 11	Business Registration

FINDINGS OF FACT

1. At all times relevant to this matter, Mark Edward Engle (Respondent) was an individual doing business and registered with the Bureau of Construction Codes (Bureau) as the Contractor of Record for Rite-Way Heating & Cooling (Respondent). Mr. Engle was engaged in the business of installing and servicing heating and air conditioning systems. He held mechanical contractor license No. 7115627, with authorization for performing work in mechanical license classification 1 (hydronic heating, cooling and process piping). This license expired on August 31, 2007.
2. At all times relevant to this matter, the Bureau's Mechanical Division was the designated governmental subdivision with responsibility and authority over the administration and enforcement of the state Mechanical Code, including, but not limited to, the issuance of permits and the conduct of inspections, pursuant to the Mechanical Code and the Stille-DeRossett-Hale Single State Construction Code Act, 1972 PA 230, as amended; MCL 125.1501, *et seq.*

3. At all times relevant to this matter, Tennison Barry was Bureau Chief of the State Mechanical Inspection Division, holding Registration No. 1658 with approval to work as Mechanical Inspector pursuant to the Building Officials and Inspectors Registration Act, 1986 PA 54, as amended, MCL 338.2301 *et seq.*
4. At all times relevant to this matter, Kevin Kalakay was Assistant Bureau Chief and Inspector of the Mechanical Division, holding Registration No. 004179 with approval to work as Mechanical Inspector, pursuant to the Building Officials and Inspectors Registration Act, 1986 PA 54, as amended, MCL 338.2301 *et seq.*
5. At all times relevant to this matter, Jonathon F. Paradine was a Bureau Inspector with the Mechanical Division holding Registration No. 004980 with approval to work as Mechanical Inspector, pursuant to the Building Officials and Inspectors Registration Act, 1986 PA 54, as amended, MCL 338.2301 *et seq.*
6. Mr. and Mrs. Burt Wakeman, [REDACTED], Michigan [REDACTED] contracted Rite-Way between March and May of 2008 to install a Utica model USC4 Boiler system at their residence (i.e. [REDACTED], [REDACTED] Michigan) for approximately \$12,000.00. During this time, Respondent Rite-Way performed mechanical additions, alterations or served in the work classification set forth in Section 6(3) of the Mechanical Act, in the Wakeman's home. On November 13, 2008, the Bureau's Office of Local Government and Consumer Services (OLGCS) received correspondence from the Wakeman's dated November 8, 2008, (Exhibit 1), complaining of substandard HVAC and boiler work by Rite-Way. The Wakeman's alleged that Rite-Way installed a non-direct vented MBG 100 boiler system that produced insufficient output and was a cheaper model than the Utica USC system they agreed upon. On November 21, 2008, the Wakeman's filed a request with the Mechanical Division's Assistant Chief for a site inspection.
7. The Bureau's OLGCS received an inspection report dated February 25, 2009 from state Inspector Jonathan Paradine (Exhibit 2) citing Respondent for installing a boiler system without a state boiler installer's license or a proper mechanical contractor license (lapsed 8/31/07) and without securing a state mechanical permit or inspection.

8. The Bureau sent Respondent letters dated March 18, 2009 and April 2, 2009 (Exhibits 3 & 4) directing Respondent to respond or arrange for correction of the aforementioned violations cited by the Bureau. The Bureau also directed Respondent to procure mechanical permit and inspection approvals from the Bureau within 10 business days of receipt of each letter.

CONCLUSIONS OF LAW

The above Findings of Fact establish that Respondent violated Section 23a(1) of the Stille-DeRossett-Hale Single State Construction Code Act (Construction Code) and Section 7(1), 11(5) and 15(1) of the Forbes Mechanical Contractors Act by failing to obtain a current mechanical contractor's license before performing work.

The above Findings of Fact establish that Respondent failed to make application for and obtain permits before installing a boiler system in violation of Section R105.1 of the Michigan Residential Code and Section 11(1)(f) of the Forbes Mechanical Contractors Act.

RECOMMENDED DECISION

The undersigned Administrative Law Judge recommends that the Board order Respondent to make restitution to the Wakeman's in the amount of \$2,800.


RENEE A. OZBURN
ADMINISTRATIVE LAW JUDGE

PROOF OF SERVICE

I hereby state, to the best of my knowledge, information and belief, that a copy of the foregoing document was served upon all parties and/or attorneys of record in this matter by Inter-Departmental mail to those parties employed by the State of Michigan and by UPS/Next Day Air, facsimile, and/or by mailing same to them via first class mail and/or certified mail, return receipt requested, at their respective addresses as disclosed below this 23rd day of April, 2013.

Shirley Dacus

Shirley Dacus
Michigan Administrative Hearing System

Mark Edward Engle



Kevin DeGroat
Corp. & Land Development
6546 Mercantile Way, P.O. Box 30703
Lansing, MI 48909

Tennison Barry
BCC Mechanical Division
P.O. Box 30254
Lansing, MI 48909

Thomas D. Warren
Assistant Attorney General
Labor Division, Ofc. of Attorney General
P.O. Box 30736
Lansing, MI 48909

Jon Paradine
Bureau of Construction Codes
P.O. Box 30254
Lansing, MI 48909

Kevin Kalakav
Bureau of Construction Codes
P.O. Box 30254
Lansing, MI 48909



RICK SNYDER
GOVERNOR

STATE OF MICHIGAN
DEPARTMENT OF LICENSING AND REGULATORY AFFAIRS
BUREAU OF CONSTRUCTION CODES
IRVIN J. POKE
DIRECTOR

STEVE ARWOOD
DIRECTOR

July 19, 2013

BCCM-12-009

TO: Members of the Board of Mechanical Rules
FROM: Kevin Kalakay, Chief, Mechanical Division
SUBJECT: Product Approval for Wardflex II

The applicant has filed a petition application for approval of a product.

APPLICANT REPRESENTATIVE:

Mr. Mike Yeckinevich

APPLICANT:

Ward Manufacturing LLC.
117 Gilick Street
Blossburg, Pennsylvania, 16912

AUTHORITY:

MCL 125.1521 of 1972 PA 230.
MCL 338.975 of 1984 PA 192

PRODUCT:

Wardflex II is a corrugated stainless steel tubing product manufactured using 300 Stainless Steel and coated with an electrically conductive coating, in sizes 1/2", 3/4", 1, 1 1/4", 1 1/2" and 2"
This product has no additional bonding requirements imposed by the manufacturer.

APPLICATION:

Wardflex II CSST is intended solely for use with fuel gas, and shall not be used with any termination fittings not manufactured for the distribution of fuel gas for residential, commercial and industrial applications. No additional bonding requirement is imposed by the manufacturer as long as the system is bonded in accordance with the NEC in the same manner as rigid metal piping.

TESTING / LISTINGS REPORTS:

ICC-ES PMG-ESR-1879
ICC-ES PMG-LC1024
ICC-ES PMG-1100

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CERTIFICATIONS:

CSA 1004880

ANSI LC-1

FM 3024738

STATE APPROVALS:

State of Massachusetts Board of Registration of Plumbers and Gas Fitters (12/7/2011)

LICENSING AND INSTALLATION REQUIREMENTS:

The manufacturer shall provide training on proper installation to all installing contractors.

CONDITIONS OF USE AND INSTALLATION:

1. All requirements of the Michigan Residential and the International Fuels Gas Code most current editions shall apply, except the code requirement for CSST bonding.
2. Installation shall be in accordance with the manufacturer's installation instructions.
3. Shall only be installed by a qualified person who has been trained through the Wardflex Gas Piping Installation Program
4. Not approved for pressures above 5-PSI
5. This approval shall become void if the product no longer conforms to the current Michigan Mechanical, Michigan Residential codes.

RECOMMENDATION:

Staff recommends that the product be recommended to the State of Michigan Construction Code Commission for acceptability with the above stipulations.

CC: Mike Yeckinevich

Petition Application for Approval of Material, Product or Method
 Michigan Department of Energy, Labor & Economic Growth
 Bureau of Construction Codes
 P.O. Box 30255, Lansing, MI 48909
 www.michigan.gov/bcc

Agency Use Only

BCCM-12-009

Application Fee: \$500.00

Authority: 1972 PA 230
 Completion: Mandatory
 Penalty: Use of material, product or method will not be approved

DELEG is an equal opportunity employer/program. Auxiliary aids, services and other reasonable accommodations are available upon request to individuals with disabilities.

PRODUCT INFORMATION

NATURE OF APPLICATION

Material Product Method of Manufacture or Construction Component

CODE UNDER WHICH APPROVAL IS SOUGHT

Building (140) Electrical (115) Mechanical (130) Plumbing (98) *VDM*

NAME OF MATERIAL, PRODUCT OR METHOD OF MANUFACTURE (Limit To One Item Per Application)

WARDFLEX II

OTHER IDENTIFICATION (Model Number)

15C, 20C, 25C, 32C, 38C, 50C

PLEASE PROVIDE A DETAILED DESCRIPTION

DESCRIPTION (Use Additional Sheets If Necessary)

Fuel gas piping system, using corrugated stainless steel tubing (CSST), to be used in installation in residential or commercial buildings.

SAME INFORMATION

INTENDED USE (Use Additional Sheets If Necessary)

Fuel gas piping system, using corrugated stainless steel tubing (CSST), to be used in installation in residential or commercial buildings.

DATA SUBMITTED

Letter
 Manual
 Standards
 Installation Instructions
 Display Catalog

Reports
 ICC - NES
 BOCA - NES
 ICBO
 SBCC
 NRB
 Other

Product Sample or Model
 Prior Approvals by Other Agencies
 Recommendations by Model Code Bodies

LABORATORY TEST BY

CSA International

PILOT-SERVICE EXPERIENCE AND CONDITIONS (Use Additional Sheets If Necessary)

RESTRICTIONS FOR USE (Use Additional Sheets If Necessary)

APPLICANT (Note: All correspondence will be sent to this address)

NAME OF COMPANY

Ward Manufacturing LLC

APPLICANT NAME

Joe Zellers

ADDRESS

117 Gulick Street

CITY

Blossburg

STATE

PA

ZIP CODE

16912

TELEPHONE NUMBER (Include Area Code)

(570) 638-2131

APPLICANT SIGNATURE (Must be an original signature)

[Signature]

DATE

9/13/2012

FAX NUMBER (Include Area Code)

(570) 638-2608



RICK SNYDER
GOVERNOR

STATE OF MICHIGAN
DEPARTMENT OF LICENSING AND REGULATORY AFFAIRS
BUREAU OF CONSTRUCTION CODES
IRVIN J. POKE
DIRECTOR

STEVEN H. HILFINGER
DIRECTOR

December 5, 2012

Mr. Joe Zellers
Ward Manufacturing LLC
117 Gulick Street
Blossburg, PA 16912

Dear Mr. Zellers:

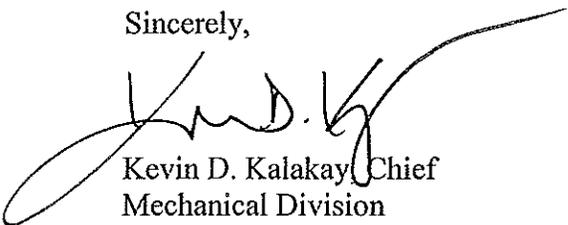
In review of your application for product approval, it has come to my attention that we are in need of some additional information.

Before we may continue the review, please submit the following information:

- Application is incomplete. Enclosed is a new application for your convenience.
- Description of product. Description must be specific to Wardflex II.
- Provide all applicable test reports.
- Pilot service.
- Restrictions.
- Sample of the product for Board of Mechanical Rules review.

Please contact me at (517) 241-9325, if you have any further questions in this matter.

Sincerely,



Kevin D. Kalakay, Chief
Mechanical Division

KDK/dmc

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Petition Application for Certificate of Acceptability
Michigan Department of Licensing and Regulatory Affairs
Bureau of Construction Codes
P.O. Box 30255, Lansing, MI 48909
www.michigan.gov/bcc

Agency Use Only

Application Fee: \$1,000.00 (Each Approval Requested Requires a Separate Application and Fee)

Authority: 1972 PA 230 Completion: Mandatory Penalty: Use of material, product, or method/manner of construction or installation will not be approved	LARA is an equal opportunity employer/program. Auxiliary aids, services and other reasonable accommodations are available upon request to individuals with disabilities.
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APPROVAL REQUESTED

NATURE OF PETITION (Limited to One Item Per Petition)

Material Product Method/Manner of Construction or Installation

CODE UNDER WHICH APPROVAL IS SOUGHT (Limited to One Code Per Petition)

Building (140) Electrical (115) Mechanical (130) Plumbing (98)

NAME OF MATERIAL, PRODUCT, OR METHOD/MANNER OF CONSTRUCTION OR INSTALLATION

WARDFLEX II

OTHER IDENTIFICATION (Model Number)

15C, 20C, 25C, 32C, 38C, 50C

DESCRIPTION (Use Additional Sheets If Necessary)

Corrugated Stainless Steel Tubing manufactured using 300 Series Stainless Steel and coated with an electrically conductive coating. ✓

INTENDED USE (Use Additional Sheets If Necessary)

Corrugated Stainless Steel Tubing used for transporting fuel gas in commercial and residential structures. ✓

DATA SUBMITTED

<input type="checkbox"/> Letter	Reports	<input checked="" type="checkbox"/> Product Sample or Model
<input checked="" type="checkbox"/> Manual	<input checked="" type="checkbox"/> ICC - ES	<input checked="" type="checkbox"/> Prior Approvals by Other Agencies
<input checked="" type="checkbox"/> Standards	<input type="checkbox"/> BOCA - NES	<input type="checkbox"/> Recommendations by Model Code Bodies
<input checked="" type="checkbox"/> Installation Instructions	<input type="checkbox"/> ICBO	<input type="checkbox"/> Laboratory Test/Evaluation
<input checked="" type="checkbox"/> Display Catalog	<input type="checkbox"/> SBCC	
	<input type="checkbox"/> NRB	
	<input checked="" type="checkbox"/> Other	

LABORATORY TEST AND/OR EVALUATION BY

CSA International

PILOT SERVICE EXPERIENCE AND CONDITIONS (Use Additional Sheets If Necessary)

N/A

RESTRICTIONS FOR USE (Use Additional Sheets If Necessary)

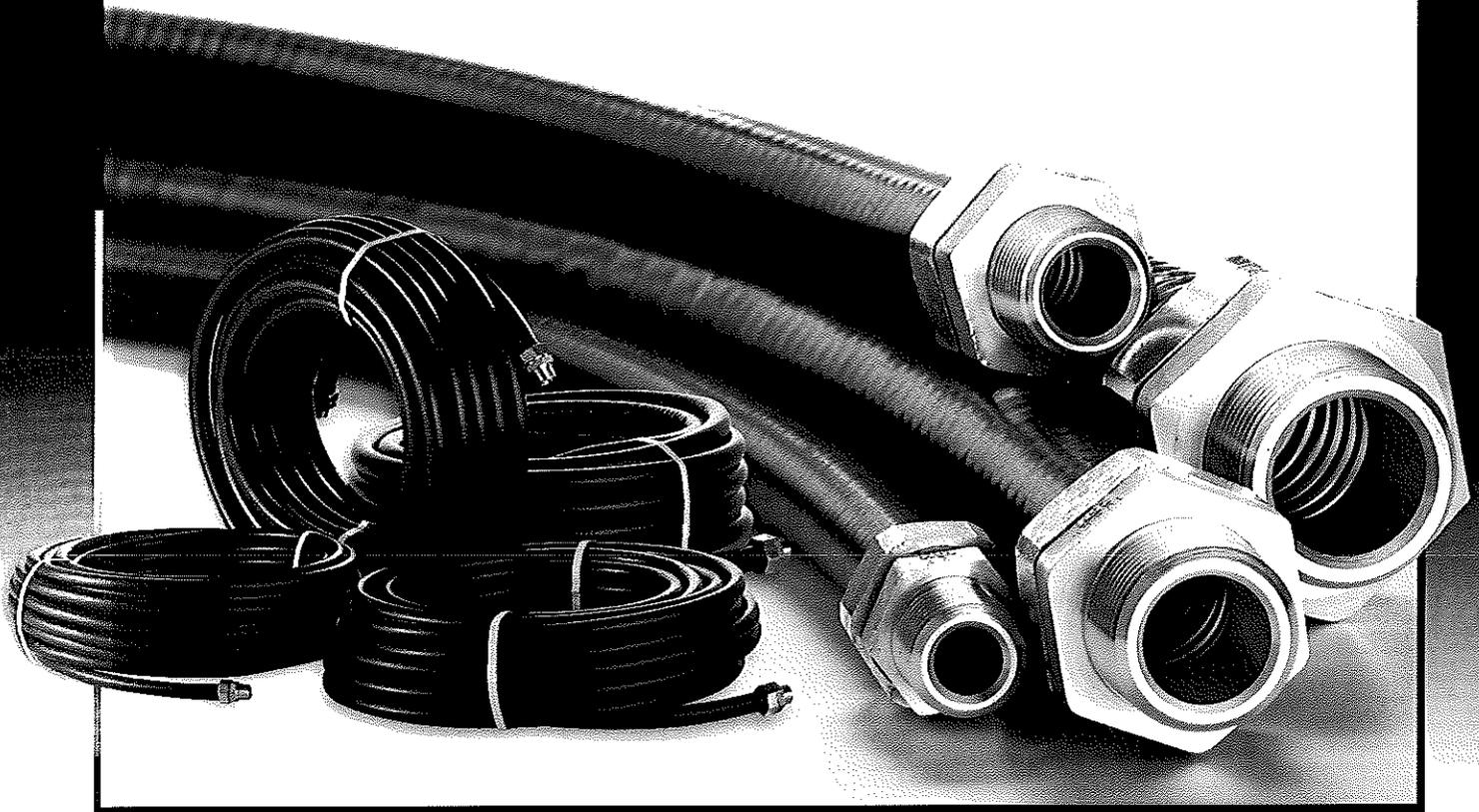
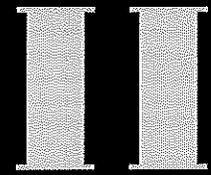
Intended solely for use with fuel gas, shall not be used with any termination fittings not manufactured by Ward Manufacturing for use with WARDFLEX CSST, Shall not be installed by anyone who has not completed the training requirements set forth by Ward Manufacturing (trained installer).

APPLICANT INFORMATION (Note: All correspondence will be sent to this address)

NAME OF COMPANY Ward Manufacturing LLC		APPLICANT NAME Mike Yeckinevich	
ADDRESS 117 Gulick Street			
CITY Blossburg	STATE PA	ZIP CODE 16912	TELEPHONE NUMBER (Include Area Code) (570) 638-2131
SIGNATURE (Must be an original signature) 		DATE 05/29/2013	FAX NUMBER (Include Area Code) (570) 638-2608

INTRODUCING!

WARDFLEX®



Conductive Coated Corrugated Stainless Steel Tubing

In 1990, Ward Manufacturing, LLC introduced Corrugated Stainless Steel Tubing (CSST) to the North American market. Since then, the WARDFLEX® system has become the industry standard in flexible gas piping.

WARDFLEX II is the next generation of CSST, delivering all the benefits of the original WARDFLEX system with a new conductive coating that disperses the

electrical energy induced on the tubing when an arc occurs between the CSST and another metallic system located in the structure.

While no CSST product is resistant to the effects of a direct lightning strike, WARDFLEX II has been designed and tested to help mitigate damage caused by transient arcing of lightning induced energy inside a building.

Testing Per LC 1024 Section 4.3.22 - Bonding Equivalency indicates that WARDFLEX II requires no additional bonding above the minimum requirements for rigid metal piping as defined in the National Electrical Code NFPA70 Article 250.104. However, the consideration of equipotential bonding is highly recommended to ensure the optimum level of safety available within the system.

Assumed Energy Associated with Transient Arcing from Lightning Inside a Building is less than 2.0 Coulombs.

Plus, the Best of WARDFLEX®.

The WARDFLEX system offers professional contractors an extremely flexible, reliable and effective way to distribute fuel gas in a building, eliminating the multiple service points seen at every turn and connection with black pipe and fittings.

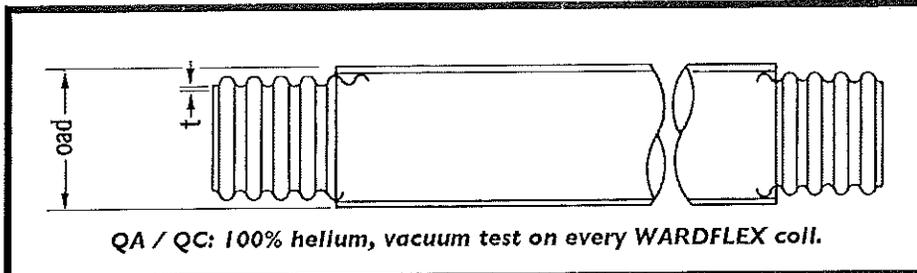
WARDFLEX II offers everything professional contractors have come to expect from WARDFLEX, including:

- Continuous run coils in a variety of sizes.
- Free training and exceptional customer support.

- Full annealing for maximum flexibility, easing installation in increasing routing options.
- Helium/vacuum testing of every foot of WARDFLEX for leak-free integrity.
- The StepSaver Double-seal Fitting for fast connections and leak-free performance.
- Improved resistance against damage from inadvertent electrical energization.



Compliance with Industry Standards



QA / QC: 100% helium, vacuum test on every WARDFLEX coll.

Maximum allowable working pressure: 25 psig

Tubing size	Item size	15C 1/2"	20C 3/4"	25C 1"	32C 1 1/4"	38C** 1 1/2"	50C** 2"
Equivalent Hydraulic diameter	EHD	19	25	30	37	48	62
Tube wall thickness (t)	in. (mm)	0.010 (0.25)	0.010 (0.25)	0.010 (0.25)	0.010 (0.25)	0.012 (0.30)	0.012 (0.30)
O.D. of coating (oad)	in. (mm)	0.812 (20.60)	1.070 (27.20)	1.303 (33.10)	1.618 (41.10)	2.120 (53.04)	2.654 (67.41)

- ANSI/ISO 14001:2004 (Environmental Certification)
- ISO 9001:2000 Certified
- ANSI LC I • CSA 6.26-2009
- National Fuel Gas Code (NFPA 54)
- Standard Gas Code (SBCCI)
- BOCA Mechanical Code
- IAPMO Classified Marking (File No. 3353)
- CABO One & Two Family Dwelling Code
- Uniform Mechanical Code (ICBO)
- International Fuel Gas Code
- International Plumbing Code
- International Mechanical Code
- ICC LC1024 (PMG-1100)

** Available 1st quarter

Expert Tested

WARDFLEX II has been tested by LTI (Lightning Technologies Institute) to LC1024. LTI is a leader in lightning technology and is internationally recognized for its expertise in this field. WARDFLEX II is also listed by CSA to ANSI LC-1 and ICC to LC1024.

At-Risk Areas

In geographic areas where lightning is a recognized risk, a Lightning Protection System should be considered for the best possible protection.

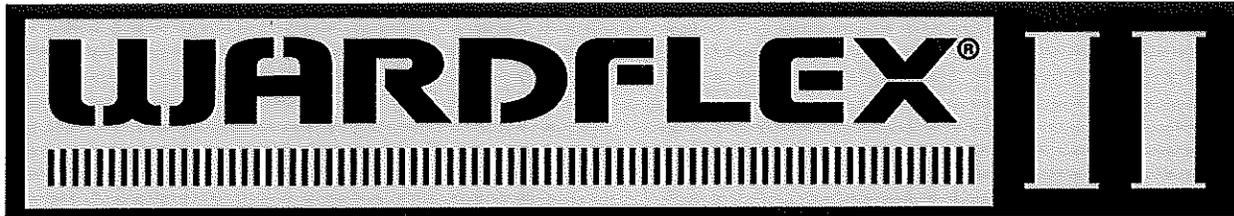


For more information, please visit our website, call us or contact your local WARDFLEX distributor.

Authorized Distributor



WARD MANUFACTURING
Make it simple. Make it Ward.



WARDFLEX II WARDFLEX® Design and Installation Guide Supplement

Release Date: 9/22/11

The intent of this document is to provide supplemental instructions to be used in conjunction with the June 2009 edition of the WARDFLEX® Design and Installation Guide for the installation of the WARDFLEX® II Corrugated Stainless Steel Tubing piping system. Design and installation aspects of the WARDFLEX® II system such as, sizing, routing, and protection are the same as the WARDFLEX® system and must follow the practices as detailed in the WARDFLEX® D&I Guide.

While similar to the WARDFLEX® Corrugated Stainless Steel Tubing piping system, the WARDFLEX® II CSST piping system has no additional bonding requirements imposed by the manufacturer. WARDFLEX® II is to be bonded in accordance with the National Electrical Code NFPA 70 Article 250.104 in the same manner as the minimum requirements for rigid metal piping. Installers must always check local codes to verify there are no conflicts with these instructions. In the event of a difference between local code and WARDFLEX® II electrical bonding instructions, local code will take precedence.

Additionally, WARDFLEX® II has not yet been tested for compliance with ASTM E84 "*Standard Test Method for Surface Burning Characteristics of Building Materials*". Installers should check local building codes to ensure compliance with applicable flame spread and smoke density requirements for nonmetallic materials.

For additional questions about the WARDFLEX II CSST system please contact Ward Manufacturing LLC.

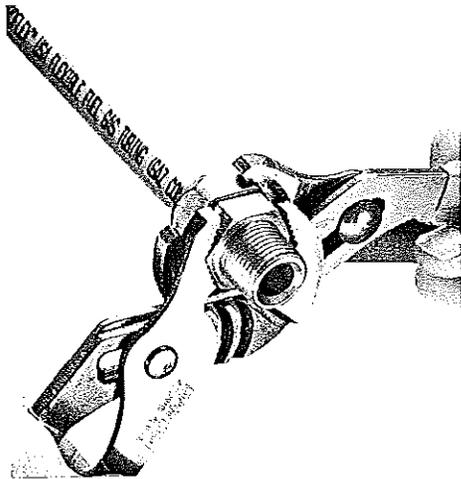
www.Wardmfg.com

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Toll Free: 800-248-1027

E-mail: info@wardflex.com

2009 DESIGN & INSTALLATION GUIDE



WARDFLEX®



June 2009

ATTENTION!

1. The installation of WARDFLEX® Flexible Gas piping must be performed by a qualified installer who has successfully completed the WARDFLEX® training program. The installer must also meet all qualifications required by the state and/or local administrative authority administering the provisions of the code where the gas piping is installed.
 2. WARDFLEX® must be installed only by qualified installers who have passed WARD MANUFACTURING'S training program. WARDFLEX® training may augment but does not supercede any state or local regulations regarding installer certifications.
 3. All piping systems using WARDFLEX® shall be designed and installed according to the requirements of this guide.
 4. Only WARDFLEX® components may be used in the system. Components from other systems are not interchangeable. Only components supplied or specified by WARD shall be used.
 5. Installation shall be in accordance with local codes, or in their absence, in accordance with the National Fuel Gas Code ANSI Z223.1 in the USA, and CAN/CGA - B149.1 & B149.2 in Canada. In cases where the requirements of this guide are in conflict with the local code, the local code must take precedence, unless the local authority having jurisdiction approves a variance, or change.
 6. Inspection, testing, and purging shall be performed according to the procedures in Part 4 of the National Fuel Gas Code, ANSI Z223.1, and/or - B149 installation Codes or in accordance with local codes.
 7. This system and related components shall be used only in gas piping systems where the operating gas pressure does not exceed 25 psig.
 8. Tubing with covering may be installed in or routed through air plenums, ducts, or other areas which may be limited by building codes to materials having maximum ASTM E84 ratings of 25 Flame Spread and 50 Smoke Density. Other procedures are to be followed by the installer to meet local building codes with respect to Flame Spread and Smoke Density regulations for nonmetallic materials.
 9. Tubing may be routed through concrete floors or walls, provided it is passed through previously embedded conduit. Tubing shall not be buried directly underground.
10. The CSST is typically routed:
- Beneath, through and alongside floor joists
 - Inside interior wall cavities
 - On top of ceiling joists in attic space.
1. Carefully unwind and route the tubing from the reel to the required location, making certain not to kink, tangle or apply excessive force.
 2. Tubing end must be temporarily capped or taped closed prior to installation to prevent contamination from foreign material.
 3. When installing WARDFLEX® avoid sharp bends, stretching, kinking, twisting, or contacting sharp objects. The tubing shall be replaced if damage occurs.

IMPORTANT - READ ENTIRE MANUAL

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It shall not be copied or reproduced without the prior permission of
WARD MANUFACTURING, LLC.**

1.1 USER WARNINGS (see section 1.8 of ANSI LC 1-CSA 6.26-2005)

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 insure 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® corrugated stainless steel tubing (WARDFLEX®) 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® components and tubing shall not be used with other corrugated stainless steel tubing system components from other manufacturers.

WARDFLEX® 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®. See Section 4.1 of the current manual for more specific information on this topic.

A gas delivery system consisting of WARDFLEX® offers significant advantages over other gas delivery systems because of its wall dimensions and corrugated design. In contrast to rigid steel pipe, WARDFLEX® 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®'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®'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® 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 and grounded. 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® should consider all of the limitations and benefits of WARDFLEX® for their particular situation. Installers shall provide building owners and electricians with the required WARDFLEX® 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® Corrugated Stainless Steel Tubing (WARDFLEX®) to distribute fuel gas in residential housing units and commercial structures. It would be impossible for this guide-line 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® 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.wardflex.com for More Information)

Standards

- United States - ANSI/AGA LC-1
- Canada - CAN/CGA 6.26 M

Listings

- CSA - Canadian Standard Association
- IAPMO - International Association of Plumbing and Mechanical Officials - File Number 3353
- UL - Classified Mark File #R18357
- ICC - International Codes Council ESR-1879
- 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 Gasses
- 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

IMPORTANT - READ ENTIRE MANUAL

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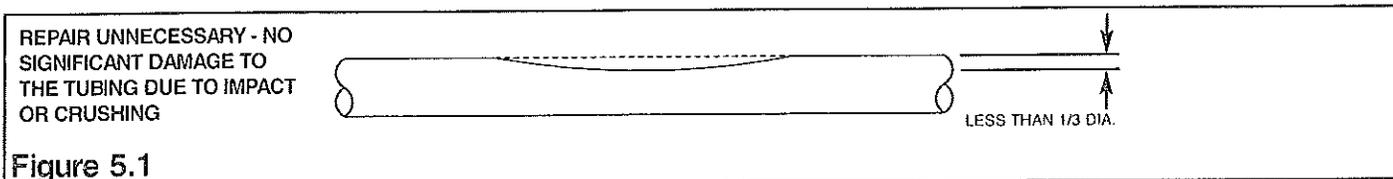
5.0 INSPECTION, REPAIR AND REPLACEMENT

5.1 MINIMUM INSPECTION REQUIREMENTS

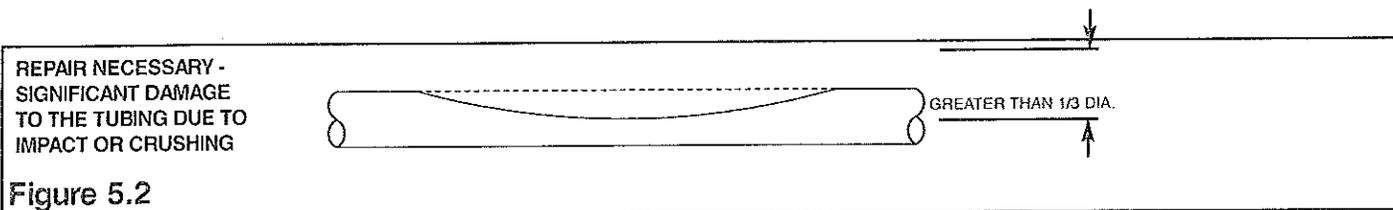
If the tubing is damaged refer to the following subsections to determine the severity of damage and, if necessary the method of repair.

Classification of Repairs

- No repairs or replacement of the tubing is necessary if the tubing is only slightly dented by crushing as indicated in Figure 5.1.

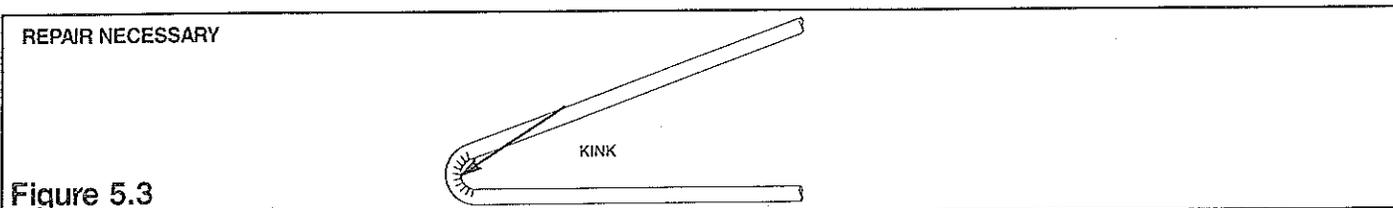


- The tubing must be repaired or replaced under the following circumstances:
- The tubing has been significantly damaged (Figure 5.2).
- The tubing has been punctured.
- The tubing has been bent beyond its minimum bend radius so that a crease or kink appears (Figure 5.3).



5.2 REPAIR/REPLACEMENT OF DAMAGED TUBING

Several methods of repair are discussed below depending on the nature of damage.



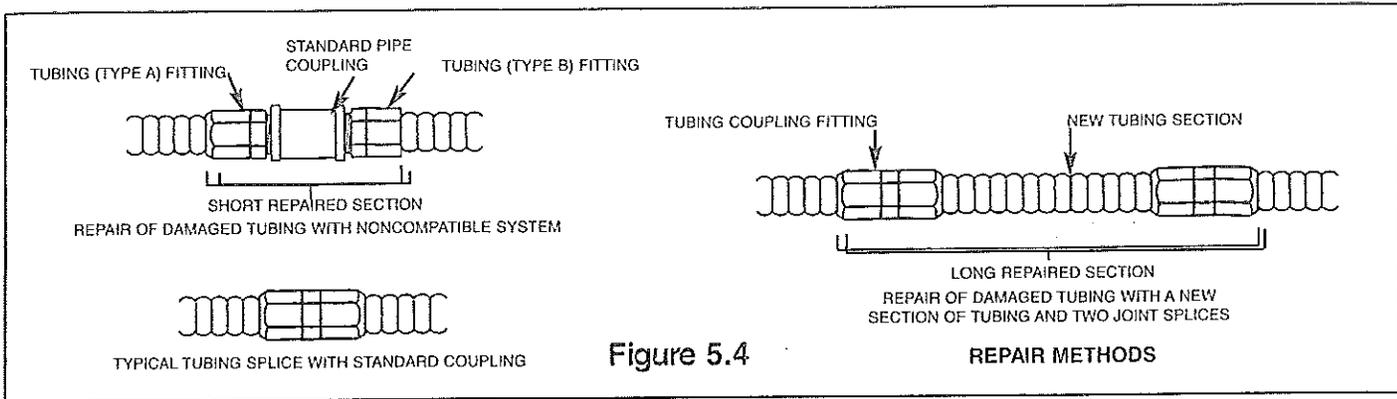
WARDFLEX® AND OTHER DESIGNS ARE NOT INTERCHANGEABLE. DO NOT MIX COMPONENTS

In the case of the Outdoor Termination Fitting, install new O-Rings. The installer shall determine the most reliable and economical method of repair using one of the following methods:

- **Replace the entire tubing run.** In most cases, when the tubing run is short and easily accessible, it can be replaced faster and more economically than repairing the damaged section. This is the preferred method because extra fittings are not required.
- **Repair the damaged section.** The damaged tubing can be repaired by each of following two methods.

Method 1: Remove the section of tubing which is damaged and reconnect the new ends with a single mechanical coupling. Use this repair method if the damaged section is small and if there is enough slack tubing in the run to make-up for the removed damaged length.

Method 2: Remove the section of tubing which is damaged and repair/replace as illustrated in figure 5.4.



6.0 TESTING

6.1 PRESSURE TESTING AND INSPECTION PROCEDURE

- The final installation is to be inspected and tested for leaks at 1 1/2 times the maximum working pressure, but not less than 3 PSIG, using procedures specified in Chapter 7 "Inspection, Testing and Purging" of the National Fuel Gas Code, NFPA 54/ANSI Z223.1 - 2002 (See Annex D). In Canada, refer to the applicable sections of the CAN/CGA - B149 Installation codes.
- Maximum test pressures recommended -10A-50A-40 PSI MAX. Excess pressure will permanently distort tubing.
- Do not connect appliances until after pressure test is completed.
- Inspect the installed system to ensure:
- Presence of listed striker plates and other protective devices at all required locations.
- Acceptable physical condition of the tubing.
- Presence of fittings (with nut bottomed out to the body).
- Correct regulator and manifold arrangement with proper venting requirements.
- All gas outlets for appliance connections should be capped during pressure testing.
- Pressure testing should be performed during rough construction of the facility (before interior walls are finished). This will permit a more complete inspection of the piping system during the pressure testing.
- The elevated pressure system requires a two-part pressure test. (See Figure 6.1)
- The first part is performed on the elevated pressure section, between the meter connection and the pressure regulator.
- The second part is performed on the low pressure section, between the pressure regulator and the individual gas appliance outlets.

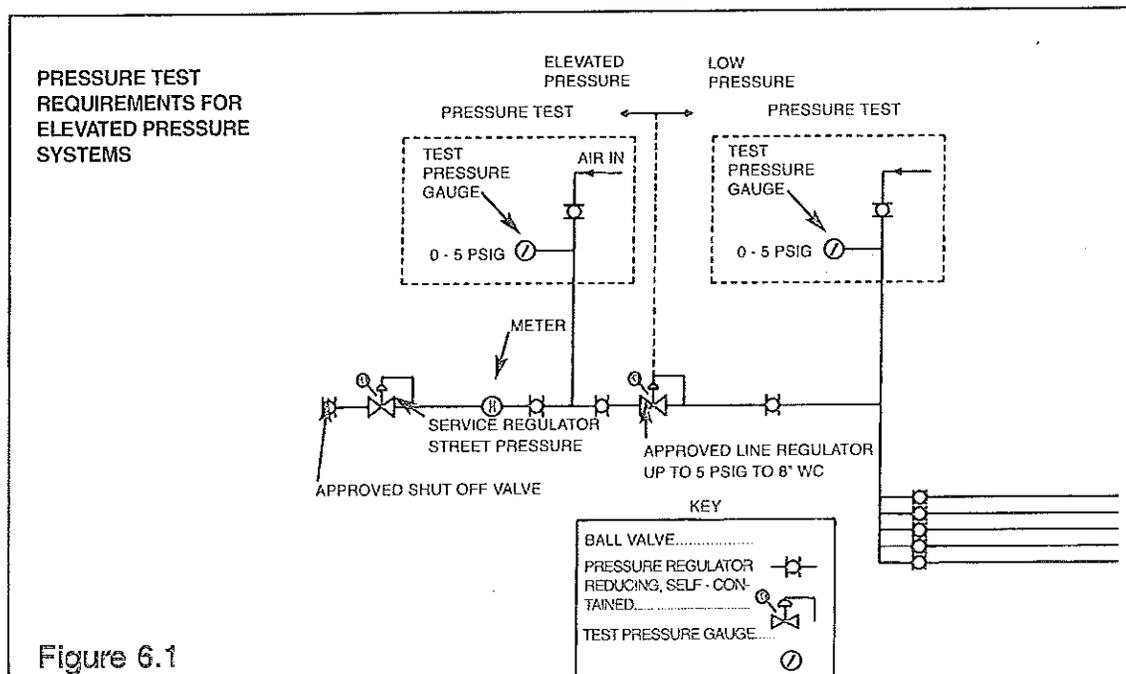


Figure 6.1

PO BOX 9 | Blossburg, PA 16912
PH: 800-248-1027 | 570-638-2131 | FAX: 570-638-3410
www.wardflex.com

WARDFLEX®



WDFLXINSTALLPAYNE30K0609

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Certificate of Compliance

Certificate: 1004880 (112940)

Master Contract: 189433

Project: 2445834

Date Issued: September 30, 2011

Issued to: Ward Manufacturing LLC

117 Gulick St
Blossburg, PA 16912-0009
USA
Attention: David R. Elder

The products listed below are eligible to bear the CSA Mark shown with adjacent indicators 'C' and 'US' for Canada and US or with adjacent indicator 'US' for US only or without either indicator for Canada only.



James J. Horvath

Issued by: James J. Horvath, PE

PRODUCTS

CLASS 3335 04 - SYSTEMS (GAS) - Fuel Piping

CLASS 3335 84 - SYSTEMS (GAS) - Fuel Piping-Certified to U.S. Standards

WARDFLEX®

CSST tubing 10A, 10A.WF 3/8 in. (10 mm)

CSST tubing 15A, 15A.WF 1/2 in. (15 mm)

CSST tubing 20A, 20A.WF 3/4 in. (20 mm)

CSST tubing 25A, 25A.WF 1 in. (25 mm)

CSST tubing 32A, 32A.WF 1 1/4 in. (30 mm)

CSST tubing 38A, 38A.WF 1 1/2 in. (38mm)

CSST tubing 50A, 50A.WF 2 in. (50mm)

* WARDFLEX ®II *



2 of 2

Certificate: 1004880 (112940)

Master Contract: 189433

Project: 2445834

Date Issued: September 30, 2011 ✓

CSST tubing 15C ½ in. (15mm)

CSST tubing 20C ¾ in. (20mm)

CSST tubing 25C 1 in. (25mm)

CSST tubing 32C 1¼ in. (32 mm)

CSST with a trade name WARDFLEX® has not been evaluated by CSA for the effects of lightening because the LC1 standard has no coverage for this claim, ✓

APPLICABLE REQUIREMENTS

ANSI LC 1•CSA6.26-2005, ANSI LC1a•CSA6.26a-2009 Fuel Gas Piping Systems Using Corrugated Stainless Steel Tubing (CSST) ✓

MARKINGS

All markings are in compliance with the above mentioned requirements. Samples are contained in the main certification report.



Certification Record

CUSTOMER	CLASS	FILE
Ward Manufacturing LLC 117 Gulick St, Blossburg PA 16912-0009 USA	3335-04 SYSTEMS (GAS)-Fuel Piping	112940_0_000
Refer to Class Description for program details		

Model Number	Electric Rating	Size
For Use With Natural and Propane Gases 5 psig Indoor or Outdoor Installation		
	Trade Name: WARDFLEX®	
CSST 10A, 10A.WF		3/8
CSST 15A, 15A.WF		1/2
CSST 20A, 20A.WF		3/4
CSST 25A, 25A.WF		1
CSST 32A, 32A.WF		1 1/4
CSST 38A, 38A.WF		1 1/2
CSST 50A, 50A.WF		2

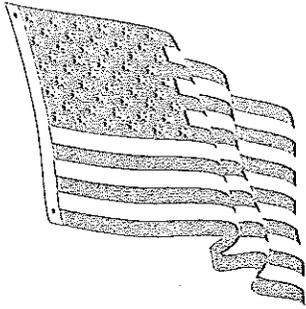
WARDFLEX®II

CSST 15C	1/2
CSST 20C	3/4
CSST 25C	1
CSST 32C	1 1/4
CSST 38C	1 1/2
CSST 50C	2

CSST with a trade name WARDFLEX®II has not been evaluated by CSA for the effects of lightning because the LC1 standard has no coverage for this claim

/sl

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PROUDLY MADE
IN THE USA

WARDFLEX[®]

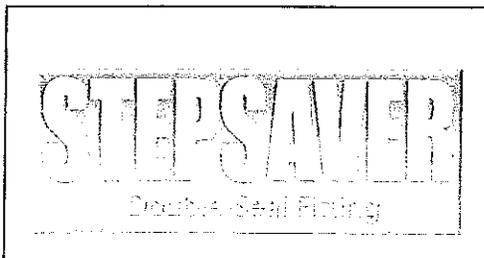
WARDFLEX[®] II

CORRUGATED
STAINLESS
STEEL
TUBING

GAS PIPING SYSTEM
COMPLIES WITH ANSI LC 1 ✓
CSA 6.26

CSA DESIGN CERTIFIED ✓

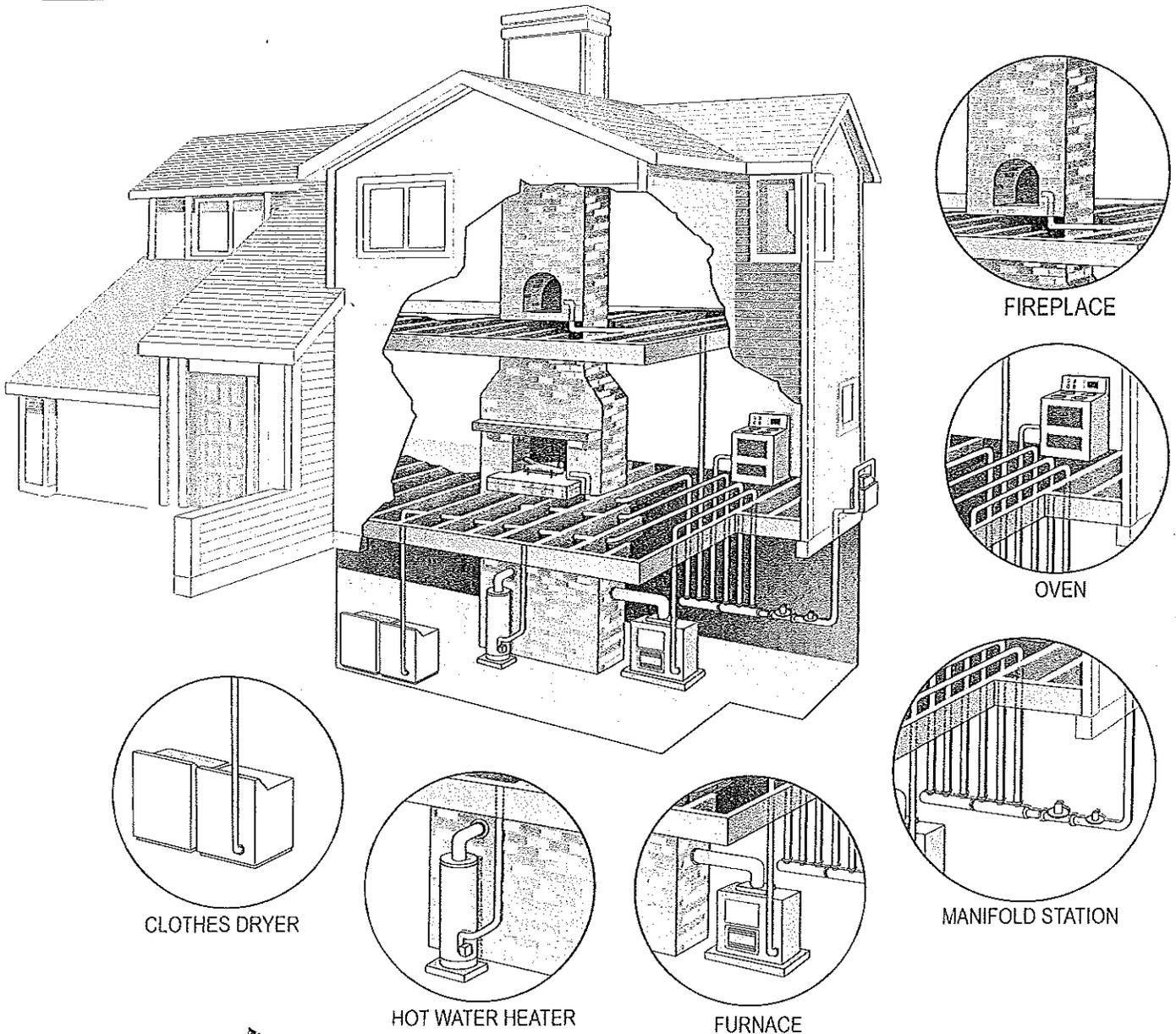
PRICE LIST
EFFECTIVE JANUARY 15, 2013
PRICE SHEET #310113



WARD MANUFACTURING

INSTALLATION REQUIREMENTS:

1. Installation must be performed strictly in accordance with local plumbing and/or building codes, and in accordance with the WARDFLEX Design and Installation Guide.
2. Installation and service must be performed by installers that have completed Ward Manufacturing's training program for the installation of WARDFLEX/WARDFLEX II CSST.
3. Pressure testing must be performed during rough construction with piping exposed.
4. Ward assumes no responsibility for product or labor for any system which has been improperly installed.





count the steps you
save with WARDFLEX

Ward Manufacturing LLC
117 Gulick St.
Blossburg, PA 16912
Tel: (570) 638-2131
Fax: (570) 638-3410
www.wardflex.com
www.wardmfg.com

WARDFLEX® II Corrugated Steel Tubing Specification Sheet

WARDFLEX® II Corrugated Stainless Steel Tubing has been designed and certified for use in fuel gas piping systems per the requirements of ANSI LC-1.

Certifications:

- CSA International
 - Certifies that WARDFLEX® II CSST conforms to the latest revision of ANSI LC-1 which governs the safe performance standards for CSST fuel gas piping systems.
 - File #: 112940_0_000
- UL – Underwriters Laboratory
 - WARDFLEX® II CSST has UL Through Penetration Firestop Listings ranging from 1 hour to 4 hours for both the U.S. and Canada.
 - File # R18357
- FM – Factory Mutual
- IAPMO – International Association of Plumbing and Mechanical Officials
 - File #: 3353
- ICC – International Code Council
 - Report #: PMG-1100

Tubing

- CSST:
 - All WARDFLEX® II CSST sizes are made from 300 series Stainless Steel conforming to ASTM A240.
 - 15C (1/2") thru 32C (1 1/4") WARDFLEX® II tubing sizes are fully annealed.
 - WARDFLEX® II CSST is approved for 25 PSI when used in conjunction with the WARDFLEX® STEPSAVER fittings.
- Coating
 - All WARDFLEX® II CSST is coated with a conductive black polyethylene (PE) jacket.

- **WARDFLEX® II CSST EHD (Equivalent Hydraulic Diameter) Values**

Tubing Size	15C (1/2")	20C (3/4")	25C (1")	32C (1-1/4")	38C (1-1/2")	50C (2")
EHD	19	25	30	37	48	62

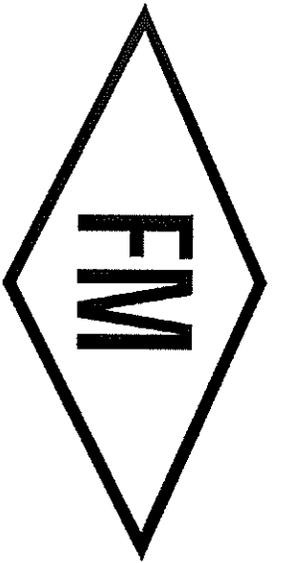
Fittings

- WARDFLEX® male and female mechanical joints, couplings, adapter nuts, and some tees are made from C360 free machining brass or equivalent.
- WARDFLEX® floor flanges, manifolds, termination fittings and some tees are manufactured using malleable iron conforming to ASTM A197.

Striker Plates

- WARDFLEX® striker plates are made of case hardened steel and conform to the requirements of ANSI LC-1.

For additional information on WARDFLEX® or WARDFLEX® II accessories, sizing, or installation practices refer to the latest versions of the WARDFLEX® Design and Installation Guide available for free download @ www.WARDFLEX.com.



APPROVED

Certificate of Compliance

This certificate is issued for the following:

WardFlex® II Flexible Gas Piping Systems

Prepared for:

Ward Manufacturing Co

P.O. Box 9

117 Gulick St

Blossburg, PA 16912

FM Approvals Class: 6036

Approval Identification: 0003024738

Approval Granted: Jan. 2, 2006

To verify the availability of the Approved product, please refer to www.approvalguide.com or www.roofnav.com

Said Approval is subject to satisfactory field performance, continuing Surveillance Audits, and strict conformity to the constructions as shown in the Approval Guide, an online resource of FM Approvals.

Cynthia Frank

Asst. Vice President - Group Manager,
Materials

FM Approvals

1151 Boston-Providence Turnpike
Norwood, MA 02062



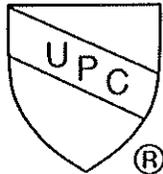
Member of the FM Global Group

IAPMO RESEARCH AND TESTING, INC.

5001 E. Philadelphia Street, Ontario, CA 91761-2816 • (909) 472-4100 • Fax (909) 472-4244 • www.iapmo.org



CERTIFICATE OF LISTING



IAPMO Research and Testing, Inc. is a product certification body which tests and inspects samples taken from the supplier's stock or from the market or a combination of both to verify compliance to the requirements of applicable codes and standards. This activity is coupled with periodic surveillance of the supplier's factory and warehouses as well as the assessment of the supplier's Quality Assurance System. This listing is subject to the conditions set forth in the characteristics below and is not to be construed as any recommendation, assurance or guarantee by IAPMO Research and Testing, Inc. of the product acceptance by Authorities Having Jurisdiction.

Effective Date: September 2012 Void After: September 2013

Product: **Gas Piping Corrugated Stainless Steel Tubing System** File No. 3353

Issued To: Ward Manufacturing LLC
117 GULICK STREET
BLOSSBURG, PA 16912

IDENTIFICATION: Each component of piping system shall bear permanent markings which include the manufacturer's name, trademark or symbol, part number, symbol of the organization making the test for compliance with ANSI/IAS LC 1b. The tubing shall also bear a permanent marking of the maximum actual operating pressure in psi, the equivalent hydraulic diameter (EHD) and the words "FUEL GAS PIPING". These markings shall appear on tubing at not less than 24-inch interval. In addition, each component supplied by the manufacturer shall bear a separate date code marking in accordance with ANSI/IAS LC 1b, and shall also bear the UPC® certification mark.

CHARACTERISTICS: Interior fuel gas piping systems, using corrugated stainless steel tubing, to be used in installation in residential or commercial buildings. Components include tubing, fittings, manifolds and sticker plate. May be used in conjunction with other approved fuel gas piping materials. May be used for fuel gas at maximum actual operating pressure not exceeding 5 psig. To be installed in accordance with the manufacturer's instructions and the latest edition of the Uniform Plumbing Code.

Products comply with the applicable sections of the latest edition of the Uniform Plumbing Code® and the International Plumbing Code®. Manufactured in compliance with ANSI/IAS LC 1-2005.

Products listed on this certificate have been tested by an IAPMO R&T recognized laboratory. This recognition has been granted based upon the laboratory's compliance to the applicable requirements of ISO/IEC 17025.

MODELS:

Mechanical Joints, Male

10A, 10AXC, 15A, 15AXC, 20A, 25A, 25AX1, 32A, 38A, 50A

Mechanical Joints, Female

10A, 15A, 20A, 20AXD, 25AX1, 32A, 38A, 50A

Indoor/Outdoor Termination Nut Assemblies

10A, 15A, 20A, 25A, 25AX1

Indoor/Outdoor Flange Termination Nut Assemblies

10A, 15A, 20A, 25AX1, 32A, 38A, 50A

Couplings

10A, 15A, 20A, 25A, 32A, 38A, 50A, 10.C, 15.C, 20.C, 25.C, 32.C, 38.C, 50.C

Tees

15A, 15AX10A, 15AX10AX10A, 15AXD, 20A, 20AX15A, 20AX15AX15A, 20AX15AXD, 20AXD, 20AXE, 25A, 25AX1, 25AXE, 25AX20A, 32A, 32AX1B, 38A, 38AX1D, 50A, 50AX2

Tubing

10A, 15A, 20A, 25A, 32A, 38A, 50A

Valves

10A, 15A, 15AWF90, 20A, 25A, 15A.WFKIT, 10.V, 15.V, 20.V, 25.V, 15.90V, 15XD.WFKIT, 20XD.WFKIT

Bodies

10XC.B, 10XD.B, 15XC.B, 15XD.B, 20XE.B, 25XE.B, 25X1.B, 32X1B.B, 38X1D.B, 50X2.B

Female Bodies

10XC.FB, 10XD.FB, 15XC.FB, 15XD.FB, 20XD.FB, 20XE.FB, 25XE.FB, 25X1.FB

Retainers

10.R, 15.R, 20.R, 25.R, 32.R, 38.R, 50.R

Nuts

10.N, 15.N, 20.N, 25.N, 32.N, 38.N, 50.N

Adapter Nuts

10.AN, 15.AN, 20.AN, 25.AN

Termination Nuts

10.PTN, 15.PTN, 20.PTN, 25.PTN

Floor Flange Termination Nuts

10.PTN, 15.PTN, 20.PTN, 25.PTN

10.FTN, 15.FTN, 20.FTN, 25.FTN, 32.FTN, 38.FTN, 50.FTN

Tee Bodies

15.T, 15X10.T, 15X10X10.T, 15XD.FT, 20.T, 20X15.T, 20X15X15.T, 20XD.FT, 20XE.FT, 25.T, 25X20.T, 25XE.FT, 25X1.FT, 32.T, 32X1B.FT, 38.T, 38X1D.FT, 50.T, 50X2.FT

NOTE: "A" can be replaced by "M". "A" designates 3 corrugations,
"M" designates 1 corrugation.**WARDFLEX II**

Models: 15C(1/2), 20C(3/4), 25C(1), 32C(1-1/4), 38C(1-1/2), 50C(2)

WARDFLEX size designations

10A, 10M = 3/8"

15A, 15M = 1/2"

20A, 20M = 3/4"

25A, 25M = 1"

32A, 32M = 1-1/4"

38A, 38M = 1-1/2"

50A, 50M = 2"

Standard Fitting Terminations

10A = 3/8" WARDFLEX x 1/2" NPT"

10AXC = 3/8" WARDFLEX x 3/8" NPT"

10MXC = 3/8" WARDFLEX x 3/8" NPT"

10MXD = 3/8" WARDFLEX x 1/2" NPT"

15A = 1/2" WARDFLEX x 1/2" NPT"

15AXC = 1/2" WARDFLEX x 3/8" NPT"
 15MXD = 1/2" WARDFLEX x 1/2" NPT"
 20AXD = 3/4" WARDFLEX x 1/2" NPT"
 20MXD = 3/4" WARDFLEX x 1/2" NPT"
 20MXE = 3/4" WARDFLEX x 3/4" NPT"
 25A = 1" WARDFLEX x 3/4" NPT"
 25AX1 = 1" WARDFLEX x 1" NPT"
 25MXE = 1" WARDFLEX x 3/4" NPT"
 25MX1 = 1" WARDFLEX x 1" NPT"
 32A = 1-1/4" WARDFLEX x 1-1/4" NPT"
 32MX1B= 1-1/4" WARDFLEX x 1-1/4" NPT"
 38A = 1-1/2" WARDFLEX x 1-1/2" NPT"
 38MX1D= 1-1/2" WARDFLEX x 1-1/2" NPT"
 50A = 2" WARDFLEX x 2" NPT"
 50MX2 = 2" WARDFLEX x 2" NPT"

Fitting Styles (suffix)

WFMJ = WARDFLEX Mechanical Joint [male NPT]

WFMJF = WARDFLEX Mechanical Joint Female [female NPT]

WFT = WARDFLEX Tee [CSST connection only] eg 15A= 1/2" tubing connections

WFFT = WARDFLEX Female Tee [CSST and female NPT connection] eg 20AX10AXD =20A X 10A tubing connections X 1/2" NPT

[WARD designates fractional size pipe fittings: A=1/8, B=1/4", C=3/8", D=1/2" and E=3/4"]

WFTF = WardFlex Termination Nut [nut has 2 mounting holes]

WFOTF = WardFlex Outdoor Termination Nut [nut has 2 mounting holes + weather sealing o-rings]

WFOTFF = WardFlex Female Outdoor Termination Nut

WFFFTA = Floor Flange Termination Nut [nut has 4 mounting holes]

WFFTNA = WardFlex Flange Termination Nut [nut has 4 mounting holes]

WFFOTNA = WardFlex Flange Termination Nut [nut has 4 mounting holes + weather sealing o-rings]

WV = WardFlex Valve

WF90V = WardFlex 90° Valve

WFC = WardFlex Coupling

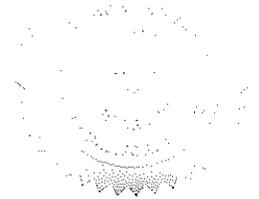
ADDITIONAL COMPANY INFO:


 Chairman, Product Certification Committee


 CEO, The IAPMO Group



Print This Document



ICC-ES PMG Listing

PMG-1100



Effective Date: October 1, 2012

This listing is subject to re-examination in one year.

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CSI: DIVISION: 23 00 00—HEATING, VENTILATING, AND AIR-CONDITIONING
 Section: 23 11 00—Facility Fuel Piping

Product certification system:

The ICC-ES product certification system includes testing samples taken from the market or supplier's stock, or a combination of both, to verify compliance with applicable codes and standards. The system also involves factory inspections, and assessment and surveillance of the supplier's quality system.

✱ Product: WARDFLEX® II Conductive Jacketed Corrugated Stainless Steel Tubing ✱

Listee: WARD MANUFACTURING LLC®
 117 GULICK STREET
 BLOSSBURG, PENNSYLVANIA 16912-0009
 www.wardflex.com

Compliance with the following codes:

2012 and 2009 *International Fuel Gas Code*® (IFGC)
2012 and 2009 *International Mechanical Code*® (IMC)
2012 and 2009 *International Residential Code*® (IRC)
2012 and 2009 *Uniform Plumbing Code*® (UPC)*
2012 and 2009 *Uniform Mechanical Code*® (UMC)*

**Uniform Mechanical Code* and *Uniform Plumbing Code* are copyrighted publications of the International Association of Plumbing and Mechanical Officials, 5001 East Philadelphia Street, Ontario, California 91761.

Compliance with the following standards:

ANSI LC 1/CSA 6.26, Fuel Gas Piping Systems Using Corrugated Stainless Steel Tubing (CSST)
NFPA 54, National Fuel Gas Code
LC1024, PMG Listing Criteria for Conductive Jacketed Corrugated Stainless Steel Tubing
ESR-1879, WARDFLEX® Flexible Fuel Gas Piping System

Identification:

→ Tubing: Each 2 feet (610 mm) of tube bears the trade names WARDFLEX® II, part number, rated pressure [5 psi (34 kPa)], equivalent hydraulic diameter (EHD), the words "Fuel Gas", the name of the third-party inspection agency [CSA International (AA-659)] and the ICC-ES PMG listing mark.

Components: Fittings, termination outlets and distribution manifolds are stamped with the WARDFLEX® logo, the part number and a date code of at least four consecutive digits (first two for the year, last two for the week).

Installation:

General: Installation must be in accordance with the WARDFLEX® Flexible Gas Piping Guide and Installation Instructions, IFGC Section 404, IRC Section 2415, UMC Section 1309 and UPC Section 1211, as applicable. The system installation consists of CSST distribution lines installed between the point of delivery and fuel gas appliances. The use and system installation must be in accordance with ICC-ES PMG-1100.

→ **Plenum Installation:** Per manufacturer's installation requirements, product must not be installed in plenum applications.

→ **Electrical Bonding:** The WARDFLEX® II Conductive Jacketed Corrugated Stainless Steel Tubing (CSST) System is electrically continuous and is considered to be bonded where it is connected to appliances that are connected to the equipment grounding conductor of the circuit supplying that appliance. Additional bonding prescribed by IFGC Section 310.1.1 is not required for WARDFLEX® II Conductive Jacketed Corrugated Stainless Steel Tubing when it is installed in accordance with this listing.

Models: The WARDFLEX® II Conductive Jacketed CSST System consists of three parts: (1) a black conductive exterior jacket; (2) corrugated stainless steel tubing which is recognized in ESR-1879 as conforming to ANSI LC-1; and (3) mechanical fittings designed for use only with the WARDFLEX® CSSTs. Mechanical fittings utilize a metal-to-metal seal and secondary gasket seal, and include mechanical fittings, distribution manifolds, shutoff valves, termination outlet devices, pressure regulators and protection devices.

Conditions of Listing:

1. WARDFLEX® II has been tested (in accordance with LC1024) and shown to resist a transient arc of 1000 amps minimum peak delivering 4.5 coulombs within 20 milliseconds (0.020 seconds). Assumed energy associated with a transient arc from lightning inside a building is less than 2.0 coulombs, providing a factor of safety of 2.25 for WARDFLEX II. Evaluation of this product for an arc exceeding this level or a direct strike from lightning is outside the scope of this listing.
2. The CSST piping system must not be used as a grounding electrode for an electrical system.
3. Additional information and requirements are defined in ICC-ES ESR-1879.
4. WARDFLEX® II is manufactured by WARD Manufacturing LLC® in Blossburg, Pennsylvania, under a quality control program with semi-annual surveillance inspections by CSA International (AA-659).

TABLE 1—PART NUMBERS FOR WARDFLEX II TUBING

TUBING SIZE (inches)	PART NUMBER
1/2	15C
3/4	20C
1	25C
1 1/4	32C
1 1/2	38C
2	50C

For SI: 1 inch = 25.4 mm.

XXX: Length of tubing in feet.

**PROPOSED PMG LISTING CRITERIA FOR
CORRUGATED STAINLESS STEEL TUBING
UTILIZING A PROTECTIVE JACKET**

LC1024

**Approved February 2010
(Revised February 2012)**

PREFACE

Plumbing, mechanical and fuel gas (PMG) listings issued by ICC Evaluation Service, LLC (ICC-ES), are based upon performance features of the *International Plumbing Code*®, *International Mechanical Code*®, *International Residential Code*®, *Uniform Plumbing Code* and *Uniform Mechanical Code*. Section 105.2 of the *International Plumbing Code*® reads as follows:

Materials, methods and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any method of construction not specifically prescribed by this code, provided that any such alternative has been approved. An alternative material or method of construction shall be approved where the code official finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, at least the equivalent of that prescribed in this code in quality, strength, effectiveness, fire resistance, durability and safety.

Similar provisions are contained in the Uniform Codes.

ICC-ES may consider alternate listing criteria, provided the listing applicant submits valid data demonstrating that the alternate listing criteria are at least equivalent to the listing criteria set forth in this document, and otherwise demonstrate compliance with the performance features of the codes. Notwithstanding that a product, material, or type or method of construction meets the requirements of the criteria set forth in this document, or that it can be demonstrated that valid alternate criteria are equivalent to the criteria in this document and otherwise demonstrate compliance with the performance features of the codes, ICC-ES retains the right to refuse to issue or renew a listing, if the product, material, or type or method of construction is such that either unusual care with its installation or use must be exercised for satisfactory performance, or if malfunctioning is apt to cause unreasonable property damage or personal injury or sickness relative to the benefits to be achieved by the use of the product, material, or type or method of construction.

Listing criteria are developed solely for use by ICC-ES for purposes of issuing ICC-ES PMG listings.

1.0 INTRODUCTION

- 1.1 Purpose:** The purpose of this listing criteria is to establish the effectiveness of a protective exterior jacket factory-applied to corrugated stainless steel tubing (CSST) which is currently recognized as code-complying in another ICC-ES PMG listing report. The exterior jacket is intended to protect the inner CSST from leakage due to transient arcing from exposure to lightning voltage/currents that may exist inside a building; utilize the appliance bond as the sole bonding method; and be recognized in an ICC Evaluation Service, Inc. (ICC-ES) listing. This listing criteria addresses a proposed level of arcing from lightning, not a direct strike.
- 1.2 Scope:** This listing criteria defines test methods and performance requirements applicable for evaluating simulated indirect lightning resistance of a protective exterior jacket factory-applied over CSST which is currently recognized in an ICC-ES PMG listing. The lightning-resistant CSST system, for use in fuel gas piping, is intended for use in normal installations when installed in compliance with the manufacturer's instructions and with Sections 309 and 310 of the *International Fuel Gas Code*[®] and Sections G2410 and G2411 of the *International Residential Code*[®].

1.3 Codes and Referenced Standards:

Note: Any standard/code referenced herein shall be the current edition or version adopted by the jurisdiction.

1.3.1 *International Residential Code*[®] (IRC), Chapter 24, Fuel Gas, International Code Council.

1.3.2 *International Fuel Gas Code*[®] (IFGC), International Code Council.

1.3.3 *Uniform Plumbing Code*[™] (IAPMO UPC), Chapter 12, Fuel Gas Piping, International Association of Plumbing and Mechanical Officials.

1.3.4 *Uniform Mechanical Code*[™] (IAPMO UMC), Chapter 13, Fuel Gas Piping, International Association of Plumbing and Mechanical Officials.

1.3.5 ANSI LC 1 / CSA 6.26, Fuel Gas Piping Systems Using Corrugated Stainless Steel Tubing (CSST) Fuel Gas. American National Standards Institute.

2.0 BASIC INFORMATION

The following basic information shall be provided:

- 2.1 Product Description:** The product consists of corrugated stainless steel tubing (CSST) and brass fittings for fuel gas piping systems recognized in another current ICC-ES PMG listing as conforming

to ANSI LC 1 / CSA 6.26, and satisfying the referenced codes listed in Section 1.3, but, with a different covering. The CSST is covered with an electrically conductive protective jacket.

2.2 Installation Instructions: The product shall be installed in accordance with the manufacturer's instructions and the requirements of the applicable codes and referenced standards listed in Section 1.3.

2.3 Product and Packaging Identifications: The unit and the package shall be permanently and legibly marked with the manufacturer's name or trademark, and the model number. The product shall also bear the ICC-ES PMG listing mark. The ICC-ES listing number shall be placed on the listed product's packaging or installation instructions.

3.0 GENERAL REQUIREMENTS

3.1 Corrugated Stainless Steel Tubing: Corrugated stainless tubing shall be currently recognized in an ICC-ES PMG listing as complying with the requirements of ANSI LC 1 / CSA 6.26.

3.2 Electrically Conductive Protective Jacket: The product shall be tested in accordance with Section 4.0 of this standard.

4.0 TEST METHOD AND PERFORMANCE REQUIREMENTS

4.1 Testing: Testing shall be performed by an International Accreditation Service (IAS) recognized lightning testing laboratory or by a signatory to a Mutual Recognition Agreement to which IAS is a signatory.

4.2 Specimen Conditioning: The specimen used for testing shall be previously subjected to a 96-hr corrosion test conducted in accordance with ASTM B117 without evidence of pitting, flaking, cracking or signs of corrosive attack. The specimen must include the protective jacket on a section of CSST and be joined to a fitting in accordance with the manufacturer's installation instructions.

Note: Additional conditioning is only applicable to specimens that contain any metallic components that were not previously evaluated in accordance with ASTM B117 under ANSI LC1. These specimens shall also be tested with fittings installed in accordance with manufacturer's instructions.

4.3 Test Wave Forms: The waveform is defined by its rise-time to peak current and fall-time to 50% of peak amplitude. The applied current wave form shall be determined by the lightning laboratory and shall be representative of induced lightning effects that could appear on gas piping inside a building. For the purposes of this listing criteria, the assumed energy associated with a transient arc inside a

building is less than two coulombs and the recognized CSST system must resist a minimum of 4.5 coulombs, which includes a factor of safety in excess of 2, when tested as noted in this listing criteria. A typical current wave form is shown in Figure 1.

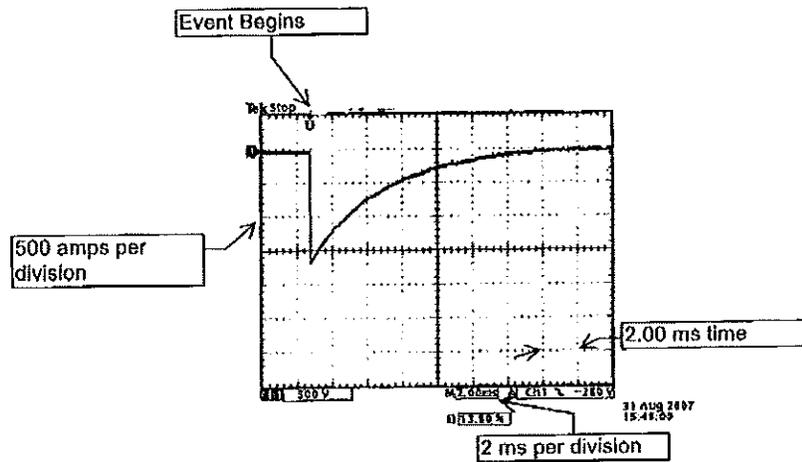


FIGURE 1—TYPICAL CURRENT WAVE FORM

4.4 Test Procedures: The procedures noted below shall be used to evaluate the performance of CSST piping. Testing shall be conducted on two samples each of the smallest, largest and an intermediate diameter tubing to qualify all sizes. The minimum performance criteria shall be 1,000 amps minimum peak delivering 4.5 coulombs within 20 milliseconds (0.020 seconds). Following exposure to this level of arcing, the sample shall be pressure-tested to 5 PSI for 1 minute with air and submerged in water without signs of leakage.

4.4.1 Calibration: A test generator is configured to produce and measure the desired current waveform. An appropriately sized copper pipe is installed $\frac{1}{8}$ inch underneath the generator's test electrode and

grounded to the generator return with a minimum AWG 6 wire or braided strap. The generator is charged to the appropriate level. The generator is then discharged through the copper pipe, and the applied current waveform is recorded. The generator is verified as producing the desired current waveform. The measured current waveform is integrated to determine the applied charge to the copper pipe. The current waveform and charge transfer waveform are recorded. If the high current generator does not yield the desired current waveform or charge transfer, the generator is reconfigured, and the calibration procedures are repeated. The copper pipe is removed from the generator.

4.4.2 Testing:

4.4.2.1 Arcing Resistance: A minimum 3-foot-long CSST test article is installed at least $\frac{1}{8}$ inch beneath a $\frac{1}{4}$ -inch-diameter test electrode. The electrode shall be placed at least 12 inches from the ends of the test article. The brass fitting or inner stainless steel piping of the CSST is grounded to the generator return using a minimum AWG 6 wire or braided strap. A dielectric may be required underneath the test article to ensure the test currents flow along the length of the test article and not to the test bench or support equipment. The lightning generator is charged to the appropriate level, and is then discharged to the test article. If the test generator does not discharge to the test article, it shall be confirmed that sufficient voltage is present to achieve dielectric breakdown of the jacket (energy enter the jacket and not to ground) and adjustments are made accordingly. It is verified that the test current enters the protective jacket and did not arc to any exposed tubing or fittings on either end of the test article. If all or a portion of the test current arced to the exposed ends or fittings of the test article, the test is invalid and must be repeated. The applied current waveform is recorded. The measured current waveform is integrated to calculate the applied charge. If the calculated applied charge is equal to or greater than the values stated in Section 4.4, the applied charge transfer is recorded. The jacket is cut away from the test article at the test location and a visual inspection of the tubing is made to determine if the stainless steel tubing is punctured. If no puncture of the tubing is noted on visual inspection, the test article shall be pressure-tested to the requirements of Section 4.4. If the test article fails visual inspection or pressure test after being subjected to the required applied charge, the test article fails. If the calculated applied charge is less than the values stated in Section 4.4, the test is performed again at a different location on the same test article, or another test article

from the same production lot, until the calculated applied charge requirements are satisfied. The test article is deemed to have passed if all of the requirements are met. In order to achieve a listing to this standard, no test articles can fail this test routine. See Figure 2 for test schematic.

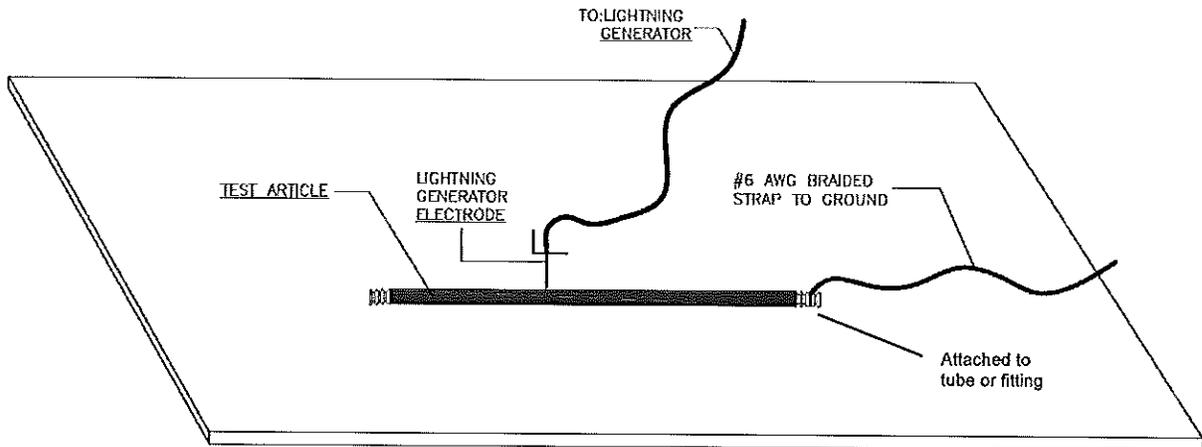


FIGURE 2—TEST SCHEMATIC

4.4.2.2 Bonding Equivalence: For the purpose of evaluating the conductive jacket for resistance to transient arcing using different bonding methods, testing in accordance with this section shall be performed using a simulated appliance consisting of:

1. A steel sheet metal chassis
2. An NPT connection point for the CSST
3. An electrical box with a minimum 10-foot-long, #14 AWG bonding conductor attached
4. A bonding clamp attached to the fitting on the free end of the CSST and a minimum 10-foot-long, #6 AWG bonding conductor

A minimum of two samples of an intermediate size of CSST shall be tested using the following configurations:

1. The #14 AWG conductor as the bond
2. The #6 AWG conductor as the bond
3. Using both as the bond

If the test results for all three configurations comply with Section 4.4.2, bonding of the conductive jacketed corrugated tubing, using a #14 AWG appliance bond, shall be deemed equivalent to using a #6 AWG bond required by IFGC 310.1.1. See Figure 3 for a test schematic.

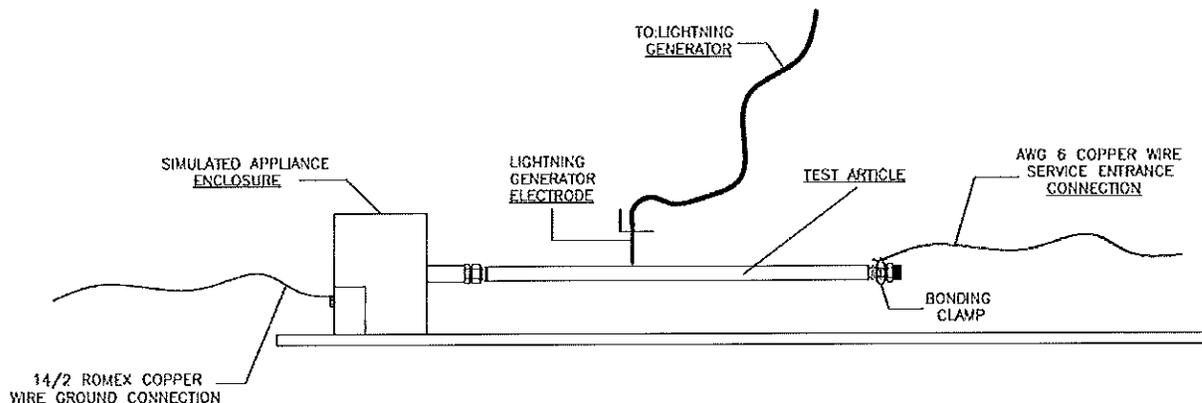


FIGURE 3—TEST SCHEMATIC

4 LISTING RECOGNITION

- 4.2 Installation shall be in accordance with the manufacturer's instructions and the applicable code.
- 4.3 The listing shall state that the documented level of resistance to arcing is 1000 amps minimum peak delivering 4.5 coulombs within 20 milliseconds (0.020 seconds).
- 4.4 The listing shall state the covering has been tested in accordance with ASTM E 84 and meets the minimum ratings of 25 for flame spread and 50 for smoke developed.
- 4.5 Upon documentation of satisfactory passing of tests noted in Section 4.4.2.2 of this criteria, the listing shall state the following: "Electrical Bonding: The Conductive Jacketed Corrugated Stainless Steel Tubing System is electrically continuous and is considered to be bonded where it is connected to appliances that are connected to the equipment grounding conductor of the circuit supplying that appliance. Additional bonding prescribed by Section 310.1.1 is not required for Conductive Jacketed Corrugated Stainless Steel Piping Systems when installed in accordance with this listing."

ICC-ES PMG Listing**ESR-1879**

Effective Date: January 01, 2013

This listing is subject to re-examination in one year.

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DIVISION: 23 00 00—MECHANICAL
Section: 23 11 00—Facility Fuel Piping**REPORT HOLDER:**WARD MANUFACTURING LLC
117 GULICK STREET
BLOSSBURG, PENNSYLVANIA 16912-0009
(570) 638-2131
www.wardflex.com**EVALUATION SUBJECT:****WARDFLEX FLEXIBLE FUEL GAS PIPING SYSTEM****1.0 EVALUATION SCOPE****Compliance with the following codes:**

- 2012 and 2009 *International Fuel Gas Code*® (IFGC)
- 2012 and 2009 *International Mechanical Code*® (IMC)
- 2012 and 2009 *International Residential Code*® (IRC)
- 2012 and 2009 *Uniform Mechanical Code*® (UMC)*
- 2012 and 2009 *Uniform Plumbing Code*® (UPC)*

**Uniform Mechanical Code and Uniform Plumbing Code are copyrighted publications of the International Association of the Plumbing and Mechanical Officials*

Compliance with the following standards:

- ANSI LC-1/CSA 6.26, Fuel Gas Piping Systems Using Corrugated Stainless Steel Tubing (CSST)
- ASTM E84 Standard Test Method for Surface burning characteristics for Building Materials

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 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; 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, pre-manufactured, 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)]

Listings are not to be construed as representing aesthetics or any other attributes not specifically addressed, nor are they to be construed as an endorsement of the subject of the listing or a recommendation for its use. There is no warranty by ICC Evaluation Service, LLC, express or implied, as to any finding or other matter in this listing, or as to any product covered by the listing.



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 IDENTIFICATION

6.1 Tubing:

Each 2 feet (610 mm) of tube must bear the followings:

- Wardflex name, trademark or symbol
- Part number
- Date code as described in ANSI LC-1/CSA 6.26
- Rated pressure of 5 psi (34 kPa);
- The Equivalent Hydraulic Diameter (EHD);
- The words "FUEL GAS";
- Name or symbol of the testing agency (CSA International),
- The evaluation report number (ESR-1879) or ICC-ES PMG mark of conformity.

6.2 Components:

Manifolds and striker plates must bear the followings:

- Manufacturer's name, trademark or symbol
- Part number
- Date code as described in ANSI LC-1/CSA 6.26
- Name or symbol of the testing agency (CSA International)
- The evaluation report number (ESR-1879) or ICC-ES PMG mark of conformity.

Each fitting of a piping system must bear the followings:

- Manufacturer's name, trademark or symbol
- Fitting size code
- Date code as described in ANSI LC-1/CSA 6.26
- Name or symbol of the testing agency (CSA International)
- The evaluation report number (ESR-1879) or ICC-ES PMG mark of conformity.
- Fitting part number shall be marked on the fitting carton



FIGURE 1—WARDFLEX LOGO

**DEPARTMENT OF LICENSING AND REGULATORY AFFAIRS
Schedule of Meetings/Hearings**

2014

Bureau/Commission/Office: Bureau of Construction Codes	
Board/Council/Commission: Board of Mechanical Rules	
Address: 2501 Woodlake Circle	Telephone: (517) 241-9325
City: Okemos	Michigan Zip Code: 48864
Contact Person: Dawn Canfield	Date: May 29, 2013

The meeting site and parking is accessible. Individuals attending the meeting are requested to refrain from using heavily scented personal care products, in order to enhance accessibility for everyone. People with disabilities requiring additional services (such as materials in alternative format) in order to participate in the meeting should call Dawn Canfield at 517/241-9325 at least 10 work days before the event. LARA is an equal opportunity employer/program. The Division on Deafness will provide assistance in locating assistive listening devices or interpreters, with advance notice, at (517) 373-1837.



X	Regular Meeting	Special Meeting	Rescheduled Meeting
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DATE	TIME	LOCATION
02/12/2014	9:00 am	Conference Room No. 3, Okemos Building; Okemos, MI
05/14/2014	9:00 am	Conference Room No. 3, Okemos Building; Okemos, MI
08/20/2014	9:00 am	Conference Room No. 3, Okemos Building; Okemos, MI
11/26/2014	9:00 am	Conference Room No. 3, Okemos Building; Okemos, MI

The above is provided pursuant to Sections 4 and 5 of Act 267 of Public Acts of 1976, being Sections 15.264 and 15.265 of the Michigan Compiled Laws.