



TITFLEX CORP. GASTITE DIVISION

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GASTITE® FLASHSHIELD™ METALLICALLY SHIELDED CORRUGATED STAINLESS STEEL TUBING (CSST) ½”, ¾”, 1”, 1- ¼”, 1-½” AND 2” DIAMETERS

CSI Section:

23 11 00 Facility Fuel Piping

1.0 RECOGNITION

Gastite® FlashShield™ recognized in this report has been evaluated for use as flexible fuel gas distribution system. The durability, electrical, fire-resistance, and physical, properties of the Gastite® FlashShield™ comply with the intent of the provisions of the following codes and regulations:

- 2012, 2009 and 2006 Uniform Plumbing Code (UPC)
- 2012, 2009 and 2006 Uniform Mechanical Code (UMC)
- 2015, 2012, 2009 and 2006 International Fuel Gas Code (IFGC)
- 2015, 2012, 2009 and 2006 International Residential Code (IRC)
- 2015, 2012, 2009 and 2006 International Mechanical Code (IMC)

1.1 PROPERTIES ASSESSED

Gastite® FlashShield™ metallically shielded CSST has been tested in accordance with LC 1024 and LC 1027 after all test samples (for both LC's) were subjected to a 96-hour salt spray test conducted in accordance with ASTM B117 and complied with the minimum performance thresholds for arcing described therein. LC 1024 has a minimum resistance to arcing of 1000 amps minimum peak delivering 4.5 coulombs within 20 milliseconds (0.020 seconds). LC 1027 has the following minimum performance thresholds:

- Indirect Effects 1 Threshold: 10 coulombs minimum utilizing a 10 x 1000µs current waveform.
- Indirect Effects 2 Threshold:

Component 1 (return Stroke)	
Peak Amplitude	30kA minimum
Action Integral	0.055 x 10 ⁶ A ² s, minimum
Time Duration	≤ 500µs
Component 2 (Intermediate Current)	
Maximum Charge Transfer	10 coulombs (± 10%)
Average Amplitude	2 kA (± 20%)
Time Duration	≤ 5 ms
Component 3 (Continuing Stroke)	
Amplitude	200 – 800 A
Charge Transfer	26 coulombs, minimum

2.0 LIMITATIONS

Use of the Gastite® FlashShield™ recognized in this report is subject to the following limitations:

2.1 Protection provided by Gastite® FlashShield™ is for arcing induced from indirect lightning only. The effects from direct lightning strikes on the system are beyond the scope of this report.

2.2 The metallic shield in the jacket shall be electrically engaged with each fitting.

2.3 Gastite® FlashShield™ shall not be used as a grounding electrode conductor for an electrical system.

2.4 The CSST is recognized as satisfying ANSI LC 1 in IAPMO R&T Listing File No. 3250 and additional information can be found there.

2.5 Product is manufactured by Titeflex Corporation in Portland, Tennessee.

3.0 PRODUCT USE

3.1 General: Gastite® FlashShield™ metallically shielded CSST is a flexible fuel gas distribution system for use with both natural gas and propane that is also designed to reduce the potential for lightning induced damage to the fuel gas piping system. The system complies with the following:

- UPC Chapter 12
- UMC Chapter 13
- IFGC Chapter 4
- IRC Chapter 24
- IMC Chapter 3

3.2 Installation:

3.2.1 Installation General: General installation shall be in accordance with the applicable codes found in Section 1.0 of this report, the manufacturer’s installation instructions and this report.

The product described in this Uniform Evaluation Service (UES) Report has been evaluated as an alternative material, design or method of construction in order to satisfy and comply with the intent of the provision of the code, as noted in this report, and for at least equivalence to that prescribed in the code in quality, strength, effectiveness, fire resistance, durability and safety, as applicable, in accordance with IBC Section 104.11. This document shall only be reproduced in its entirety.





3.2.2 Plenum Installation: Gastite® FlashShield™ is qualified to be installed in plenums. When tested in accordance with ASTM E84, FlashShield™ satisfies the plenum installation requirement with the flame spread index of less than 25 and a smoke development index of less than 50.

3.2.3 Electrical bonding: The FlashShield™ metallicly shielded CSST system is electrically continuous and is considered to be bonded when it is connected to appliances that are connected to the equipment grounding conductor of the circuit supplying the appliance. If the product is installed in accordance with this listing, additional bonding prescribed in Section 310.1.1 of the IFGC and Section 1211.15.2 of the UPC is not required. FlashShield™ shall be bonded in accordance with the National Electrical Code NFPA 70 Article 250.104B.

4.0 PRODUCT DESCRIPTION

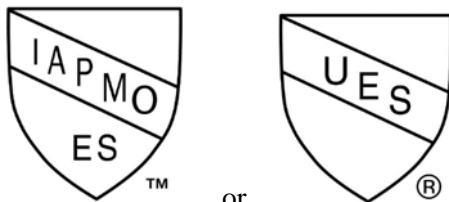
FlashShield™ Metallicly Shielded CSST consists of the following layers:

- 1 - A metallic shield layer sandwiched between two layers of exterior jacket material
- 2 - Corrugated Stainless Steel Tubing
- 3 - Mechanical fittings designed for use with Gastite FlashShield™ CSST

5.0 IDENTIFICATION

FlashShield™ tubing bears the name FlashShield™ by Gastite, the part number, the rated operating pressure, the equivalent hydraulic diameter, date code, listings, and fuel gas.

A label shall be affixed on product, packaging, installation instructions or descriptive literature. The label shall include the company name or trademark, model number, the IAPMO Uniform ES Mark of Conformity, the name of the inspection agency (when applicable) and the Evaluation Report Number (ER-239) to identify the products recognized in this report. A die-stamp label may also substitute for the label. Either Mark of Conformity may be used as shown below.



IAPMO UES ER-239

6.0 SUBSTANTIATING DATA

Data submitted was in conformance with PMG Listing Criteria LC 1024 – Dated February 2012 and PMG Listing Criteria LC 1027 - Dated February 2011 – including a 96-hour corrosion test conducted in accordance with ASTM B117-97 on which the bonding and arcing tests were conducted.

Test results are from laboratories in compliance with ISO/IEC 17025.

7.0 STATEMENT OF RECOGNITION

This evaluation report describes the results of research carried out by IAPMO Uniform Evaluation Service on Gastite® FlashShield™ to assess conformance to the codes shown in Section 1.0 of this report and serves as documentation of the product certification. The tubing is produced at locations noted in Section 2.5 of this report under a quality control program with periodic inspection under the supervision of IAPMO UES.

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For additional information about this evaluation report please visit www.uniform-es.org or email us at info@uniform-es.org



TABLE — PART NUMBERS: GASTITE® FLASHSHIELD™ TUBING AND FITTINGS

TUBING SIZE (inch)	PART NUMBER	DESCRIPTION
1/2	FS-8	1/2" FlashShield™ CSST
3/4	FS-11	3/4" FlashShield™ CSST
1	FS-16	1" FlashShield™ CSST
1 1/4	FS-20	1 1/4" FlashShield™ CSST
1 1/2	FS-24	1 1/2" FlashShield™ CSST
2	FS-32	2" FlashShield™ CSST
1/2	FSFTG-8	1/2" FlashShield™ Straight Fitting -- 1/2" NPT
3/4	FSFTG-11	3/4" FlashShield™ Straight Fitting -- 3/4" NPT
1	FSFTG-16	1" FlashShield™ Straight Fitting -- 1" NPT
1 1/4	FSFTG-20	1 1/4" FlashShield™ Straight Fitting -- 1 1/4" NPT
1/2	XR3FTG-8	1/2" XR3 Straight Fitting -- 1/2" NPT
3/4	XR3FTG-11	3/4" XR3 Straight Fitting -- 3/4" NPT
1	XR3FTG-16	1" XR3 Straight Fitting -- 1" NPT
1 1/4	XR3FTG-20	1 1/4" XR3 Straight Fitting -- 1 1/4" NPT
1 1/2	XR3FTG-20	1 1/2" XR3 Straight Fitting -- 1 1/2" NPT
2	XR3FTG-16	2" XR3 Straight Fitting -- 1" NPT
1/2	FSFTG-FM-8	1/2" FlashShield™ Straight Fitting -- 1/2" Female NPT
3/4	FSFTGFM-11-8	3/4" FlashShield™ Straight Fitting -- 1/2" Female NPT
3/4	FSFTGFM-11	3/4" FlashShield™ Straight Fitting -- 3/4" Female NPT
1/2	XR3FTG-FM-8	1/2" XR3 Straight Fitting -- 1/2" Female NPT
3/4	XR3FTGFM-11-8	3/4" XR3 Straight Fitting -- 1/2" Female NPT
3/4	XR3FTGFM-11	3/4" XR3 Straight Fitting -- 3/4" Female NPT
3/4	FSREDFTG-11-08	3/4" FlashShield™ Straight Reducing Fitting -- 1/2" NPT
1	FSREDFTG-16-12	1" FlashShield™ Straight Reducing Fitting -- 3/4" NPT
3/4	XR3REDFTG-11-08	3/4" XR3 Straight Reducing Fitting -- 1/2" NPT
1	XR3REDFTG-16-12	1" XR3 Straight Reducing Fitting -- 3/4" NPT
1/2	FSCPL-8	1/2" FlashShield™ Coupling
3/4	FSCPL-11	3/4" FlashShield™ Coupling
1	FSCPL-16	1" FlashShield™ Coupling
1 1/4	FSCPL-20	1 1/4" FlashShield™ Coupling
1/2	XR3CPL-8	1/2" XR3 Coupling
3/4	XR3CPL-11	3/4" XR3 Coupling
1	XR3CPL-16	1" XR3 Coupling
1 1/4	XR3CPL-20	1 1/4" XR3 Coupling
1 1/2	XR3CPL-24	1 1/2" XR3 Coupling
2	XR3CPL-32	2" XR3 Coupling
1/2	FSTRM-8	1/2" FlashShield™ Termination Fitting -- 1/2" NPT
3/4	FSTRM-11	3/4" FlashShield™ Termination Fitting -- 3/4" NPT



TABLE – PART NUMBERS: GASTITE® FLASHSHIELD™ TUBING AND FITTINGS (continued)

TUBING SIZE (inch)	PART NUMBER	DESCRIPTION
1	FSTRM-16	1" FlashShield™ Termination Fitting – 1" NPT
1 ¹ / ₄	FSTRM-20	1 ¹ / ₄ " FlashShield™ Termination Fitting Assembly
1/2	XR3TRM-8	1/2" XR3 Termination Fitting – 1/2" NPT
3/4	XR3TRM-11	3/4" XR3 Termination Fitting – 3/4" NPT
1	XR3TRM-16	1" XR3 Termination Fitting – 1" NPT
1 ¹ / ₄	XR3TRM-20	1 ¹ / ₄ " XR3 Termination Fitting Assembly – 1 ¹ / ₄ " NPT
1 ¹ / ₂	XR3TRM-24	1 ¹ / ₂ " XR3 Termination Fitting Assembly – 1 ¹ / ₂ " NPT
2	XR3TRM-32	2" XR3 Termination Fitting Assembly – 2" NPT
1/2	FST-8	1/2" Run x 1/2" Run x 1/2" Tee Fitting
3/4	FST-11	3/4" Run x 3/4" Run x 3/4" Tee Fitting
1	FST-16	1" Run x 1" Run x 1" Tee Fitting
3/4	FST-11-8-8	3/4" Run x 1/2" Run x 1/2" Tee Fitting
3/4	FST-11-11-8	3/4" Run x 3/4" Run x 1/2" Tee Fitting
1	FST-16-11-8	1" Run x 3/4" Run x 1/2" Tee Fitting
1	FST-16-11-11	1" Run x 3/4" Run x 3/4" Tee Fitting
1	FST-16-16-8	1" Run x 1" Run x 1/2" Tee Fitting
1	FST-16-16-11	1" Run x 1" Run x 3/4" Tee Fitting
1/2	XR3T-8	1/2" Run x 1/2" Run x 1/2" XR3 Tee Fitting
3/4	XR3T-11	3/4" Run x 3/4" Run x 3/4" XR3 Tee Fitting
1	XR3T-16	1" Run x 1" Run x 1" XR3 Tee Fitting
3/4	XR3T-11-8-8	3/4" Run x 1/2" Run x 1/2" XR3 Tee Fitting
3/4	XR3T-11-11-8	3/4" Run x 3/4" Run x 1/2" XR3 Tee Fitting
1	XR3T-16-11-8	1" Run x 3/4" Run x 1/2" XR3 Tee Fitting
1	XR3T-16-11-11	1" Run x 3/4" Run x 3/4" XR3 Tee Fitting
1	XR3T-16-16-8	1" Run x 1" Run x 1/2" XR3 Tee Fitting
1	XR3T-16-16-11	1" Run x 1" Run x 3/4" XR3 Tee Fitting