



**HOSE MASTER Inc.**

# **Flexible Connector Systems**

**For the Petroleum  
Fueling Industry**



## ***Engineers Delivering Solutions . . .***

For more than 25 years, Hose Master has been the benchmark in flexible metal hose connectors across North America. Headquartered in its 250,000 square foot facility in Cleveland, Ohio, Hose Master is the industry's leading authority in metal hose fabricating techniques, research and development.

With the resources needed to design and engineer connectors for virtually any metal hose application, Hose Master has the technical expertise, ingenuity and proven quality systems that ensure product reliability. Hose Master guarantees all elements of the manufacturing process, from raw materials that meet Hose Master's stringent specifications through engineering, manufacturing, fabrication, and all the way to delivery – total accountability. From its team of in-house engineers to its more than 50 weld stations, and state-of-the-art forensic laboratory, Hose Master means quality, service, and dependability.



Founded in 1982 by Sam J. Foti, his guiding principles remain unchanged:

- Engineer intelligent, customer-driven design
- Supply the highest quality manufacturing
- Guarantee outstanding customer service and support

***Tell us what we can do for you.***



Call (800) 221-2319  
[www.hosemaster.com](http://www.hosemaster.com)

- Technical and Engineering Center
- Forensic Laboratory
- 25 Engineers and Research and Development Specialists
- 50 Weld Stations
- Total Quality Control
- 250,000 square ft. facility in Cleveland, Ohio
- 25,000 square ft. facility in Houston, Texas



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# Why Buy From Hose Master?

*Hose Master is specified by and sells to PEI Distributors throughout the United States. Some of the companies using Hose Master connectors include:*

BP  
ExxonMobil  
Conoco Phillips  
Hess Corporation  
Chevron  
Shell Oil  
Valero  
Tesoro  
Sunoco  
Canadian Tire  
Petro-Canada  
Federated Co-Op  
7-Eleven  
Speedway/Marathon  
Race Trac  
Casey's General Store  
Flying J Inc.  
Sheetz  
Getgo/Giant Eagle  
Costco  
Meijer  
Cumberland Farms  
Quicktrip Corp.  
Travel Centers of America  
Love's Travel Stops &  
Country Stores  
Murphy's/Wal-Mart/Sam's  
Club

*Along with thousands of independently operated service stations*

## ***Major Oil Companies Request Hose Master***

- As the manufacturer, we have the resources to guarantee our product performance.
- As the manufacturer of the core of the assembly - the corrugated metal hose and braid - we control and certify the origins of all raw materials.
- Our Engineering team can design and custom-build connectors for any application.
- We have the most comprehensive Research & Development laboratory in the business; we guarantee product integrity, and we stand behind every connector we make.

## ***Distributors Rely on Hose Master***

- Cataloged Fire-Shield connectors and accessories are stocked on the shelf and ready to ship within 24 hours.
- Custom-built connectors and prototypes are available for unique applications.
- National sales support from a professional team of PEI (Petroleum Equipment Institute) salespeople.
- Customer Service technical support team and industry's leading engineers are always available to assist with any product questions or requests.

## ***Installers Prefer Hose Master***

- Connectors are highly flexible for easy installation.
- Hose Master offers ongoing installer training programs.
- Products are designed to meet or exceed stringent governmental regulations and agency requirements
- Hose Master's Customer Service and industry specialists are prepared to offer step-by-step assistance with any industry application.

## ***Call Us - We Will Do The Design Work For You***

Connectors must be properly specified for each installation and that all factors must be considered including the stresses and movements to which the connectors will be exposed during use. If you have any questions, call us for technical, engineering and design assistance.



# Hydroformed Difference

## Hydroformed Corrugation Process

Our manufacturing process of corrugated metal hose begins with a high-quality stainless steel strip. The strip is rolled and the edges of the strip are welded to form a thin-walled, gas-tight tube. After the tube has been welded, corrugations are fashioned into the tube to create flexibility.



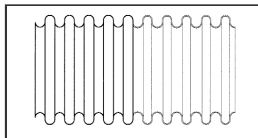
*High-quality stainless steel strip*



*Rolled to form a thin-walled, gas-tight tube*



*Strong, clean, non-oxidized seam welds*



**Annular Profile**  
*Independent corrugations, straight and parallel*

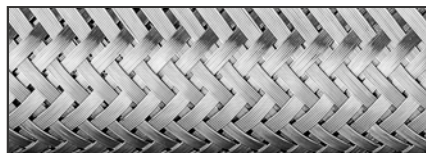


**Hydroformed**      **Mechanically Formed**  
*Corrugations are fashioned into the tube either mechanically or hydraulically, called "hydroforming." Hydroforming corrugations evenly distributes stresses; mechanically forming corrugations creates concentrated stresses*

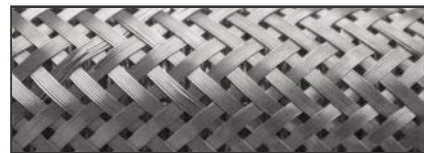
The benefits of hydroforming include: uniform wall thickness; consistent O.D. and I.D.; longer service life; enhanced flexibility; elimination of failure caused by faulty seam welds; producing the cleanest product (manufactured using water, not oil), and minimal work hardening.

## Braid Coverage

Hose Master's stainless steel wire braid gives corrugated hose the ability to withstand pressure. For increased safety, Hose Master machines the braid directly onto the hose, ensuring that the braid fits tightly against the hose to prevent the potential for hose deformation or squirm. Compared to competitor products, Hose Master offers the highest percentage of braid coverage (90%) yielding better cycle life and protection against damage to the hose.



*Hose Master Braid Coverage*



*Competitor's Braid Coverage*

## Fabricating



Hose Master is the leading authority in metal hose fabricating techniques, research, and development. With more than 50 weld stations, a state-of-the-art forensic laboratory, and team product specialists, Hose Master guarantees the quality and performance of all its connectors.

Call (800) 221-2319  
[www.hosemaster.com](http://www.hosemaster.com)



# Fire-Shield Products

Hose Master's Fire-Shield connectors are the industry standard. Here's why:

The Fire-Shield connectors meet and exceed specifications for:

- Above-ground piping applications
- Underground piping applications
- NFPA's Uniform Fire Codes
- Full vacuum rated
- BSPP or BSPT threaded fittings

Hose Master's unique "hydroforming" process increases flexibility and service life.

Proprietary tube seam weld technology resists aromatic vapor permeation, while the company's ASME IX certified welders ensure the strongest fitting attachments.

Extensive zinc-plated and stainless steel end fitting options ensure quick and cost-effective solutions for connecting fiberglass or flexible pipe to the submersible pump and shear valve.

Fire-Shield connectors minimize threaded connections, resulting in:

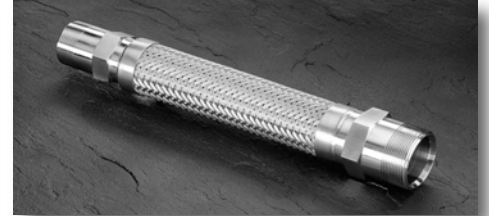
- Fewer leak points
- Reduced installation time and labor

Connectors are designed to accept approved secondary containment systems.



**FSMM - Male x Male**

Hose Diam. (in.)	Working Pressure (p.s.i.)	Minimum Bend Radius (inches)	Standard Lengths (inches)
3/4	150	1-3/4	12, 15, 18, 24, 30
1	150	4	12, 15, 18, 24, 30
1-1/2	150	4-1/2	12, 15, 18, 24, 30
2	150	6	12, 15, 18, 24, 30
3	150	9	12, 15, 18, 24, 30



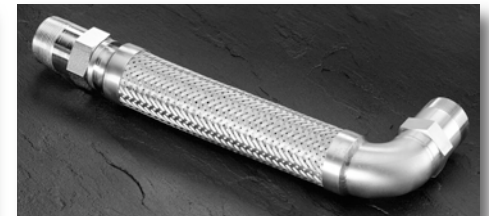
**FSM2M - 1 1/2" Male x 2" Male**

Hose Diam. (in.)	Working Pressure (p.s.i.)	Minimum Bend Radius (inches)	Standard Lengths (inches)
1-1/2	150	4-1/2	12, 15, 18, 24, 30



**FSMSE - Male x 90° Male Swivel**

Hose Diam. (in.)	Working Pressure (p.s.i.)	Minimum Bend Radius (inches)	Standard Lengths (inches)
1-1/2	50	4-1/2	12, 15, 18, 24, 30
2	50	6	12, 15, 18, 24, 30



**FSSME - Male Swivel x 90° Male**

Hose Diam. (in.)	Working Pressure (p.s.i.)	Minimum Bend Radius (inches)	Standard Lengths (inches)
1-1/2	50	4-1/2	12, 15, 18, 24, 30
2	50	6	12, 15, 18, 24, 30



**FSMU - Male x Union**

Hose Diam. (in.)	Working Pressure (p.s.i.)	Minimum Bend Radius (inches)	Standard Lengths (inches)
3	50	9	12, 15, 18, 24, 30



**FSUU - Union x Union**

Hose Diam. (in.)	Working Pressure (p.s.i.)	Minimum Bend Radius (inches)	Standard Lengths (inches)
3	50	9	12, 15, 18, 24, 30

## Custom-Built Connectors

This catalog highlights our most commonly purchased connectors. Dedicated to meeting all of your hose requirements, Hose Master's technical staff will design and manufacture custom built connectors to meet any challenge. Please contact our customer service department for further details.



**Connectors with cULus approval can be supplied in lengths up to 8 feet.**

# Fire-Shield Products



**FSMS - Male x Male Swivel**

Hose Diam. (in.)	Working Pressure (p.s.i.)	Minimum Bend Radius (inches)	Standard Lengths (inches)
1-1/2	50	4-1/2	12, 15, 18, 24, 30
2	50	6	12, 15, 18, 24, 30



**FSMF - Male x 2" Female**

Hose Diam. (in.)	Working Pressure (p.s.i.)	Minimum Bend Radius (inches)	Standard Lengths (inches)
1-1/2	150	4-1/2	12, 15, 18, 24, 30
2	150	6	12, 15, 18, 24, 30



**FSFS - 2" Female x Male Swivel**

Hose Diam. (in.)	Working Pressure (p.s.i.)	Minimum Bend Radius (inches)	Standard Lengths (inches)
1-1/2	50	4-1/2	12, 15, 18, 24, 30
2	50	6	12, 15, 18, 24, 30



**FSSSE - Male Swivel x 90° Male Swivel**

Hose Diam. (in.)	Working Pressure (p.s.i.)	Minimum Bend Radius (inches)	Standard Lengths (inches)
1-1/2	50	4-1/2	12, 15, 18, 24, 30
2	50	6	12, 15, 18, 24, 30



**FSSWE - Male Swivel x 90° Female Swivel**

Hose Diam. (in.)	Working Pressure (p.s.i.)	Minimum Bend Radius (inches)	Standard Lengths (inches)
1-1/2	50	4-1/2	12, 15, 18, 24, 30
2	50	6	12, 15, 18, 24, 30



**FSS2WE - Male Swivel x 2" 90° Female Swivel**

Hose Diam. (in.)	Working Pressure (p.s.i.)	Minimum Bend Radius (inches)	Standard Lengths (inches)
1-1/2	50	4-1/2	12, 15, 18, 24, 30



**FTMM\* - Male Swivel x Male Tee**

Hose Diam. (in.)	Working Pressure (p.s.i.)	Minimum Bend Radius (inches)	Standard Lengths (inches)
1-1/2	50	4-1/2	12, 15, 18, 24, 30

\*Not available in 24 Hour Shipping Time



## Swivel Adapter

Part Number: ACSWA  
Hose Master's plated swivel adapter converts the integral hex male to a swivel end. This unique adapter creates a positive metal-to-metal seal when used with Hose Master's exclusive 30° chamfered hex male fitting. This swivel adapter facilitates installation and is only compatible with Hose Master's Fire-Shield or Tefcon connectors.



## Anode

Part Number: ACANO  
Hose Master's underground connectors, used with our anode, comply with EPA regulations for buried metal components. Our easily monitored system also meets NACE RP-01-69 standards for cathodic protection.



Connectors with cULus approval can be supplied in lengths up to 8 feet.

Call (800) 221-2319  
www.hosemaster.com





# Tefcon Products

Hose Master's Tefcon connectors couple the highest grade materials with the most consistent quality control measures, thereby producing the best Teflon®\* connectors available anywhere.

Hose Master's state-of-the-art manufacturing methods ensure the greatest flexibility and resistance to vapor permeation. This technology, along with Hose Master's unique fitting design, allows Tefcon connectors to be used in the most difficult underground piping applications. Tefcon connectors are also available with BSPP or BSPT threaded fittings, and are made to accept all approved secondary containment systems.



**TCMM - Male x Male**

Hose Diameter (inches)	Working Pressure (p.s.i.)	Minimum Bend Radius (inches)	Standard Lengths (inches)
1-1/2	150	4-1/2	12, 15, 18, 24, 30
2	150	6	12, 15, 18, 24, 30



**TCMW - Male x Female Swivel**

Hose Diameter (inches)	Working Pressure (p.s.i.)	Minimum Bend Radius (inches)	Standard Lengths (inches)
1-1/2	150	4-1/2	12, 15, 18, 24, 30
2	150	6	12, 15, 18, 24, 30



**TCMF - Male x 2" Female**

Hose Diameter (inches)	Working Pressure (p.s.i.)	Minimum Bend Radius (inches)	Standard Lengths (inches)
1-1/2	150	4-1/2	12, 15, 18, 24, 30
2	150	6	12, 15, 18, 24, 30

\*Teflon® is a registered trademark of the DuPont Company



**Connectors with cULus approval can be supplied in lengths up to 8 feet.**



# Tefcon Products



**TCMS - Male x Male Swivel**

Hose Diameter (inches)	Working Pressure (p.s.i.)	Minimum Bend Radius (inches)	Standard Lengths (inches)
1-1/2	150	4-1/2	12, 15, 18, 24, 30
2	150	6	12, 15, 18, 24, 30



**TCSW - Male Swivel x Female Swivel**

Hose Diameter (inches)	Working Pressure (p.s.i.)	Minimum Bend Radius (inches)	Standard Lengths (inches)
1-1/2	150	4-1/2	12, 15, 18, 24, 30
2	150	6	12, 15, 18, 24, 30



**TCFS - 2" Female x Male Swivel**

Hose Diameter (inches)	Working Pressure (p.s.i.)	Minimum Bend Radius (inches)	Standard Lengths (inches)
1-1/2	150	4-1/2	12, 15, 18, 24, 30
2	150	6	12, 15, 18, 24, 30



**Swivel Adapter**

Part Number: ACSWA

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Part Number: ACANO

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# Specifications

## Fire-Shield UL/ULC Hose Specifications

Hose Diameter (inches)	Number of Braids (#)	Braid Alloy	Hose Material	UL Standards		Minimum Bend Radius (inches) <sup>(2)</sup>	Minimum Length for 90° Bend (inches)
				Working Pressure (p.s.i.) <sup>(1)</sup>	Burst Pressure (p.s.i.)		
3/4	1	300 Series Stainless	300 Series Stainless	150	600	1.7	12
1	1	300 Series Stainless	300 Series Stainless	150	600	4.0	16
1 1/2	1	300 Series Stainless	300 Series Stainless	150	600	4.5	18
2	1	300 Series Stainless	300 Series Stainless	150	600	6.0	24
3	1	300 Series Stainless	300 Series Stainless	150	600	9.0	28

<sup>(1)</sup> The working pressure is rated at ambient temperatures. Working pressure changes to 50 psi when using a Fire-Shield integral hex swivel fitting.

<sup>(2)</sup> The minimum bend radius is measured from the centerline of the hose.

\*Teflon® is a registered trademark of the DuPont Company

## Tefcon UL/ULC Hose Specifications

Hose Diameter (inches)	Number of Braids (#)	Braid Alloy	Hose Material	Working Pressure (p.s.i.)	Burst Pressure (p.s.i.) <sup>(2)</sup>	Minimum Bend Radius (inches)
1 1/2	1	300 Series Stainless Steel	PTFE Teflon®*	150	600	4.5
2	1	300 Series Stainless	PTFE Teflon®*	150	600	6.0

Note: Hex fitting types are S80 integral male or female (integral swivel optional)

## Fitting Specifications

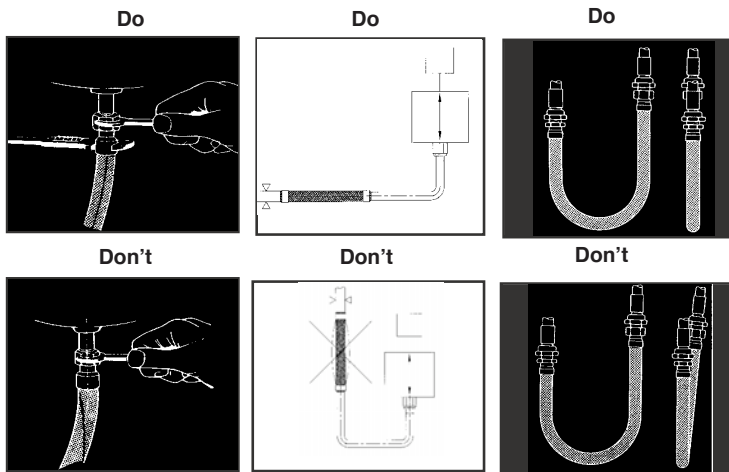
		Fire-Shield		Tefcon	
		Thread Size (inches) <sup>(3)</sup>	Hex Size (inches)	Thread Size (inches)	Hex Size (inches)
3/4	Male	3/4 x 14	1.06	-----	-----
1	Male	1 x 11-1/2	1.38	-----	-----
1 1/2	Male	1-1/2 x 11-1/2	1.94	1-1/2 x 11-1/2	2.00
1 1/2	Male Swivel	1-1/2 x 11-1/2	1.94	1-1/2 x 11-1/2	2.00
1 1/2	Female Swivel	1-1/2 x 11-1/2	1.94	-----	-----
1 1/2	Male Tee	1-1/2 x 11-1/2	2.23	-----	-----
2	Male	2 x 11-1/2	2.38	2 x 11-1/2	2.50
2	Female	2 x 11-1/2	2.63	2 x 11-1/2	2.75
2	Male Swivel	2 x 11-1/2	2.38	2 x 11-1/2	2.50
2	Female Swivel	2 x 11-1/2	2.38	2 x 11-1/2	2.38
3	Male	3 x 8	4.00	-----	-----
3	Union	3 x 8	5.75	-----	-----

<sup>(3)</sup> Denotes N.P.T. size and number of threads per inch

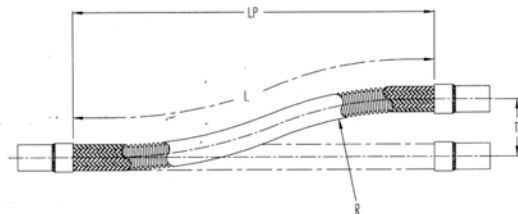


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## Installation Do's and Don'ts



## Lateral Offset



Formula:

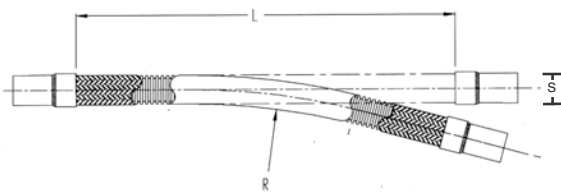
$$L = \sqrt{20R \times T}$$

$$L_p = \sqrt{L^2 - T^2}$$

Note 1: When the offset motion occurs on both sides of the hose centerline, use total travel in the formula.

Note 2: The offset distance "T" for constant flexing should never exceed 25% of the centerline bend radius.

## Angular Deflection

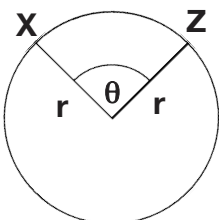


Formula:

$$L = 2S + (\theta / 57.3)R$$

S = O.D. of hose

## Circle



Area =  $\pi r^2$  Where:  $\pi = 3.14$   
 Circumference =  $2\pi r$   
 Length of Arc XZ =  $\theta^* (\pi/180)^* r$

## INSTALLATION DO'S AND DON'TS

- **DO** design the installation to allow for all movement (ground, vibration, etc.) after the installation.
- **DO** keep the hose free from all objects and debris.
- **DO** measure to ensure proper length of connector has been selected.
- **DO** handle and store the connectors carefully before an installation.
- **DO** follow all printed instructions included with the connectors.
- **DO** note the minimum bend radius as specified.
- **DO** install flexible connectors so that the bend is as close to the center of the connector as possible.
- **DO** keep the painted lay line straight and on the centerline of the connector.
- **DO** use a wrench only on the hex flats.
- **DO** use the manufacturer's recommended cathodic protection system or dielectric isolation boot.
- **DO** check for leaks before covering the
- **DON'T** use a wrench or any other tool on the hose or braid collar.
- **DON'T** twist or torque the hose.
- **DON'T** over-bend a flexible connector beyond its minimum bend radius.
- **DON'T** install a flexible connector with the bend next to the end fittings.
- **DON'T** attempt to stretch or compress a flexible connector to fit an installation.
- **DON'T** restrict flexibility by allowing a connector to come into contact with other components or equipment during an installation.

Note: The above installation Do's and Don'ts serve as a guideline to facilitate installation. As you design and install your system, refer to the Petroleum Equipment Institute's RP900 UST Inspection and Maintenance Manual.



If you would like information on Hose Master's flexible connector training and certification programs, please contact Hose Master's Customer Service Department at 800-221-2319.

## 24 Hour Shipping Program

Hose Master announces its 24 hour shipping program on standard catalog Fire-Shield products. These products are stocked and stored on shelves in both our Cleveland, Ohio location as well as our branch in Houston, Texas. For immediate delivery on standard catalog Fire-Shield products within 24 hours - contact Hose Master's Customer Service department.



**HOSE MASTER Inc.**

1233 East 222nd Street • Cleveland, Ohio 44117  
(800) 221-2319 • Fax: (216) 481-7557 • [www.hosemaster.com](http://www.hosemaster.com)

Locations: **Cleveland • Houston**

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Registered Quality System

