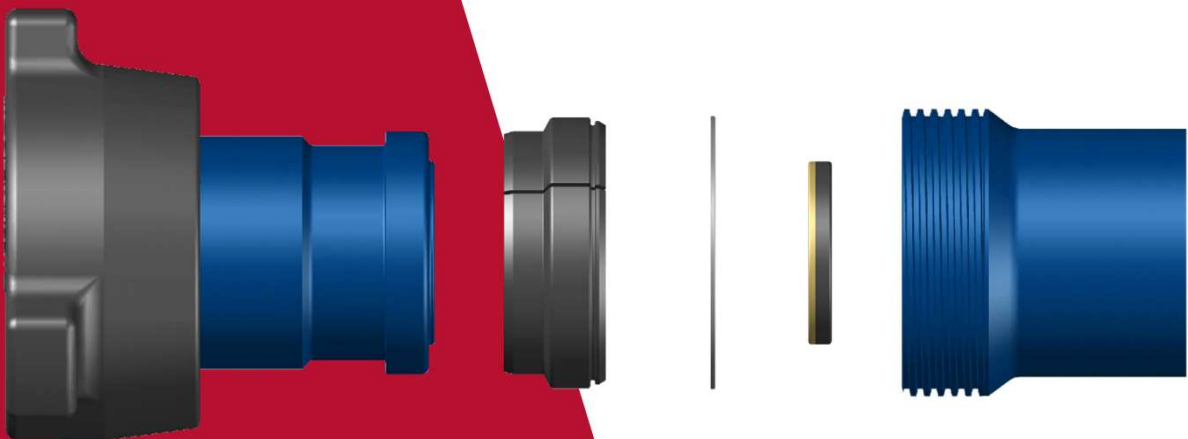
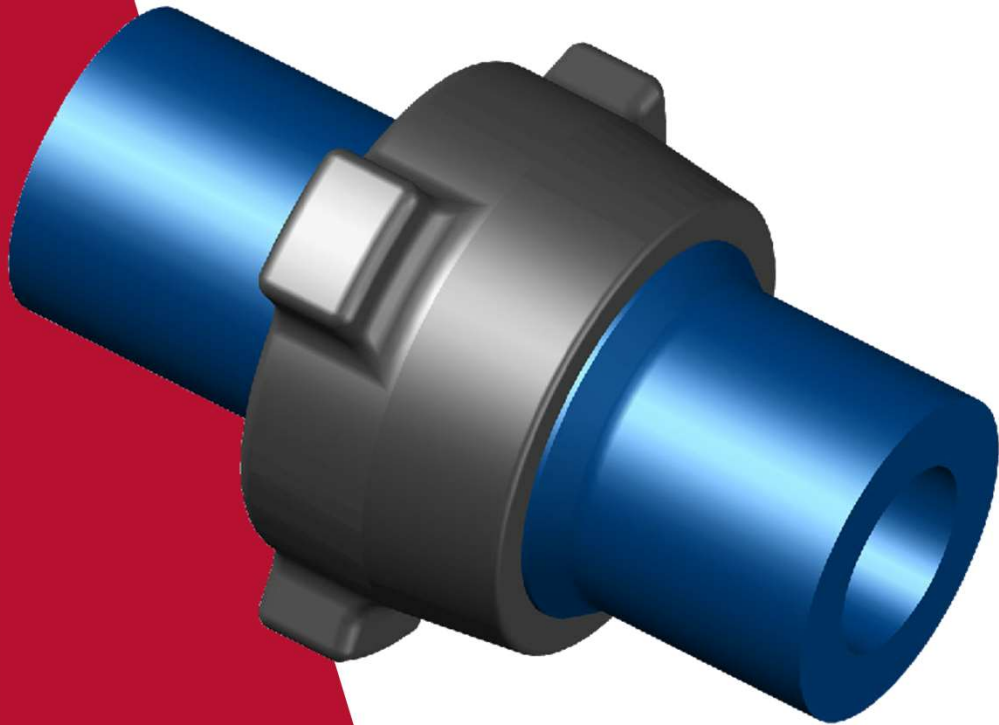




OILFIELD SOLUTIONS

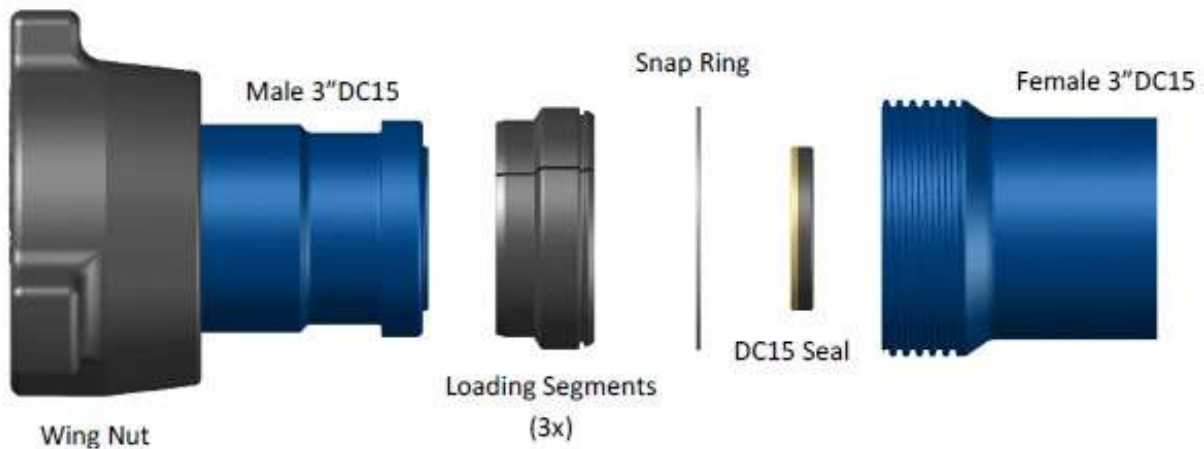
DC15 CONNECTION



DC 15 CONNECTION

Introduction:

Hammer Unions have been the standard in the oil and gas industry for over 50 years. However, the hammer union has weaknesses and limitations for current critical applications. In response to this, Tech-Seal International has designed and manufactured the 3"DC15 Connection. We have critically analyzed every flaw within the hammer union connection. After doing so, we visited each flaw one by one and made significant improvements in every aspect. This resulted in the 3"DC15 Connection having improved performance over the hammer union connection in both fatigue and bending loads.



Design Features:

- Improved contact geometry between components.
- Minimized stress concentration at external thread roots of the female connection.
- Minimized stress concentration at the male shoulder corner.
- Minimized stress concentration at the last full thread engagement of the nut.
- Improved DC15 union seal design offers longer lasting performance than the 1502 hammer union seal.
- 3 piece load segments with special geometry to reduce stress concentration.

Benefits:

- Uniform bore between male, female and union seal.
- Reduce erosional damages at connection.
- Improve fatigue life of the equipment.
- Improvement in bending load.

Applications:

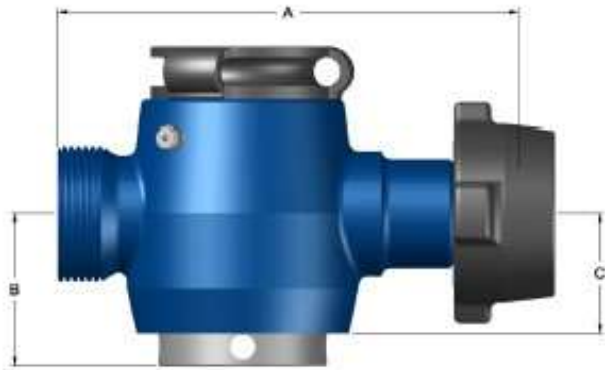
Tech-Seal International has incorporated the DC15 connection into many of our current products. Custom configurations are available.

- Plug Valves
- Flapper Check Valve
- Integral Fittings
- Swivels
- Laterals
- Chokes
- NPST Pipes

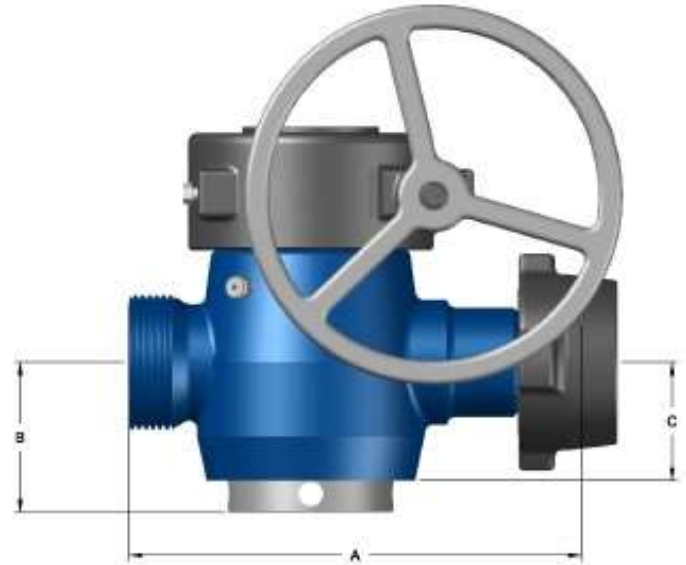
The DC15 connection can be incorporated into many applications whether it be single line or complex manifolds.

With crossovers TSI is capable of changing your entire fracking system or just high stress areas.

DC 15 PLUG VALVES



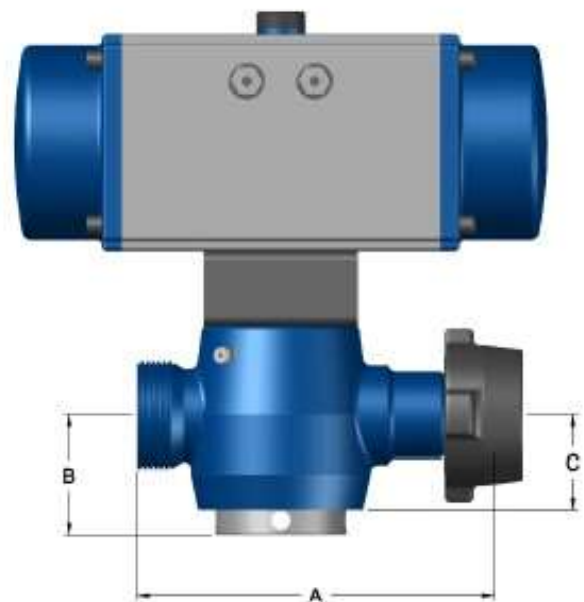
Manual DC15 Plug Valve



Gear Operated DC15 Plug Valve



Hydraulic DC15 Plug Valve



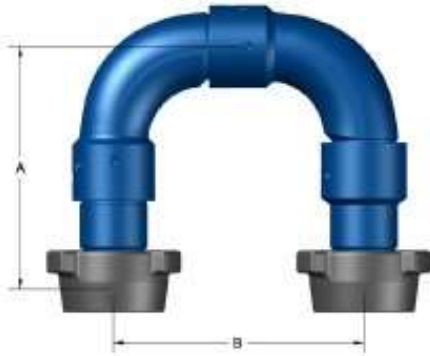
Pneumatic DC15 Plug Valve

Size and Connection	M.A.W.P (psig)	A	B	C
3" DC15	15,000	18.50"	7.19"	5.79"

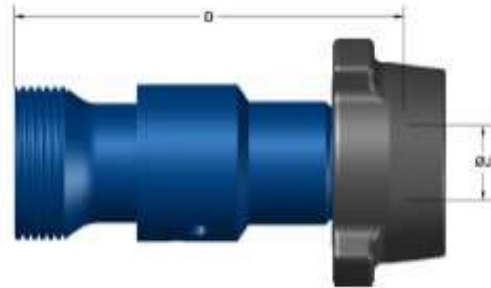
FLOWCELL[®] SYSTEM



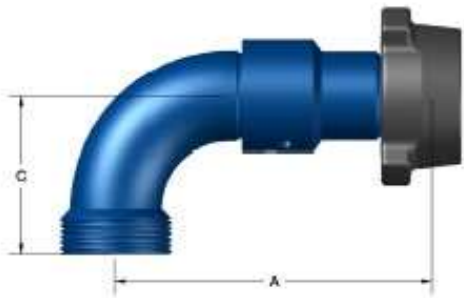
DC 15 SWIVELS



STYLE 10 M x M



STYLE 20 M x F



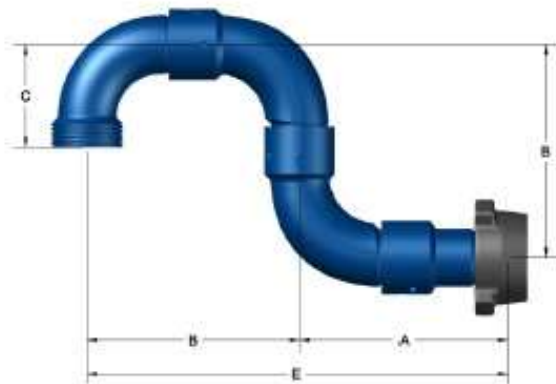
STYLE 30 M x F



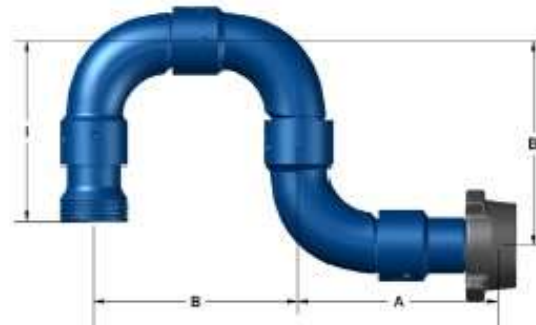
STYLE 50 M x F



STYLE 60 M x F



STYLE 80 M x F



STYLE 100 M x F

Size	MP (PSI)	A	B	C	D	E	I	J
3"	15,000	15.89"	16.37"	7.88"	16.37"	32.26"	14.48"	2.75"

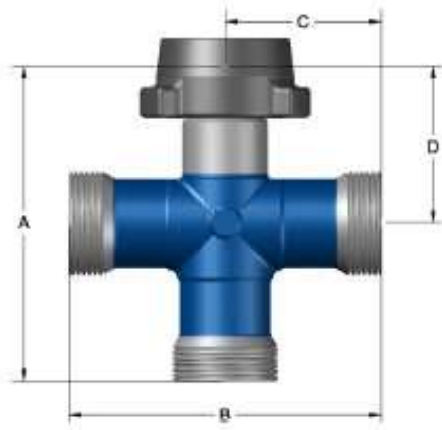
FLOWCELL[®] SYSTEM



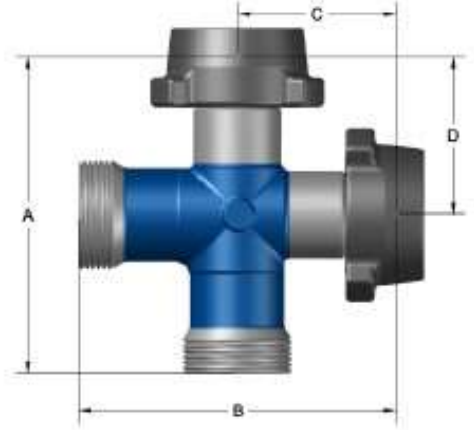
DC 15 TEE, CROSS & ELBOWS



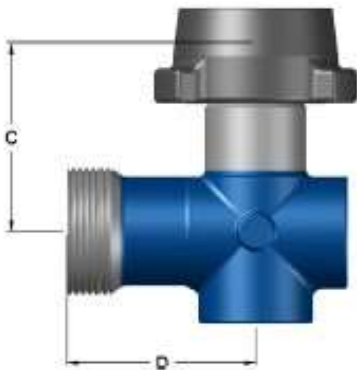
CROSS M x M x M x F



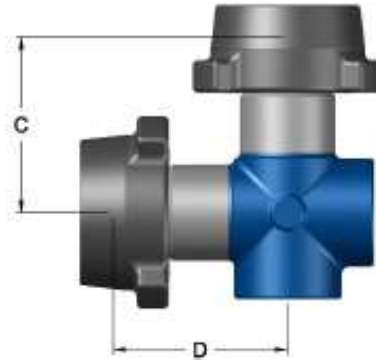
CROSS F x F x F x M



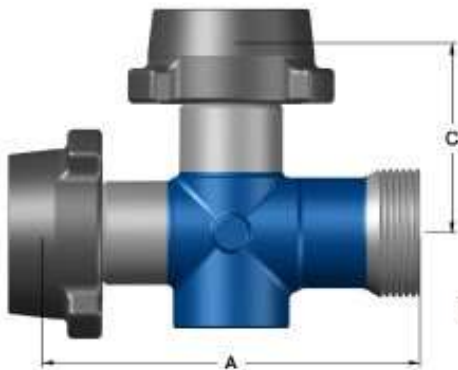
CROSS F x F x M x M



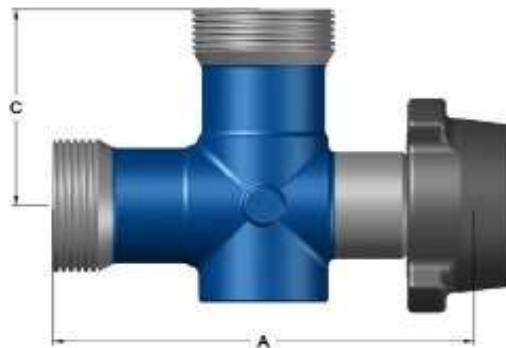
ELBOW M x F



ELBOW M x M



TEE M x M x F



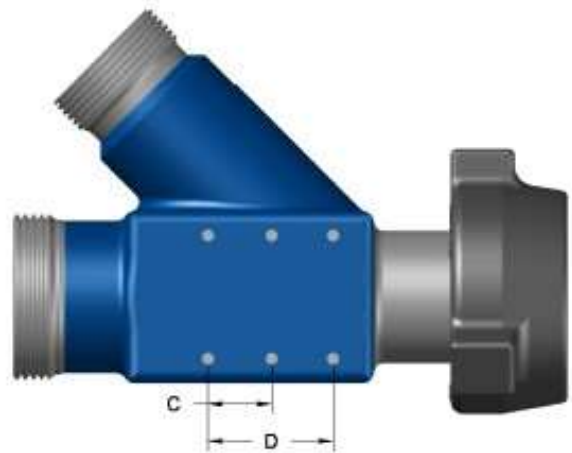
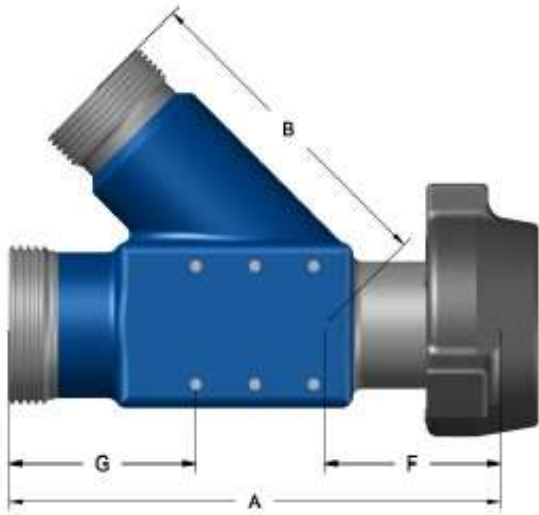
TEE M x F x F

Size	M.A.W.P.	A	B	C	D
3"	15,000	16.260"	16.260"	8.130"	8.130"

FLOWCELL[®] SYSTEM



DC 15 LATERALS



Connections (Run x Run x Branch)	A	B	C	D	E	F	G	H
4" DC15 (F) x 4" DC15 (M) x 3" DC15 (F)	21.60"	13.89"	2.50"	5.00"	7.0" TYP	8.22"	7.94"	3.50"
4" 1502 (F) x 4" 1502 (M) x 3" DC15 (F)	20.88"	13.89"	2.50"	5.00"	7.0" TYP	7.50"	7.94"	3.50"

FLOWCELL® SYSTEM





Certificate of Registration

APIQ1® REGISTRATION NUMBER
0452

This certifies that the quality management system of
TECH-SEAL INTERNATIONAL
3131 West Little York
Houston, TX

has been assessed by the American Petroleum Institute (Quality Register (APIQR)) and found it to be in conformance with the following standard:
ISO 9001:2015

The scope of this registration and the approved quality management system applies to the:
Design and Manufacture of Chokes, Tees and Crosses, Adapter and Spacer Spools, Flanged Connectors, Threaded Connectors, Bulplugs, Valve Removal Plugs and Other End Connections

APIQR® approves the organization's justification for excluding:
No Exclusions Identified as Applicable

Effective Date: JUNE 16, 2017
Expiration Date: JULY 1, 2020
Registered Since: JULY 1, 2011




Vice President, API Global Industry Services



This certificate is valid for the period specified herein. The registered organization must maintain a valid copy of registration at all times. Registration is not a guarantee. This document is issued on the condition that the organization will maintain the quality management system in conformance with the standard to which it is registered. The certificate is subject to periodic audits. For more information, visit www.api.org/qms. © 2017 American Petroleum Institute. All rights reserved.





REGISTRATION NO. Q1-0168

Certificate of Registration

The American Petroleum Institute certifies that the quality management system of
TECH-SEAL INTERNATIONAL
3131 West Little York
Houston, TX

has been assessed by the American Petroleum Institute and found to be in conformance with the following:
API Specification Q1

The scope of this registration and the approved quality management system applies to the:
Design and Manufacture of Chokes, Tees and Crosses, Adapter and Spacer Spools, Flanged Connectors, Threaded Connectors, Bulplugs, Valve Removal Plugs and Other End Connections

API approves the organization's justification for excluding:
No Exclusions Identified as Applicable



Effective Date: JULY 1, 2017
Expiration Date: JULY 1, 2020
Registered Since: DECEMBER 6, 2004



Vice President, API Global Industry Services



Certificate of Authority to use the Official API Monogram

License Number: 6A-0696 ORIGINAL

The American Petroleum Institute hereby grants to

TECH-SEAL INTERNATIONAL
3131 West Little York
Houston, TX

the right to use the Official API Monogram™ on manufactured products under the conditions of the official publications of the American Petroleum Institute entitled API Spec Q1™ and **API-6A** and in accordance with the provisions of the License Agreement.

In all cases where the Official API Monogram is applied, the API Monogram shall be used in conjunction with this certificate number: **6A-0696**

The American Petroleum Institute reserves the right to revoke this authorization to use the Official API Monogram for any reason whatsoever in the scope of business of the AMERICAN PETROLEUM INSTITUTE.

The scope of this license includes the following: Adapter and Spacer Spools, Chokes, Flanged Connectors, Other End Connectors, Tees and Crosses, Threaded Connectors, Top Connectors of PSL 1, PSL 2, PSL 3, Valve Removal Plugs, Bulplugs

GMS Exclusions: No Exclusions Identified as Applicable

Effective Date: JULY 1, 2017
Expiration Date: JULY 1, 2020

To verify the authenticity of this license, go to www.api.org/verifylicense.



Vice President, API Global Industry Services



About Us

We are an engineering and manufacturing company aimed at redefining the operations of the pressure pumping industry. Our unwavering goal is to deliver best-in-class equipment with true, lowest cost of ownership.

The designs of our solutions are not merely supplementary. Detailed equipment definition and full ground-up equipment designs are essential for making frac sites as efficient and safe as possible. Each new product is designed from the bottom up to ensure that nothing is overlooked. Small changes require multiple layers of technology to match and support the design change. Our approach details each of those layers for fully synergistic development.

The solutions come with **Total Life Cycle Management System** to assure your investment pays you dividends well into the future.