

M-FLEX[®]

Restrained Ball Joint
Fitting for Maximum
Deflection



PIPE
FABRICATION
RESTRAINED JOINTS
FITTINGS
GASKETS
COATINGS & LININGS

U.S. PIPE

A QUIKRETE[®] COMPANY

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**U.S.
PIPE**

GENERAL INFO

INFORMATION & SUGGESTED SPECIFICATION WORDING

ANSI/AWWA STANDARDS

ANSI/AWWA C153/A21.53
“Ductile-Iron Compact Fittings for water service or ANSI/AWWA C110/A21.10 Ductile-Iron and Gray-Iron Fittings, 3 in. Through 48 in., for Water.”

M-FLEX Fittings conform to applicable requirements of ANSI/AWWA C153/A21.53 or ANSI/AWWA C110/A21.10.

ANSI/AWWA C111/A21.51
“Rubber-Gasket Joints for Ductile Iron Pipe and Fittings”

ASTM A746-03 Standard Specification for Ductile Iron Gravity Sewer Pipe.
ASTM A716-08 Standard Specification for Ductile Culvert Pipe.
ASTM A536 Standard Specification for Ductile Iron Castings.

U.S. Pipe M-FLEX® restrained joint fitting is a ball joint fitting that provides a minimum of 15° of deflection that is ideally suited for underwater installations where the high cost of equipment and manpower emphasizes the importance of ease and speed of assembly.

The assembly of M-FLEX ball and socket is the same as our USIFLEX® joint, however, the short lay length of the M-FLEX with bell and spigot ends can be connected between standard TR FLEX®, HP-LOK® or HDSS® pipe. This arrangement allows the designer or installer to quickly and easily make field adjustments without long lead times and downtime. M-FLEX can also be supplied with plain end x plain end, restrained spigots or mechanical joint plain end x TR FLEX, HP-LOK or HDSS mechanical joint bell to make tie-ins, connections or the transition to over land piping.

M-FLEX is not only for river crossings or underwater applications but can be utilized on any projects requiring large amounts of deflection. Another benefit of M-FLEX, used in conjunction with our restrained joints, is that the deflection of the restrained joint is also available. This provides an additional 1 to 10° of deflection depending upon the type of restrained joint pipe used. M-FLEX can also be used with TR-XTREME® seismic piping.

Suggested Specification

Restrained joint fittings and the restraining components shall be Ductile Iron in accordance with applicable requirements of ANSI/AWWA C110/A21.10 and/or C153/A21.53 with the exception of the manufacturer's proprietary design dimensions. Fitting shall be asphaltic coated inside and outside. The fitting shall have joints in accordance with ANSI/AWWA C111/A21.11. The fitting shall be designed for a water working pressure of 350 psi for sizes 6" through 24" and 250 psi for sizes 30" through 36". Restrained joint fitting shall be U.S. Pipe's M-FLEX® or approved equal.

Subaqueous/underwater applications notes

Underwater installations are difficult and require special attention to be successful. If pipe will be assembled under water, please contact USP for additional assistance that will aid underwater assembly. USP does not recommend choker straps or cables be used to assemble pipe joints underwater. Experience has shown the use of such devices does not provide enough axial force for assembly. Additionally, use of choking type devices can damage special coatings and polyethylene encasement meant to protect the pipe. The preferred method to assemble joints underwater is to use the back-hoe bucket to push against the bell. Special subaqueous lube must also be used for the gasket and spigot.

NOTE: If specifiers or users believe that corrosive soils will be encountered where our products are to be installed, please refer to ANSI/AWWA C105/A21.5 “Polyethylene Encasement for Ductile Iron Pipe Systems” for proper external protection procedures. For certain wastewater applications a ceramic epoxy lining is available—see PROTECTO 401™ Ceramic Epoxy Lined Pipe and Fittings Brochure. **Special note:** Due to the large amount of movement of the Ball of the M-FLEX assembly, it is not possible to coat the ball of the assembly with PROTECTO 401 or the joint compound as the coating would be rubbed off. As septic, corrosive sewage is typically not a problem in completely full pipelines, and most all applications involving the M-FLEX Coupling would result with the pipeline being completely full, the ball would typically not need to be coated with a coating or joint compound other than the Sub-Aqueous lube that the ball is coated with during assembly.

NOTE: Each of the following is a nationally recognized standards organization: American National Standards Institute (ANSI), American Water Works Association (AWWA), American Society for Testing and Materials (ASTM), Underwriters Laboratories (UL), National Fire Protection Association (NFPA), National Sanitation Foundation (NSF), Factory Mutual (FM)

NOTE: Joints that provide expansion and contraction should be installed with subaqueous lubricant. This lubricant is NSF approved and does not dry over time thus allowing mobility for the life cycle of the pipeline. Subaqueous lubricant is supplied with all U.S. Pipe products that provide expansion, contraction, or utilize a ball joint for deflection.

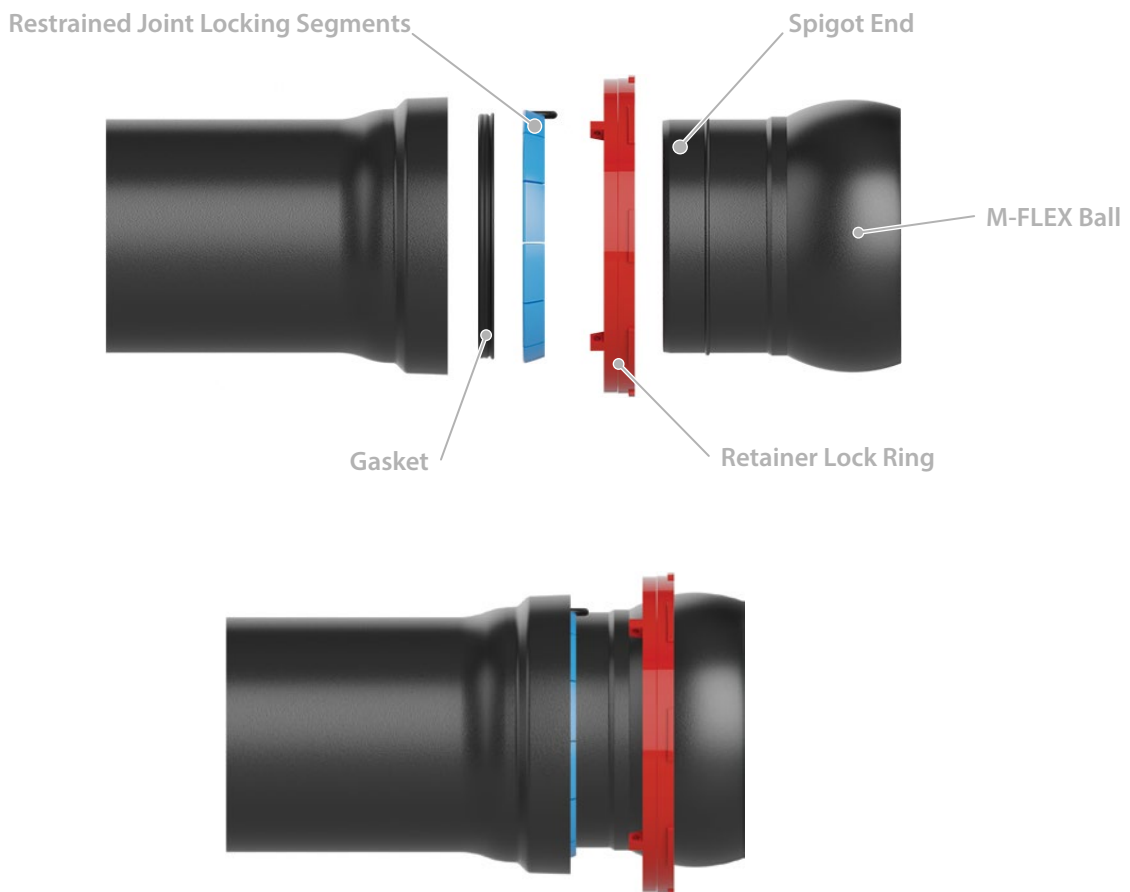
ASSEMBLY INSTRUCTIONS

M-FLEX INSTALLATION

STEP 1

Assemble the M-FLEX® Ball x HDSS PE fitting with the mating HDSS® pipe bell.

1. The gasket seat and HDSS locking segment cavity of the bell must be clean and free of debris or any foreign matter. Remove the asphalt coating on the M-FLEX ball. The asphalt may be removed with mineral spirits or similar solvents, and allow the solvents to evaporate before the assembly into the M-FLEX bell in Step 3.
2. Install the TYTON® Gasket in the HDSS bell. Do not lubricate gasket prior to installing into bell.
3. Insert the spigot end of the M-FLEX Ball x HDSS PE through the M-FLEX Retainer Lock Ring such that the lettering and lifting lugs on the ring are facing the same direction as the spigot end. The ring should be leaned toward the ball to allow clearance so that the HDSS segments can be inserted.
4. Lubricate the gasket and spigot end of the M-FLEX Ball x HDSS PE fitting with TYTON JOINT® Lubricant.
5. Position the HDSS pipe so that the slot in the bell is in a 12 o'clock location, this will enable easy installation of the locking segments, especially in larger pipe sizes.
6. Insert the spigot end with the retainer ring into the bell. The installer must make sure that the spigot end is fully homed in the bell and not deflected.
7. Insert the locking segments (large end first) into the slot in the bell and slide the segment left or right allowing it to slide to the bottom of the bell. Continue sliding the segments in and around the pipe until all the locking segments are inserted.
8. Install the Rubber retainer in between the locking segments at the Bell Slot.
9. Pull back on the inserted pipe to extend the joint and remove the slack and deflect the joint as needed but not to exceed the listed joint deflection.



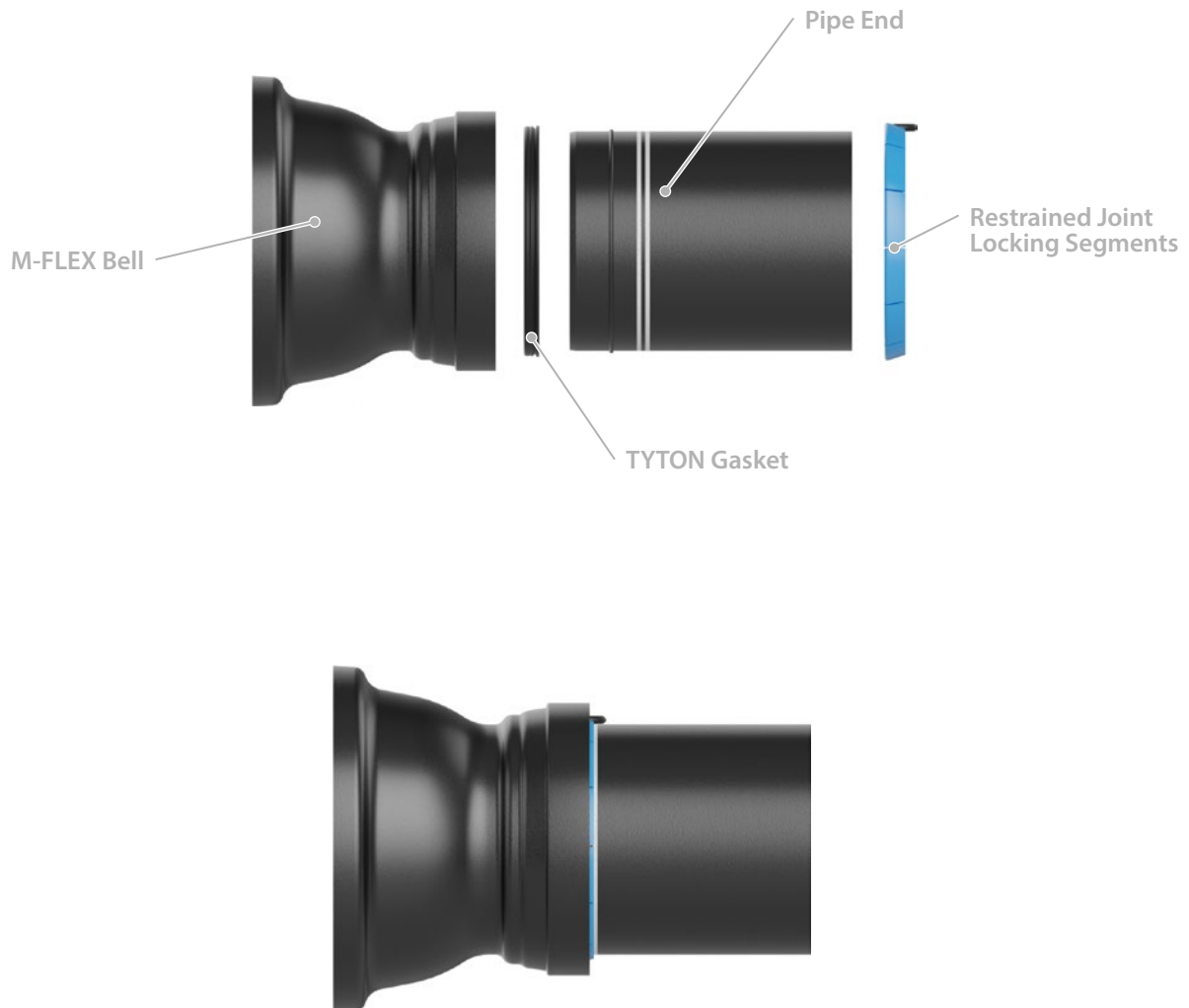
ASSEMBLY INSTRUCTIONS

M-FLEX INSTALLATION (Continued)

STEP 2

Assemble the M-FLEX Ball Socket x HDSS fitting with the mating HDSS pipe spigot.

1. The gasket seat and HDSS locking segment cavity of the bell must be clean and free of debris or any foreign matter.
2. Install the TYTON® Gasket in the HDSS bell. Do not lubricate gasket prior to installing into bell.
3. Lubricate the gasket and spigot end of the mating HDSS pipe with TYTON JOINT® Lubricant.
4. Position the M-FLEX bell x HDSS bell so that the HDSS bell slot is in the bell is in a 10 – 2 o'clock location, this will enable easy installation of the locking segments, especially in larger pipe sizes.
5. Insert the pipe end spigot into the bell. The installer must make sure that the spigot end is fully homed in the bell and not deflected.
6. Insert the locking segments (*large end first*) into the slot in the bell and slide the segment left or right allowing it to slide to the bottom of the bell. Continue sliding the segments in and around the pipe until all the locking segments are inserted.
7. Install the Rubber retainer in between the locking segments at the Bell Slot.



ASSEMBLY INSTRUCTIONS

M-FLEX INSTALLATION (Continued)

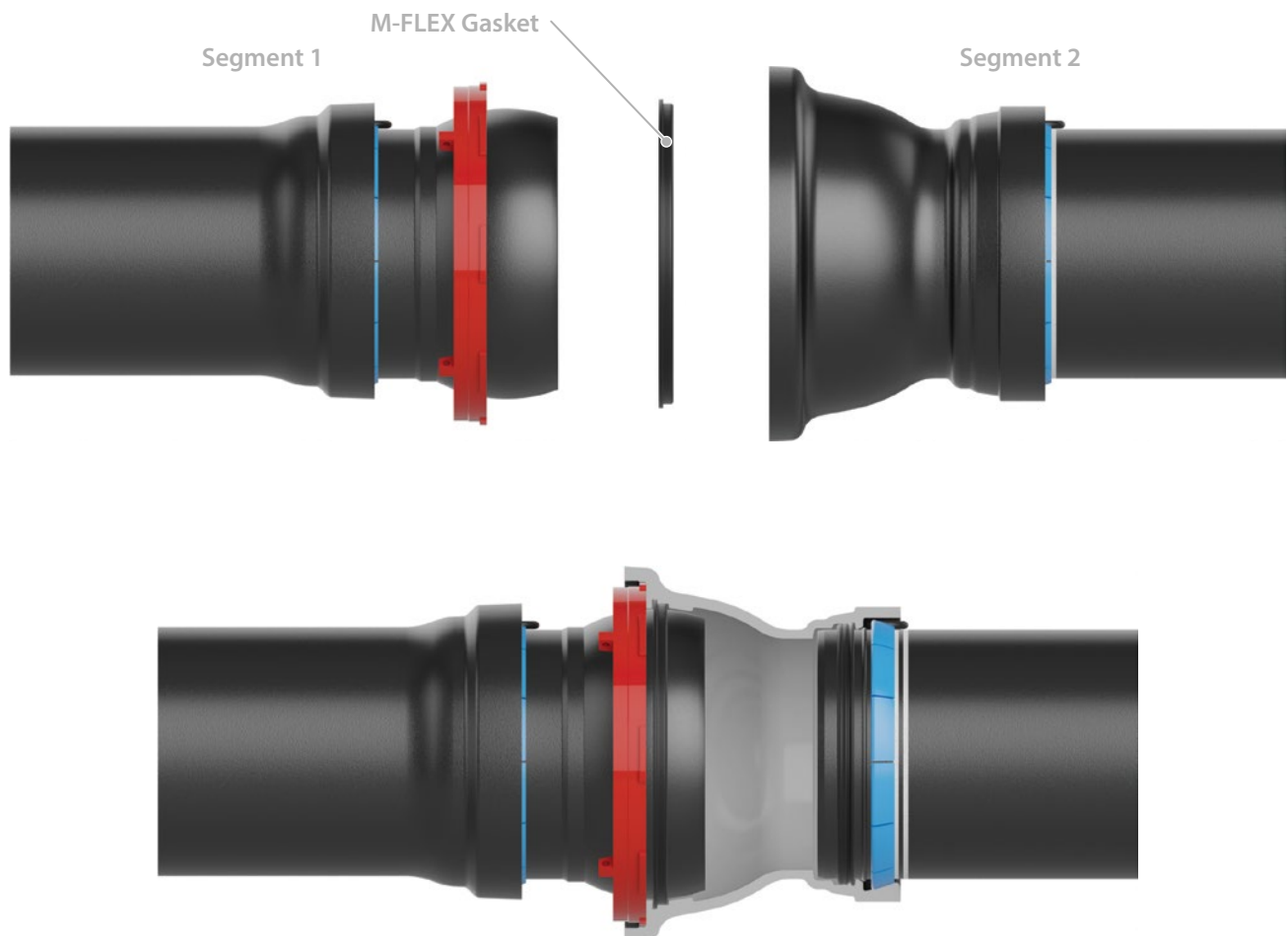
STEP 3

Assemble the M-FLEX® Ball and Socket Joint.

1. The gasket seat of the ball socket must be clean and free of debris or any foreign matter.
2. Insert the M-FLEX® Gasket into its seat in the ball socket. Lubricate the ball and exposed surface of the inserted gasket with NO-OX-ID subaqueous lubricant. This will permit easy assembly and deflection of the joint. The lubricant furnished is a non-toxic material. Lubricant other than that furnished with the pipe should not be used.

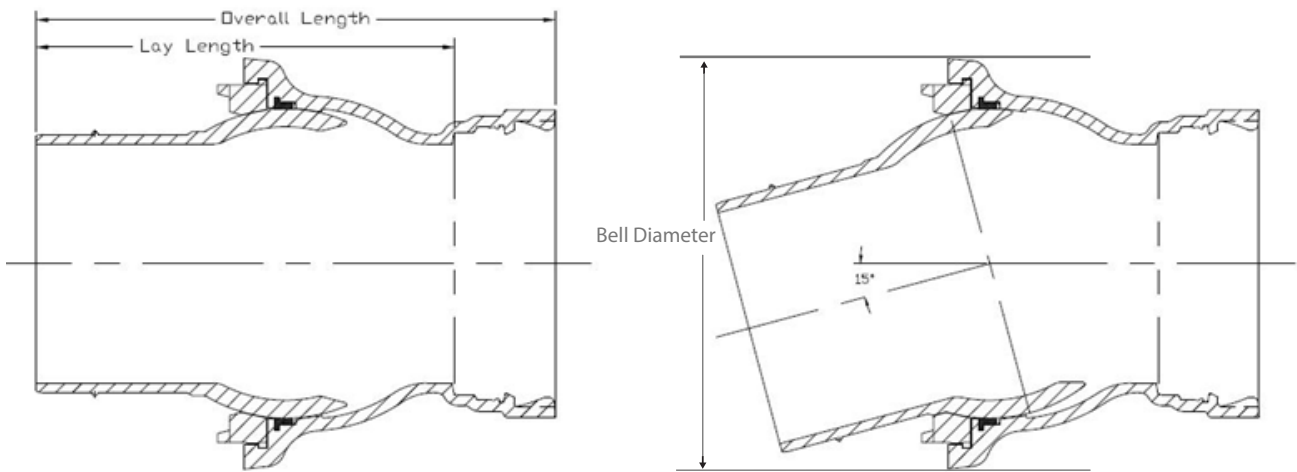
CAUTION: The use of spray-on lubricant is not recommended. Experience has determined that spray-on lubricant may not have sufficient lubricity to allow joint assembly without gasket displacement.

3. With the entering pipe suspended by a crane or other means, place the lubricated ball in the receiving bell and force the ball into the socket, thereby compressing the gasket to effect a bottle-tight seal. While keeping the ball forced into the bell bring up the retainer ring, line up the lugs with the recesses in the bell, move the retainer ring inward and turn it until the retainer ring lugs interlock with the internal flange segments in the bell. If the retainer ring cannot be rotated, make sure the ball is firmly pushed into the socket; ample clearance is provided by a slight amount of joint slack or pull out to enable easy assembly.
4. Insert one rubber retainer into a space between two slots to hold the retainer ring in the locked position. Only one retainer is required per joint to prevent the ring from rotating.



SPECIFICATIONS

BASIC DIMENSIONS



SIZE	WORKING PRESSURE	DEFLECTION	LAY LENGTH	OVERALL LENGTH	BELL DIAMETER	WEIGHTS
INCHES	PSI	DEGREES	INCHES	INCHES	INCHES	POUNDS
6	350	15°	17.50	22.77	13.29	178
8	350	15°	21.00	26.82	16.73	297
12	350	15°	23.50	29.80	23.13	647
16	350	15°	23.00	39.95	27.94	1037
18	350	15°	31.00	39.19	31.05	1105
20	350	15°	35.00	43.44	34.36	1463
24	350	15°	37.00	45.86	38.87	2252
30	250	15°	44.00	54.34	47.25	3672
36	250	15°	46.00	56.86	54.60	5141

NOTE: These deflections are based on joints with nominal dimensions.



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Our products are manufactured in conformance
with national standards so that our customers
may be assured of getting the performance and
longevity they expect. Use of accessories or other
appurtenances that do not comply with recognized
standards may jeopardize the performance and
longevity of the project.



A QUIKRETE® COMPANY

Headquarters

U.S. Pipe
Two Chase Corporate Drive
Suite 200
Birmingham, AL 35244

866-347-7473

info@uspipe.com

www.uspipe.com