



Georg Fischer Piping Systems

Fuseal[®], 1-1/2"- 6"

Fuseal[®] Fast-Lock[™], 1-1/2"- 4"

Installation Training #236 – Rev. G / 20-August-2020

Pipe & Fitting Inspection & Storage

- Pipe & fittings should be inspected upon arrival for obvious shipping damage.
- Store pipe and fittings in a dry location, protected from direct sunlight.
- If material is to be stored outside, it should be covered with a light colored tarp to be kept dry and protected from UV damage.
- Pipe should be laid on a flat surface to prevent warping.



Installation Environment



Material and fusion machine must be the same temperature prior to fusion. This can be achieved when components and machine are in the same environment for 2 hours.

As with all plastic piping systems, thermal expansion should be considered and incorporated into the design (use of expansion loops for example).

Special precautions should be taken when installing product in cold weather environments. Fusions should not be done below 40°F (4°C)., unless proper precautions have been taken to insure that the fusion joint (pipe and fitting) maintain a uniform temperature above 40°F (4°C).



Eye protection
should be worn
at all times
during
installation!



Fuseal[®], 1-1/2" – 6"

- Fuseal Joint Preparation
- Setting up 1-1/2" – 6" Joints
- Leak Testing Procedures



Pipe Preparation 1½"- 6"



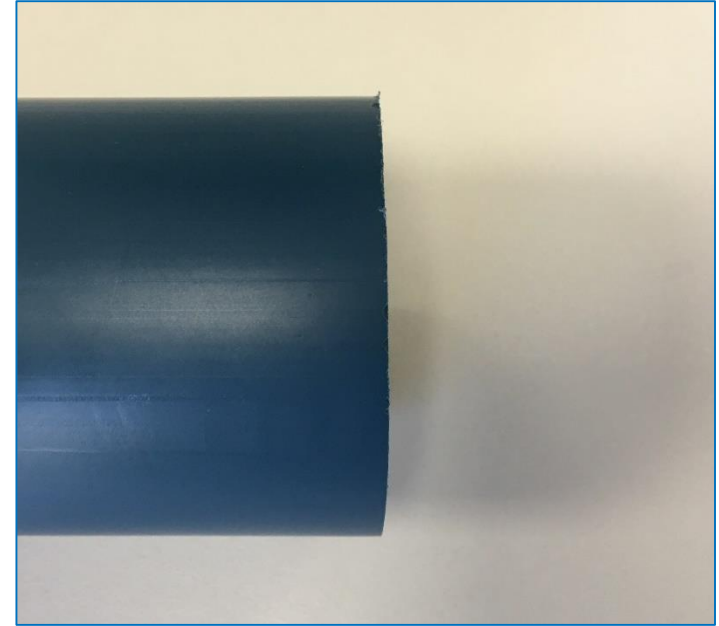
1.

Cut pipe end square with axis of pipe!

Use a fine tooth hand saw and miter box, a power cutoff saw with blade for plastic or a wheel type pipe cutter for plastic.

****Ratchet Type pipe cutters are not recommended**

Regardless of tool, pipe needs to remain round and square.

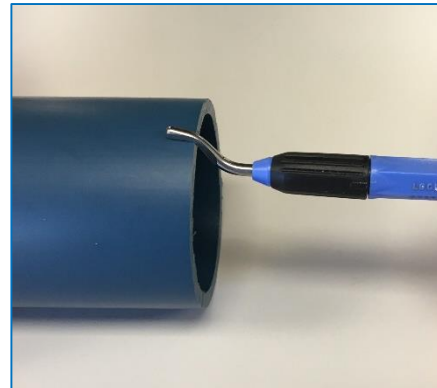


2.

Chamfer the pipe end to ease insertion of the pipe and to prevent the fusion coil from being damaged.

For 6" only:

The shown chamfering tool is from Noga Deburring System www.noga.com which can be purchased from your distributor.



For 1½"-4":

The shown chamfering tool is from our catalog.
Part No. 150109104



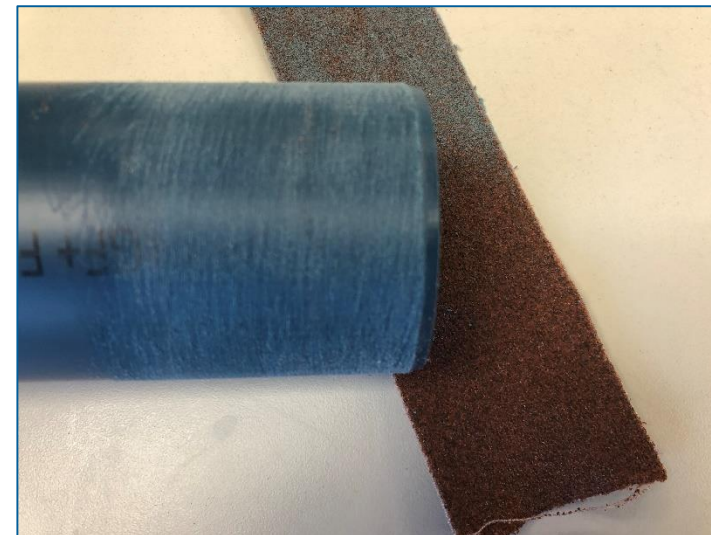
Pipe & Socket Preparation 1½"- 6"

+GF+

3.

Vigorously **sand the outside surface of the pipe** where it enters the fitting socket.

- **Must use 60 grit abrasive cloth!**
- GF Part # **37X004819** - 2"x50yd Roll



4.

Clean sanded pipe surface and inside of fitting socket with Isopropyl Alcohol (*IPA).

- The alcohol concentration must be at least 70%!
- Do not handle the freshly cleaned surfaces before assembling.
- If the fittings have become excessively dirty due to the environment, collars should be carefully removed and fittings hub and collar cleaned of debris and dirt. Care should be used when removing collar.

*(For proper use and safety regulations of IPA, please see supplier's Material Safety Data Sheets)



Pipe & Socket preparation 1½"- 6" +GF+

5.

Mark socket depth on the pipe.

Fitting	Socket depth
1½"	7/8" / 2.2 cm
2"	1" / 2.5 cm
3"	1-1/16" / 2.7 cm
4"	1-1/16" / 2.7 cm
6"	1-9/32" / 3.3 cm

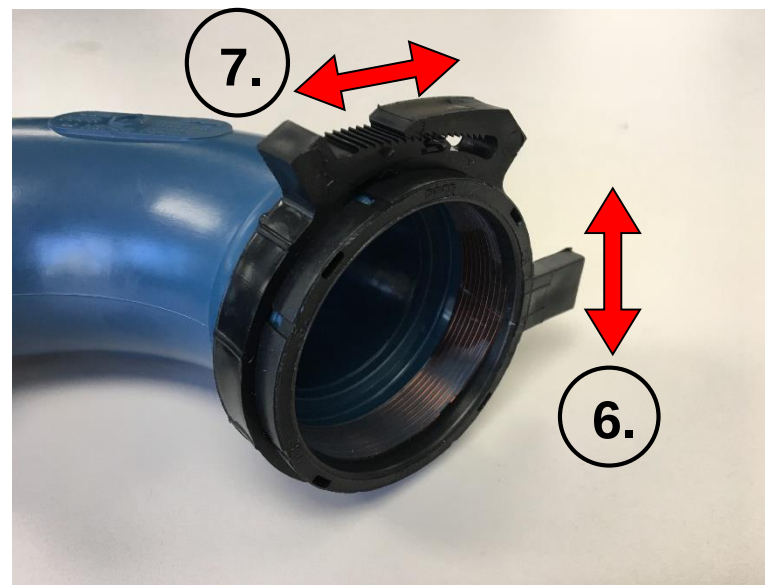


6.

Rotate the fusion collar for easy access to the duplex receptacle and make sure the collar is completely seated.

7.

Rotate the plastic clamp to orient the ratchet closure to the right or left of the duplex receptacle.



Setting up 1½"- 6" joints

+GF+

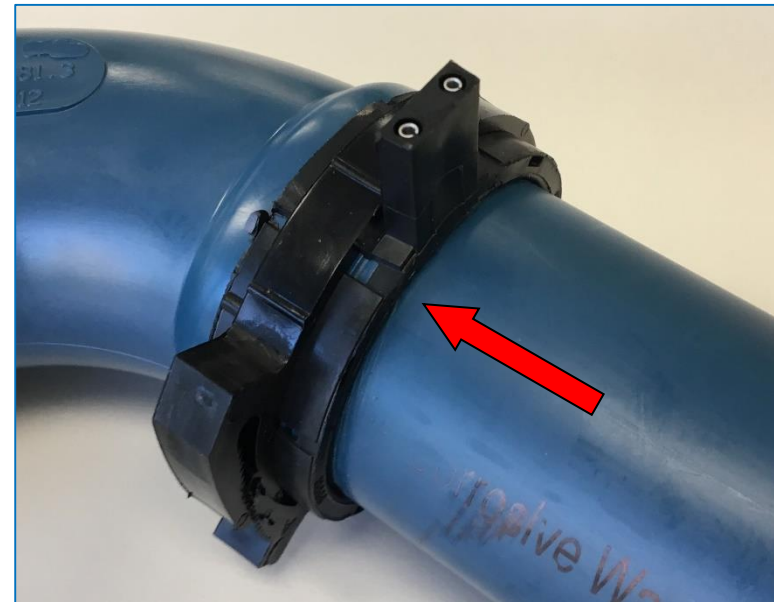
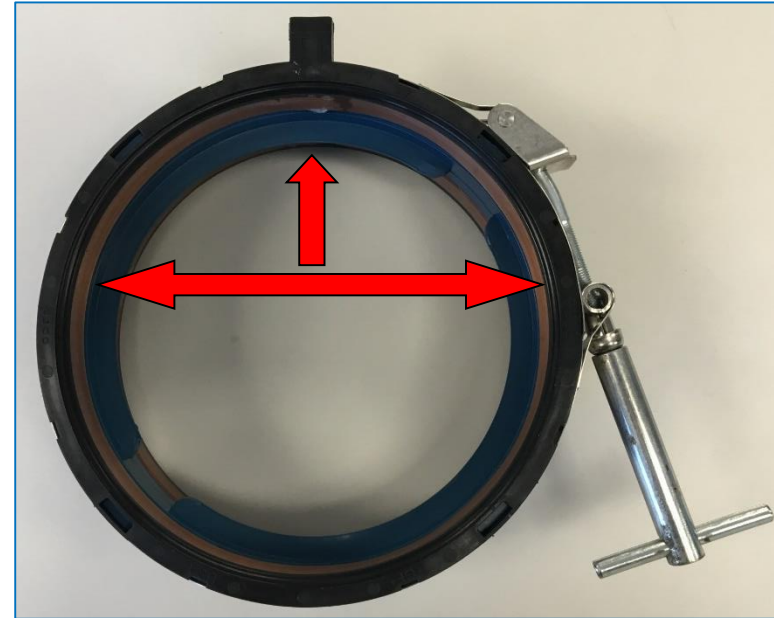
7.1

For 6" joints only, fit the steel band clamp to orient the T-handle on the right or left side of the duplex receptacle.

8.

Insert the pipe into the fitting and push to the pipe stop. **The pipe must be fully inserted into the fitting socket to the pipe stop.** Rotate the collar so the socket depth mark is visible when looking at the duplex receptacle.

Check socket depth mark to be sure the pipe is fully inserted.



Setting up 1½"-6" joints

+GF+

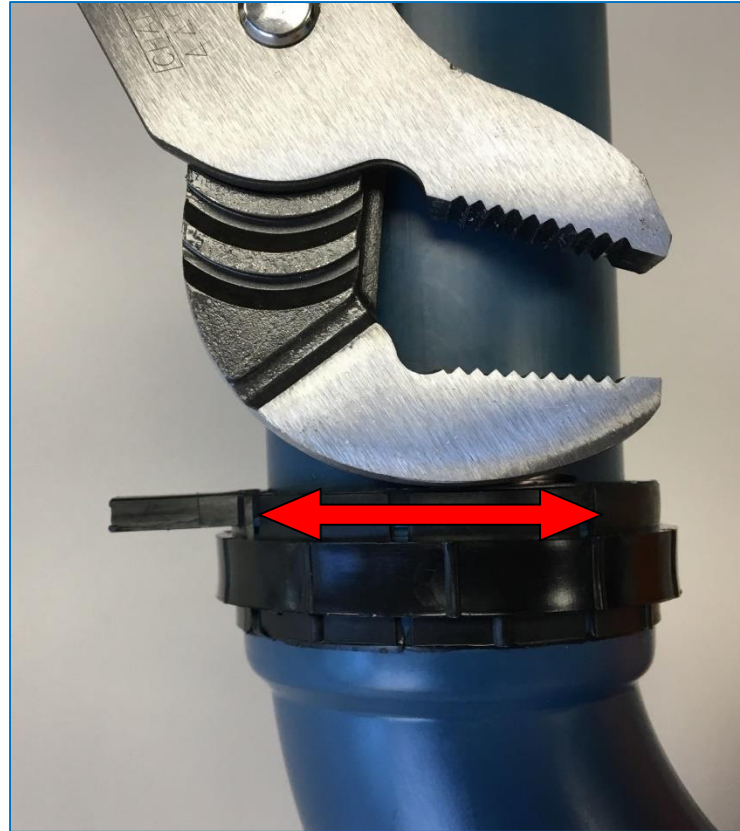
9.

The fusion collar must be fully seated on the hub of the fitting socket.

This can be easily checked visually if there is a gap between the fusion collar and the fitting. Tap the fusion collar carefully on the top, for example with channel lock pliers, if it's not fully seated in the fitting!

A mark can be applied to the bottom of the collar to verify proper seating.

The gap is not visible on 6" fusion collars with steel band clamps so the mark is required.



Setting up 1½"-6" joints



10.

Tighten the clamp firmly before fusion. Proper clamp tightness will result when the pipe can not be rotated in the fitting socket. For 6" metal clamps, tighten to 65 in-lb.

- Use a channel lock #440 for 1½"-3" plastic clamps. GF Part # **37X004817**
- Use a channel lock #460 for 4" plastic clamps. GF Part # **37X004818**



For 6" only: Begin tightening the steel band clamp by hand using the T-handle. Once aligned, complete tightening with a torque tool. Tighten clamp to 65 in-lb. Torque tools and modified sockets are available. Details on following pages.



Note: Clamp does not prevent pipe from being pulled out during handling.

Setting up 1½"-6" joints



10.1

6" Metal Clamp Torque Tool Usage Instructions

1. Attach modified socket to square drive of tool. The spring loaded ball will retain the socket. The ratchet style or T-handle style can be used, depending on preference and/or space limitations.



2. Assemble pipe/fitting/collar/clamp fusion joint following GF Fuseal installation procedures. Complete tightening of clamp using a torque tool with the modified socket on the metal clamp T-handle. Make sure the pipe/fitting/collar/clamp assembly is properly aligned and seated before using torque tool. Each tool is pre-set to the appropriate torque.

Setting up 1½"-6" joints



10.2

6" Metal Clamp Torque Tool Usage Instructions – cont.

3. Grasp handle at furthest point away from drive and turn smoothly and evenly. When the pre-set torque is reached, you will feel a sharp snap. The tool has reached its value and has reloaded. The first brake will most likely be a surprise. Smoothly cycle the tool a few more times, since over tightening is impossible. This will help assure the clamp is properly torqued down.



Setting up 1½"-6" joints



11.

Check the continuity of every fusion collar with the continuity tester before fusing.

A green light will indicate a good fusion collar.



MSA250 or EX MULTI



Electro Plus®

12.

Connect the factory-supplied fusion cables to the duplex receptacle of the fusion collars.

Check how many joints are possible per fusion cycle.



Joint Fusion



13. See the Instructions for the Electro Fusion Machine Trainings.

MSA250-SE or -EX Multi

Training # 236 – MSA250



Electro Plus®

Training # 236 – Electro Plus



After the Joint Fusion



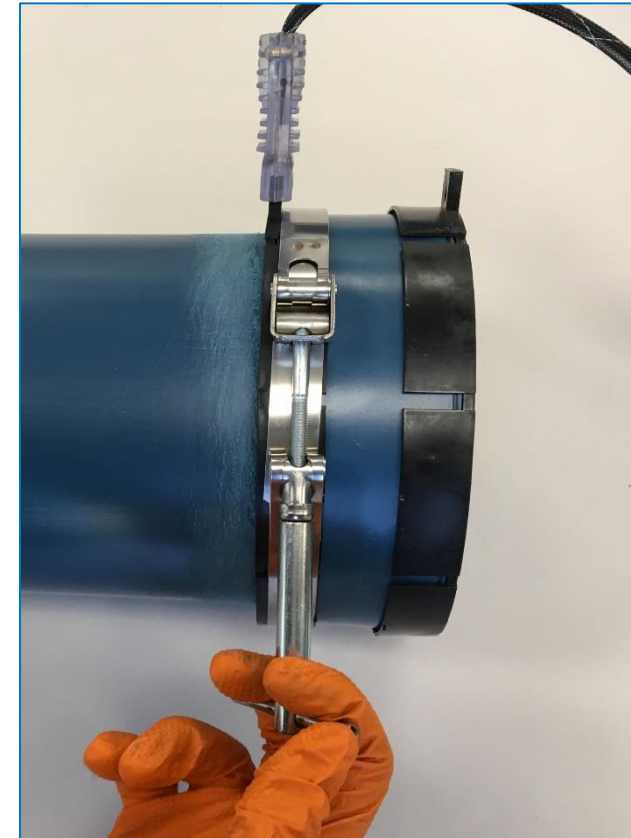
14.

Tighten the band clamps within 30 seconds after the fusion cycle is finished!

For 1½"-4", tighten the fusion clamp approximately 1 to 2 clicks; do not exceed 2 clicks. If the clamp breaks, replace immediately.



For 6" only: Tighten the steel band clamp approximately ½ to one full turn.



End of the Installation



15. Allow the joint to cool to the touch before testing.



End of the Installation

- **The plastic clamps for 1½"- 4" can stay on the fittings.** If you must remove them, wait for the joint to cool and remove with caution as the clamp is under pressure and may fracture.
- **The steel band clamp on the 6" fittings can be removed after a cooling time of 10 minutes.**

Testing

- **Joints may be pressure tested 10 minutes after completion of fusion. Test in accordance with local plumbing codes. All selections of the system can be tested with up to 30 feet head of water.**
- **It is a good plumbing practice to test a small section (20 fittings) of the fused piping system first, to ensure proper installation procedures are being performed before continuing with the completion of the system.**
- **To re-fuse a leaking joint, drain any liquid from the area surrounding the joint and allow it to dry, then repeat steps 10 through 15, using a new plastic clamp for sizes 1½" through 4". If this does not fix the leak, it is recommended that you cut out the leaking joint and replace. Multiple re-fusions are not recommended.**

Main causes of system failures!



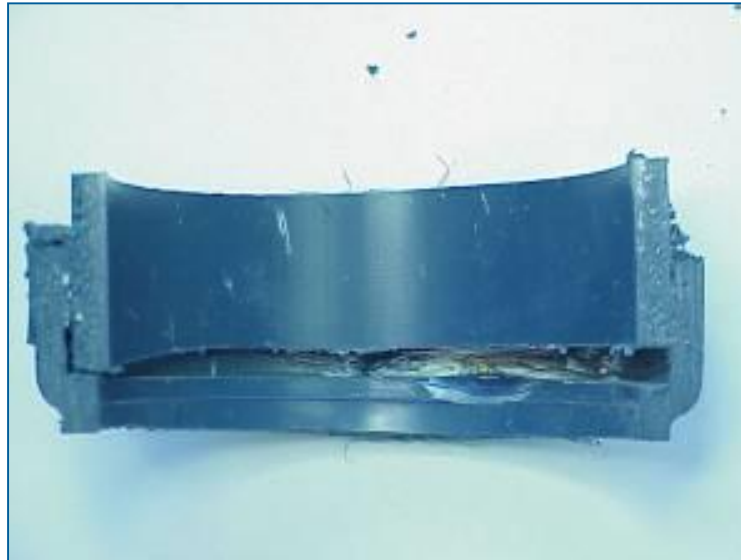
Pipe was not full inserted
to the pipe stop!



Pipe and fitting were
not cleaned!



Pipe was not cut square!

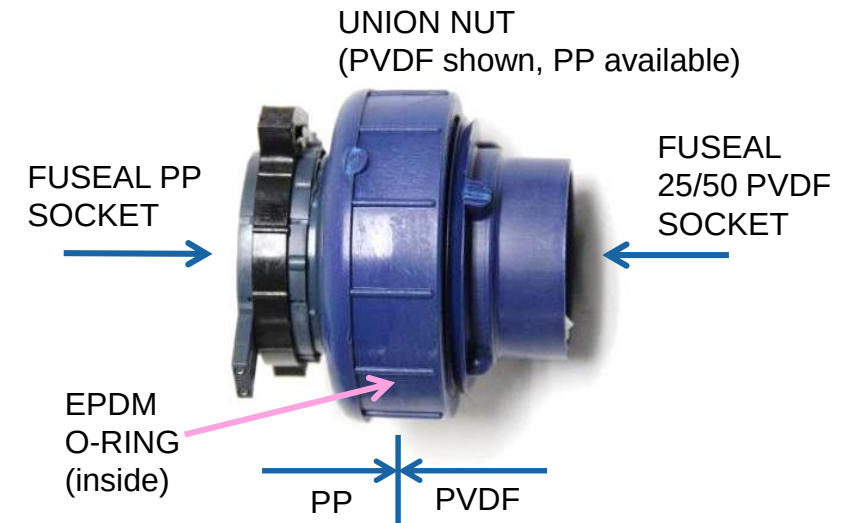


Fuseal® PP to Fuseal® 25/50 PVDF Transition



Fuseal PP and Fuseal 25/50 PVDF cannot be electro-fused together.

See the GF catalog for Fuseal PP to PVDF union joints. The installer fuses 25/50 PVDF pipe into the PVDF socket and PP pipe into the PP socket. The connection is completed by tightening the union nut.



Fuseal® Fast-Lock™, 1-1/2" – 4"

- Fuseal Fast-Lock Mechanical Joint Preparation
- Setting up 1-1/2" – 4" Joints
- Leak Testing Procedures



Fuseal® Fast-Lock™ MJ Installation Instructions



- Fuseal Fast-Lock fittings are pre-assembled at the factory.
- Items / tools needed for installation
 - Eye Protection – Safety Glasses
 - Pipe Chamfering Tool
 - Isopropyl Alcohol – 70% minimum concentration
 - Disposable Shop Towels or Wipes
 - Silicon-based Lubricant (Dow Corning Molykote 111 or similar)
 - Ratchet or Hand-held Power Drill
 - 8mm (5/16") and 10mm (3/8") Socket
 - Spreader Tool



Fast-Lock Pipe Preparation 1½"- 4"



1.

Cut pipe end square with axis of pipe!

Use a fine tooth hand saw and miter box, a power cutoff saw with blade for plastic, or a wheel type pipe cutter for plastic.

***Ratchet Type pipe cutters are not recommended*

Regardless of tool, pipe needs to remain round and square.



Fast-Lock Pipe Preparation 1½"- 4"



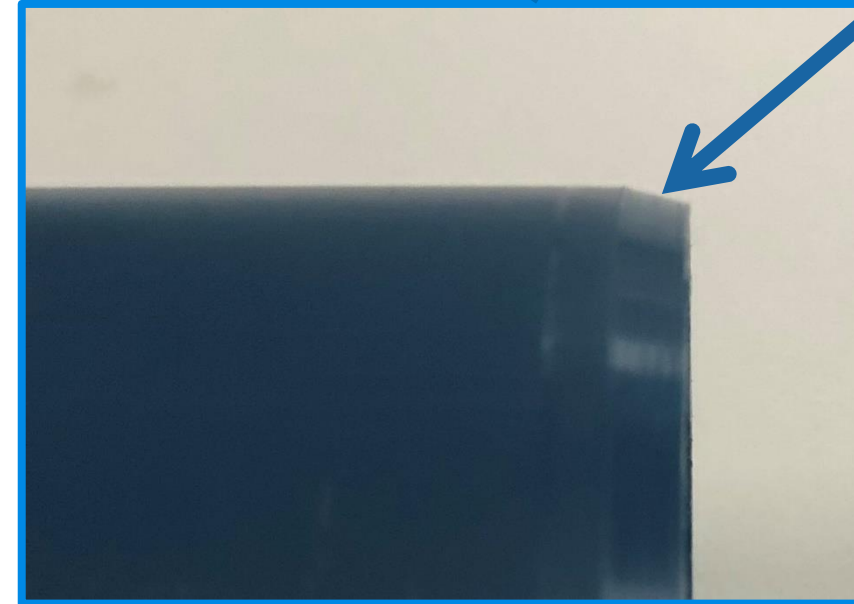
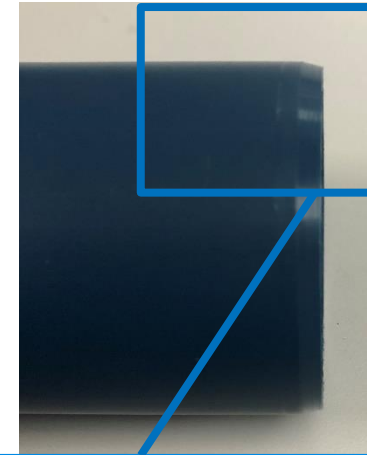
2.

Chamfer the pipe end to ease insertion of the pipe and to prevent the Fast-Lock sealing gasket from being damaged.

The shown chamfering tool is from the GF catalog offering.
Part # **799495146**



The shown chamfering tool is from the GF catalog offering.
Part # **150109104**



Pipe must have proper chamfer to ease insertion of pipe, and prevent damage to sealing gasket

Fast-Lock Pipe Preparation 1½"- 4"

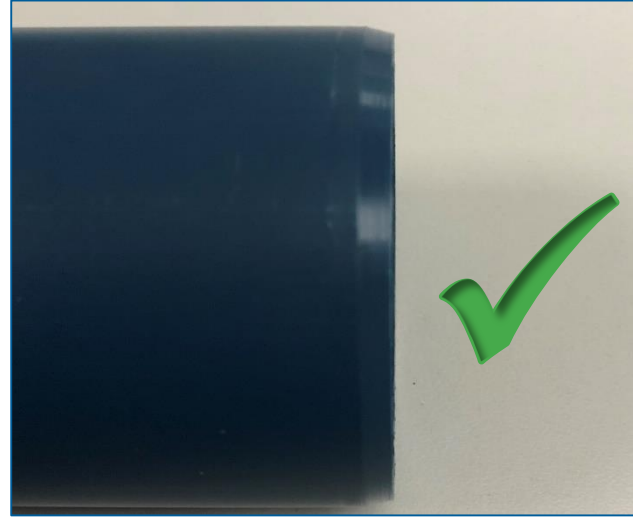


3.

Clean pipe surface with minimum 70% Isopropyl Alcohol (IPA*).

Check pipe for any scratches or damage. The sealing area of the pipe must be smooth.

*(For proper use and safety regulations of IPA, please see supplier's Material Safety Data Sheets)



4. **Make witness mark on the pipe to socket depth.**

Fitting	Socket depth
1½"	1-1/8" / 2.9 cm
2"	1-1/4" / 3.2 cm
3"	1-1/2" / 3.8 cm
4"	1-1/2" / 3.8 cm



Fast-Lock Socket Preparation

5. Remove shrink wrap film and inspect fitting.

- Look to insure sealing gasket is properly seated.
- Look to insure there is no debris on gasket surface.

Fast-Lock fitting gaskets are pre-lubricated at the factory to aid in pipe insertion, so applying additional lubricant is normally not required on standard fittings.

If additional lubricant is required (for instance, due to contamination of factory-applied lubricant, or difficulty with pipe insertion), use a silicon-based lubricant, such as Dow Corning Molykote 111.



The shown Dow Molykote 111 silicon lubricant is from the GF catalog offering.
Part #
37Z000097



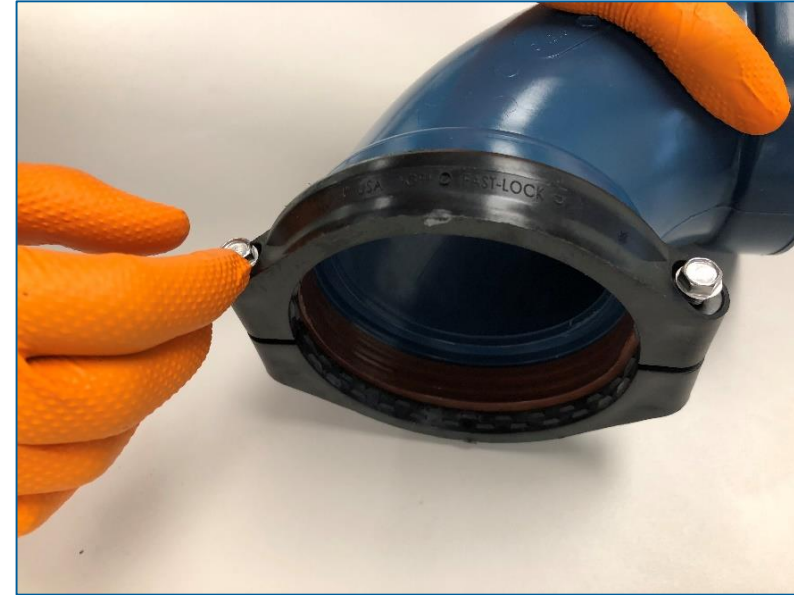
Fast-Lock Socket Preparation



6.

Rotate Fast-Lock collar to position bolts in an easily accessible location for tightening.

If necessary, use spreader tool to ease rotation of collar.



The shown Spreader Tool is available from GF.
Part # **37Z000096**



Fast-Lock Pipe & Socket Assembly



7.

Insert the pipe into the fitting and push to the pipe stop.

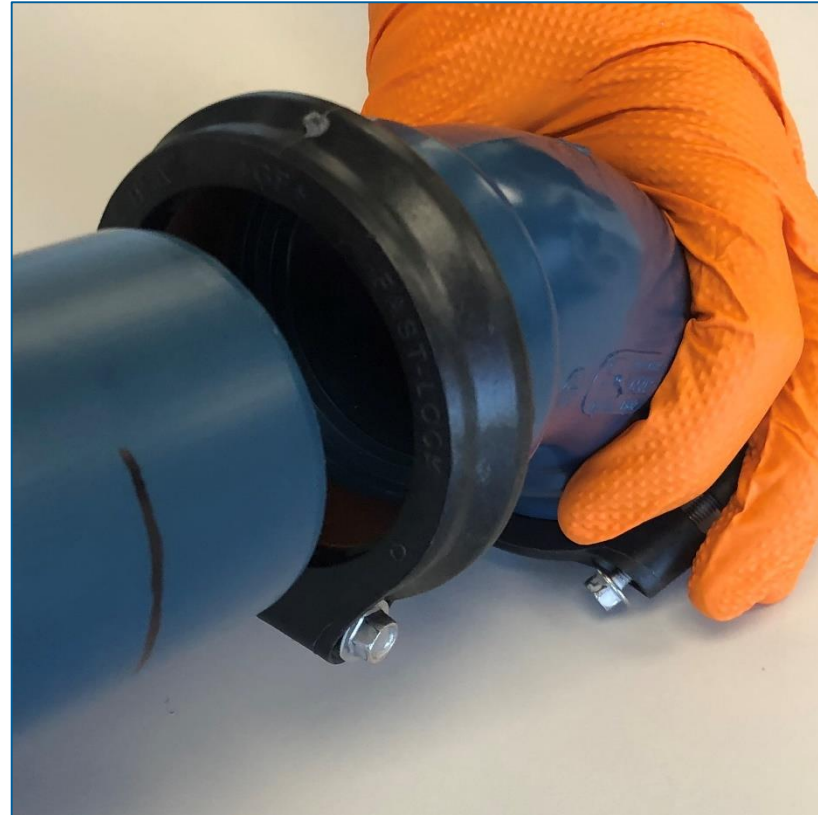
The bolt comes pre-set at the proper distance to allow proper insertion. However, if insertion is difficult, loosen bolt slightly until pipe can be inserted properly. If necessary, use spreader tool to provide clearance before inserting pipe.

To ease pipe insertion, keep pipe aligned with fitting and rotate pipe during insertion.

The pipe must be fully inserted to the pipe stop in the fitting socket.

Verify full insertion with socket depth witness mark.

1-1/2" & 2"



3" & 4"



Fast-Lock Pipe & Socket Assembly



8.

Tighten bolts until nibs touch (1-1/2" and 2"), or until collars touch (3" and 4").

Follow tightening procedure in section 8.1 for 3" and 4" joints.

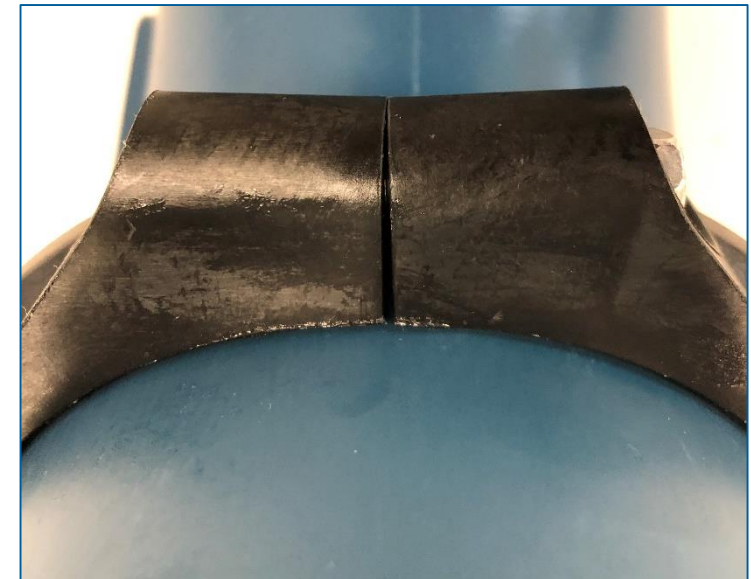
Do not overtighten!

Overtightening can cause damage to bolt threads and/or collar.

1-1/2" & 2"
Nibs Touch



3" & 4"
Collars Touch



Fast-Lock Pipe & Socket Assembly



8.1

For 3" and 4" installations with "split" halves, tighten bolts evenly until collars touch.

To accomplish even tightening, alternate between each side.

1. Tighten first side to the approximate halfway point, then...
2. Tighten alternate side to approximate halfway point.
3. Complete tightening original side until collars touch, then...
4. Tighten alternate side until collars touch.

Check to insure the collars are touching on both sides. Do not overtighten!



Fast-Lock MJ Kits



Fast-Lock Kits can be used in the following scenarios:

- As a replacement for a damaged Fast-Lock joint.
- As an alternative to a Fuseal Electrofusion joint.

The Fuseal Fast-Lock MJ system is interchangeable with Fuseal Electrofusion fittings. Simply remove the electrofusion collar and clamp, and install the Fast-Lock MJ Kit per the following instructions.



1-1/2" & 2" Fast-Lock MJ Kit



3" & 4" Fast-Lock MJ Kit



Fuseal Fast-Lock MJ Kit

Includes Fast-Lock MJ Collar, Bolt, & Gasket



Size (inch)	Part No.	Pack Qty
1 ½	375 160 001	10
2	375 160 002	10
3	375 160 003	10
4	375 160 004	10

Fast-Lock Kit Installation 1½"- 4"



1.

Clean inside of fitting socket thoroughly, and look for any damage on the sealing surface.

Insert gasket into socket as shown. Make sure the gasket lip is flush with the end of the socket.

2.

Lubricate inside of gasket using a silicon-based lubricant, such as Dow Corning Molykote 111.

Apply lubricant liberally to ease insertion of pipe into socket.



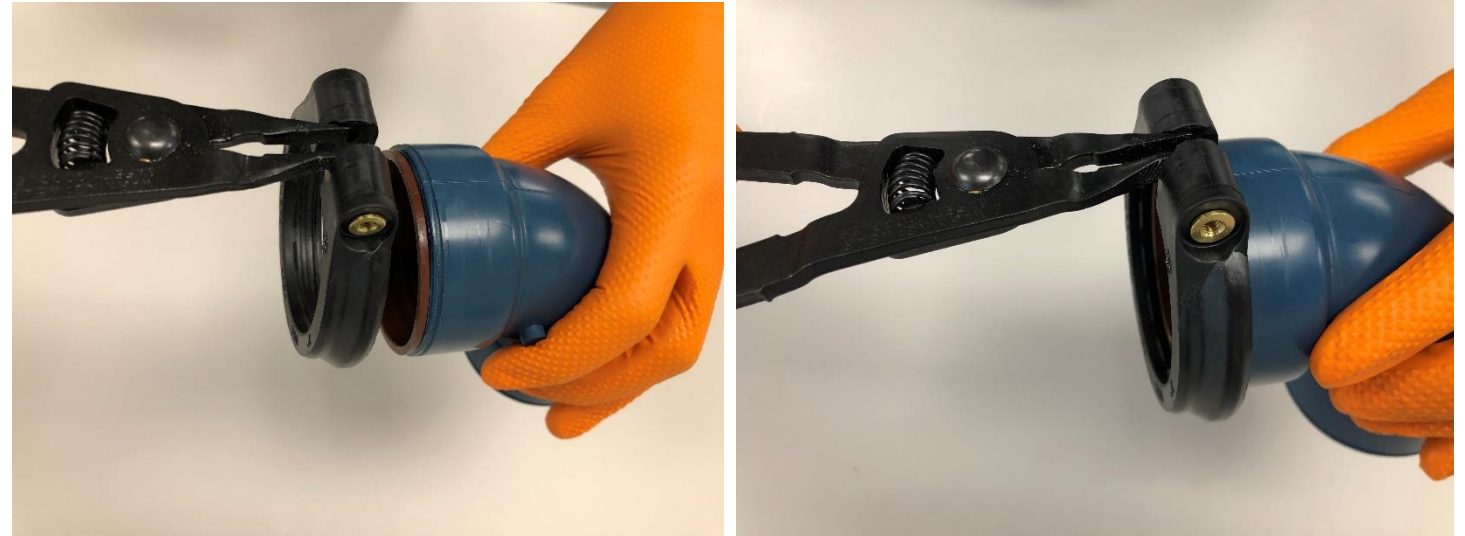
Fast-Lock Kit Installation 1½"- 2"



3.

Using spreader tool, open collar and slide onto end of fitting.

Insure that the rib on the inside of the collar is seated in the groove on the outer edge of the fitting.



4.

Install bolts by hand.

To avoid damaging the bolt threads, insure that the bolt and insert threads are aligned properly before tightening.



Fast-Lock Kit Installation 3"- 4"



5.

Slide first half of split collar onto fitting from side as shown.

Insure that the rib on the inside of the collar is seated in the groove on the outer edge of the fitting.



Fast-Lock Kit Installation 3"- 4"



6.

Slide second half of split collar onto fitting from side as shown.

Insure that the rib on the inside of the collar is seated in the groove on the outer edge of the fitting.



Fast-Lock Kit Installation 3"- 4"

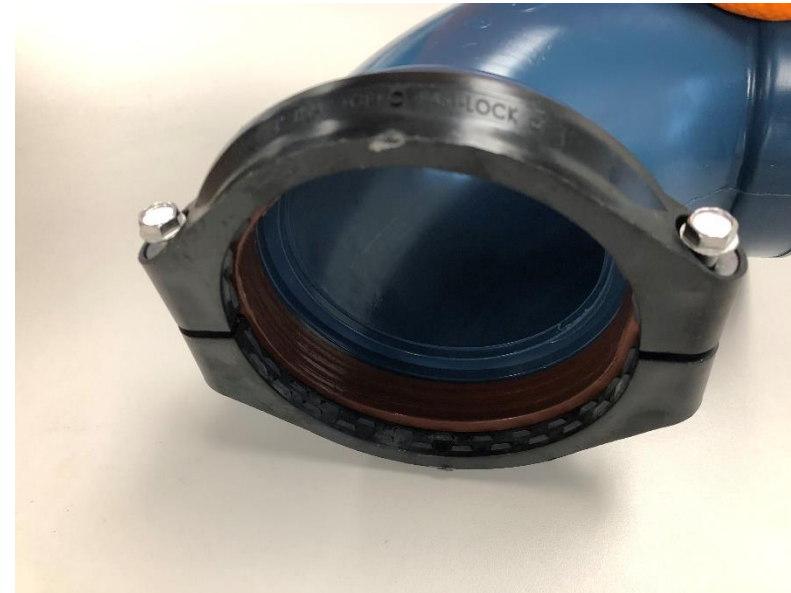
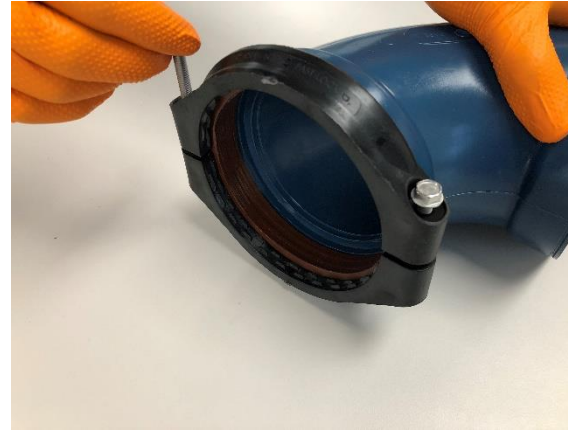


7.

Install bolts by hand.

To avoid damaging the bolt threads, insure that the bolt and insert threads are aligned properly before tightening.

Fast-Lock fitting socket is now ready for install.



9.

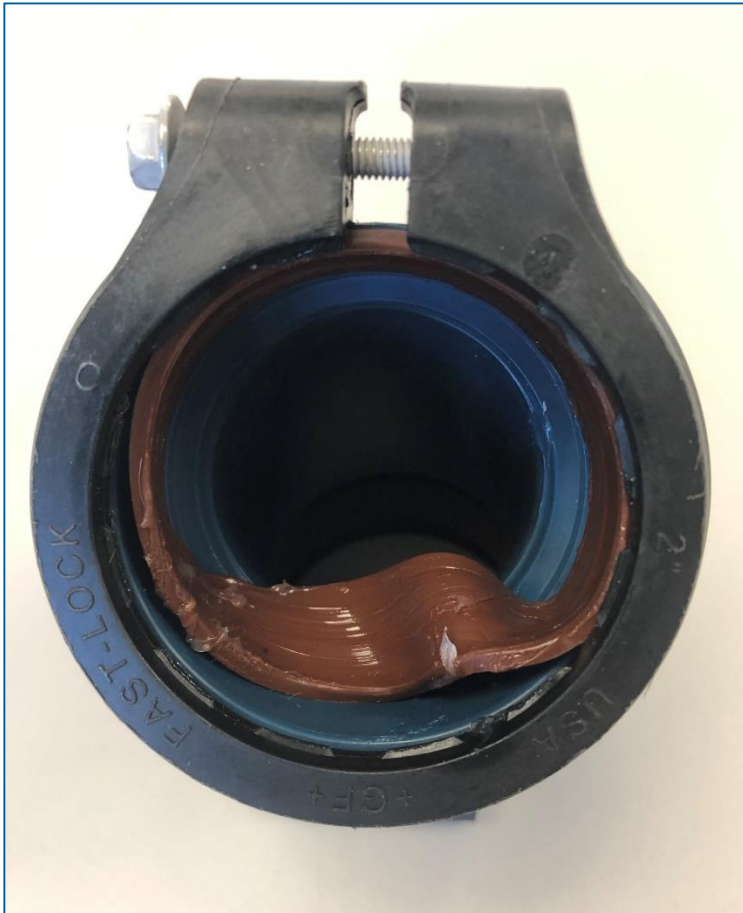
Testing the Fuseal Fast-Lock System

- Joints may be pressure tested immediately after completion of assembly. Test in accordance with local plumbing codes. All selections of the system can be tested with up to 30 feet head of water.
- It is a good plumbing practice to test a small section (20 fittings) of the Fast-Lock mechanical joining piping system first, to ensure proper installation procedures are being performed before continuing with the completion of the system.
- To repair a leaking joint, carefully disassemble the joint and check for damage to the collar, gasket, and/or pipe. If pipe is damaged, re-cut pipe and repeat steps 1 through 8. If the collar or gasket is damaged, carefully replace with a new Fast-Lock MJ Kit. Then repeat steps 2 through 8. If this does not fix the leak, it is recommended that the leaking fitting be removed and replaced.

Main risks of a system failure!



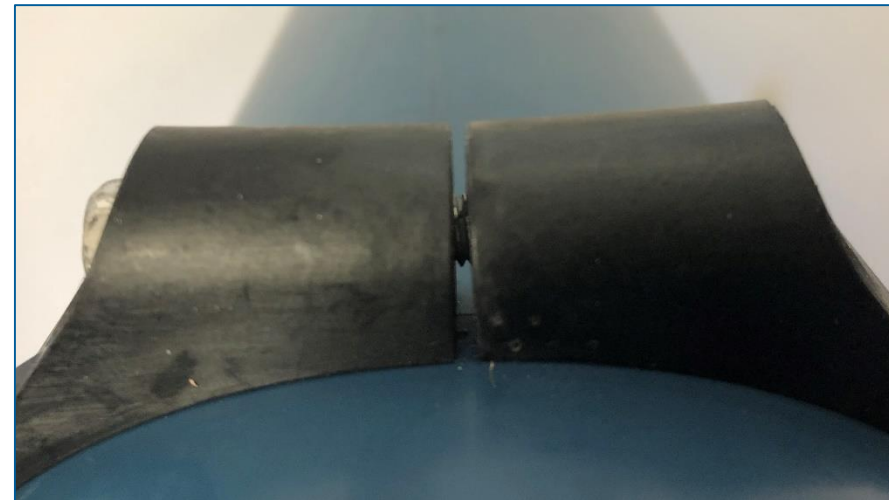
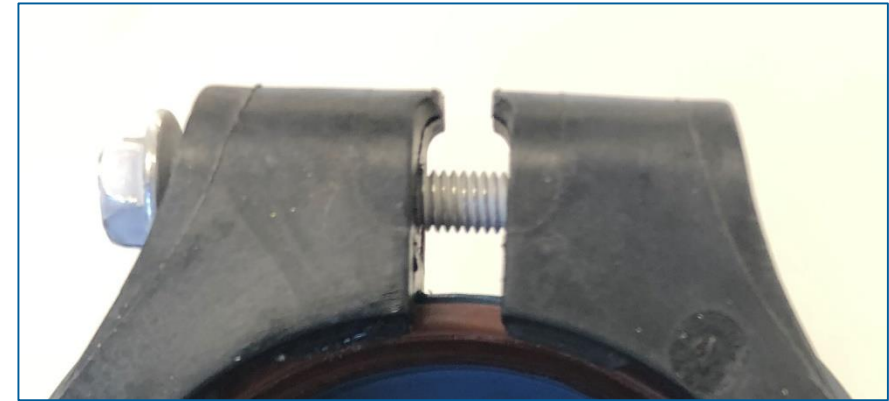
Sealing gasket not seated properly – Gasket pushed through!



Bolts Overtightened – Damage to collars and/or inserts and bolt threads!



Bolts Undertightened - Nibs or Collar Halves not touching!



Further Information



If you have any questions regarding the Fuseal System contact your **+GF+ Area Sales Manager**.

For further information about the fusion units, see the instruction manuals.

The machines need to be calibrated as noted on the service label on the machine.

For specific questions about the fusion units, contact our Machine Service Department.

Address for Machine Service and technical questions:

**Georg Fischer Piping, LLC.
Machine Service Department
9271 Jeronimo Rd
Irvine, CA 92618**

**Phone: (714) 368-4284
Fax: (714) 731-9056**

