

# BRAVO F-SERIES INSTALLATION INSTRUCTIONS

F-Series SingleWall Fiberglass Entry Fittings with test ports at the 9 and 6-o'clock positions  
FOR FRP SINGLEWALL SUMPS AND SIZE OVER SIZE FRP PIPE ONLY

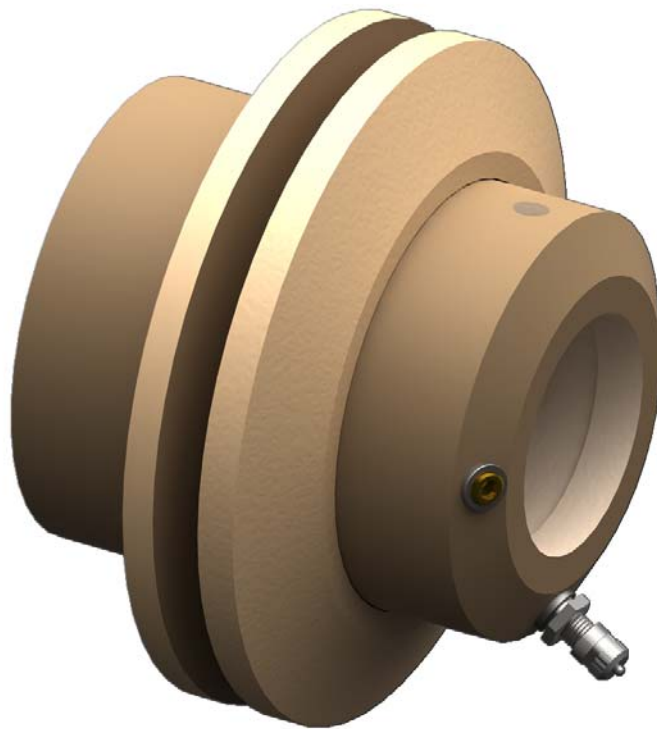
Models: F-32-TS-T-MP, F-43-TS-T-MP, F-64-TS-T-MP

For:

3" x 2" (F-32)

4" x 3" (F-43)

6" x 4" (F-64)



## READ THIS MANUAL FRONT TO BACK

ii-F-Series-TS-T-MP-15A



WWW.SBRAVO.COM  
800-AT-BRAVO



# MANDATORY

The F-Series SingleWall Fiberglass Penetration Fittings **MUST** be installed by a **Bravo Certified Contractor**.

Our convenient Training Program can be found at [www.sbravo.com/cert](http://www.sbravo.com/cert)

# IMPORTANT

**READ THESE INSTRUCTIONS - KEEP FOR FUTURE REFERENCE**

## TABLE OF CONTENTS

INCLUDED AND MANDATORY PARTS & TOOLS.....	p. 3
WARRANTY INFORMATION.....	p. 4
WINTER WARNING & GUIDELINES.....	p. 5
INSTALLATION SUMMARY.....	p. 6
A) Preparing the fitting and fiberglass sall.....	p. 7
B) Bonding entry fitting to sump wall.....	p. 8-9
C) Primary pipe Installation & testing.....	p. 10-13
D) Installation of secondary pipe.....	p. 13-14
E) Epoxy Injection to primary pipe.....	p. 14-15
F) Secondary pipe testing.....	p. 16
G) Secondary test ports.....	p. 16

*- Closely adhere to all directions and warnings indicated on the product or contained in these instructions.*

*- Warranty is void if there is any evidence of modification, abuse, negligence or improper installation.*

**If you have any problems with Bravo Systems components, SingleWall Containment Systems, or accessories, Call Bravo Systems Immediately:**

**1-800-28-BRAVO**

**1-323-888-4133**

**info@sbravo.com**

SAFETY FIRST! S. Bravo Systems, Inc. urges you to adhere to the normal safety procedures and precautions followed by your company. Please follow the mandates and compliances decreed by OSHA, local, State and federal regulations regarding the use of this product.

### WARRANTY

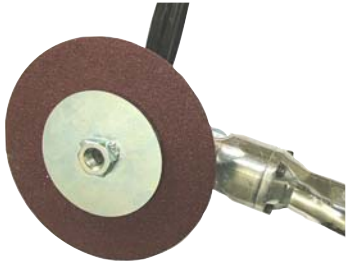
All containment systems sold by S. Bravo Systems, Inc. are warranted to be free from defects in material and workmanship for a period of one year from date of purchase. This warranty will be limited to the repair and replacement of Bravo parts only and will exclude all claims for labor or consequential damage. No other express warranties given and no affirmation of S. Bravo Systems, Inc., or its agents and/or representatives, by words or action, will constitute a warranty. IT IS EXPRESSLY AGREED THAT THIS WARRANTY WILL BE IN LIEU OF ALL WARRANTIES OF FITNESS AND IN LIEU OF THE WARRANTY OF MERCHANTABILITY.

This warranty is void if there is any evidence of modification, abuse, negligence, or improper installation. If any fittings or components, other than S. Bravo Systems approved fittings or components, are used in conjunction with any S. Bravo Systems product, the warranty pertaining to these products is immediately void.

# F-Series COMPONENTS

## INCLUDED

for F-32-TS - "T-FS-CLAMP-F3"  
for F-43-TS - "T-FS-CLAMP-F4"  
for F-64-TS - "T-FS-CLAMP-F6"



## RECOMMENDED

F-32-TS - "T-FS-SAND-F3"  
F-43-TS - "T-FS-SAND-F4"  
F-64-TS - **Must use grinder**  
Part numbers include sanding discs.  
Sanding Gun Sold separately

## REQUIRED TOOLS

(NOT PROVIDED)

Centralized hole saws,  
4-1/2", 5-1/2" & 8" diameters.

Air Sander w/ 5/8" Arbor

**Approved Epoxys:**

**Bravo Epoxy (Recommended)\***

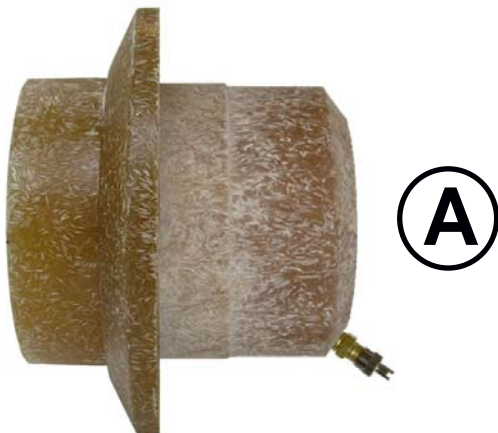
NOV Smith

Ameron PSX-20

\* **Bravo Epoxy is NOT to be used for primary pipe endpoints or connectors. Only bonding the fitting to the sump wall, the secondary joint within the F-Series fitting, and injection around the exterior of primary or secondary lines.**

## Included Parts (Per fitting)

- A) 1x Fiberglass F-Series body (MP = multi-port)
- B) 1x Loose fiberglass flange
- C) 1x Plastic syringe
- D) 2x 1.5 ounce bag of fiberglass filler for epoxy (For thickening NOV epoxy only)
- E) 2 x Pair of Industrial nitrile gloves (Large) (not shown)
- F) 1x Sheet of 60 grit sand paper (not shown)
- G) 1x Schrader test valve
- H) 1x Brass hex plug (not shown)
- I) 1x Installation tri-pod clamp of appropriate size





# WARNING



## WARRANTY IS VOID:

IF ANY OF THE FOLLOWING OCCUR

- A) Epoxy that is not Bravo-Approved is used to install the F-Series fittings.
- B) The F-Series fittings are cut, drilled, tapped or otherwise modified in any way.
- C) F-Series Fiberglass Fittings are **NOT** installed by a **Bravo Certified Contractor**.
- D) The F-Series Fittings are applied to Fiberglass Sumps that are not **Third Party Approved**.

If there is any indication or suspicion of damage to F-Series fittings or their packaging, mark the freight paperwork "*Suspect Freight Damage*" and return to the factory.

## ⚠ CRITICAL

**Bravo Epoxy is NOT to be used for primary or secondary pipe endpoints or connectors. Only bonding the fitting to the sump wall, the secondary joint within the F-Series fitting, and injection around the exterior of primary or secondary lines.**

**ALL SUMPS AND BRAVO SYSTEMS FIBERGLASS F-SERIES FITTINGS MUST BE KEPT FREE OF CONTAMINANTS, ESPECIALLY DIRT AND WATER / MOISTURE.**

**APPLY MEASURES TO KEEP THE INSTALLED FITTINGS DRY WHEN LEFT OVERNIGHT ON-SITE.**

# CAUTION

## WINTER WARNING

**FOR COLD WEATHER AT 50°F DEGREES OR LESS:  
OBSERVE AND FOLLOW THE WARNINGS BELOW**

BRAVO SYSTEMS FF-SERIES FLANGE FITTINGS AND F-SERIES FITTINGS ARE THICKER THAN THE TYPICAL FIBERGLASS CLAMSHELLS COMMONLY INSTALLED IN FIBERGLASS PIPING APPLICATIONS. YOU MUST APPLY ADEQUATE HEAT TO THE PARTS AND BONDING EPOXYS TO ALLOW A FULL CURE TIME DURING EXTREME COLD TEMPERATURES. FAILING TO ALLOW THE INSTALLATION TO FULLY CURE MAY CAUSE THE EPOXY BOND TO THE FITTING TO FAIL.

**▲ CRITICAL JUST BEFORE EACH EPOXY APPLICATION  
DRY FIT YOUR COMPONENTS ONE LAST TIME**

- 1) PRE-HEAT THE SUMP TO NO MORE THAN 150°F TO ELIMINATE MOISTURE.
- 2) PRE-HEATING COMPONENTS IN EXTREME COLD WEATHER IS CRITICAL:
  - > PRE-HEAT THE FIBERGLASS FITTING THOROUGHLY TO ~100°F
  - > PRE-HEAT THE EPOXY TO ~80°F. DO NOT HEAT CATALYST!!
- 3) DO NOT ASSUME THE EPOXY IS CURED BECAUSE IT HAS HARDENED ON THE EXTERIOR. IT MAY ONLY BE A CURED “CRUST” IN THIS TEMPERATURE AND ANY MOVEMENT OR WATER TESTING MAY CAUSE DELAMINATION AND TOTAL FAILURE OF THE BOND.
- 4) DO NOT ADJUST, MOVE, SHIFT OR OTHERWISE DISTURB THE SUMP, FITTINGS OR PIPING DURING THE CURING PROCESS.
- 5) **▲ CRITICAL** YOU MUST ENSURE A FULL CURE BEFORE WATER TESTING. FOLLOW YOUR EPOXY INSTRUCTIONS FOR TEMPERATURE GUIDELINES.

# Summary of Installation

These critical steps are not a substitute for the detailed installation steps contained in the following pages.

**DO NOT ATTEMPT TO INSTALL F-SERIES FITTINGS BASED solely ON STEPS SHOWN ON THIS PAGE**

**During the course of your F-Series Installation, you will, in order:**

- A) Determine exact location of penetrations.**
- B) Install fittings to a fiberglass sump wall & allow a full cure.**
- C) Dry-fit all piping, determining area to rough up on primary pipe.**
- D) Seal primary lines to close the system and test lines.**
- E) Seal secondary lines to close the system. NO TESTING YET!**
- F) After primary test passes, seal primary to fitting via epoxy Injection.**
- G) After epoxy injection cures, install schrader test valve and brass plug into face of F-Series fitting.**
- H) Test secondary lines (last).**

**⚠ CRITICAL**

**Bravo Epoxy is NOT to be used for primary or secondary pipe endpoints or connectors. Only bonding the fitting to the sump wall, the secondary joint within the F-Series fitting, and injection around the exterior of primary or secondary lines.**

**ALL SUMPS AND BRAVO SYSTEMS FIBERGLASS F-SERIES FITTINGS MUST BE KEPT FREE OF CONTAMINANTS, ESPECIALLY DIRT AND WATER / MOISTURE.**

**APPLY MEASURES TO KEEP THE INSTALLED FITTINGS DRY WHEN LEFT OVERNIGHT ON-SITE.**

# A) Preparing the Fitting & FRP wall

**A.1)** Prepare your fittings by identifying the parts. Clean the surfaces of all fittings with trichloroethylene or acetone to remove any contamination. Hand sand with 60-grit sandpaper if necessary. Do not lay them on dirt, water, debris or other contaminated surfaces. When dusting off, use a shop brush, chip brush or compressed air. **Do not use rags, cloth or cloth-like material**

**IMPORTANT**

**DRY-FIT YOUR FITTINGS TO BE SURE THAT THEY ALIGN PROPERLY WITH THE FALL YOUR VAPOR LINES WILL NEED.**

**⚠ CRITICAL**

**DO NOT PLAN HOLE SAW CUTS ON UNEVEN SURFACES OR ON LAMINATION SEAMS  
FLAT PANELS ONLY.**

**IMPORTANT**

**YOU CAN NOT BOND FLAT-WALL FITTINGS ON ROUND-WALL SUMPS**

**A.2)** Dust off Sump walls (inside and out) and **drill your pilot holes** centered on the planned fitting locations using a 1/4" Drill bit. Proceed when done to cut your holes with appropriate size hole saw with 1/4" centralizer. **See the table of fittings and hole saw sizes below.** Hand-sand the rough edges inside and outside made by the hole saw and use the Bravo Sanding Kit (Step A.3) or air powered grinder to rough up the surfaces the fittings will be bonded to. For other brand sumps you must remove any and all paint or gel-coat (Bravo sumps do not have either).

For curved sump walls, you must use an air grinder to prepare the bonding surfaces as consistently as possible.

**DO NOT OVERGRIND!!  
MAINTAIN A MINIMUM WALL THICKNESS OF 1/8" INCH**

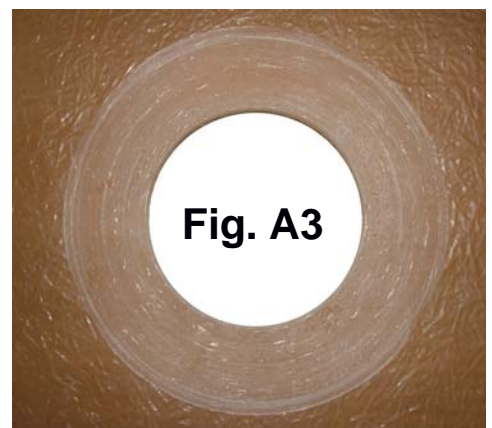
## **HOLE SAW SIZE CHART**

**4-1/2"** for F-32-TS-T-MP / F-22-LS-T-MP

**5-1/2"** for F-43-TS-T-MP / F-33-LS-T-MP

**8"** for F-64-TS-T-MP

**A.3)** The Sanding kit is recommended (**Page 3, sanding gun sold separately**) with an air powered source to lightly abrade each hole until the surfaces are flat and even (**Fig. A3**).



## B) Bonding fitting to sump wall

**B.1)** Your primary pipe, secondary pipe, and F-Series fittings should be clean and **COMPLETELY DRY AT ALL TIMES**. All pre-abraded or milled areas should be inspected for debris and inconsistencies. No dirt, grit, water or other foreign material should be on or inside the fiberglass fitting components.

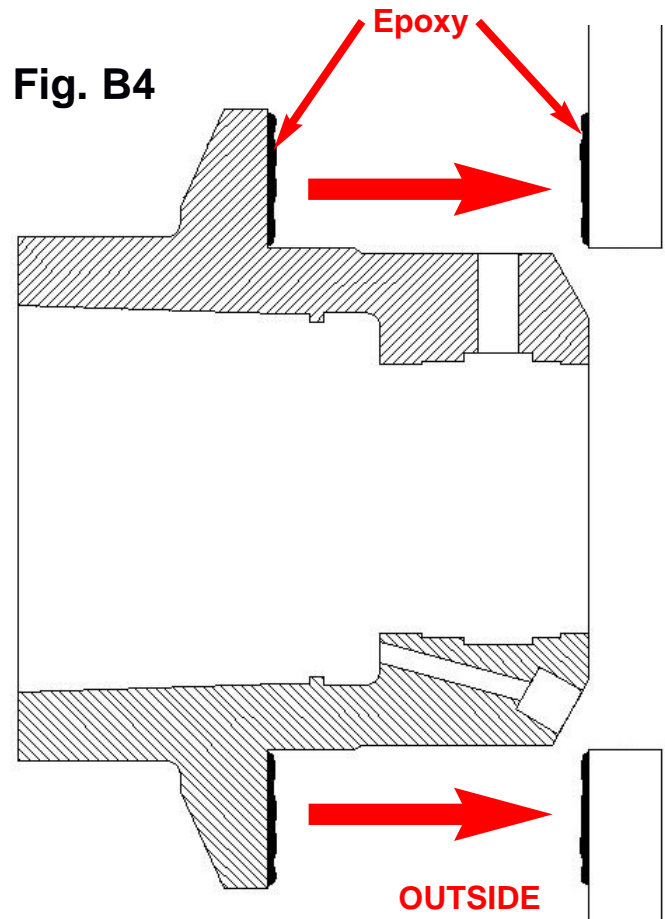
**B.2)** Get an F-Series clamp ready for each fitting.

**B.3)** If using Bravo EPOXY-EPOXY-KIT, mix the smaller catalyst container into larger can until creamy and a consistent bright yellow. Follow manufacturer's directions otherwise. One bag of the provided milled FRP filler is to be fully mixed with each NOV Smith epoxy kit before bonding or injection.



**DO NOT ATTEMPT TO MIX MORE THAN ONE KIT AT A TIME.**

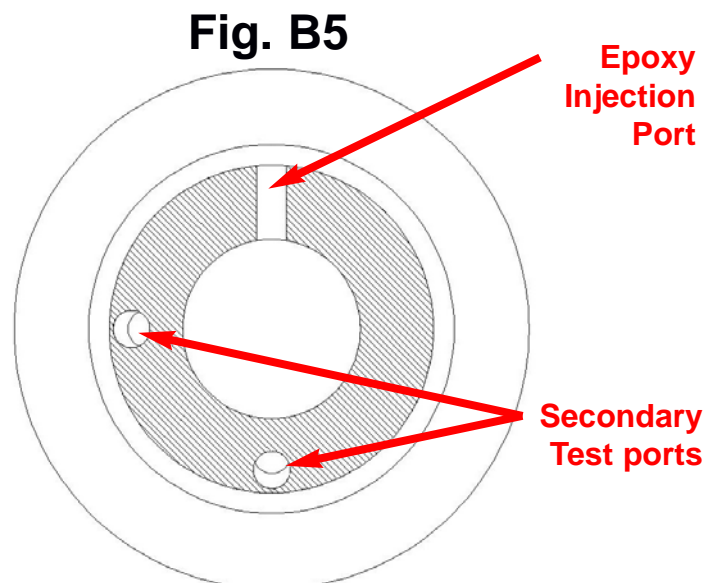
**B.4)** Main body first - Apply a generous amount of epoxy to the wall and the face of the integrated flange that will contact the wall (**Fig. B4**).



**B.5)** The main fitting body should be installed from the outside so that it protrudes into the sump interior. Orientation is critical for installation and regulatory reasons. Rotate the fitting until the injection port is at the top, and the two secondary test ports are at the 9 'o'clock and 6 'o'clock positions. (**Fig. B5**)

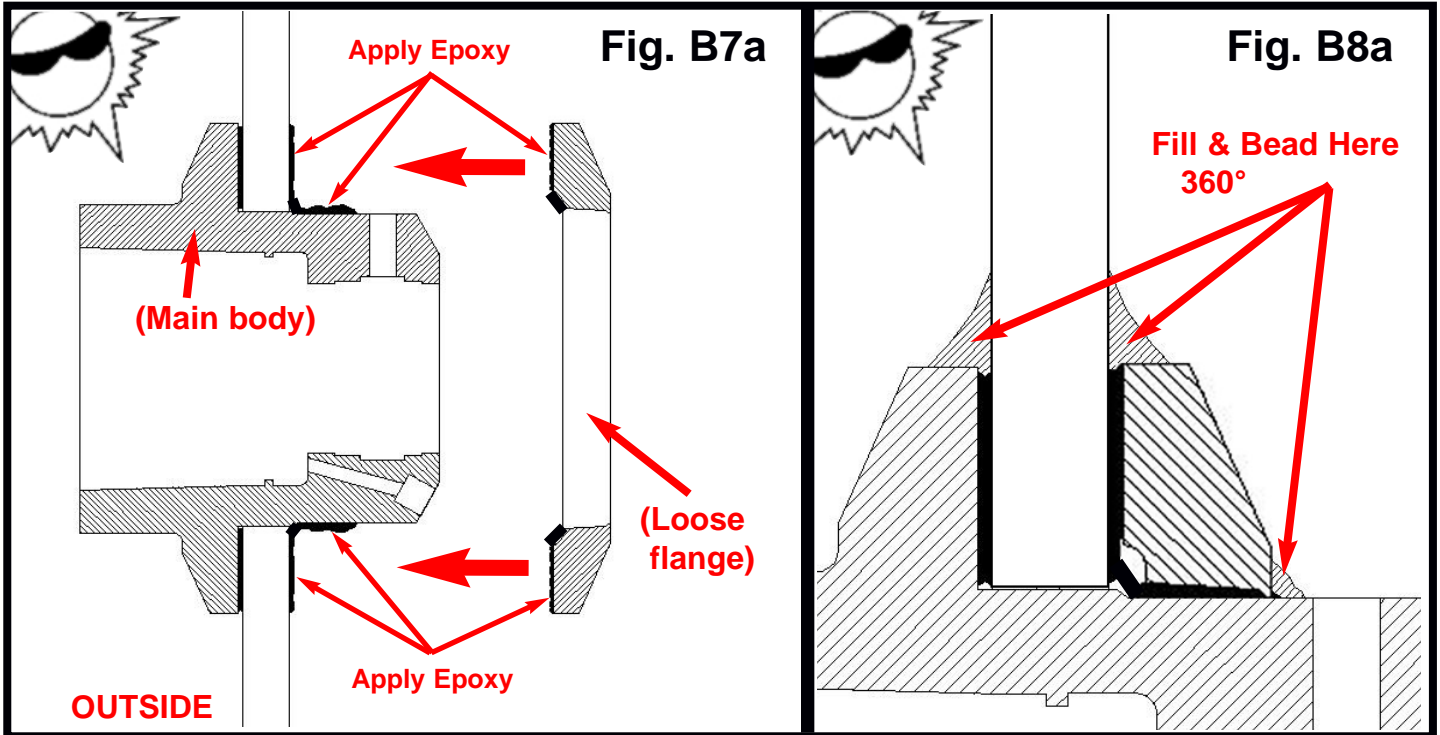
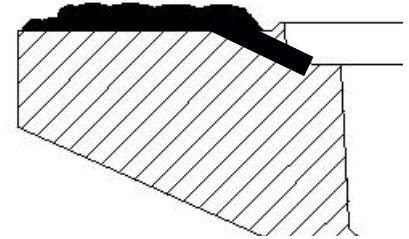


The Epoxy Injection Port on the fitting body must be at the **top or 12 'o'clock position**. (**Fig. B5**)





**B.6)** Apply epoxy to the contact faces of the loose flange.



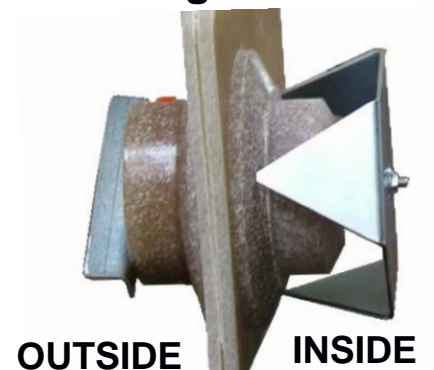
**B.7)** On the interior, apply epoxy to the fitting body where it meets the wall, approximately 3/4" out, 360° around. Remove the label that is affixed over the injection port (**Fig. B7b**) and lightly sand the area where the label was applied. After applying epoxy to all contact areas (**Fig. B7a**) Install the loose flange over the fitting to the wall as shown. This step may drag epoxy on the flange across the body and over the injection port. If it does, make sure to clean this area and keep the injection port clear.

**Fig. B7b**



**B.8)** Press the parts together firmly and bead excess epoxy around with a gloved finger. Then apply the Bravo Tripod Clamp as shown in **Fig. B8b**. The tripod feet should each be centered on the loose flange on the sump interior. Tighten well but not until it cannot tighten any more. When you tighten, the body may want to rotate so make sure to maintain correct orientation. After tightening it, more epoxy will ooze from the flanges. Bead epoxy around the three joints shown in **Fig. B8a**.

**Fig. B8b**



**B.9)** Allow for a full undisturbed cure time. Cure times vary based on ambient temperature and other factors. Refer to your epoxy manufacturer's instructions.

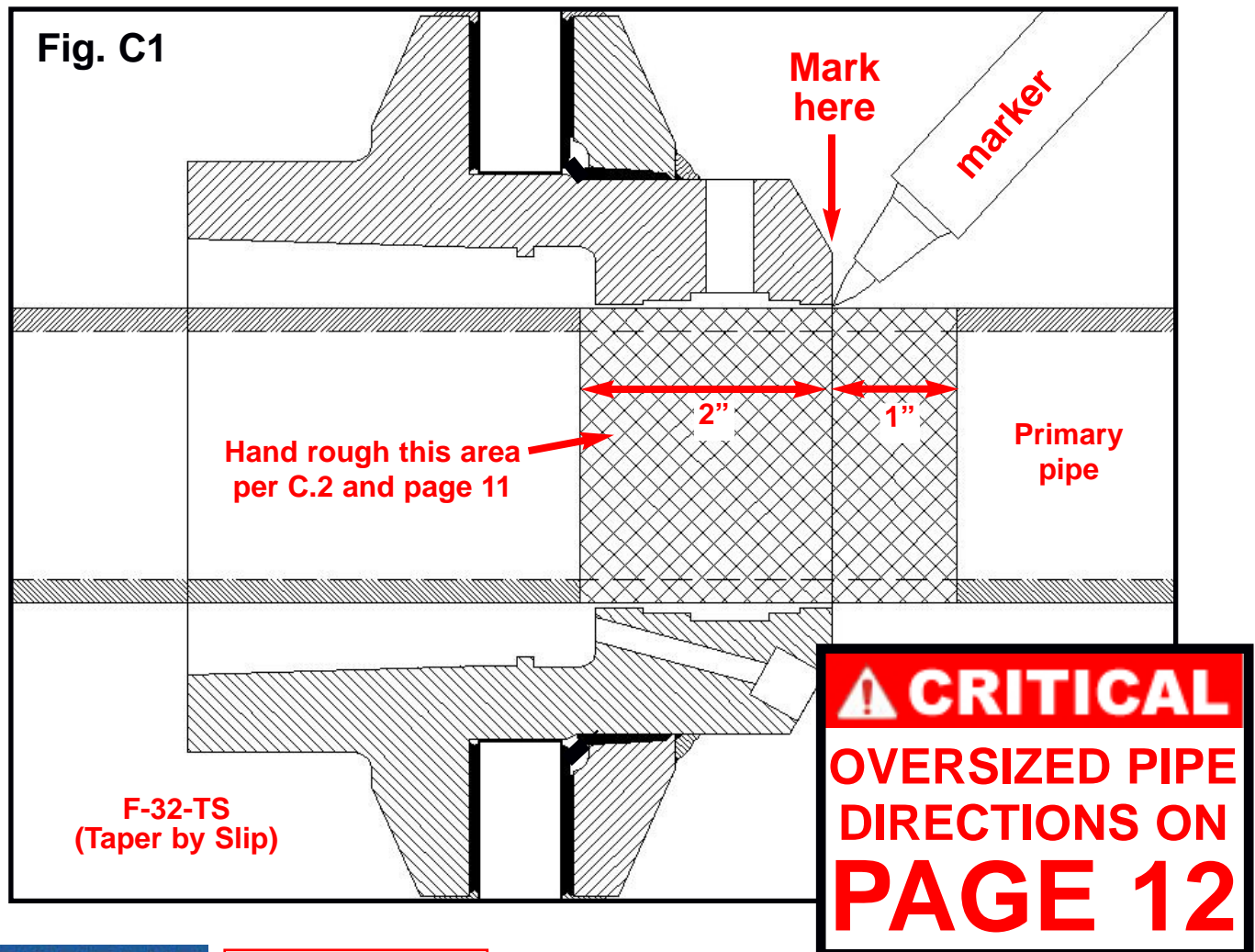
**B.10) TESTING,** you can not test the F-Series fittings until the primary pipe has been installed, sealed by epoxy injection and cured.

**DO NOT UNDER ANY CIRCUMSTANCES, DRILL, CUT OR TAP ANYWHERE ON THE F-SERIES FITTING**

## **C) Primary Pipe Installation & Testing**

Your primary pipe, secondary pipe, and Bravo FRP rigid penetration fittings should be inspected for damage and contamination. No dirt, grit, water or other foreign material should be on or inside the fiberglass fitting components. **YOUR SUMPS AND FITTINGS SHOULD BE COMPLETELY DRY!** Your primary and secondary endpoints should be measured and tapered / prepped.

**C.1)** Dry fit your primary pipe and mark a line on the pipe (**Fig. C1**) where it meets the edge of the F-Series fitting on the interior of the sump.



**IMPORTANT** NO EPOXY YET !

**C.2)** From your mark line, you must hand sand the primary fiberglass pipe **One Inch (1")** towards the interior, and **Two Inches (2")** towards the fitting body or sump exterior. **Fig. C1.**

**REFERENCING PAGE 11, HAND SAND THIS AREA WITH 60 GRIT. NO POWER TOOLS!**

Bravo provides an emery strip to quickly and effectively rough and de-gloss the FRP pipe.

# ROUGHING-UP YOUR PRIMARY PIPE WITH SAND STRIP



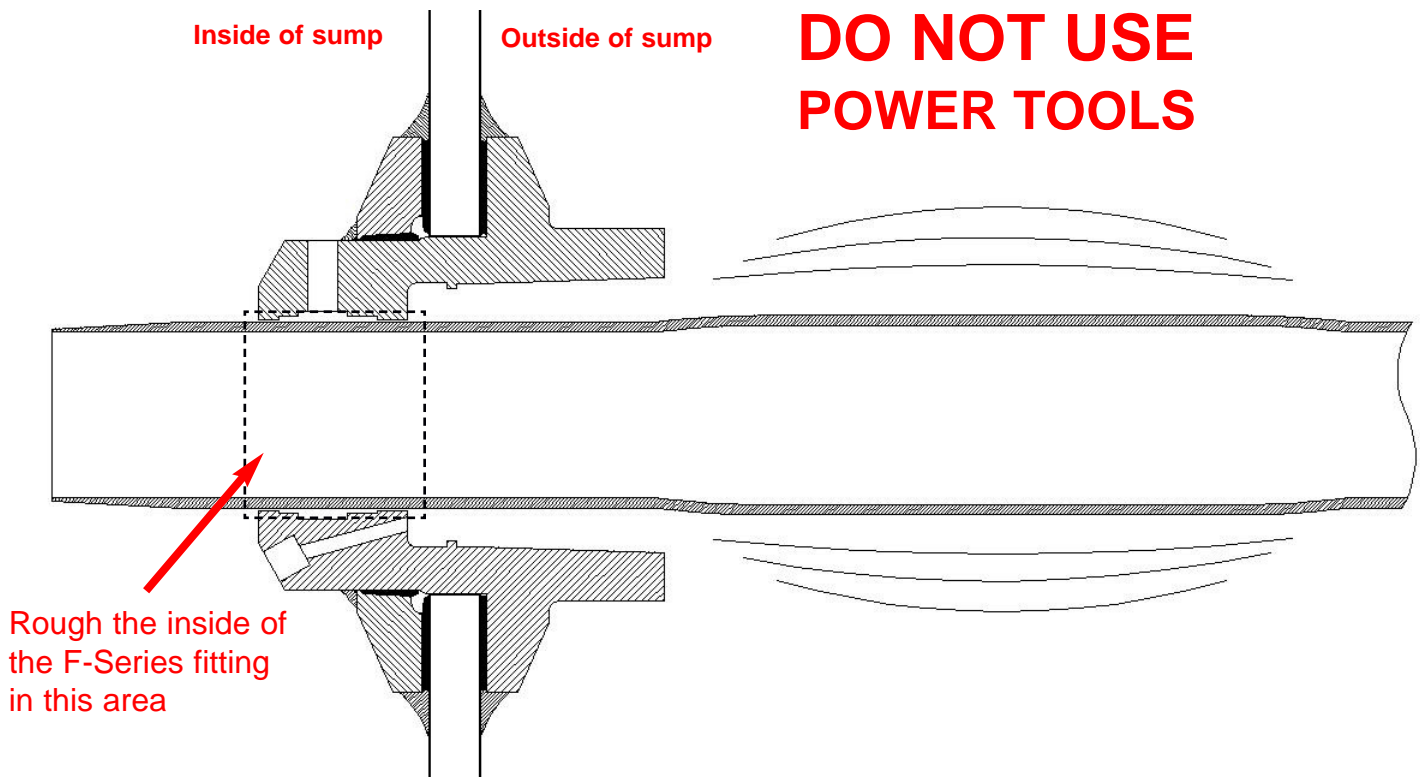
**Your pipe must be hand roughed in preparation for the Epoxy Injection step.**

**The “gloss” or sheen should be mostly removed.**

**Do not sand pipe until the entire area is open fiberglass or use any power tools.**

# OVERSIZED PIPE

Fiberglass pipe has natural Outer Diameter inconsistencies due to manufacturing techniques. The F-Series line of Fittings are engineered to be compatible with NOV RedThreadII and Dualloy brand fiberglass piping ONLY. If the pipe is manufactured by another company, contact Bravo Support.



If your Primary Fiberglass pipe does not cleanly enter the Bravo F-Series fitting, do the following:

**A)** Twist the pipe as you insert it. If it seems to become stuck, do not attempt to use force, remove it immediately and carefully and try **Step B**.

**B)** **LIGHTLY** sand the outside of your primary pipe where it must enter the fitting. (See Page 11) If your pipe still has trouble fitting into the F-Series Fitting, try **Step C**.

**C)** **LIGHTLY** and **BRIEFLY** sand (3 seconds) the interior of the F-Series Slip joint 360° around and try again. If you do this, you must then blow out the fitting with **DRY**, compressed air so that no fiberglass dust or sandpaper grit is present. Start again with **Step A** and repeat subsequent steps as necessary.

**▲ CRITICAL**

**▲ CAUTION**

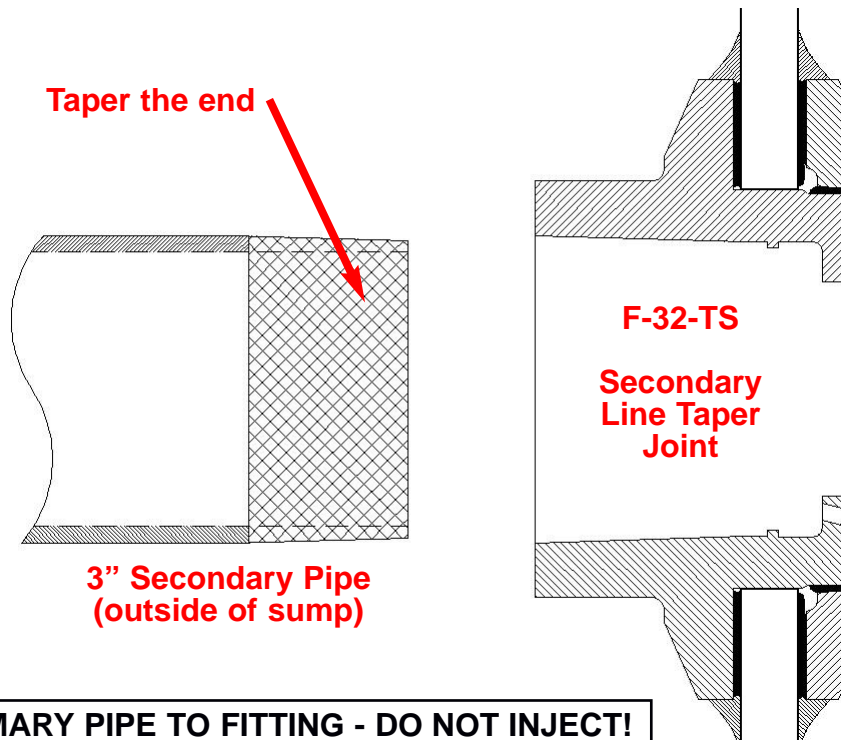
**DO NOT OVERSAND THE PIPE! Follow the pipe manufacturers instructions for pipe diameters and sanding allowances.**

# ⚠ CRITICAL

Bravo Epoxy is NOT to be used for primary or secondary pipe endpoints or connectors. Only bonding the fitting to the sump wall, the secondary joint within the F-Series fitting, and injection around the exterior of primary or secondary lines.

**STEP C.3)** Fully install and seal the primary system. All secondary piping should be in place over the primary lines with endpoints scarfed / tapered and ready to seal, pending successful primary testing. Ensure that the tapered ends and scarfed areas of your secondary pipe are clean of debris and any contaminants.

**STEP C.4)** After a full cure time that is appropriate for the ambient temperature, pressure test your primary piping system per mfg. guidelines and/or local regulations.



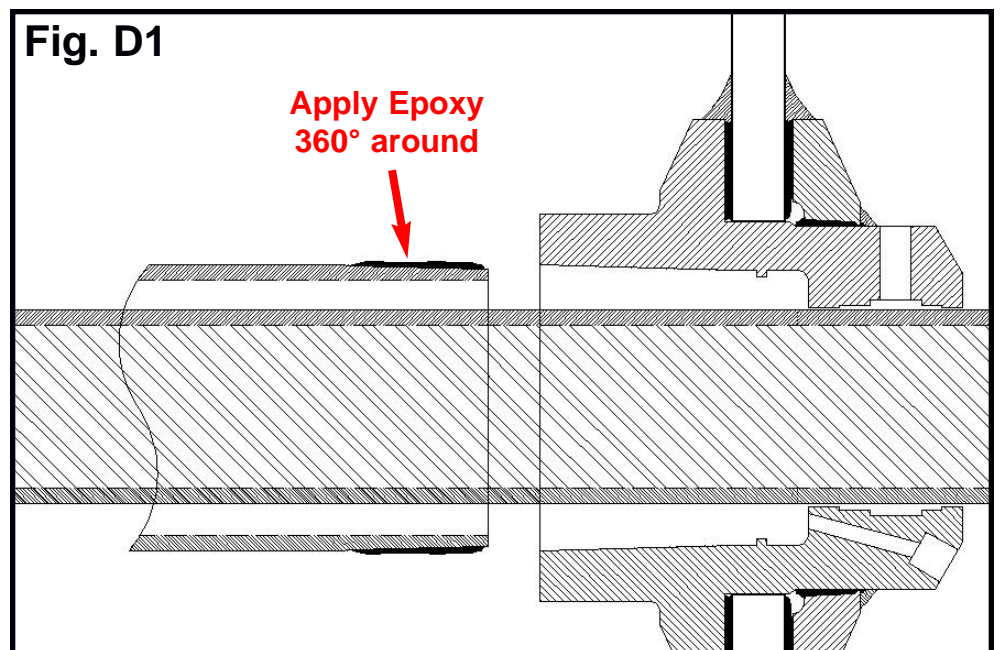
# ⚠ CRITICAL

**DO NOT GLUE PRIMARY PIPE TO FITTING - DO NOT INJECT!**

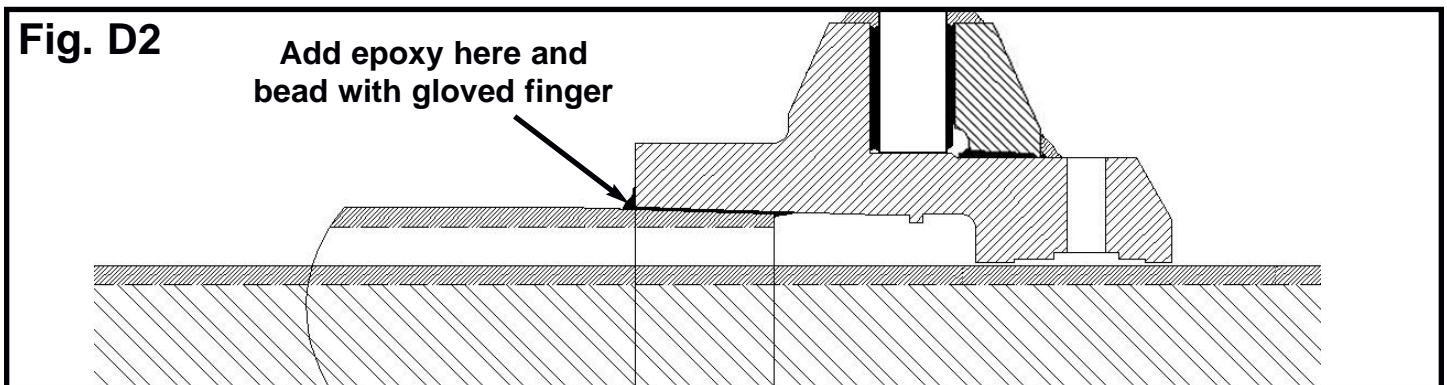
## D) Installation of Secondary Pipe

Your Primary should be installed, sealed and have passed the line testing at this time. **YOUR SUMPS AND FITTINGS MUST BE COMPLETELY DRY!** No dirt, grit, water or other foreign material should be on or inside the fiberglass fitting components. Abrade and clean as necessary.

**D.1)** Apply epoxy to the taper joint on the secondary pipe end and seat it into the back of the tapered joint of the F-Series fitting. Giving it about a 1/4 turn will help it lock in place. **(Fig. D1)**



**STEP D.2)** The epoxy should seep out, add more epoxy to this area all the way around, and run a smooth bead with a gloved finger. Let cure. (Fig. D2)



**YOUR SECONDARY IS STILL NOT COMPLETELY SEALED.  
DO NOT TEST YOUR SECONDARY YET.**

## E) Epoxy Injection to lock Primary Pipe

All primary and secondary piping should be installed with the primary lines having passed all required testing. The secondary lines should also be completely installed. After this injection step to lock the primary pipe to the F-Series fitting and a full cure time, secondary line testing can begin. A syringe should be loaded by placing the tip into the epoxy can and drawing the epoxy in. **There can be no air pockets in the epoxy-loaded syringe.** After loading, proceed to inject each entry fitting from the top port at 12 o'clock. Adhesive will ooze the most at the top seam as shown but this is normal.

**IMPORTANT**

**LOAD YOUR SYRINGE BY PLACING THE TIP IN THE CAN OF MIXED EPOXY AND DRAWING IT UP.**



**DO NOT  
COMPLETELY  
FILL SYRINGE**

**EPOXY INJECTION CHART**

- 2" Primary - 30 ml Epoxy**
- 3" Primary - 45 ml Epoxy**
- 4" Primary - 60 ml Epoxy**

**STEP E.1)** Referencing the epoxy injection chart on **page 14**, load the correct amount of epoxy into the syringes and proceed to inject them all.

**Note that the fitting will likely fail and or not pass it's secondary testing if you inject any air into the epoxy injection channel.**

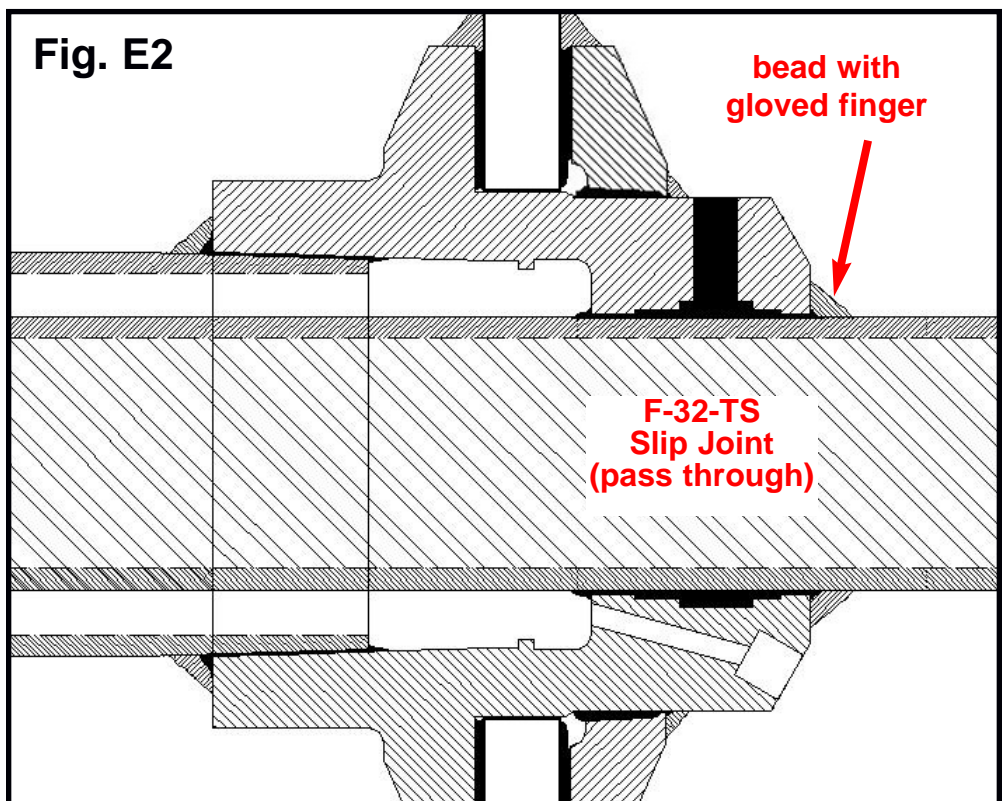
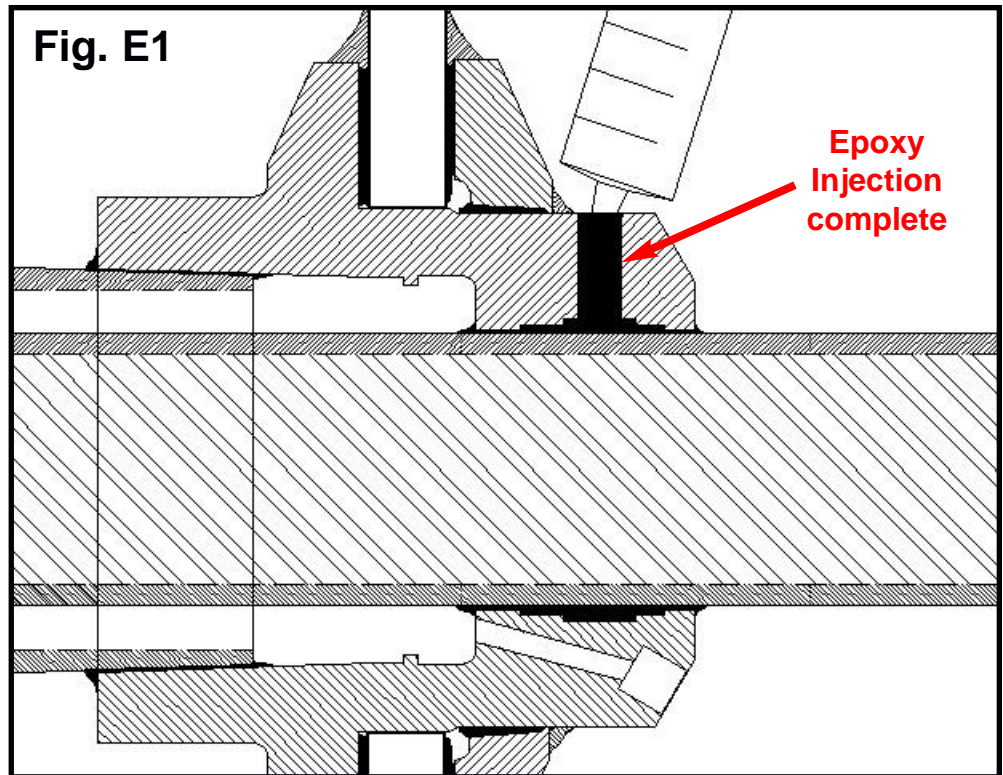
**DO NOT ATTEMPT TO THIN OUT THE EPOXY!**

If NOV Smith epoxy is used, it must be thickened with one bag of provided milled fiber each. If it is too runny, it will slowly leak from the lower pipe seam, especially in warmer weather. For this reason Bravo's Standard Epoxy is recommended.

**E.2)** Bead the excess epoxy that oozes out around the pipe joint at the face of the fitting 360° around with a gloved finger. **(Fig E2)**

Then inspect every entry fitting to make sure they are injected, and epoxy is beaded at all cricial pipe seams.

Plan for and allow a full and complete cure time for this process. Consult cure time charts provided by your epoxy manufacturer.



**⚠ CRITICAL DO NOT TEST WHILE EPOXY IS WET!**

**IMPORTANT**

For the Maximum Test Pressure, consult your pipe manufacturers Instructions and/or Testing guidelines.

## **F) Secondary Pipe Testing**

After the full cure time, test your secondary pipe per manufacturer guidelines and/or local, state, or federal codes and/or regulations.

If you have any problems with Bravo Systems components, SingleWall Containment Systems, or accessories, Call Bravo Systems Immediately:  
1-800-28-BRAVO      1-323-888-4133      support@sbravo.com

**DO NOT UNDER ANY CIRCUMSTANCES, DRILL, CUT OR TAP ANYWHERE ON THE F-SERIES FITTING**

## **G) INSTALLING SECONDARY TEST PORTS**

Once your fittings have fully cured, generously apply UL Approved thread paste or Vulkem (Recommended) and **CAREFULLY** thread in your Schrader valve and hex plug by hand.

**DO NOT USE TEFLON TAPE.**

**DO NOT EXCEED 10 Ft-lbs.**

**DO NOT OVERTORQUE THESE COMPONENTS OR THREAD THEM ALL THE WAY HOME.**

**DO NOT PLUG THE INTERIOR WITH EXCESSIVE THREAD PASTE.**

