BRAVO F-SERIES INSTALLATION INSTRUCTIONS
F-33-LS, F-33-LS-T, F-22-LS, F-22-LS-T

AMERON LCX
BRAVO F-SERIES FOR RIGID SINGLE WALL SUMPS
AMERON FIBERGLASS LCX COAXIAL PIPE ONLY

READ THIS MANUAL FRONT TO BACK

F-XX-LS MODELS MUST NOT BE INSTALLED ON ANY MANUFACTURERS DOUBLE WALL FIBERGLASS SUMPS. DO NOT INSTALL ON ROUND OR POLYETHYLENE SUMPS.
MANDATORY

The F-Series SingleWall Fiberglass Penetration Fittings for Ameron LCX Coaxial pipe MUST be installed by a Bravo Certified Contractor.
Details can be found at 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
A) Preparing the Fitting and Fiberglass Wall......................p. 5
B) Factory Gluing Recommendation.................................p. 6-7
C) Gluing Alternative to Recommendation.......................... p. 8-9
D) LCX Pipe Prep, Gluing & Testing Primary.....................p. 10, 13
  Scarfing Primary Pipe with Sand Strip........................p. 11
  Jacket Cutter Instructions........................................ p. 12
E) Testing your F-Series Install on a SingleWall Sump.........p. 13
G) Secondary Interstice Air Valve & common practices...........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

MANDATORY
for F-22-LS - ‘CLAMP-F3’
for F-33-LS - ‘CLAMP-F4’
(Per Fitting)

Included Parts (Per fitting)
A) 1x Fiberglass F-Series Body (main body)
B) 1x Loose Fiberglass Flange
C) 2x 1.5 ounce bag of Fiberglass Filler for PSX-20 Adhesive
D) 1x Plastic Syringe
E) 2 x Pair of Industrial Nitrile gloves (Large)
F) 1x Sheet of 60 grit sand paper (not shown)

Optional Secondary Test Port

RECOMMENDED
F-22-LS - SAND-F3
F-33-LS - SAND-F4
sanding disc assembly. Includes sanding discs. Sanding Gun Sold Separately

REQUIRED TOOLS
(NOT PROVIDED)
Triclorehylene or Acetone to clean parts/pipe
Hole saw, 4-1/2” and 5-1/2” diameters.
1/4” Drill bit
Air Sander w/ 5/8” Arbor
MCX Jacket Cutting Tool

Approved Adhesive:
Ameron™ 8oz PSX-20
WARRANTY IS VOID:
IF ANY OF THE FOLLOWING OCCUR

A) Adhesive other than Ameron Brand PSX-20 8oz is used to install the F-Series fittings.

B) Fittings are installed on Polyethylene sumps or Round sumps.

C) F-Series Fiberglass Penetration Fittings are NOT installed by a Bravo Certified Contractor.

D) Failure to comply with the Required written report guidelines for Bravo DoubleWall Sumps.

E) The F-Series Fittings are applied to Fiberglass Sumps that are not Third Party Approved.

If there is any indication or suspect damage, you must mark the freight paperwork “Suspect Freight Damage”

CRITICAL

USE ONLY AMERON™ ADHESIVE ON AMERON™ PIPE

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.
Flat panels only. Careful of corners and edges.

**Important**

You can NOT mount fittings on round surfaces.

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.

HOLE SAW SIZE CHART

<table>
<thead>
<tr>
<th>Size</th>
<th>Fitting(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-1/2”</td>
<td>F-22-LS, F-22-LS-T</td>
</tr>
<tr>
<td>5-1/2”</td>
<td>F-33-LS, F-33-LS-T</td>
</tr>
</tbody>
</table>

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

Follow the T-FS-SAND-KIT Installation Instructions.

Slightly angle your grind if necessary to create an angle drop for your penetration.

**Do not overgrind!! Maintain a minimum wall thickness of 1/8” inch**
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 ADHESIVES TO ALLOW A FULL CURE TIME DURING EXTREME COLD TEMPERATURES. FAILING TO ALLOW THE INSTALLATION TO FULLY CURE MAY CAUSE THE ADHESIVE BOND TO THE FITTING TO FAIL.

⚠️ CRITICAL ⚠️
JUST BEFORE EACH ADHESIVE 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 ADHESIVE TO ~80°F. DO NOT HEAT CATALYST!!

3) DO NOT ASSUME THE ADHESIVE 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 ADHESIVE INSTRUCTIONS FOR TEMPERATURE GUIDELINES.
B) FACTORY GLUING RECOMMENDATION

B.1) Your Ameron LCX Coaxial pipe and Bravo FRP rigid penetration 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) If you have room, you must lay your Fiberglass UDC on its side, preferably on some pallets or other raised platform. You will need easy access to the interior. 

**CAUTION**

DO NOT DAMAGE THE SUMP! CAREFULLY LAY THE SUMP ON ITS SIDE AND DO NOT ALLOW IT TO FALL ANY DISTANCE TO THE GROUND.

**CRITICAL**

USE AMERON™ 8oz PSX-20 ADHESIVE ONLY

B.3) You do NOT need Bravo Clamp tools for this factory-install method.

B.4) **Follow Ameron PSX-20 Instructions to mix and apply your adhesive.** One bag of fiberglass filler is to be fully mixed with each adhesive kit.

B.5) Main body first - carefully apply a generous amount of adhesive to the wall and the face that will meet the wall (Fig. B5). Place fitting into the hole and briefly press it down so some adhesive oozes out 360° around. **ALLOW TO CURE FOLLOWING THE PIPE MANUFACTURERS ADHESIVE INSTRUCTIONS.**

B.6) After full cure. Turn the UDC over on its opposite side and ensure the abraded surface on the interior of the sump is clean and dry, ready for adhesive gluing.

**CAUTION**

MAKE SURE TO NOT DAMAGE THE FITTING THAT HAS BEEN INSTALLED!
DO NOT LAY THE SUMP ON AN INSTALLED FITTING!

---

Fig. B5

Adhesive 360° Around

THE INJECTION PORT MUST FACE 12-O-CLOCK, TOWARDS THE TOP OF SUMP (OPENING)

INSIDE OF SUMP
B.7) The Flange (Item B) should be installed to the inside of the sump after adhesive has been applied as shown. (Fig. B7)

**IMPORTANT**
The Adhesive Injection Port on the fitting body must be at the 12-o-Clock or North Position, towards the top of sump (opening). (Fig. X)

B.8) Bead the adhesive 360° around the fitting edge where it meets the sump wall (Fig. B8). Then again allow to cure following Ameron PSX-20 adhesive instructions. **SKIP TO STEP D.**
C) Gluing Alternative to Recommendation

**C.1)** Your Ameron LCX Coaxial pipe and Bravo FRP rigid penetration 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.

**C.2)** Follow Ameron LCX installation guidelines on cleaning, cutting, scarfing and gluing your fiberglass coaxial pipe. Use a minimum of 4 feet between first joint & sump fitting for proper flexibility. Clean all parts after scarfing and tapering.

**C.3)** Get T-FS-CLAMP clamping tool ready for each fitting installation.

**C.4)** Follow Ameron PSX-20 Instructions to mix and apply your adhesive. One bag of provided fiberglass filler is to be fully mixed with each adhesive kit. *(Pg. 3)*

**C.5)** Main body first - carefully apply a generous amount of adhesive to the wall and the face that will meet the wall *(Fig. C5)*.

---

**CRITICAL**

USE AMERON™ 8oz PSX-20 ADHESIVE ONLY

---

**NOTICE**

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

**C.6)** The main fitting body (Item A) should be installed to the outside first. Then apply adhesive as shown (Fig. C6).

The **Adhesive Injection Port** on the fitting body must be at the **12-o-Clock** or North Position, towards the top of sump (opening). (Fig. X)

![Fig. C6](image1)

![Fig. C9](image2)

**Install Main body to outside of sump and apply adhesive to areas shown**

**Install the loose Flange and use gloved finger to run a generous bead along joint.**

**C.7)** Apply adhesive to the Main Body's outer surface 360° where shown. **DO NOT BLOCK TEST PORTS.** After applying adhesive to all contact areas (Fig. C6) Apply the flange over the fitting and to the wall (Item B, Fig. C6)

**C.8)** Apply the Bravo Clamp immediately as shown in Fig. C8. Install clamp shown to the body roughly flush with the face and tighten. Then hand-tighten each bolt so it is snug. Apply 1/4 - 1/2 turn to each bolt evenly until the clamp starts to move. Do not tighten bolts until the clamp falls off the body.

**C.9)** Apply a generous bead of adhesive as shown. (Fig. C9)

**C.10)** Glue all penetration fittings and allow to cure following the pipe manufacturers adhesive instructions.
**D) LCX PREPARATION & GLUING**

**STEP D1)** The F-22-LS (LCX by Slip) below requires critical measurements. Follow the directions! Dry fit to determine the distance from the face of your fitting to your termination. (Fig. D1)

![Fig. D1](image)

**STEP D2)** You must add 2-7/8” to your total distance and use a Jacket Cutter to cut the secondary coaxial away at that point. **SEE PAGE 11 FOR JACKET CUTTER DIRECTIONS.** YOU MUST NOT FORGET TO ADD ANY ADDITIONAL DistANCES.

From the point where your secondary LCX is cut, scarf 3” away from the cut and 3-1/2” towards the cut and break the edge on your Secondary cut. **See Page 11 for Directions on how to scarf.**
Your pipe must be well-scarfed in preparation for the Adhesive Injection step. Your target is 80-90% open fiberglass within the area specified.
Field cutting and tapering primary pipe

Cutting

Use a fine-blade hacksaw, radial cut-off saw or circular saw with abrasive wheel to cut pipe in the field. The cut end must be square to within 3/32" (0.5 mm).

Hold pipe securely for all cutting and tapering. When using a pipe vise, always wrap the pipe with a protective material such as a 1/4-inch thick rubber pad. Take care not to damage or over-deflect the pipe when tightening the vise.

Removing containment with jacket cutting tool

The jacket cutting tool is used to quickly remove the containment layer from the end of the pipe. The tool makes tapering of the pipe easier, reduces wear on the tapering equipment and provides a square finished edge to the containment. The tool consists of a pneumatic grinder equipped with a diamond cut-off wheel. It is adjustable to allow it to be set at the desired height to cut through the containment without any risk of cutting into the primary pipe.

The jacket cutting tool, the tool can either be clamped into a vise or can be hand operated if the pipe is clamped into a pipe vise.

- Remove the containment by activating the grinder and inserting the end of the pipe into the housing.
- Push the pipe into (or onto) the tool to cut a longitudinal groove in the containment.
- When the end of the pipe reaches the stop at the back of the tool, rotate the pipe (or tool), cutting the containment circumferentially.
- When cutting the jacket of a pipe to be used with a termination sleeve, a longer cut of jacket is needed to allow enough room to bond to both the primary and containment pipe. Minimum dimensions are shown in the table above.
- Rotate back to the starting position and remove the pipe from the tool.
- Physically remove the containment layer by prying it open slightly and pulling it off the primary. Use care to not damage the primary pipe during this operation.

Note: The cut-off wheel will wear down eventually and may need readjustment to cut through the containment. To adjust, set the depth so that the wheel cuts just to the tape layer and not into the layer of glass beads. This will minimize wear on the wheel.

See Universal Jacket Cutter Operating Instructions (FP817) for 2" thru 4" containment cutting and removal.

![Diagram](image-url)

Adjust grinder motor position by loosening set screw, move motor 1.25" (32 mm) then tighten set screw. Readjust when finished making termination cuts.
STEP D3) **YOUR SUMPS AND FITTINGS MUST BE COMPLETELY DRY!** Get your Adhesive Kits together and glue your **PRIMARY LINE** to their respective hardpoints (Tees, Elbows, Etc..). Follow your Ameron PSX-20 adhesive Instructions to mix and apply your adhesive. **DO NOT MIX MORE THAN ONE KIT AT A TIME.**

**CRITICAL**

- PRIMARY PRESSURE TESTING ON GLUED PIPE JOINTS ONLY
- DO NOT GLUE COAXIAL TO FITTING YET

STEP D4) After a full cure time, pressure test your primary pipe as per your pipe manufacturer. **DO NOT TEST WHEN ADHESIVE IS WET.**

If the test passes, continue to Section E. If the test fails, find the leak points and repair per your pipe manufacturers guidelines.

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

**E) TESTING YOUR F-SERIES INSTALLATION ON A SINGLEWALL FIBERGLASS SUMP**

**MANDATORY**

THE F-SERIES FIBERGLASS PENETRATION FITTINGS MAY ONLY BE INSTALLED AND TESTED BY A BRAVO CERTIFIED CONTRACTOR

Details can be found at [www.sbravo.com/cert](http://www.sbravo.com/cert)

**E.1) After all the F-Series Fiberglass Fittings on one Sump are installed and fully cured:**

For **SingleWall:** Bravo allows a water level test to a maximum of 2” above the highest penetration. If any leaks are found on or around the F-Series fittings, Call Bravo Systems Technical Support for special directions. Always refer to your local codes/regulations before testing. **DO NOT ATTEMPT TO FIX OR SEAL LEAKS ON THE FITTING YOURSELF!**

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

1-800-28-BRAVO 1-323-888-4133 info@sbravo.com
F) Ameron Coaxial Pipe Final Installation

Your Ameron LCX pipe should be in place and pressure tested at its joints. You will now seal the primary and secondary of your LCX pipe to the F-Series fitting.

**IMPORTANT**

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

**CRITICAL**

USE ONLY AMERON™ 8oz PSX-20 ADHESIVE

**IMPORTANT**

YOU MUST PURGE THE AIR FROM THE TIP OF THE ADHESIVE SYRINGE

THERE CAN NOT BE MOISTURE IN THE ADHESIVE CHANNELS OF THE FITTING. DRY YOUR FITTINGS WITH AIR. USE CAUTION WHEN USING ELECTRIC DRYERS OR OTHER AIR SOURCE.

ADHESIVE JOINT CHART

<table>
<thead>
<tr>
<th>Size</th>
<th>Adhesive Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>2” LCX</td>
<td>30 ml Adhesive</td>
</tr>
<tr>
<td>3” LCX</td>
<td>45 ml Adhesive</td>
</tr>
</tbody>
</table>

**HINT!**

LOAD YOUR SYRINGE BY PLACING TIP IN THE CAN OF MIXED ADHESIVE AND DRAWING IT UP DIRECTLY. THIS METHOD IS NEAT AND CLEAN.

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

1-800-28-BRAVO 1-323-888-4133 info@sbravo.com
STEP F1) On an LCX Secondary termination, there is no taper so no adhesive needs to be added to either the pipe or fitting before insertion.
Ensure that your LCX pipe is properly scarfed per the drawing on page 10.
YOUR SUMPS AND FITTINGS SHOULD BE COMPLETELY DRY & FREE OF DEBRIS!

Slide the LCX pipe all the way into the fitting. Mix your Ameron PSX-20 adhesive kit with the provided fiberglass filler. Load your syringe by placing the tip in the can of mixed adhesive and drawing it up. LOAD THE CORRECT AMOUNT OF ADHESIVE INTO THE SYRINGE AND PURGE THE AIR FROM THE SYRINGE TIP (Pg. 14)

STEP F2) Quickly Inject the adhesive into the OUTSIDE Port first, at the top of the fitting body. The paste should seep out along the LCX pipe. (Fig. F2)

STEP F3) Quickly Inject the same amount of adhesive into the INSIDE Port second. The paste should seep out along the LCX pipe. (Fig. F3)

STEP F4) Run adhesive around the joints and bead with a gloved finger. (Fig. F4)

STEP F5) After a full cure time, test your secondary pipe as per Ameron and local, state, or federal codes and/or regulations.

⚠️ CRITICAL ⚠️ DO NOT TEST WHILE ADHESIVE IS WET!

⚠️ IMPORTANT ⚠️

For the Maximum Test Pressure, consult Ameron LCX pipe Instructions and/or Testing guidelines.
DO NOT UNDER ANY CIRCUMSTANCES, DRILL, CUT OR TAP ANYWHERE ON THE F-SERIES FITTING

G) SECONDARY INTERSTICE AIR VALVE

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

DO NOT USE TEFILON TAPE.
DO NOT EXCEED 10 Ft-lbs.
DO NOT OVERTORQUE THIS VALVE OR THREAD IT ALL THE WAY HOME.
DO NOT PLUG THE INTERIOR WITH THREAD PASTE.

ALWAYS CHECK WITH YOUR LOCAL, STATE, & FEDERAL REGULATORY AUTHORITIES FOR RESTRICTIONS AND GUIDELINES ON INSTALLATIONS

TYPICAL INSTALLATION EXAMPLES (Images shown are not a substitute for jobsite drawings)

Pipe Falling Away From Sump No Test Port Required
Jumper Configuration Two SVA-BARB’s and hose
Low Point Drain with Sensor SVA-BARB Required to be OPEN

Connect the SVA-BARB to your Schrader Valves for testing & continuous vacuum monitoring

CAP
SVA-BARB