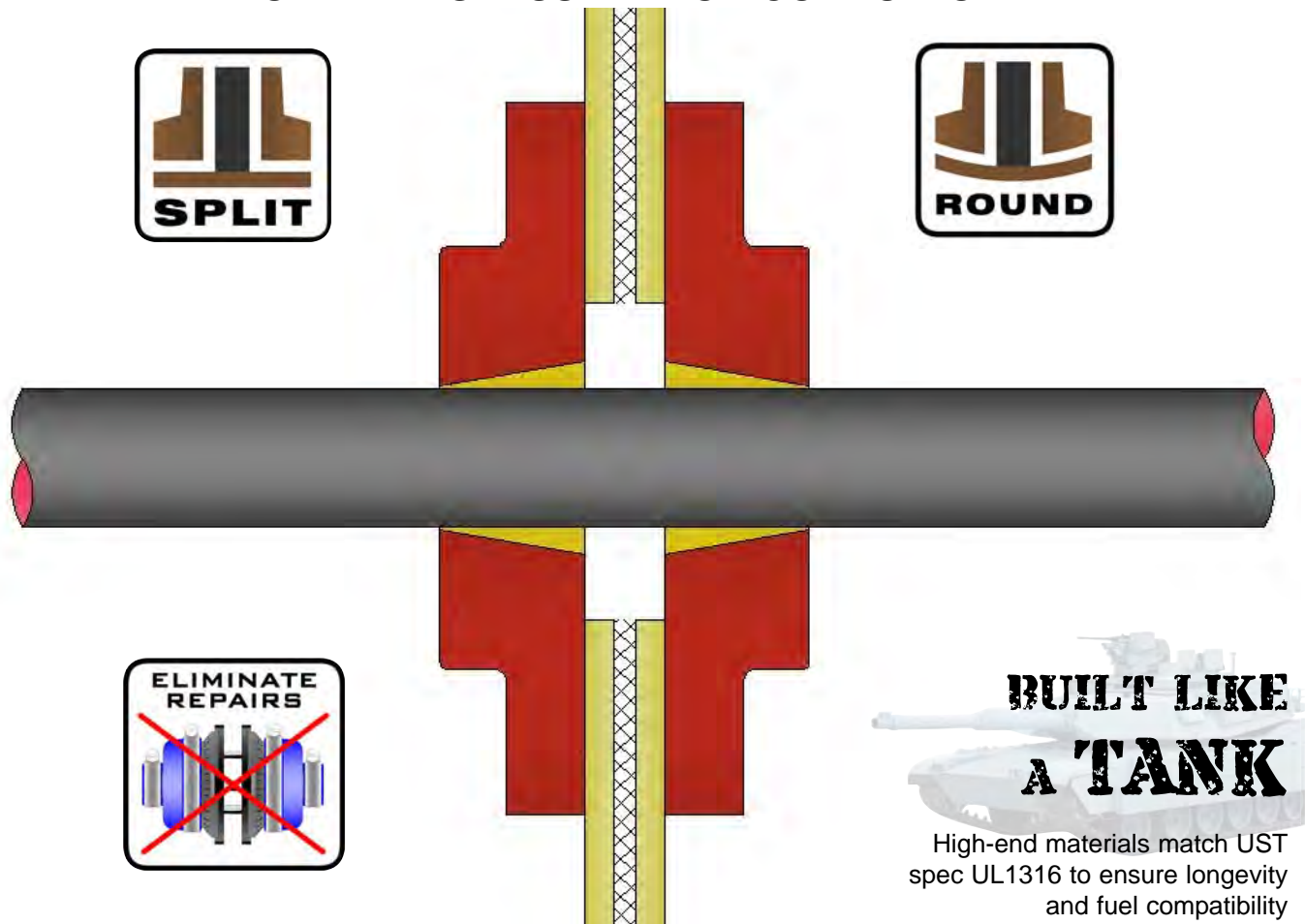


# F-xx-RETROFIT-S-DCT-OS INSTALLATION INSTRUCTIONS

BRAVO FIBERGLASS SD-AB SERIES FOR DOUBLE WALL FRP SUMPS ONLY

**FOR RETROFITTING ALL FLEXIBLE ENTRY BOOTS**

FOR FIBERGLASS PIPE OR CONDUIT ONLY



## READ THIS MANUAL FRONT TO BACK

**Note:** Actual products may vary in appearance from illustrations in this manual

ii-F-Series-Retrofit-SD-AB-13B



WWW.SBRAVO.COM  
800-AT-BRAVO



# MANDATORY

The F-Series Doublewall Retrofit-S AB-2481 Fittings from S. Bravo Systems, Inc. **MUST** be installed by a **Bravo Retrofit-Certified Installer**. The **Retrofit Test** must be completed at [www.sbravo.com/cert](http://www.sbravo.com/cert)

**You must also be Confined-Space Certified when working within Tank Sumps.**

**COMPLETE**  KEEP TRACK of your job by taking advantage of the “Complete” checkboxes paired with each major step.

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

**LIMITED WARRANTY**  
Products 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 are 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 - including but not limited to installation or maintenance by a Non-Specialist Certified individual. 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.



VENTILATE YOUR  
AREA. WEAR MASK,  
SAFETY GLASSES,  
GLOVES AND OTHER  
PROTECTION

**NO** > ELECTRIC TOOLS  
> IGNITION SOURCES



**MANDATORY**

Ensure that the workspace is operating below the LEL (lower explosive limit). Test regularly or monitor continuously.

**NOTE:**

***BRAVO RECOMMENDS THAT AT A MINIMUM,*** all flexible entry fittings on a sump are retrofit with the F-Series Retrofit-SD-AB fitting. Having every entry fitting sealed with this product will ensure the best interstitial integrity and test results

**WARRANTY IS VOID  
OR YOUR CERTIFIED STATUS  
WILL BE REVOKED:**

**IF ANY OF THE FOLLOWING OCCUR**

- A) NOT** Installing an F-Series Retrofit-SD-AB fitting with Bravo **ADHESIVE-RETROFIT-EPOXY-KIT**.
- B)** Installing an F-Series Retrofit-SD-AB fitting with adhesives that are not specified in this manual.
- C)** F-Series Retrofit-SD-AB Fittings are **NOT** installed by a **Bravo Certified Contractor**.
- D)** Installing an F-Series Retrofit-SD-AB fitting on Polyethylene sumps or flex pipe.
- E)** Installing an F-Series Retrofit-SD-AB fitting without monitoring lower explosive limit.

# FITTING SPECS

Model Number	Wall type	Pipe type and size	O.D.	Length	Bravo Adhesive Kits Included
F-05-Retrofit-SD-AB	Flat	1/2" Conduit	7"ø	6"	2
F-07-Retrofit-SD-AB	Flat	3/4" Conduit	7"ø	6"	2
F-10-Retrofit-SD-AB	Flat	1" Conduit	7"ø	6"	2
F-20-Retrofit-SD-AB	Flat	2" Fiberglass	9"ø	6"	2
F-30-Retrofit-SD-AB	Flat	3" Fiberglass	9"ø	6"	2
F-40-Retrofit-SD-AB	Flat	4" Fiberglass	11"ø	9"	2
F-05-Retrofit-SD-AB-RND	Round	1/2" Conduit	7"ø	8"	3
F-07-Retrofit-SD-AB-RND	Round	3/4" Conduit	7"ø	8"	3
F-10-Retrofit-SD-AB-RND	Round	1" Conduit	7"ø	8"	3
F-20-Retrofit-SD-AB-RND	Round	2" Fiberglass	9"ø	8"	3
F-30-Retrofit-SD-AB-RND	Round	3" Fiberglass	9"ø	8"	3
F-40-Retrofit-SD-AB-RND	Round	4" Fiberglass	11"ø	11"	3
F-20-Retrofit-SD-AB-LCX	Flat	2" Ameron LCX	9"ø	6"	2
F-30-Retrofit-SD-AB-LCX	Flat	3" Ameron LCX	9"ø	6"	2
F-20-Retrofit-SD-AB-LCX-RND	Round	2" Ameron LCX	9"ø	8"	3
F-30-Retrofit-SD-AB-LCX-RND	Round	3" Ameron LCX	9"ø	8"	3



# F-Series Retrofit-SD-AB COMPONENTS

## Included Parts (Per fitting)

- A) 2x Fiberglass Retrofit-S Body (two halves) with SS pipe clamps
- B) Bravo **ADHESIVE-RETROFIT-EPOXY-KIT**: (quantity chart on page 4)
  - 1x Bravo Epoxy Adhesive Can 6oz
  - 1x Bravo Epoxy Catalyst bottle 1oz
  - 2x Pair of Industrial Nitrile gloves (Large)
  - 1x Stir stick
  - 1x 1" chip brush
- C) 1x 60 grit emery cloth strip
- D) 1x 80 grit sheet of sandpaper

## REQUIRED TOOLS

(NOT PROVIDED)

Air Sander and Air Drill  
Eye protection  
Respiratory protection

### Approved Bonding Adhesive:

Bravo "ADHESIVE-RETROFIT-EPOXY-KIT"

**MANDATORY**

A Confined-space  
Certification is required  
when installing this fitting  
inside Tank Sumps

**▲ CRITICAL**

**USE ONLY BRAVO SYSTEMS ADHESIVE WHEN INSTALLING  
THIS FITTING TO FIBERGLASS PIPE OR CONDUIT**

**DO NOT SUBSTITUTE ADHESIVES, MIX THEM OR ADD  
LIQUIDS SUCH AS WATER OR ANOTHER RESIN. DO NOT USE  
ANOTHER CATALYST OTHER THAN WHAT IS PROVIDED.**

# Summary of Installation

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

**DO NOT ATTEMPT TO INSTALL THIS PRODUCT BASED ONLY ON THE SUMMARIZED STEPS LISTED ON THIS PAGE**

- 1) Read the entire manual front to back, read carefully. Do not just view images.
- 2) Evaluate the sump, ensure sump material is FRP, and the piping is FRP or conduit.
- 3) Remove any necessary components that will obstruct your access to the sump wall. Excavate adequate area on outside of all fittings you will install.
- 4) Drain each sump of any interstitial fluid and dispose of properly.
- 5) Clean each sump. Remove all contaminants, water and debris. Ensure each sump will be completely dry during all installation steps.
- 6) Secure conduit endpoints so they do not move or act as a lever.
- 7) Remove the entire boot and all of it's components or sealants from the wall and pipe.
- 8) Properly protect the pipe or conduit against damage.
- 9) Abrade both sides of sump wall around hole until bare fiberglass is shown.
- 10) Clean, dry and rough up pipe or conduit surface on both sides in preparation for bonding.
- 11) Dust off all abraded surfaces with compressed air.
- 12) Dry-fit your fittings for clean fit against the wall and piping. Mark alignment stripe across the fitting halves and the sump wall with a permanent marker.
- 13) Bond split fitting to the outside of sump FIRST. Manually press exterior split fitting halves firmly against the sump wall using hand strength.
- 14) Bead excess adhesive around primary seams at the wall and at the pipe.
- 15) Use acetone to clean the face of each fitting to look like a new install. Clamp halves together tight and re-clean any adhesive that oozes.
- 16) Repeat number 10-16 to install other fitting half to the inside of the sump.
- 17) Allow adhesive to fully cure before testing fitting installation. Do not disturb while curing!
- 18) Mandatory Pressure/soap test to verify the fitting installation is good.

**MANDATORY**

Ensure that the workspace is operating below the LEL (lower explosive limit) before starting work. Test regularly or monitor continuously.

**MANDATORY**

A Confined-space Certification is required when installing this fitting inside Tank Sumps

## **STEP 1 READ THIS ENTIRE MANUAL FRONT TO BACK BEFORE BEGINNING INSTALLATION**

**BEFORE BEGINNING WORK ON YOUR JOBSITE. YOU MUST EVALUATE THE EXISTING SUMPS, PIPE, CONDUIT AND FLEXIBLE ENTRY BOOTS YOU WILL BE RETROFITTING. FOLLOW THESE RULES:**

- A) Ensure the sump material is fiberglass only.
- B) Ensure the piping is fiberglass, galvanized steel or PVC coated steel only.
- C) If the PVC coated conduit is Ocal-Blue brand, you must strip the PVC away from the fitting area and rough up the steel conduit beneath.
- D) Ensure that the conduit has not rusted through. This fitting should not be bonded with any adhesive to a corroded or partially corroded conduit line. You must replace the corroded lines with new conduit first.

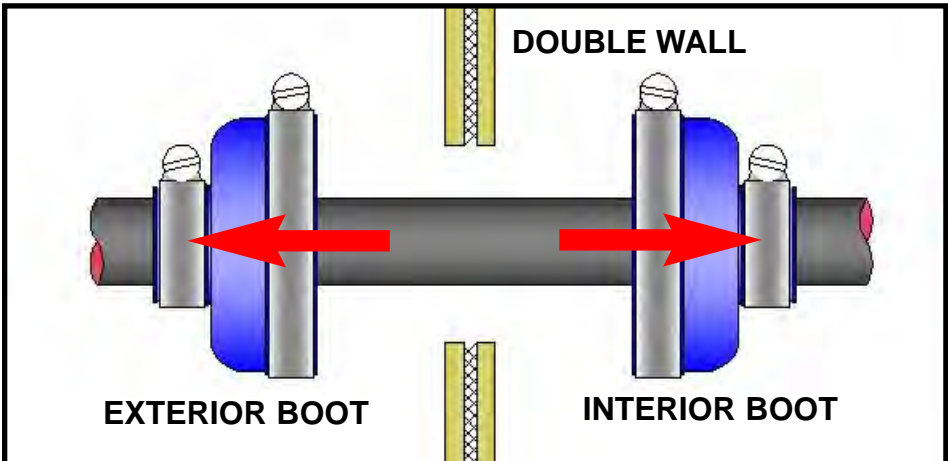
## **FOLLOW THESE STEPS IN ORDER**

- DONE**  1) Excavate to gain access to all fittings on each sump.
- DONE**  2) Remove any components that will obstruct access to the fittings.
- DONE**  3) Drain sump of any interstitial fluid and dispose. Do not re-use.
- DONE**  4) Clean interior and bottom of each sump. Remove contaminants, water and debris. Dispose of HAZMAT per local codes.
- DONE**  5) Ensure each sump will be completely dry during installation.
- DONE**  6) Secure all conduit lines by bracketing them to at least one rigidly connected conduit or the riser. Do not allow conduit endpoints to move or act as a lever.



# STEP 2

COMPLETE

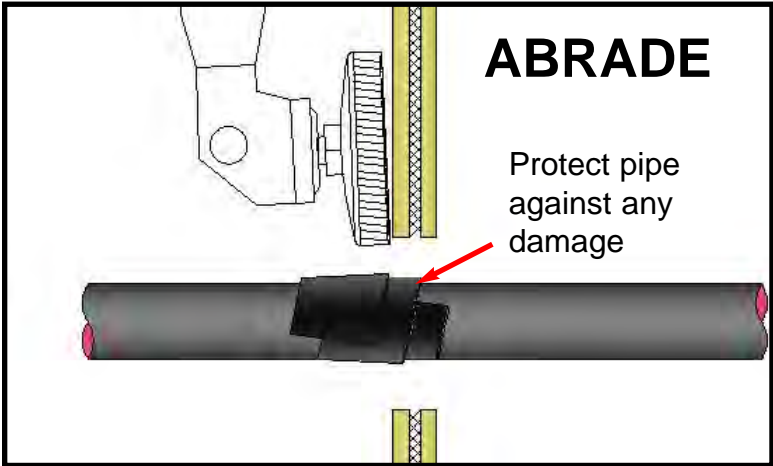


Remove boot from the wall with all components, bolts and sealants. **DO NOT USE TOOLS THAT CAN DAMAGE THE PIPE OR CONDUIT.**

Use an angle measurement tool such as a protractor if you need to check pipe angles

# STEP 3

COMPLETE



**Before starting work, ensure all fuels and flammables have been removed. Test/monitor your LEL's and ventilate.**

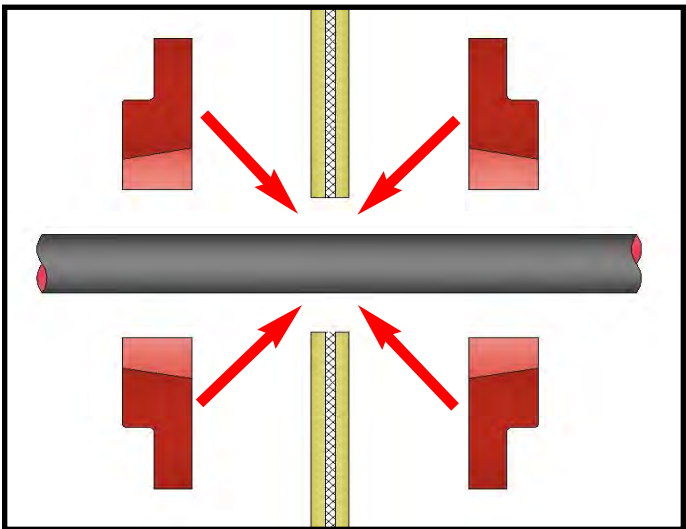
**STARTING ON THE OUTSIDE OF SUMP**  
Properly protect your piping from power or sharp tools. **DO NOT DAMAGE PIPE!**

Proceed to grind your walls clean of any paint, gel-coat, adhesives or sealants until open fiberglass is clearly visible **3 INCHES AWAY FROM THE HOLE.**

# STEP 4

**MANDATORY**

COMPLETE



**SECURE ALL CONDUIT LINES BY BRACKETING THEM TO AT LEAST ONE RIGIDLY CONNECTED CONDUIT OR THE RISER. DO NOT ALLOW CONDUIT ENDPOINTS TO MOVE OR ACT AS A LEVER**

Dry-fit each fitting to both sides of the wall to make sure they both sit flat against the walls.



# ROUGHING-UP YOUR FRP PIPE WITH SAND STRIP



Your pipe must be hand roughed in preparation for Gluing

**DO NOT USE ANY POWER TOOLS ON PIPE, EVER!**

# MIXING YOUR ADHESIVE

Your adhesive should be stored in a cool place until ready to be mixed. You should warm your adhesive and fiberglass fitting components if the ambient temperature is below 70°F.

**DO NOT MIX MORE THAN ONE CAN AT A TIME**  
**DO NOT ATTEMPT TO MIX HALF A CAN**  
**ONLY USE 1 BOTTLE OF CATALYST PER ADHESIVE CAN**

## **⚠ CRITICAL**

**USE ONLY BRAVO SYSTEMS ADHESIVE WHEN INSTALLING THIS FITTING TO FIBERGLASS PIPE OR CONDUIT**  
**DO NOT SUBSTITUTE ADHESIVES, MIX THEM OR ADD LIQUIDS SUCH AS WATER OR ANOTHER RESIN. DO NOT USE ANOTHER CATALYST OTHER THAN WHAT IS PROVIDED.**

## **⚠ CRITICAL**

**ADHESIVE HAS AN ACTIVE COLORANT**

**ADD CATALYST TO ADHESIVE AND MIX THOROUGHLY UNTIL THE COLOR IS EVEN AND CONSISTENT WITH NO SWIRLS**



# CAUTION

## WINTER WARNING

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

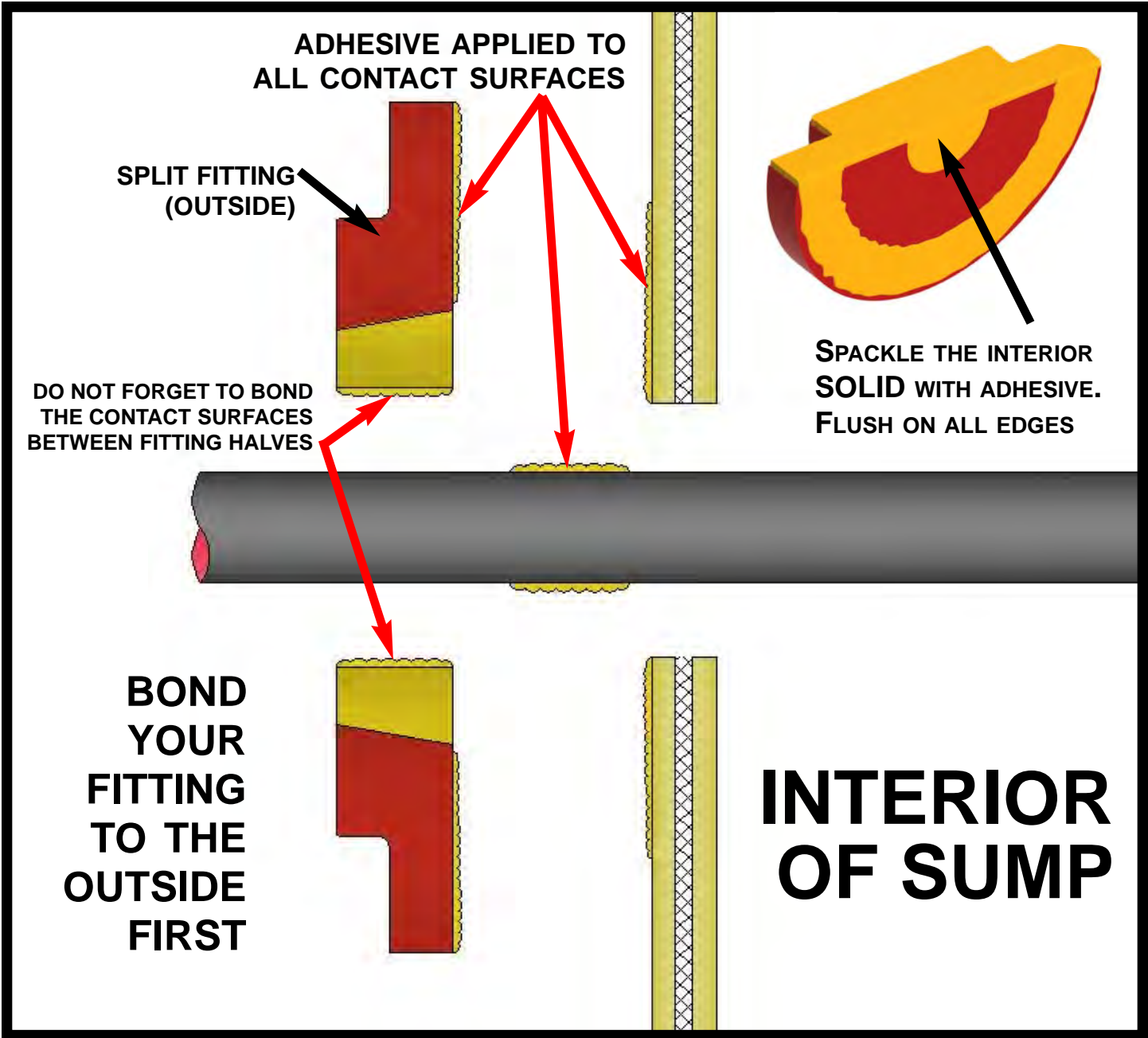
BRAVO SYSTEMS FF-SERIES FLANGE FITTINGS AND F-SERIES FITTINGS ARE THICKER THAN THE TYPICAL FIBERGLASS CLAMSHELLS COMMONLY INSTALLED IN FIBERGLASS PIPING APPLICATIONS. YOU MUST APPLY ADEQUATE HEAT TO THE PARTS AND BONDING ADHESIVES TO ALLOW A FULL CURE TIME DURING EXTREME COLD TEMPERATURES. FAILING TO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

# STEP 5

COMPLETE



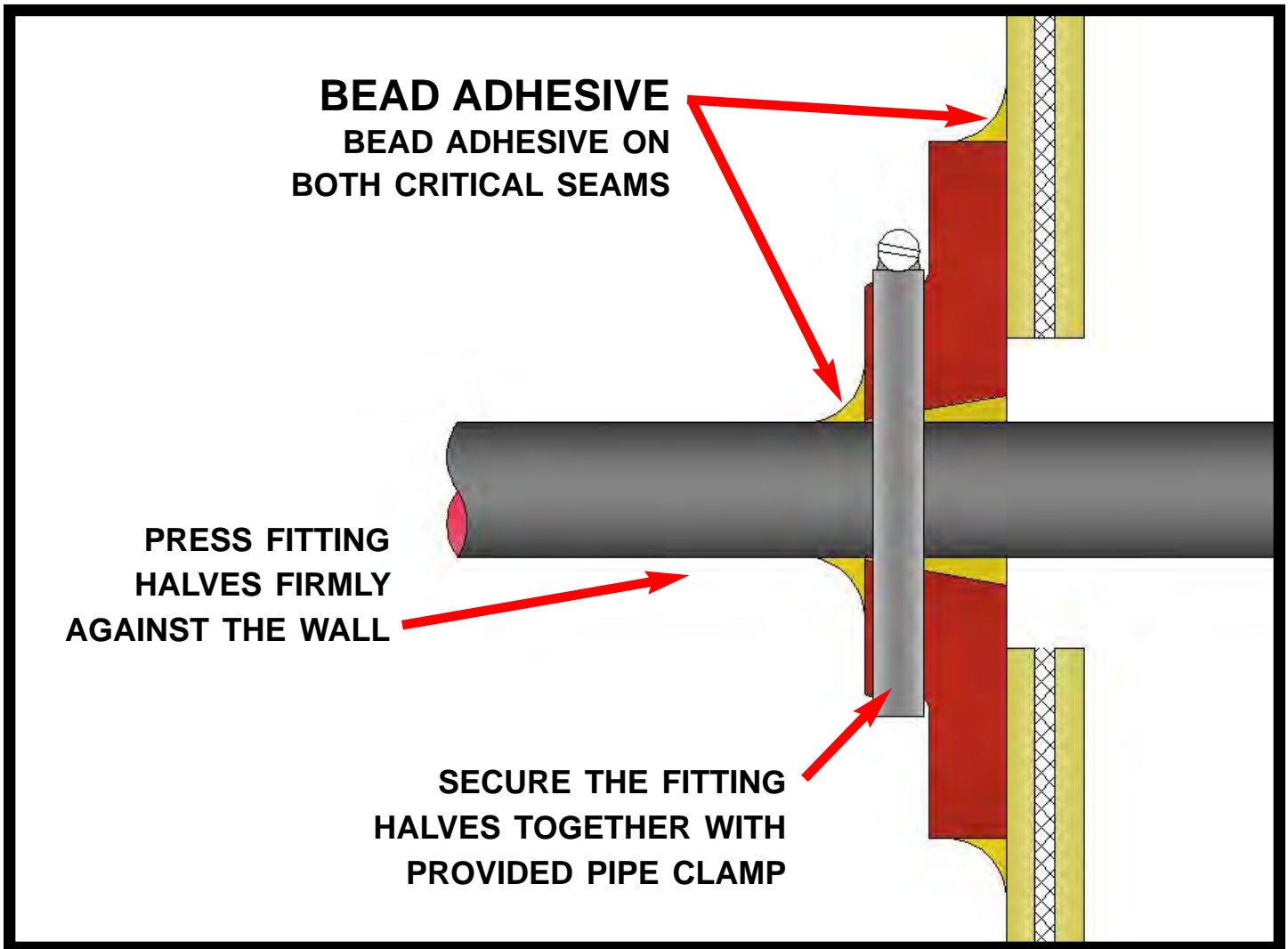
## GLUE FITTING HALF TO THE OUTSIDE FIRST

Apply your mixed Bravo adhesive to all Contact Surfaces; between both halves of the fitting where they contact each other, the pipe, the wall, and the face of the fitting that will contact the wall. Pack the interior hole of the fitting with adhesive. For conduit, you can fill it solid. For 2" pipe and above, you will apply ~ 1" (ONE INCH) thick of adhesive to the interior of each half. Stick this assembly to the wall and apply a strong pressure to push the halves together and against the wall. When joined, rotating the fitting back and forth helps.



# **STEP 6**

**COMPLETE**



Adhesive should ooze from every seam and joint while pushing the fitting halves together against the pipe and wall. Clean the face of the fitting with acetone or equivalent and remove excess adhesive. You want the fitting clean enough to remove the pipe clamp after the fitting cures.

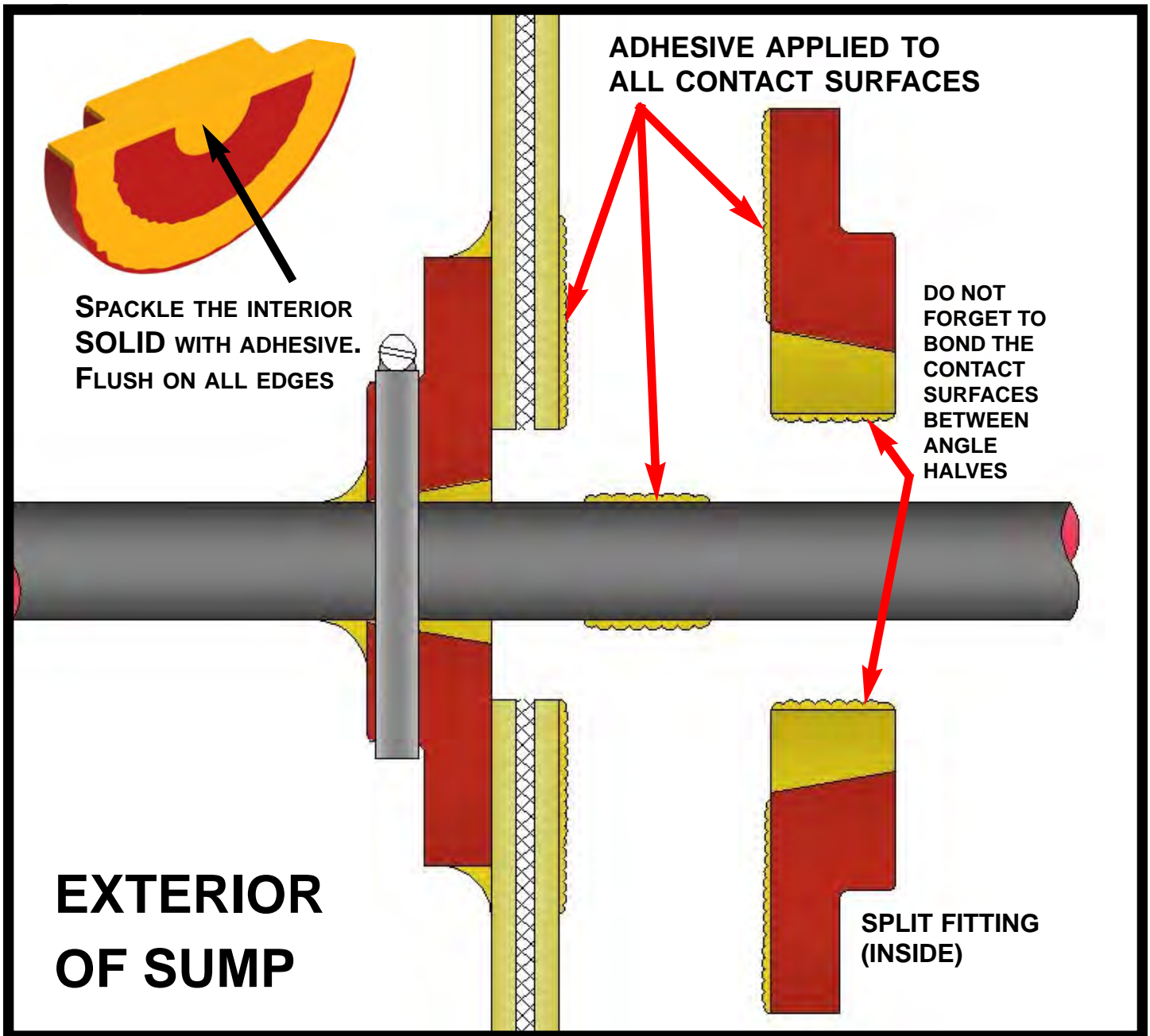
Use provided pipe clamp to secure the fitting halves to each other. More adhesive may ooze from the split seams as you tighten, re-clean as necessary.

## **CURE IT**

After a full cure, remove the pipe clamp holding the two fitting halves together. If it is too difficult to remove and appears to be bonded in place, do not force it off.

# STEP 7

COMPLETE

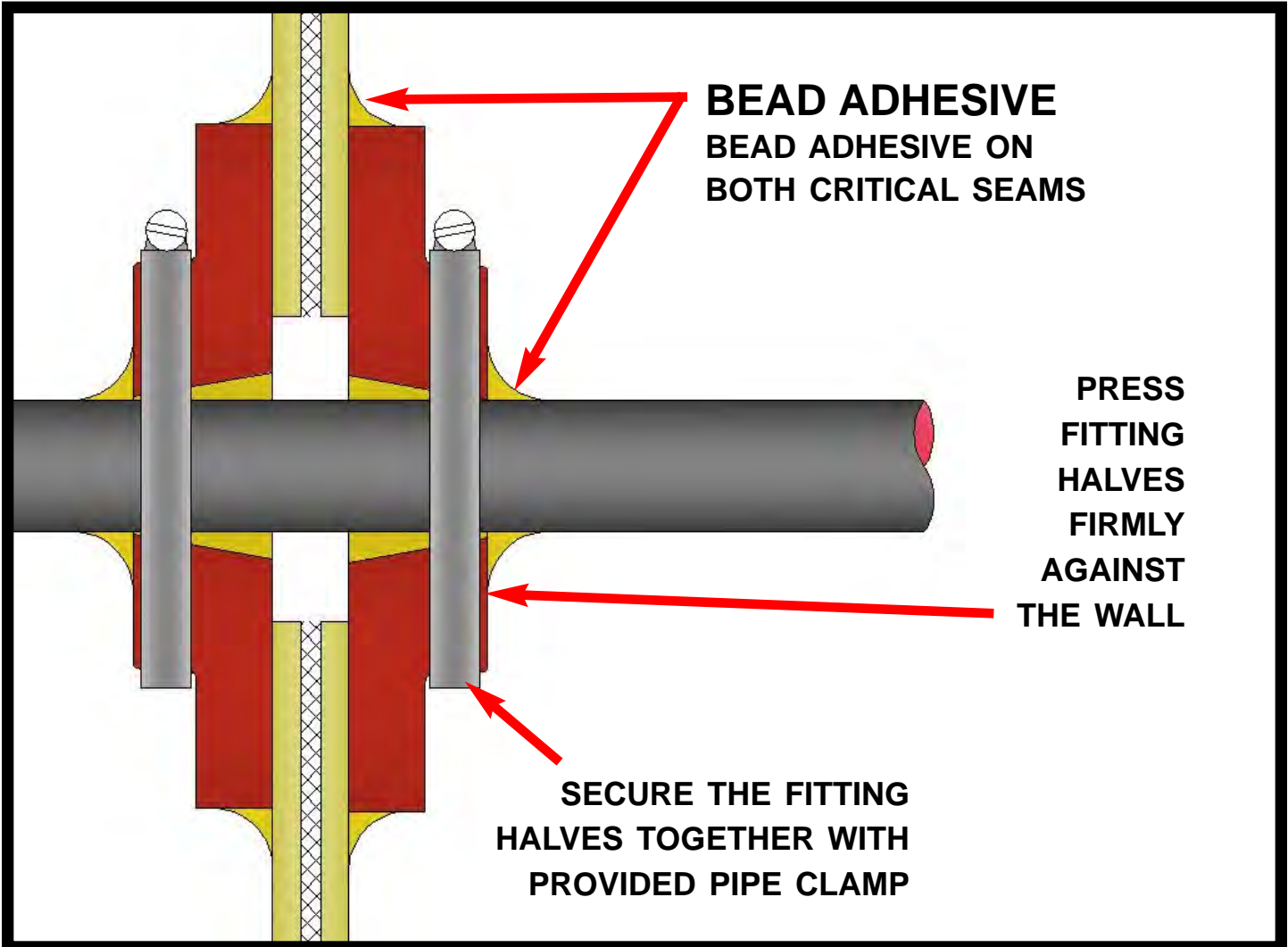


## **AFTER ALL GLUED FITTINGS HAVE CURED NOW REPEAT FITTING BOND ON THE INSIDE**

Apply mixed Bravo adhesive to all Contact Surfaces; between both halves of the fitting where they contact each other, the pipe, the wall, and the face of the fitting that will contact the wall. Pack the interior hole of the fitting with adhesive. Stick this assembly to the wall and apply a strong pressure to push the halves together and against the wall. When joined, rotating the fitting back and forth helps.

# STEP 8

COMPLETE



Adhesive should ooze from every seam and joint while pushing the fitting halves together against the pipe and wall. Clean the face of the fitting with acetone or equivalent and remove excess adhesive. You want the fitting clean enough to remove the pipe clamp after the fitting cures.

Use provided pipe clamp to secure the fitting halves to each other. More adhesive may ooze from the split seams as you tighten, re-clean as necessary.

**LET THE FITTING(S) CURE DO NOT CAUSE PIPE OR CONDUITS TO MOVE OR TWIST DURING CURE**

After a full cure, remove the pipe clamp holding the two fitting halves together. If it is too difficult to remove and appears to be bonded in place, do not force it off.



# FINAL - STEP 9

**COMPLETE**

## MANDATORY PRESSURE TESTING:

To test your complete fitting installation after a full adhesive cure time of 4 hours minimum at 75°F or greater, conduct a pressure/soap test on all fittings, inside and outside at all critical joints.

**Bravo Systems DoubleWall Containment Sump:** Maximum 4 PSI and minimum 20"hg Vacuum.  
**Other Manufacturer's Containment Sump & fittings:** Follow manufacturers guidelines

## EXTENDED TESTING (RECOMMENDED):

When extended testing is possible and you feel it is necessary, the following recommended guidelines are provided. The results and procedures are not supported by Bravo Technical Support unless the sumps are of Bravo manufacture.

If you use **Pressure**, a minimum test of **8 hours** is the guideline.

If you use **Vacuum**, a minimum test of **2 hours** is the guideline.

Test per all local, State or federal regulations.

