BRAVO
PROBLEM SOLVED

NEW EPA REGULATION COMPLIANCE
DOUBLEWALL SUMPS AND FRP RETROFITS

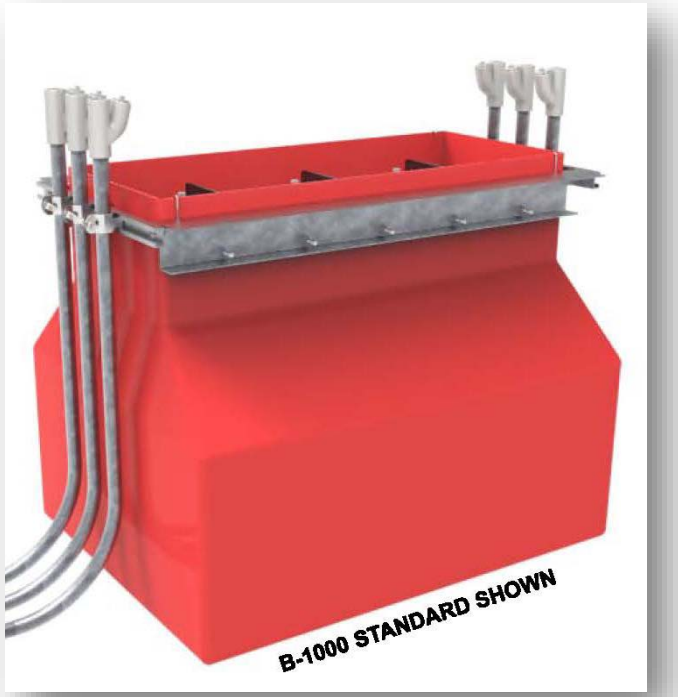
Agenda – Feb 2, 2018

- Bravo 14 yr. history, doublewall products and experience
- New EPA federal regulations vs existing CA
- Doublewall secondary containment sumps
- Interstice monitoring options / dry interstice
- FRP entry fittings
- FRP retrofit fittings
- Fulfillment Center

CONTAINMENT HISTORY

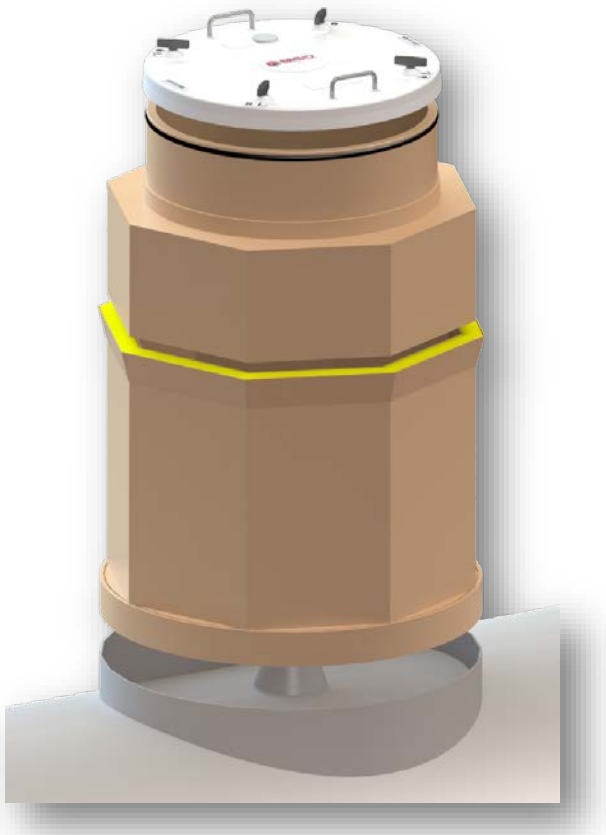
Containment History

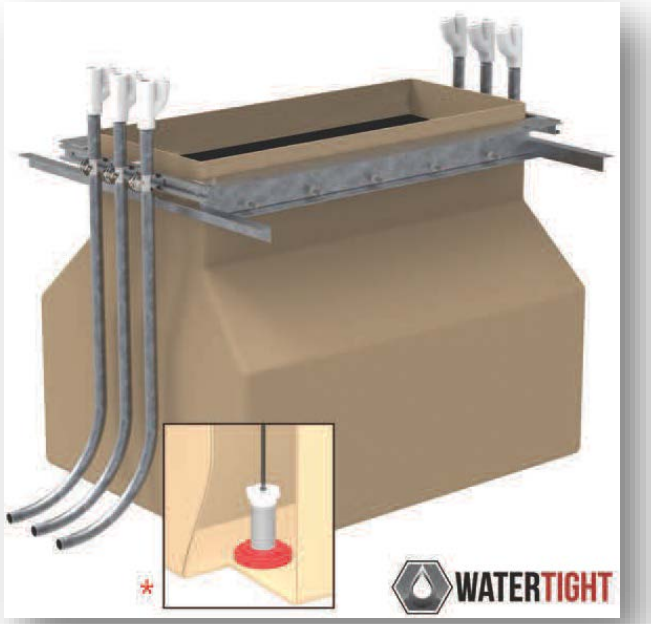
Singlewall FRP Sumps



Containment History

Doublewall Monitored Sumps





NEW FEDERAL EPA REGULATIONS

New Federal EPA Regulations

40 CFR Parts 280 & 281

Compliance with Doublewall Sumps

And FRP Retrofit Fittings

New Federal EPA Regulations

Changes to the regulations include:

- Adding secondary containment requirements for new and replaced tanks and piping
- Existing sites with single wall sumps will be hydrostatically tested every three years. New vacuum technologies being developed and tested
- Double wall constantly monitored sumps will be exempt from testing – hydrostatic or vacuum

New Federal EPA Regulations

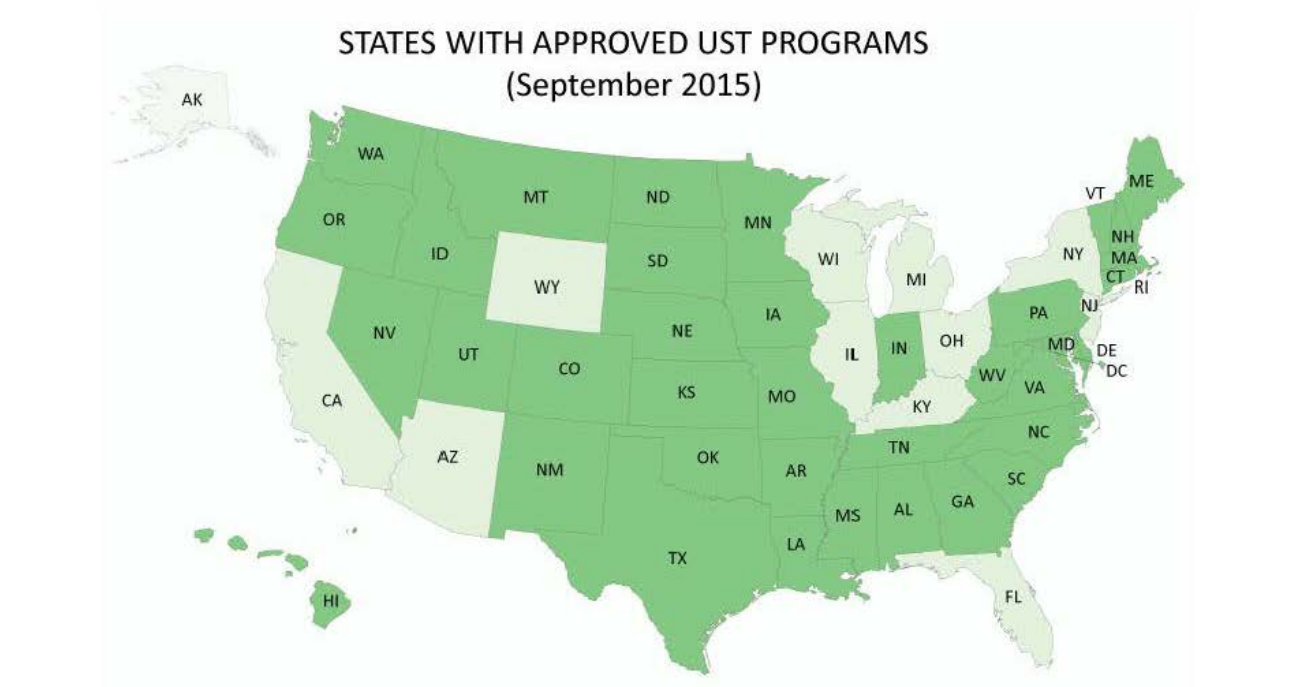
Cont'd:

- The deadline for testing in states with a non-approved state program is October 13th 2018

EPA thinks these changes will protect human health and the environment by reducing the number of releases to the environment and quickly detecting releases, if they occur.

EPA Regulations

2018 Federal EPA regulations vs. existing CA regulations



Key
Light color states = non-approved state programs, subject to federal regulation
Green color states = approved state programs, EPA has deemed state regulation to be as stringent as federal law

EPA Regulations

2018 Federal EPA regulations vs. existing CA regulations

- New EPA regulations are similar to long standing regulations in California - with some exceptions
- SB 989 (Testing of singlewall containment sumps)

  California has very specific testing methodologies
- **Failures during the initial test cycle was 65%**
- AB 2481 (VPH constant monitoring / doublewall sumps)

EPA Regulations

2018 Federal EPA regulations vs. existing CA regulations

- Doublewall sump monitoring options in CA:
  - Vacuum, Pressure, or Hydrostatic
- Doublewall sump monitoring options federally:
  - Not defined

PMAA ANNOUNCMENT

May 12, 2017 WR-17-19
EPA APPROVES PMAA'S LOW LIQUID LEVEL ALTERNATIVE TEST METHOD FOR SUMPS

Provides major cost savings to Petroleum Marketers

The U.S. EPA's Office of Underground Storage Tanks (OUST) announced this week that it has approved PMAA's low liquid level integrity test as an alternative method for containment sump testing that is required under the 2015 federal UST regulations. The 2015 regulations require liquid testing every three years of all containment sumps used for interstitial monitoring of piping. However, the test method cited in the rule requires filling sumps with water above the penetration points in the sump wall. This sump test method would be prohibitively expensive for tank owners. Instead, the PMAA UST Task Force developed an alternative test for containment sumps.

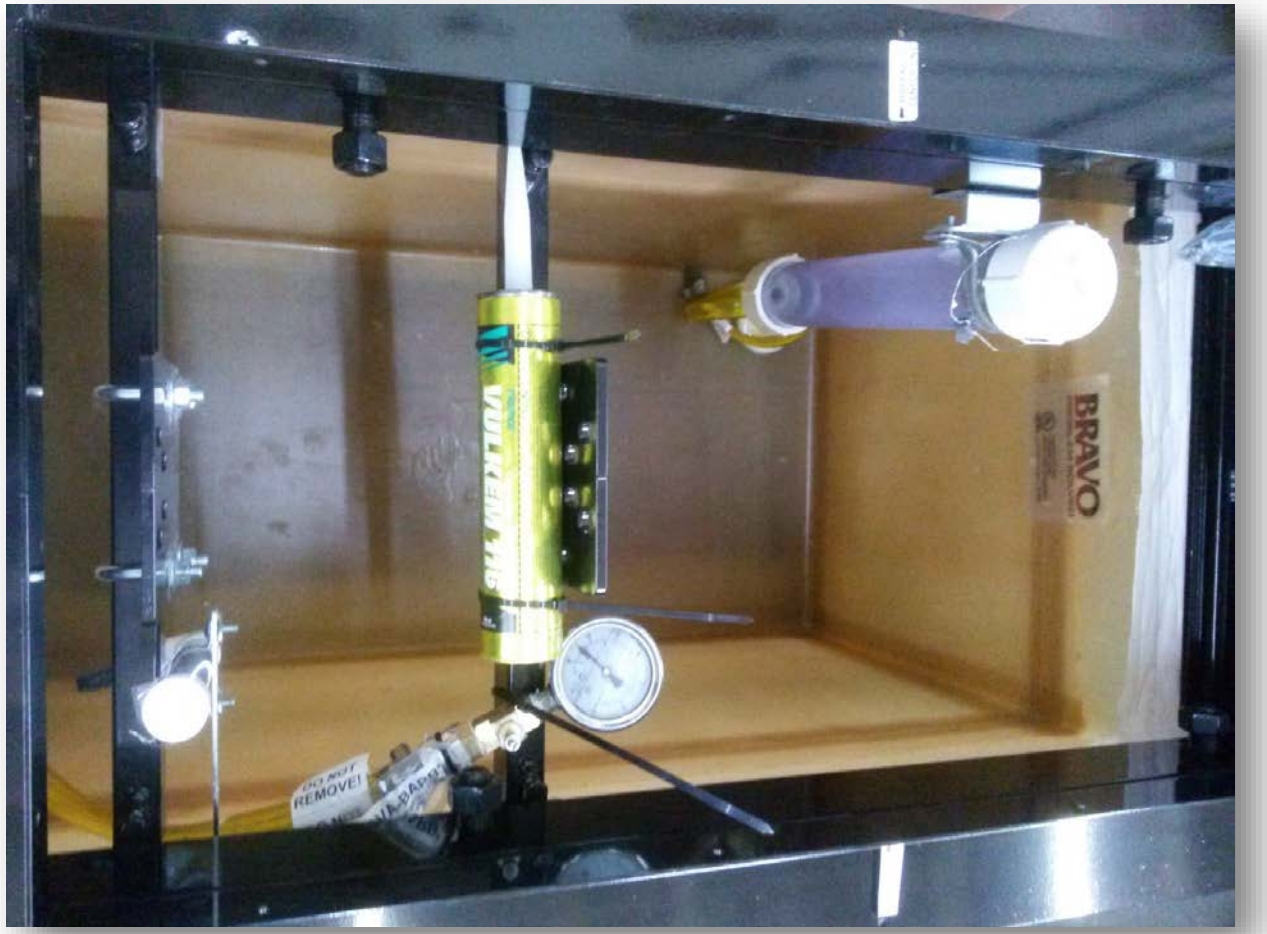
DOUBLEWALL SUMPS

Doublewall Sumps

Constant monitoring accomplished by:

- Pulling a vacuum on the interstice.
- Filling the interstice with a monitoring fluid (hydrostatic) and having a sensor monitor fluid level change.
- OR, a dry interstice and use a sensor to detect fluid ingress. EPA has issued a compendium that disapproves this option.

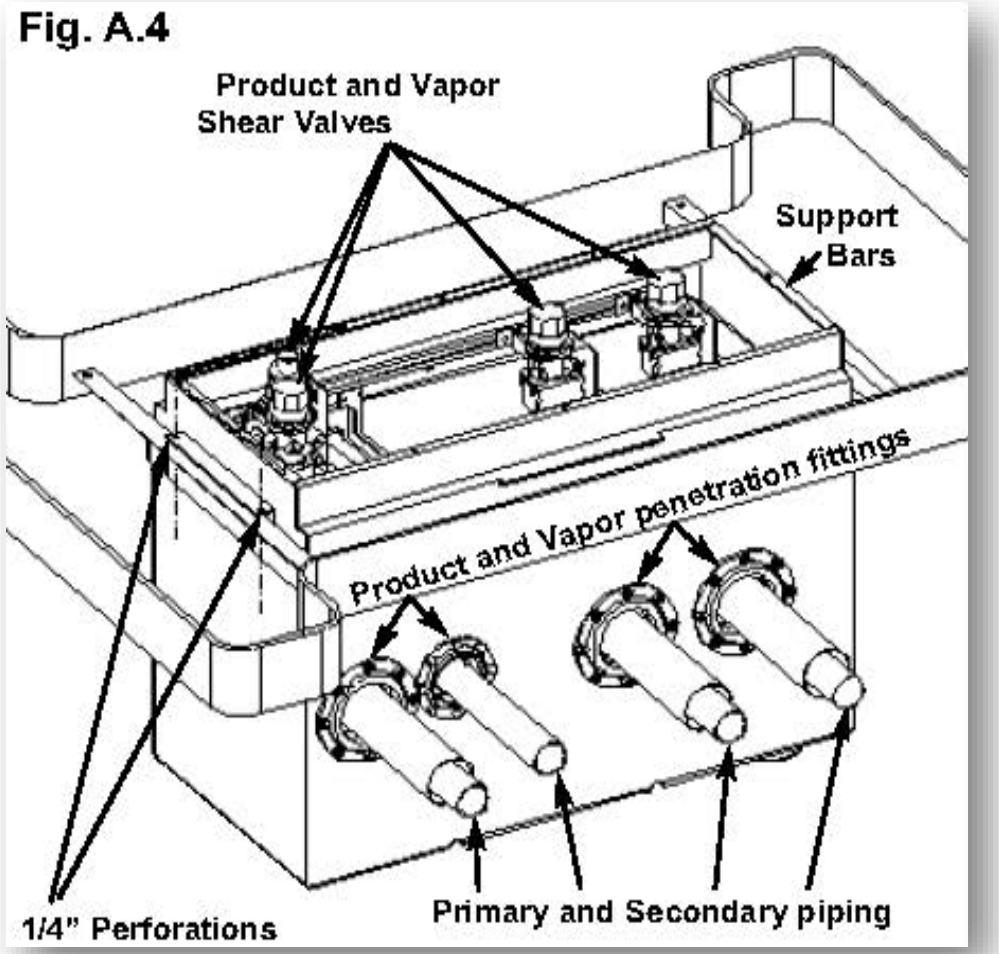
Doublewall Sumps



Doublewall Sumps

Key Steps:

- Prior to cutting the sump wall for piping be sure the vacuum gauge is above 12” HG
- The vacuum isn’t released until the sump is penetrated for entry fittings



Doublewall Sumps

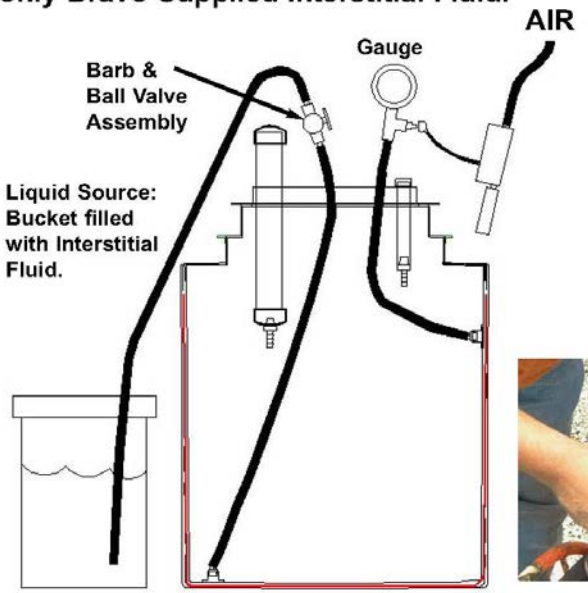
Doublewall sump testing is performed via the interstice as opposed to hydrostatic testing

Doublewall Sumps VPH

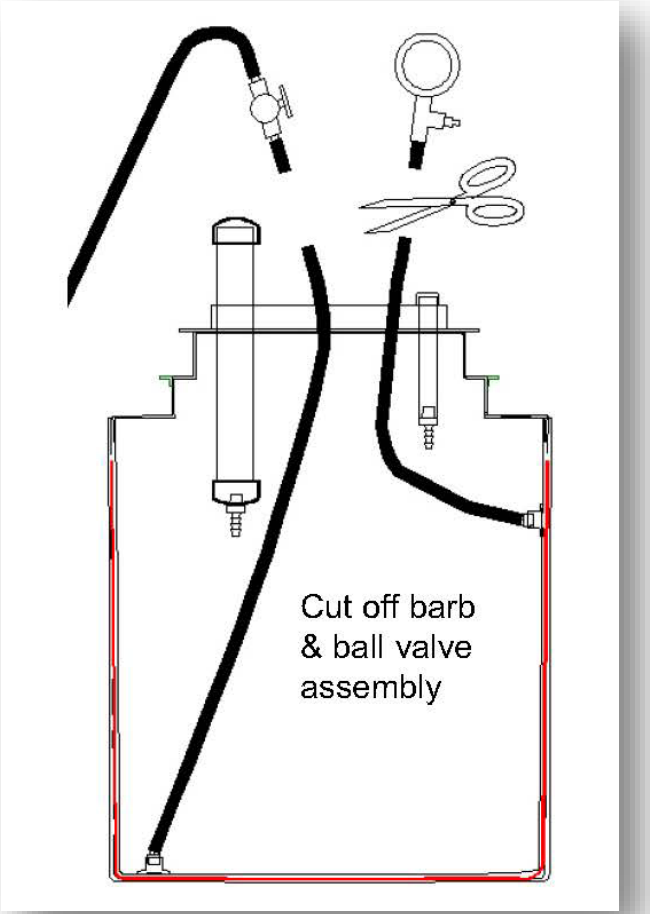
B.6 - Close off ball valve completely and **prime the open ended 36" length of clear tubing** with provided Interstitial Fluid. A liquid funnel is recommended.

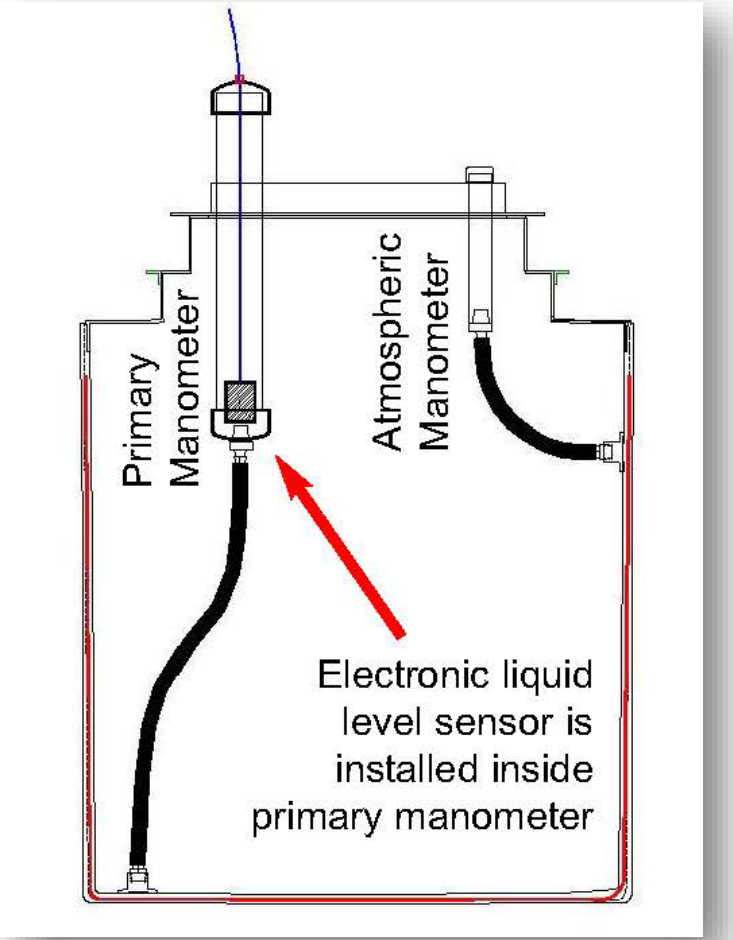
⚠WARNING

Filling Bravo Systems Double Wall Products with Brine (saline) solution will void the product warranty. You must use only Bravo-Supplied Interstitial Fluid.

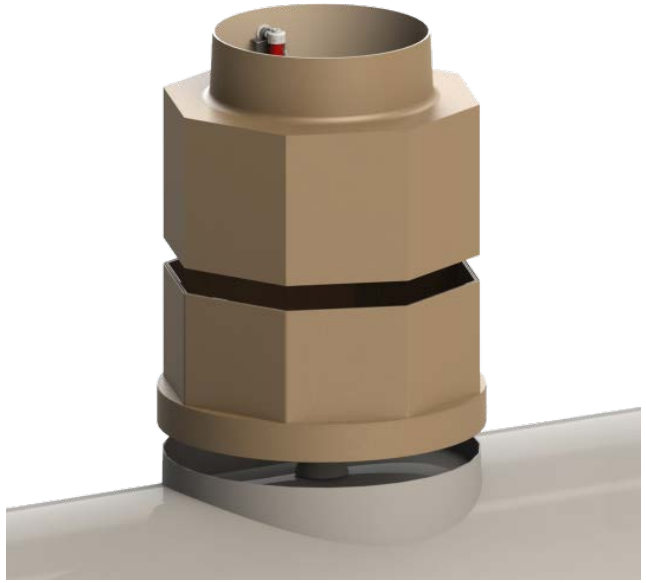


Doublewall Sumps VPH

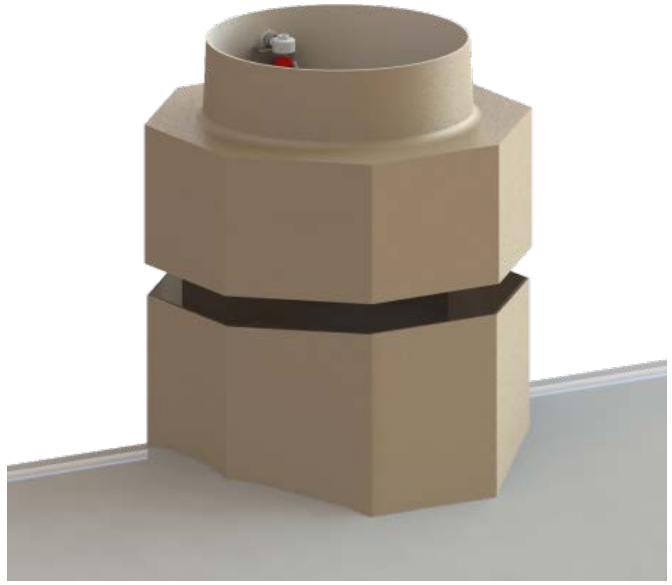




Doublewall Sumps



Collar Mount



Tall Collar

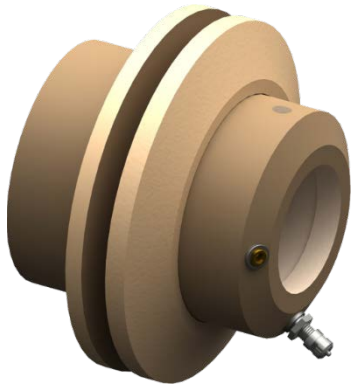
Riser Adaptor

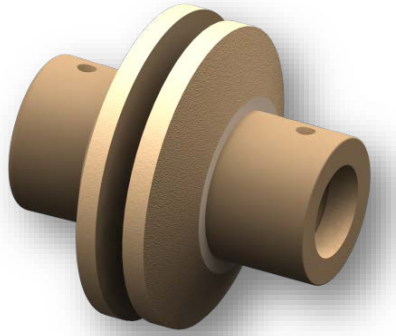
FRP ENTRY FITTINGS

FRP Entry Fittings

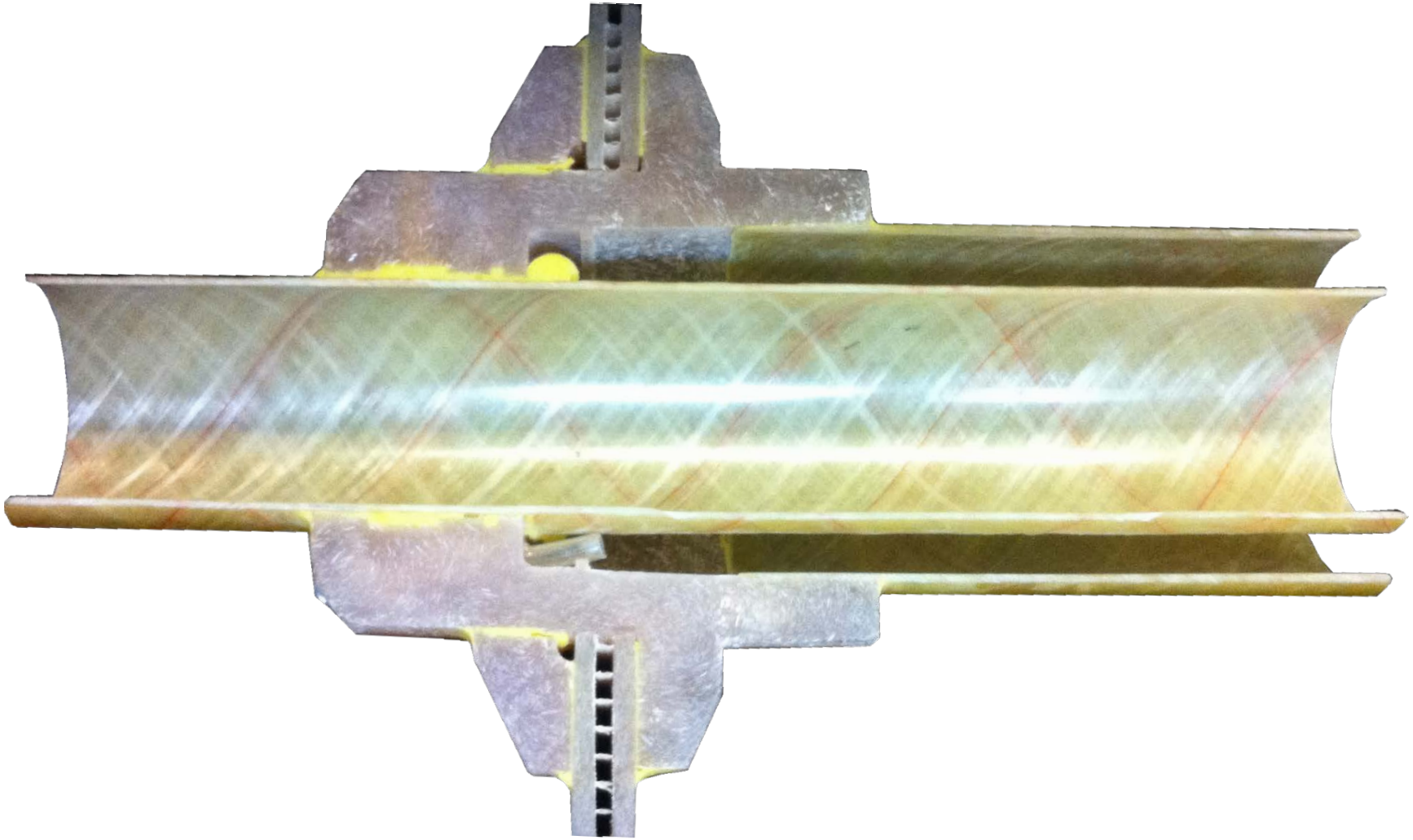
For New Construction:

- All-Fiberglass F-Series “Full Body” entry for Product and Conduit
- “Tank-Spec” fiberglass with integrated external flange and loose interior flange
- Size over size for 2”, 3”, 4” & 6” FRP pipe
- Conduit models for 3/4” and 1” galvanized or PVC-coated conduit
- Dual test ports at 9 and 6 ‘o-clock with plug & shrader valve included
- Pipe / conduit sealed via adhesive injection
- Secondary has a standard tapered joint
- LCX models can pass through or terminate secondary within fitting





FRP Entry Fittings



PROBLEM SOLVED

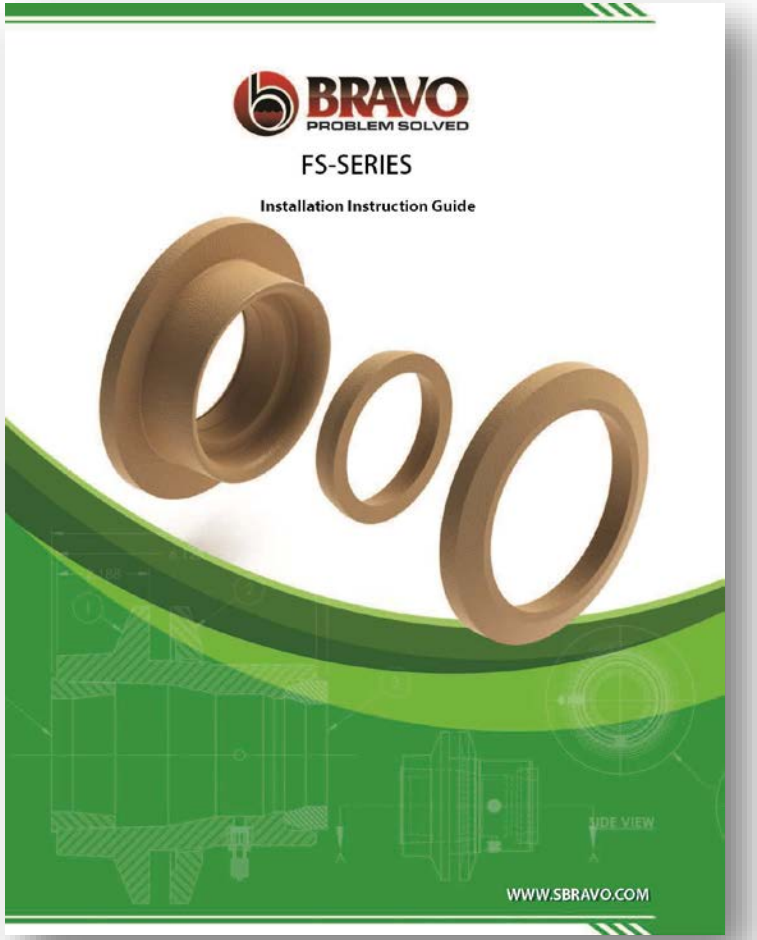
FRP Entry Fittings

- The F-32U-T entry fitting is universal for both size over size and LCX pipe
- It is for both single- and doublewall sumps
- It is compatible with both series and parallel piping

FRP Entry Fittings

FRP Entry Fittings

- Pass through versions are also available
- These will require a separate test reducer to terminate from primary to secondary pipe



FRP Retrofit Fittings

Typical Size over Size

RETROFIT-S

- **PERMANENT AND FINAL SOLUTION** TO ELIMINATE YOUR LIABILITY AND AVOID CONTAMINATION AND WATER INTRUSION.
- **FAST AND EASY INSTALLATION** EASIER AND FASTER TO INSTALL THAN CONVENTIONAL FLEXIBLE ENTRY BOOTS.
- **ACCOMODATES ALL PIPING ANGLES** AS HIGH AS 45° WITHOUT FAILURE.
- **ACCOMODATES CONDUIT BENDS** EVEN WHEN THE SWEEP BEGINS WITHIN THE WALL.
- **THE ONLY RETROFIT FITTINGS** IN THE WORLD THAT FEATURE:
  - ZERO MAINTENANCE
  - ZERO CORROSION
  - ZERO MATERIAL DEGREDATION
  - THIRTY YEAR WARRANTY

FROM THE BRAND THAT INVENTED SECONDARY CONTAINMENT, GET YOUR

PROBLEM SOLVED

Close proximity & high angle

Fitting on curved sump

Product & Vapor lines

FRP Retrofit Fittings

Epoxy/Adhesive Cure Times

EP-100 (New), EP100-RF (Retrofit)

Ambient Temperature, (F°)	Work Time in minutes	Cure Time in hours
60°	45 min	6 Hours
70°	30 min	3 Hours
80°	25 min	2.5 Hours
90°	15 min	2 Hours

Less than 60°, Warm Epoxy to 70° before use
Epoxy will stop curing at 40°

Epoxy/Adhesive Cure Times

Nylon Adhesive

Ambient Temperature, (F°)	Cure Time in hours
50°	24
70°	18
90°	13
120°	10

- Less than 45°, Warm Epoxy to 70° before use
- Heat can be added to reduce cure time, must be safe for the environment and equipment

Epoxy/Adhesive Cure Times

Adhesive-PE-Kit	
Max Open Time	10 Minutes
Work Time	8 Minutes
Time for Full cure	24 Hours
Anticipated Shelf Life under conditions	
if Frozen 0° or below	1 year
Below 40° or Refrigerated	6 months
Ambient temp 76°	45 Days
Ambient Temp 94°	22 Days

Epoxy/Adhesive Cure Times

Bravo Lamination Kit

FRP-407-Kit

DRAFT/ WORK IN PROGRESS

DRAFT/ WORK IN PROGRESS

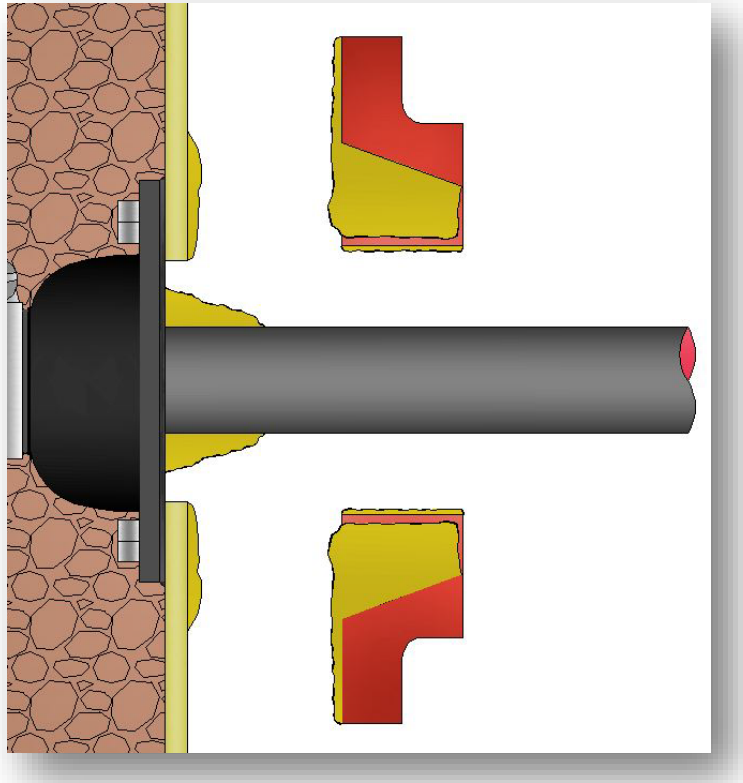
Ambient Temperature, (F°)	Work Time in minutes based on proper resin to catalyst ratio	Cure Time in hours
Less than 60°, store resin at 70° or indoors over night		
60°	30	6 Hours
70°	20 min	3.5 Hours
80°	20 min	2.5 Hours
90°	12 min	2 Hours
More than 90°, Chill Epoxy to 70°		

Summer Catalyst	2 bottles per gallon of Resin
Winter Catalyst	4 bottles per gallon of Resin

More than 90°, Chill Epoxy to 70° to extend work time

FRP Retrofit Fittings

- Apply epoxy to wall before installing main split fitting body
- *NOTE: The curved flange isn't needed if the wall is flat. Toss it!*
- Apply liberal amount of epoxy to interior draft feature – almost full
- Press fitting body firmly into place using the alignment stripe as a guide

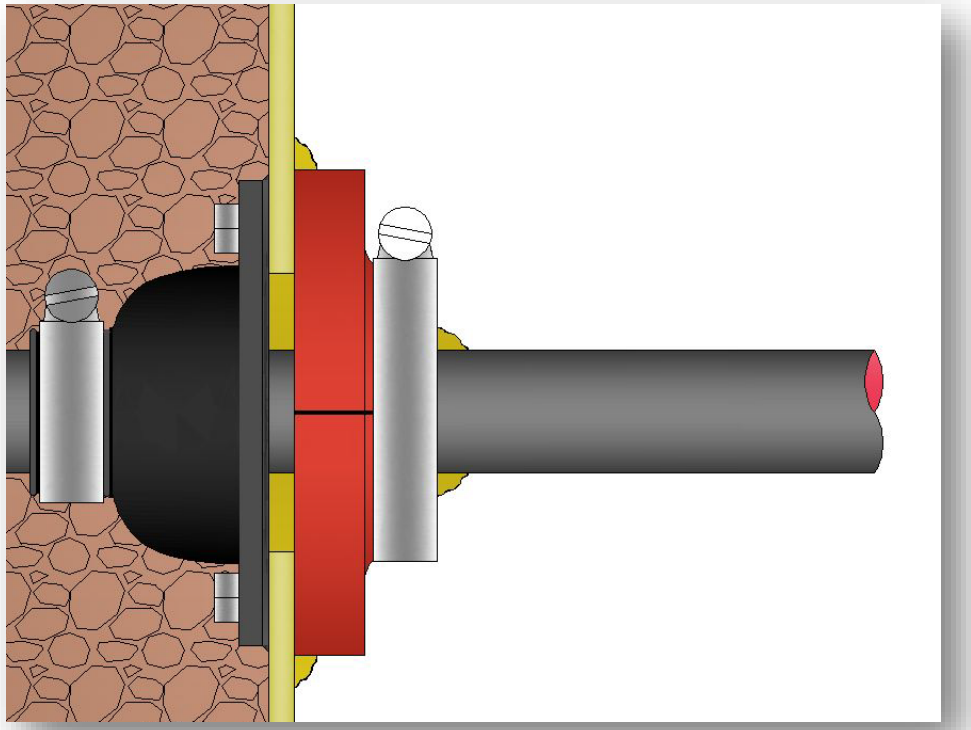


FRP Retrofit Fittings

- Use the included hose clamp to secure the two halves of the fitting body together during cure
- Bead the epoxy that oozes out around all seams with a gloved finger

<u>RECOMMENDED:</u>

- Clean the face of the fitting with acetone to make it look presentable but do not wipe epoxy away from the primary seams at wall and pipe



FRP Retrofit Fittings

FRP Retrofit Fittings

Removal of the interior portion of the fittings

FRP Retrofit Fittings

Surface prep and installation of the FRP sleeve adaptors

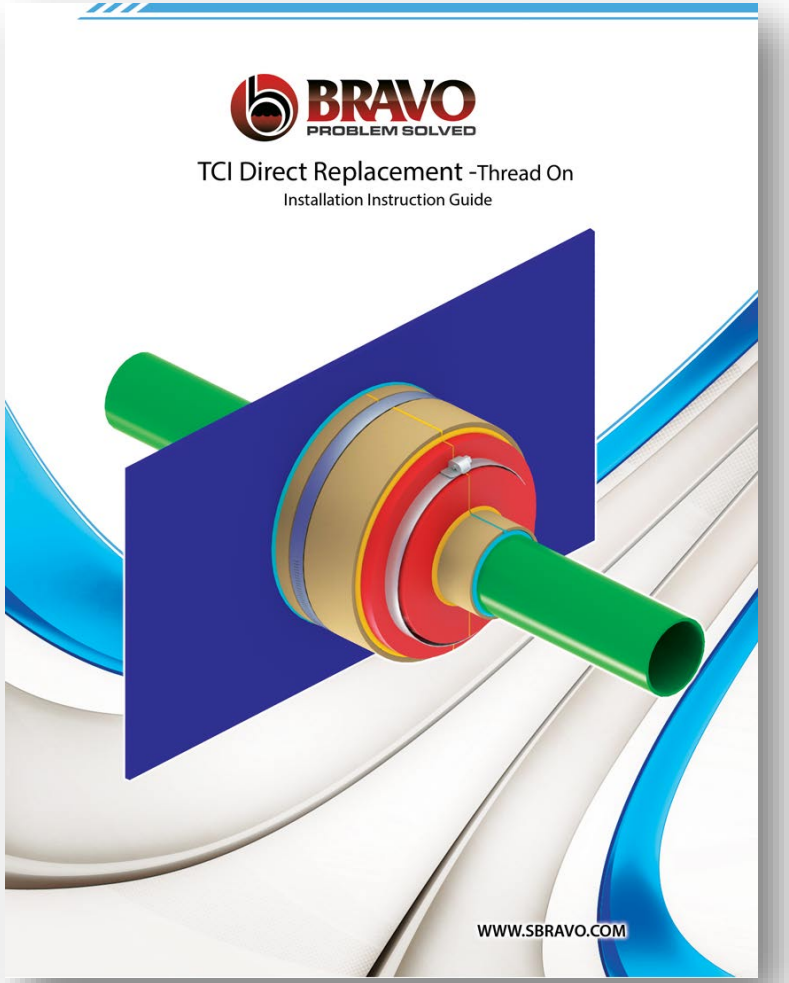
FRP Retrofit Fittings

Completed FLX installation

FRP Retrofit Fittings

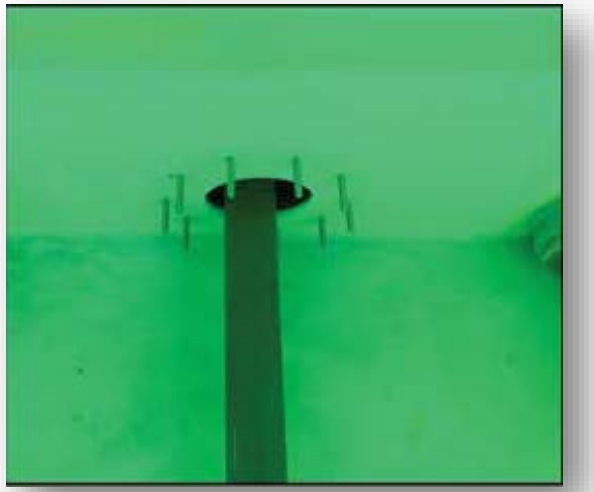
FRP Retrofit Fittings

FRP Retrofit Fittings

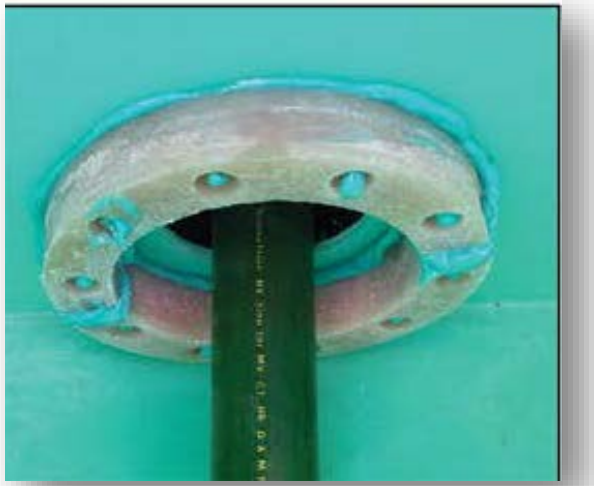


FRP Retrofit Fittings

- Remove interior portion of existing penetration fitting
- Clean and scuff the interior sump wall



FRP Retrofit Fittings



Place the mounting ring on the existing studs and tighten hose clamp

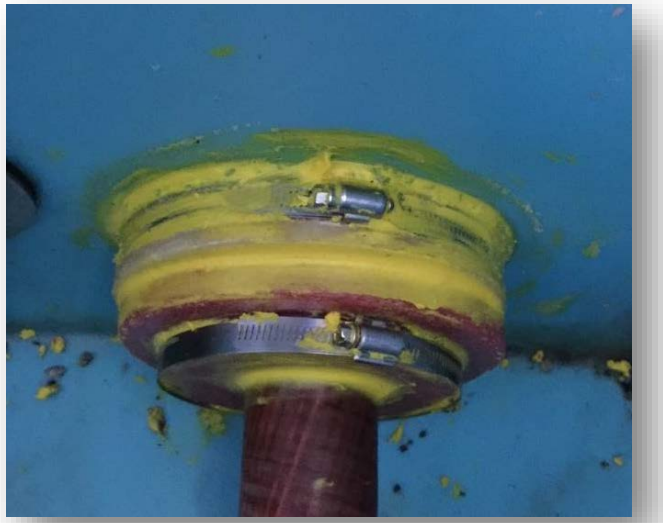
FRP Retrofit Fittings

Install the nuts and clean up excess adhesive - complete installation

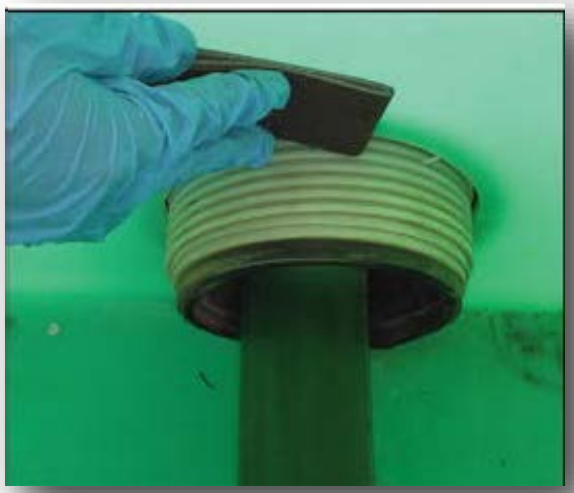
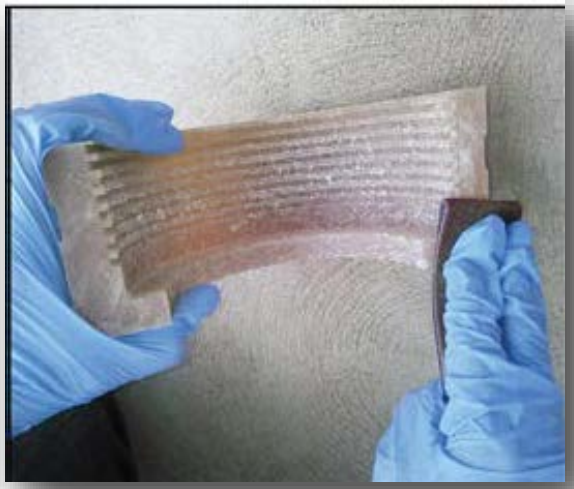
FRP Retrofit Fittings

Seat the fitting flange in place firmly and ensure all beads are sealed

FRP Retrofit Fittings



FRP Retrofit Fittings



PROBLEM SOLVED

FLEXIBLE PIPING

FLEXIBLE PIPING IDENTIFICATION

Visual identification chart used to identify common flex-pipes.

- Nupi
- UPP
- APT Poly Tech
- APT XP
- OPW CP 15 & 20
- OPW Flex-works
- Western FG
- Environ Geo D & Plus

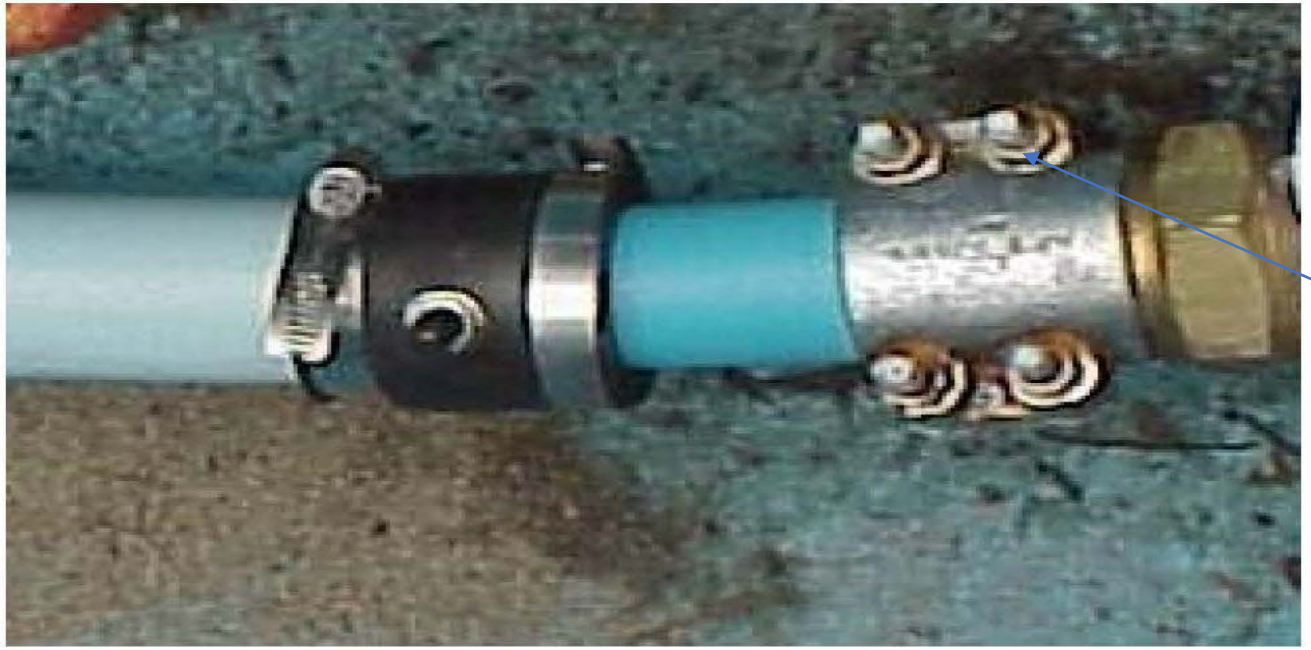
FLEX PIPE - NUPI

Nupi pipe is black polyethylene. It generally uses green electro fusion couplers.

FLEX PIPE - UPP

UPP pipe is either black or green. It is very similar to Nupi and comes in the same metric sizes. It is made from polyethylene.

FLEX PIPE - APT POLY TECH (1ST Generation)



First generation APT had a polyethylene secondary. The primary is dark blue and the secondary is light blue. It's easily identified by the 4 bolt end fitting.

FLEX PIPE - APT – XP PIPE (2nd Generation)

XP Pipe has a secondary made of nylon. The secondary is dark blue and the primary is light blue. It is easily identifiable by the 2 bolt end fitting.

2 bolt end fitting

FLEX PIPE - OPW CP-15 & 20 (Pisces)

OPW Pisces pipe has either a blue or purple secondary made of polyethylene.

FLEX PIPE - OPW FLEX WORKS

OPW Flex-works has a blue primary with a clear secondary made of PVDF.

FLEX PIPE - WESTERN FG (2ND Generation)

The current generation of co-flex pipe has a grey primary and a clear secondary made of PVDF.

FLEX PIPE - ENVIRON GEO-FLEX PLUS

Geo-Flex Plus was manufactured until Environ closed. It has a green primary and a clear secondary made of PVDF.

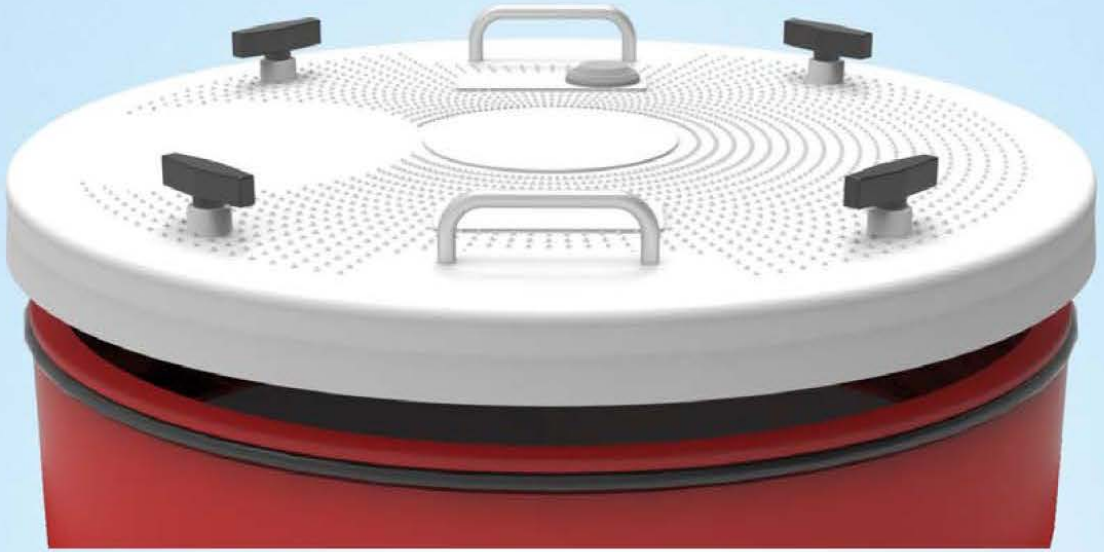
FLEX PIPE - ENVIRON GEO-FLEX D

Environ Geo-Flex D pipe has a white primary and a green secondary made of polyethylene.

Retrofit water-tight "Snap-Lock" sump lids

NEXT-GENERATION DESIGN THAT MAKES TWIST-LOCK COVERS OBSOLETE...

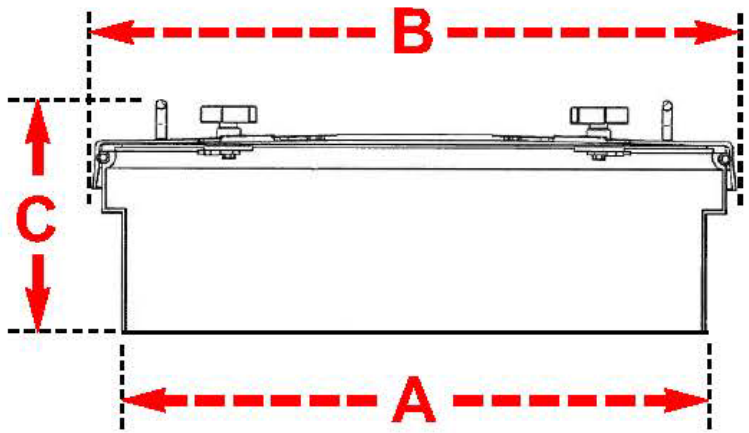
SNAP LOCK SHOWN



NON LOCK AVAILABLE

TESTED TIGHT UNDER 5 FEET OF WATER

Retrofit water-tight sump lids



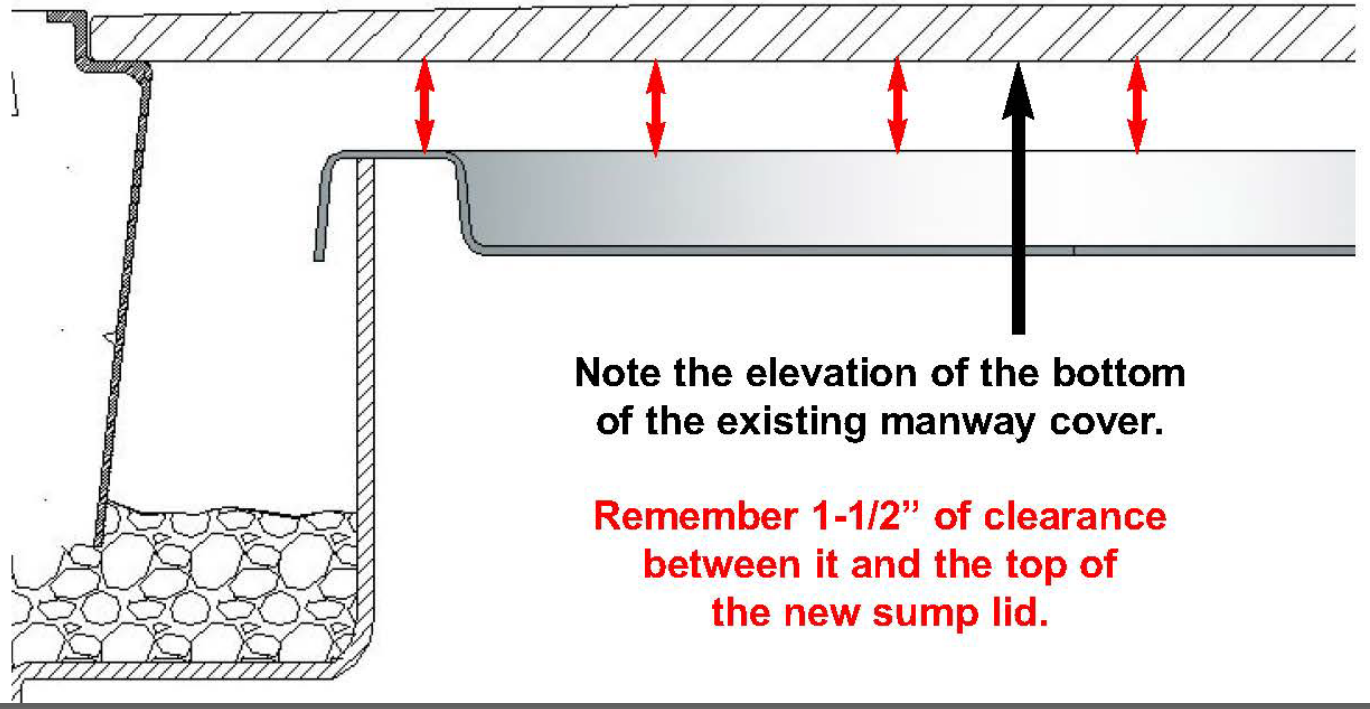
Part Number:	Reducer O.D. (A)	Maximum O.D. (B)	Total Ht. (C)
RC-32-10T-30-SL	30”	33-1/2”	12”
RC-32-10T-31-SL	31”	33-1/2”	12”
RC-32-10T-32-SL	32”	33-1/2”	12”
RC-32-10T-33-SL	33”	33-1/2”	12”
RC-32-10T-34-SL	34”	34”	12”
RC-32-10T-35-SL	35”	35”	12”
RC-32-10T-XX-SL	CHOOSE	≥ 33-1/2”	12”

Retrofit water-tight sump lids

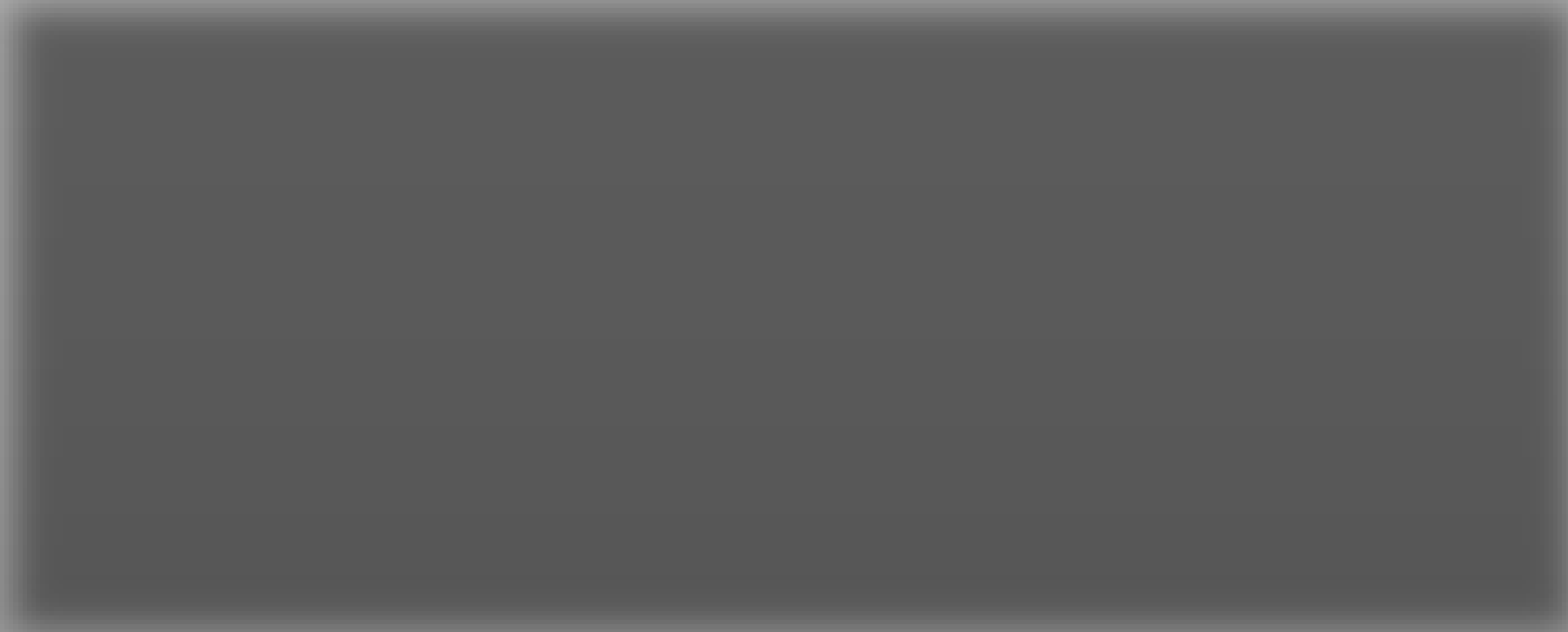
2) Clearances

During all measuring, ensure that you plan for a minimum clearance of 1-1/2" from the very top of the Bravo SNAP-LOCK retrofit cover (fully assembled) to the bottom of the existing manway cover.

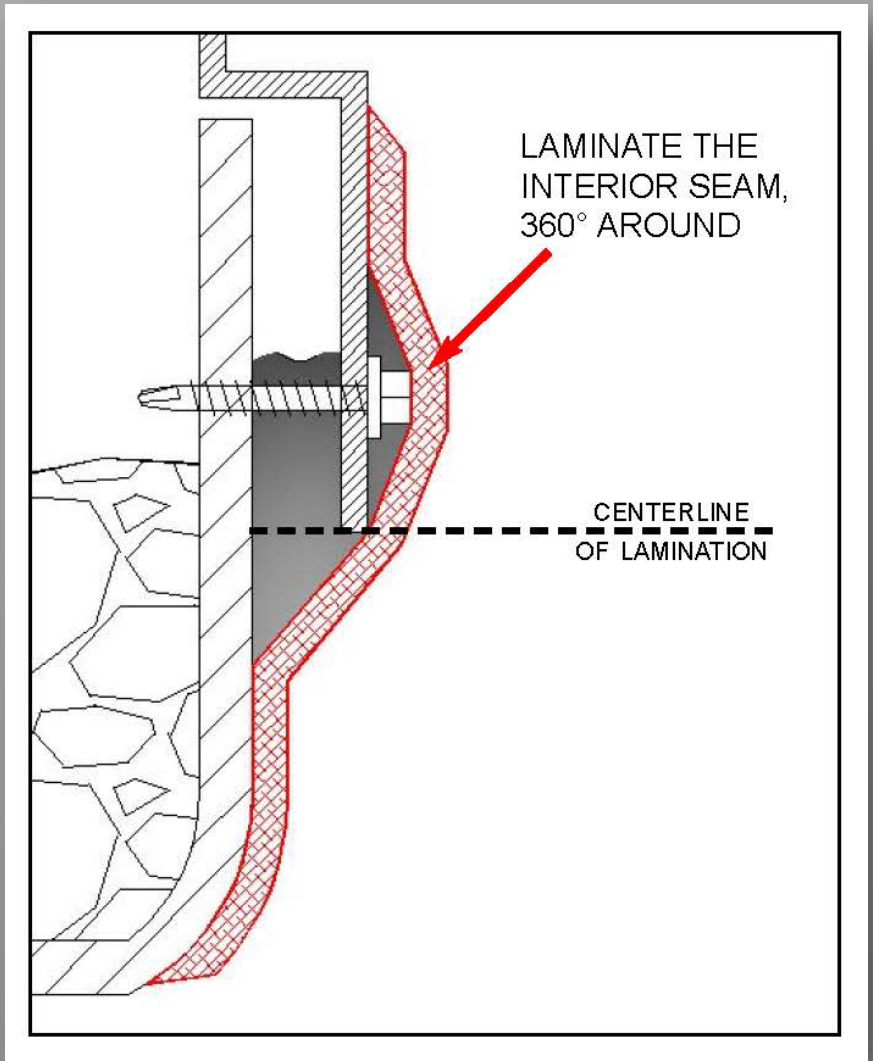
Dry fit the retrofit reducer into the existing tank sump reducer and ensure it fits INSIDE without issues.



Retrofit water-tight sump lids



Retrofit water-tight sump lids



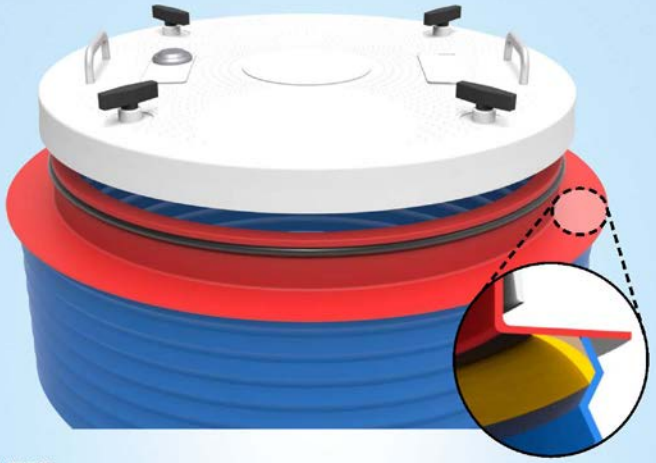
Laminate over the seam, covering the head of the screw

Retrofit water-tight sump lids

Retrofit water-tight sump lids

RCP RETROFIT **SNAP-LOCK** COVER
FOR POLYETHYLENE TANK SUMPS
32" DIAMETER COVER WITH FLANGED OPTIONS
MANUFACTURED OF FIBERGLASS

WATER-TIGHT SNAP-LOCK RETROFIT FOR *POLY*



FEATURES:

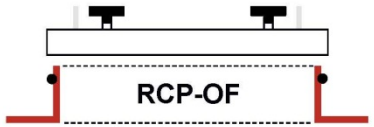
> Water-Tight SNAP-LOCK for poly sumps
> All "FRP" construction
> Three flanged models to choose
> Includes poly and epoxy bonding kits
> LOTS of adhesive included for each

E85 UP TO E100 & B100

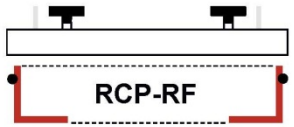
BUILT LIKE A TANK
High-end materials match UST spec UL1316 to ensure longevity and fuel compatibility

PATENT PENDING 15A

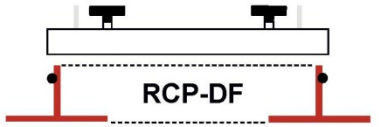
BRAVO PROBLEM SOLVED WWW.SBRAVO.COM 800-AT-BRAVO made in USA Certified WBENC PEI MEMBER



OUTER FLANGE STYLE



REVERSE FLANGE STYLE



DOUBLE FLANGE STYLE

OF - OUTER FLANGED SL REDUCER

Part Number:	Flange O.D.	Flange I.D.	Assembled Height	Included Kits Epoxy / PE	List
RCP-OF-SL32	42"ø	32"ø	5"	4 EP100 / 250ml PE *	$ 977

RF - REVERSE FLANGED SL REDUCER

RCP-RF-SL32	32"ø	23"ø	5"	3 EP100 / 250ml PE *	$ 885

DF - DOUBLE FLANGED SL REDUCER

RCP-DF-SL32	42"ø	23"ø	5"	4 EP100 / 250ml PE *	$ 1125

FOR 8" INSPECTION PORT, ORDER: INSP-PORT-8INCH AT $ 198 LIST

* ONE "MAN-GUN-FS-10" IS REQUIRED PER JOB SITE AT $ 230 LIST

Retrofit water-tight sump lids

Sand and clean the top 2” of the poly reducer.

Retrofit water-tight sump lids

Use a roller to incorporate PE Adhesive into C-Vail

FRP Retrofit Fittings

Place C-Vail strips on the inside lip of the poly reducer and fold over the top.

FRP Retrofit Fittings

Use a chamfer roller to smooth out the strips. The strips should over lap each other approximately 1”.

FRP Retrofit Fittings

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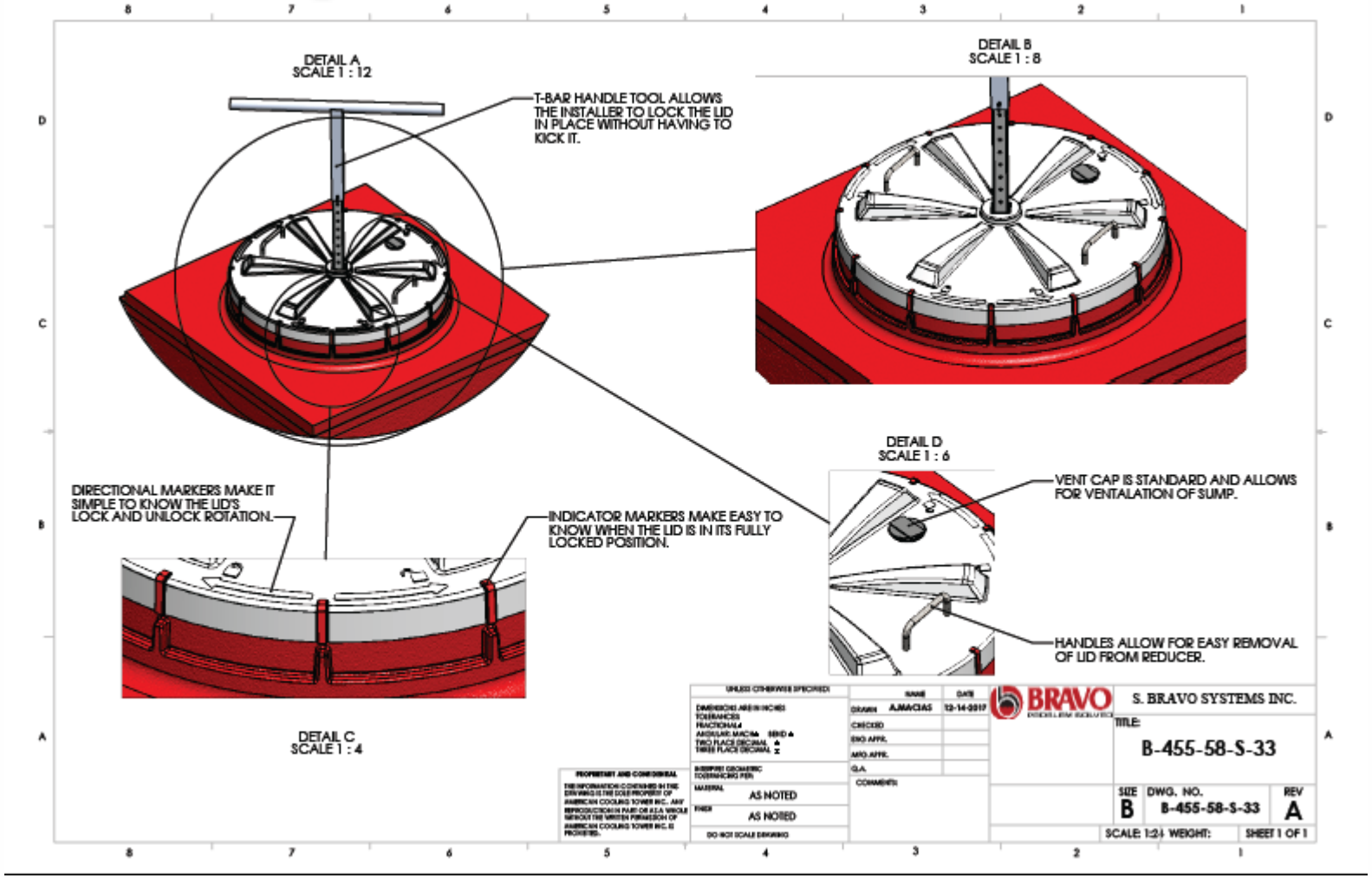
FRP Retrofit Fittings

Firmly press reducer into place and 45 the epoxy bead from the inside. Allow to fully cure before attempting to install lid.

NEW Torque Lock Lid



Q & A

Test Questions
1

Bravo retrofit fittings can never be field modified.

Test Questions
2

Bravo Retrofit-S series fittings handle 20 degrees of pipe angle without modification.

Test Questions
3

You can double the catalyst used in Bravo retrofit epoxy if the temperature is below 50 degrees.

Test Questions
4

All gel-coat must be removed before bonding FRP entry fittings to the sump wall.

Test Questions
5

No surface preparation is necessary for poly sump walls when installing a retrofit fitting.

Test Questions

6

Generous adhesive application is always emphasized when installing Bravo retrofit fittings.

Test Questions
7

Bravo Retrofit S fitting kits are universal for round or flat FRP sumps.

Test Questions
8

Epoxy will cure below 30 Degrees F.

Test Questions
9

All flexible piping is manufactured from the same type of plastics.

Test Questions
10

Bravo RCP Series retrofit water-tight sump lids can be used on polyethylene tank sumps.

Test Questions
11

Double wall constantly monitored sumps must be hydro tested every three years.

Test Questions
12

Single wall and double wall sumps use the same entry fittings.

Test Questions
13

No tool is needed to tighten TCI direct replacement retrofit fittings.

Test Questions
14

Bravo epoxy adheres to fiberglass, steel, PVC, & PVDF.

Test Questions
15

When dealing with flexible piping you should always dry fit the FRP sleeve adaptor and trim as needed.

Test Questions
16

Direct replacement retrofits can only be used on FRP sumps.

Test Questions
17

All retrofits except direct replacements are universal for round or flat sump walls

Test Questions
18

Retrofit sump lid configurations are available for FRP sumps, poly sumps, and adjustable height.

Test Questions
19

Bravo yellow epoxy can be used as a substitute for poly adhesive if none is available.

Test Questions
20

Bravo has a flexible pipe identification chart available you can use to determine what the appropriate adhesive is for flexible piping.

Test Questions
21

Double wall sumps with dry interstice monitoring have the float sensor in a low point as opposed to hydrostatic sumps which have the sensor near the top of the sump.

Test Questions
22

The sump wall must be dry and all water intrusion must be stopped before bonding a fitting to the wall.

Test Questions
24

When installing the mounting ring for a studded direct replacement fitting you should always tighten the band clamp before tightening the nuts on the studs.

Test Questions
25

You can use any manufacturers epoxy to install Bravo retrofit fittings

Test Questions
26

You should never overcoat exposed poly adhesive with EP-100RF (Bravo epoxy).

Test Questions
27

Hose clamps must always be removed from the FRP sleeve adaptors when installing FLX Series retrofit fittings.

Test Questions
28

Double wall sumps require 3 layers of lamination to attach to a tank collar.

Test Questions
30

You must always maintain 1.5” of clearance between the highest point on your sump lid and the bottom of the traffic cover.