OPW
FUELING CONTAINMENT SYSTEMS

71SO Overfill Prevention Valves and 71SO Testable Overfill Prevention Valves Installation and Maintenance Instructions

IMPORTANT INFORMATION FOLLOW ALL INSTRUCTIONS

Please read these warnings and use and assembly instructions completely and carefully before starting. Failure to do so may cause product failure, or result in environmental contamination due to liquid leakage into the soil, creating hazardous spill conditions.

OPW Standard Product Warranty Tag: Notice: FlexWorks by OPW, Inc., VAPORSAVER™ and all other OPW products must be used in compliance with all applicable federal, state, provincial and local laws, rules and regulations. Product selection is the sole responsibility of the customer and/or its agents and must be based on physical specifications and limitations, compatibility with the environment and material to be handled. All illustrations and specifications in this literature are based on the latest production information available at the time of publication. Prices, materials and specifications are subject to change at any time, and models may be discontinued at any time, in either case, without notice or obligation.

OPW warrants solely to its customer (the initial purchaser and any subsequent purchasers within the warranty period) that the following products sold by OPW will be free from defects in materials and workmanship under normal use and conditions for the periods indicated:

PRODUCT	WARRANTY PERIOD
FlexWorks Primary Pipe	10 years from date of manufacture
All Products and replacement parts installed in the State of California Certified to California CP -201 and/or CP-206 Standards*	1 year from date of installation (proof of purchase from certified contractors/ technicians required) OPW warrants ongoing compliance with the standards and specifications for the duration of the warranty period required by the State of California; this limited warranty is under the condition the equipment was installed and maintained by trained and certified contractors/ technicians unless noted in Installation Manual.
All other Products and replacement parts	1 year from date of manufacture**
*Products certified to California CP-201 and/or CP-206 Standards have been factory tested and met all applicable performance standards and specifications and will have an OPW registration card enclosed/attached to the product.	

OPW's exclusive obligation under this limited warranty is, at its option, to repair, replace or issue credit (in an amount not to exceed the list price for the product) for future orders for any product that may prove defective within the applicable warranty period. (Parts repaired or replaced under warranty are subject to prorated warranty coverage for remainder of the original warranty period). Complete and proper warranty claim documentation and proof of purchase required. All warranty claims must be made in writing and delivered during the applicable warranty period to OPW at OPW 9393 Princeton-Glendale Road Hamilton, Ohio, USA 45011, Attention: Customer Service Manager. No products may be returned to OPW without its prior written authority.

This limited warranty shall not apply to any FlexWorks or VAPORSAVER™ product unless it is installed by an OPW attested installer and all required site and warranty registration forms are completed and received by OPW within 60 days of installation. This limited warranty also shall not apply to any FlexWorks, VAPORSAVER™ or other OPW product: unless all piping connections are installed with a nationally-recognized or state-approved leak detection device in each tank and dispenser sump (which are not for storage and from which all discharge hydrocarbons must be removed, and the systems completely cleaned, within 24 hours); unless testable sumps utilize FlexWorks pipe and access fittings; unless a sump inspection log or an EPA recommended/required checklist is maintained and the results are furnished to OPW upon request; and unless OPW is notified within 24 hours of any known or suspected product failure and is provided with unrestricted access to the product and the site. This limited warranty also shall not apply to any product which has been altered in any way, which has been repaired by anyone other than a service representative authorized by OPW, or when failure or defect is due to: improper installation or maintenance (including, without limitation, failure to follow FlexWorks Quick Reference Manual Installation Guide and all product warning labels); abuse or misuse; violation of health or safety requirements; use of another manufacturer's, or otherwise unauthorized, substances or components; soil or other

surface or subsurface conditions; or fire, flood, storm, lightning, earthquake, accident or any other conditions, events or circumstances beyond OPW's control .

THIS LIMITED WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, AND ALL OTHER WARRANTIES INCLUDING, WITHOUT LIMITATION, THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE HEREBY EXCLUDED.

OPW shall have no other liability whatsoever, whether based on breach of contract, negligence, gross negligence, strict liability or any other claim, including, without limitation, for special, incidental, consequential or exemplary damages or for the cost of labor, freight, excavation, clean-up, downtime, removal, reinstallation, loss of profit, or any other cost or charges. No person or entity is authorized to assume on behalf of OPW any liability beyond this limited warranty. This limited warranty is not assignable.

**** Date of manufacture on this product is located on the flat area of the valve body, under float.**

GENERAL INSTRUCTIONS

The OPW 71SO Overfill Prevention Valve is designed for tight fill, gravity drop applications to help prevent accidental or intentional overfilling of underground storage tanks for use with automotive fuels and similar (fuels or liquids). It is installed in the UST drop tube in place of a standard drop tube.

The main 71SO valve closes when liquid reaches the initial shut off point. A small bypass valve remains open to allow the delivery hose to drain at 3-5 gallons per minute. If the delivery truck valve is not closed after initial shut-off, the bypass valve will close and will restrict all fuel delivery to ensure that the top of the tank is not wetted per EPA requirements.

The 71SO models of the 71SO are designed to be installed with the following OPW products: Face Seal Adaptor, OPW Spill Container or Multi-port, Jack Screw Kit, Rotatable Product Adaptor, and Product Cap.

IMPORTANT

Read these assembly and installation instructions completely and carefully prior to starting. Check to make sure all parts have been provided. Use only the parts supplied; substitution of parts may cause product failure.

Failure to follow instructions may cause improper product operation or premature failure which may permit storage tank overfill. An overfilled storage tank may create hazardous conditions and/or environmental contamination.

NOTE: Valve must be assembled and installed by a qualified person. The use of non-qualified personnel or any deviations from these recommended procedures could result in damage or malfunction.

CAUTION

Do not remove elastic band from around float until instructed to do so, as damage to valve may result.

WARNING

Failure to properly connect delivery hose and elbow, and/or disconnecting a liquid filled delivery hose or elbow will result in a hazardous spill, which may result in personal injury, property damage, fire, explosion, and water and soil pollution.

- Make sure all connections, including the hose and elbow connections, between storage tank and transport are securely coupled.
- Make sure the lip seal and/or all gaskets in the delivery elbow are properly in place to prevent spills.
- Do not operate with damaged or missing parts, which prevent tight connections.

Normal Operation: A Hose "Kick" and reduced flow signal that the tank is full. Close transport delivery valve and drain hose into tank before disconnecting any hose fitting.

Overfilled Tank: Failure of the hose to drain after closing the delivery valve signals an overfilled tank. Do Not Disconnect any delivery hose fitting until the liquid level in the tank has been lowered to allow the hose to drain into the tank.

WARNING

In the event you are splashed with fuel remove wet clothing immediately. Skin contact with gasoline can cause chemical burns and may result in inhalation of vapors that may be fatal. Never go inside confined areas after being splashed and never go near ignition sources.

IMPORTANT

Determine if the underground storage tank is equipped with a ball float vent valve, as illustrated in Figure 24. In all systems, the shut-off point of the 71SO must be reached before the ball float reduces flow to ensure proper overfill valve operation.

TOOLS NEEDED FOR INSTALLATION AND ASSEMBLY:

1. 71SO-TOOL or 71SO-TOOLC or
   71SO-TOOLCT (includes the following)
   - Sharp 3/16" drill bit with stop
   - Punch

NOTE: Testable 71SO models ending with a "T" require the 71SO-TOOLCT or modified 71SO-TOOL or 71SO-TOOLC.

2. Drill
3. Hammer
4. Tape measure
5. Hacksaw or cut-off saw, fine tooth; 24 teeth/inch
6. Fine half round file
7. Screwdriver - Phillips blade
8. Fine grit sandpaper / steel wool
9. Grease, black moly
10. Torque Wrench
11. Band clamp (3-3/4" diameter minimum)
12. TESTABLE MODELS ONLY: rivet tool for 1/8" mandrel, crimping tool / pliers, wire cutter / scissors, pipe dope, 1/4" square drive extension or 3/8" square drive extension with 3/8" to 1/4" socket adapter.

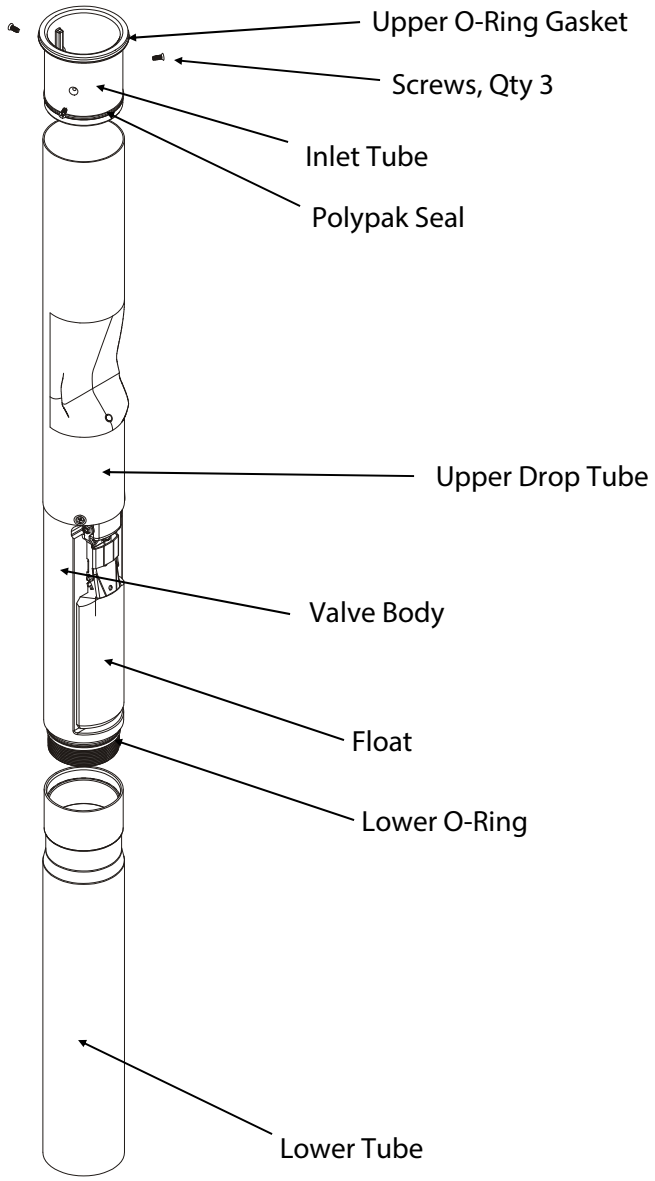
WARNING

Using electrically operated equipment near gasoline or gasoline vapors may result in fire or explosion, causing personal injury and property damage. Check to assure the working area is free from such hazards, and always use proper precautions.

IMPORTANT: The figures in this installation and maintenance instruction may contain vapor recovery equipment (including model numbers) that is not certified by the California Air Resources Board (CARB) for a specific Phase I Vapor Recovery System. Please refer to Exhibit 1 of the appropriate CARB Phase I Executive Order for a list of certified Phase I Vapor Recovery System Equipment.

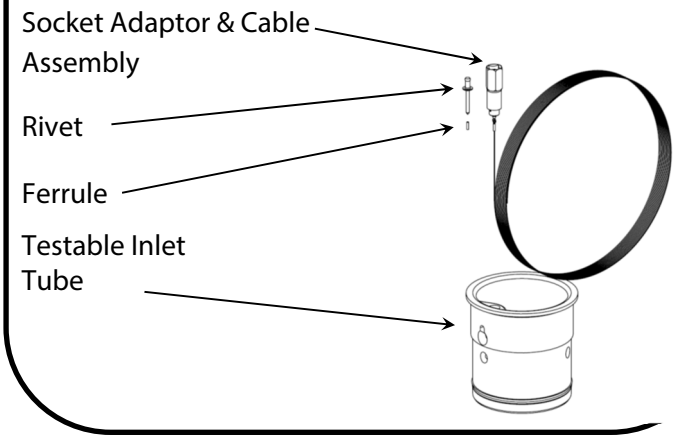
NOTE: Valve is not intended for storage in excessive temperatures. Rough handling (drops, impacts, crushing, dragging, etc.) may cause damage or malfunction during use. Visually inspect the valve prior to installation to ensure no damage to valve, float, tubes, etc. Damaged valves shall not be used.

71SO Parts Diagram



Alternate Components - Testable Versions

Note: ***all components are the same except the socket adaptor & cable assembly, rivet, testable inlet tube, and ferrule.***



IMPORTANT: The instructions below for the 71SO Overfill Prevention Valve are written for the initial stage shutoff at 95%, but can be adjusted to shutoff at any desired tank capacity. Please contact the Authority Having Jurisdiction (AHJ) and review local, state, and national codes to determine the regulatory requirements governing shut-off capacity in your region, as well as take into account other considerations such as extreme tank tilt. In all cases, the upper tube must protrude into the tank at least 6 1/2" to ensure that the valve can shut off flow into the tank completely before the top of the tank is wetted consistent with EPA requirements 40 CFR 280.20 (c) (1) (ii) (C).

HOW TO LOCATE THE POSITION OF THE 71SO AT 95% TANK CAPACITY

(Shut-off points can be adjusted to any capacity to comply with AHJ Requirements)

The length of the upper tube and the placement of the 71SO valve body determine the shut-off point. Following the standard instructions for the OPW 71SO will provide for initial shutoff at 95%. In all cases, the upper tube length must be a minimum of 6-1/2" plus the length of the riser pipe. All length measurements are in inches.

NOTE: When installing 71SO and the actual measured tank diameter is smaller than the tank diameter as designated on the tank calibration chart, use the smaller dimension in determining your 95% capacity from.

INSTRUCTIONS

1) Find tank capacity (in gallons) from tank calibration chart provided by tank manufacturer.
2) Calculate 95% of capacity
3) Locate the 95% volume number on the tank calibration chart.
4) Find the dipstick number (X) which corresponds to the 95% tank volume. And, find the dipstick number (Y) which corresponds to the 100% volume.
5) Subtract the dipstick number (X) from the tank diameter (Y) to find the upper tube reference number (Z).

   (Y) - (X) = (Z)

6) Subtract 2" from (Z) to find the upper tube depth (C) if initial shut-off at the specified percentage is desired. Add 1.5" to (Z) to find the upper tube depth (E) if final shut-off at the specified percentage is desired.

   (Z) - 2" = C ⟶ AHJ Requires Initial Shut-Off

   (Z) + 1.5" = (E) ⟶ AHJ Requires Final Shut-Off (refer to Appendix C for subsequent steps)

7) Is C less than 6-1/2"?

NO Upper tube length is C plus the distance from the top of the Face Seal Adaptor installed on the riser pipe to the inside, top lip of the storage tank (A).

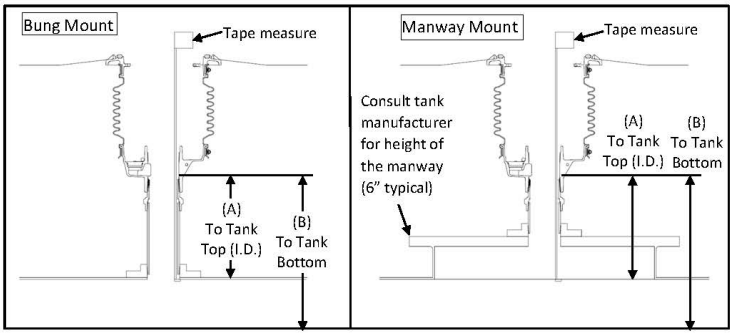
Upper Tube Length = C + (A)

For testable models only, ending in "T":
Upper Tube Length = C + (A) – 1-1/2"

YES Upper tube length is 6-1/2" plus the riser pipe measurement (A).

Upper Tube Length = 6-1/2" + (A)

For testable models only, ending in "T":
Upper Tube Length = 6-1/2" + (A) - 1-1/2"



NOTE: You must find the actual tank capacity number that correlates to the 6-1/2" + (A) depth for the station records. This number may also be used for the purposes of calibrating an electronic tank level system.

Figure 1

EXAMPLE

1) For an Owens-Corning Model G-3 Fiberglass® Tank Calibration Chart:
   Tank Capacity - 10,000 gal., nominal 9,403 gal.
   NOTE: Use actual capacity only
2) 95% of actual tank capacity = 0.95 x 9403 gal. = 8933 gal.
3) The closest number which is less than 8933 gal. Is 8910 gal. Choosing the closest number less than 95% of actual capacity ensures that the initial shutoff will occur when the tank is no more than 95% full.
4) The calibration chart reading of 8910 gal. corresponds to a dipstick measurement of 82".

5) Dipstick number (X) = 82″
Tank diameter (Y) = 92″
(Y) - (X) = (Z) (92″ - 82″ = 10″)
(Z) = 10″

6) (Z) - 2″ = C (10″ - 2″ = 8″)
C=8″

7) Is 8″ less than 6-1/2″?

NO Measure the distance from the top of the FSA-400 Face Seal Adaptor installed on the riser pipe to the inside, top lip of the storage tank and obtain measurement (A).

Upper tube length = C + (A)

For testable models only, ending in "T": Upper Tube Length = C + (A) - 1-1/2″

ASSEMBLY INSTRUCTIONS

IMPORTANT: Each of the numbered steps in the installation instructions are designed as a CHECK LIST to ensure proper installation and trouble free operation of the OPW 71SO Overfill Prevention Valve.

Read and follow these steps carefully, checking them off as you proceed.

Figure numbers correspond to step numbers for easy reference.

STEP 1: MEASURE

Install the OPW Face Seal Adaptor and the OPW Thread-on Spill Container on the Fill Riser (Refer to the Installation Instructions Supplied with the Spill Container). Insert a tape measure through the riser pipe and hook it under the inside of the tank in the lengthwise direction. Measure the distance from the top of the Face Seal Adaptor threads inside the base of the spill container bucket just below the drain valve outlet window to the inside, top lip of the storage tank (Dim. "A") **(See Figure 1 &1A).**

The top flange on the 71SO will rest on the Face Seal Adaptor just below the drain valve outlet, and be locked in place between the Face Seal Adaptor and the 4" nipple that is installed in the spill container with the Jack Screw Kit **(See Figure 1A).** (For riser pipe configurations other than that shown, consult installation drawings or use other necessary means to measure Dimension "A").

Using a tape measure, measure the distance from the top of the Face Seal Adaptor in the spill container to the bottom of the tank (Dim. "B").

IMPORTANT: Inspect the riser pipe for any foreign material. Over spray from tank relining or any internal burrs inside of pipe must be removed prior to installation. Failure to have an unobstructed riser pipe may prevent proper installation and operation of the valve. The 71SO is designed for installation into schedule 40 riser pipes. The 71SO cannot be installed into schedule 80 riser pipes.

STEP 2: MARK THE TUBE

Use the result from Step 1 and ***HOW TO LOCATE THE POSITION OF THE 71SO AT 95% TANK CAPACITY*** to mark the upper tube. Measure the distance from the seam where the upper tube and valve body meet. Use a tape measure to mark the calculated upper tube length onto the upper tube. **See Figure 2.**

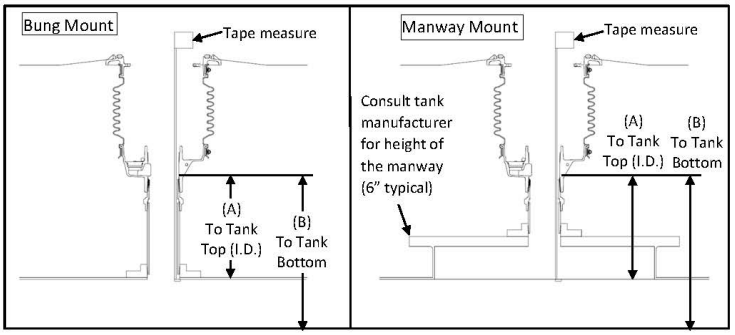


Figure 1

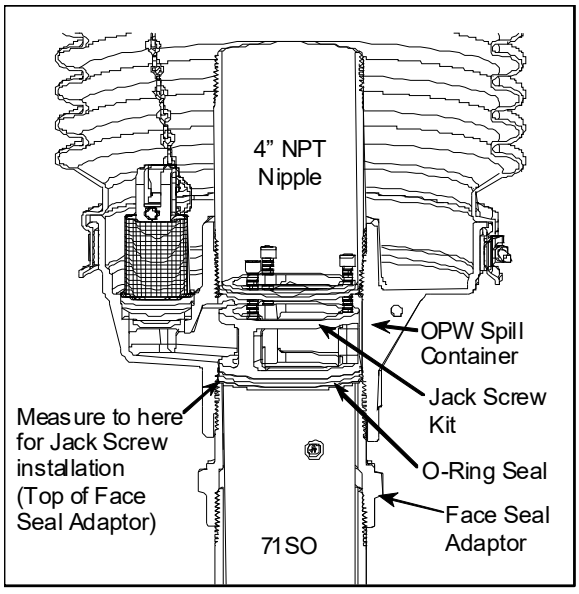


Figure 1A

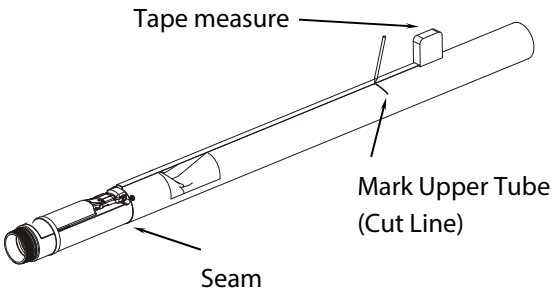


Figure 2

STEP 3: CUT THE UPPER DROP TUBE

Attach the supplied band clamp to the upper tube just below the mark and ensure that it is assembled square to the tube. The clamp can be used as a guide for making a square cut. If a vise is used, clamp on the valve body casting only to avoid damage to the float and tubes **(See Figure 3A).** Carefully saw through the tube squarely, at the mark made in Step 2. Use a hacksaw with a new fine-tooth blade. Rotating the upper tube as the sawing progresses will minimize run out and ensure a square 90-degree cut. Remove the band clamp after tube is cut.

CAUTION - DO NOT use a pipe or tubing cutter to cut the upper drop tube, this may damage the tube, causing it to be out of round thereby prohibiting assembly of the unit.

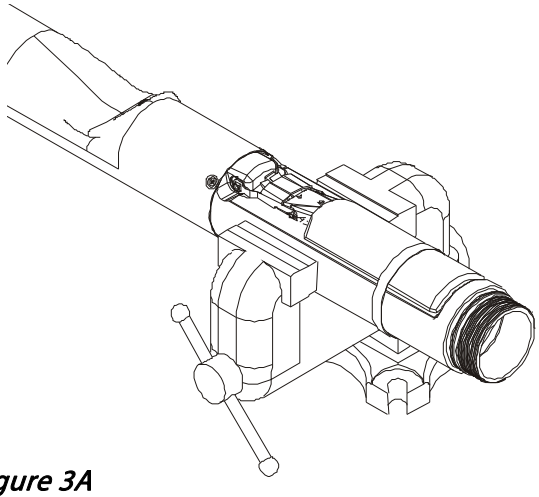


Figure 3A

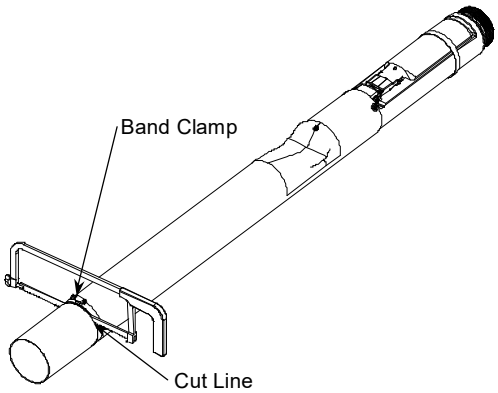


Figure 3B

IMPORTANT: Remove all chips and shavings generated in steps 3 thru 5 out of the cut end of the tube. DO NOT remove chips and shavings by dumping thru valve body.

STEP 4: FILE THE UPPER DROP TUBE

File the upper tube square, and remove any burrs or rough edges. Make sure the cut is flat and square.

IMPORTANT: Carefully file a good chamfer on the inside edge of the drop tube to provide a lead-in for the polypak seal and inlet tube installed in Step 8.

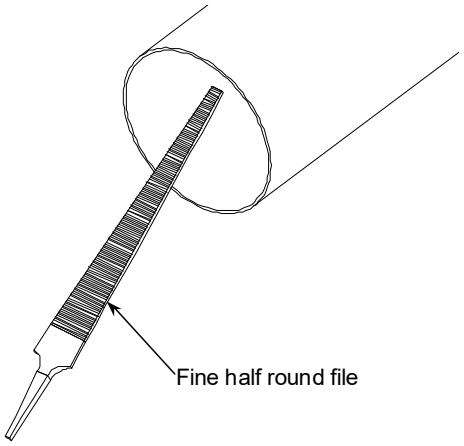


Figure 4

STEP 5: SAND THE UPPER DROP TUBE

Sand the inside of the drop tube with sandpaper and/or steel wool to remove all burrs and sharp edges. After sanding wipe down the inside of the tube with a clean rag from the top to approximately 4 inches down to remove any debris.

Caution: Failure to properly chamfer, sand, and clean the drop tube may cut the seal and result in a failure of a pressure decay leak test.

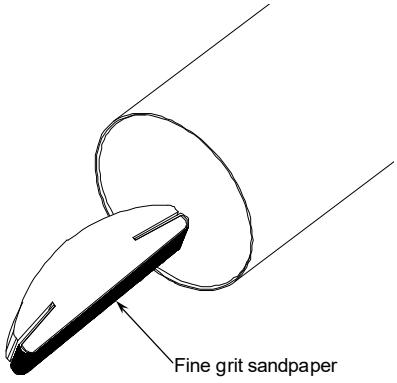


Figure 5

STEP 6: APPLY GREASE TO DROP TUBE

Apply black moly grease to the inside diameter of the upper drop tube. Make sure coverage is completely around the tube as shown in **Figure 6.**

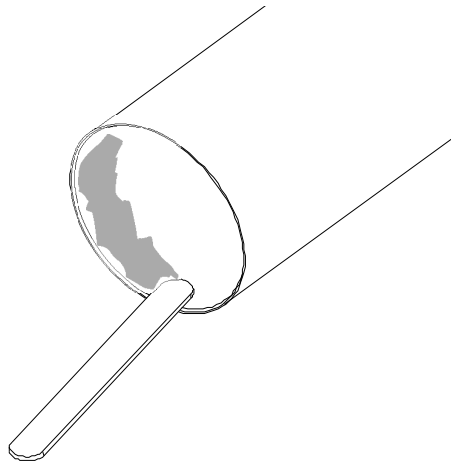


Figure 6

STEP 7: APPLY GREASE TO POLYPAK SEAL

Ensure that the polypak seal is installed on the inlet tube with the lip up as shown in ***Figure 7***. Apply black moly grease to the polypak as shown. Make sure coverage is completely around the polypak seal.

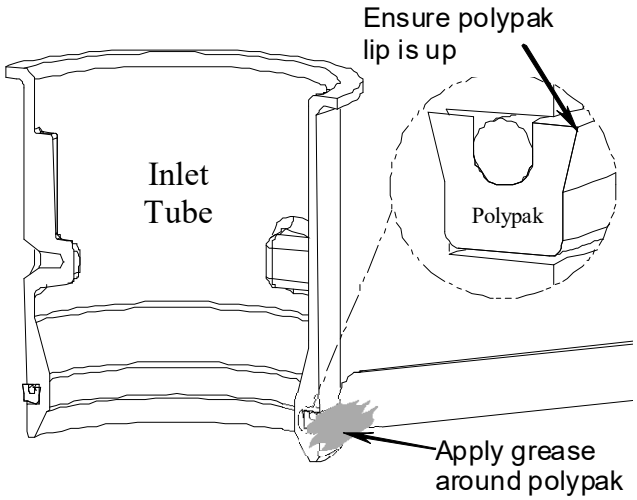


Figure 7

STEP 8: INSTALL INLET TUBE

Insert the inlet tube into the upper tube until the upper tube seats against the flange on the inlet tube. Ensure polypak is inserted evenly and stays in inlet tube groove.

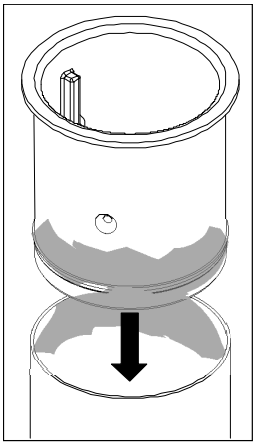


Figure 8

NOTE: Testable inlet tube must have cable port in line with float. Testable inlet tube bottoms out on stop, it does not bottom out on inlet flange. ***See Figure 8A***

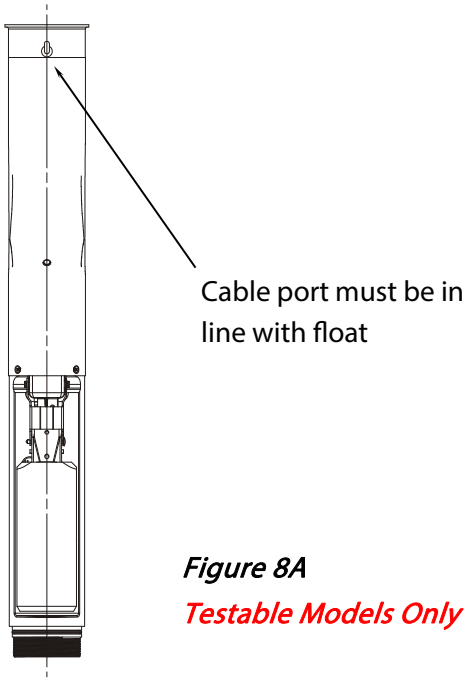


Figure 8A

Testable Models Only

SEE PAGE 8 FOR INSTRUCTIONS USING THE 71SO-TOOL.

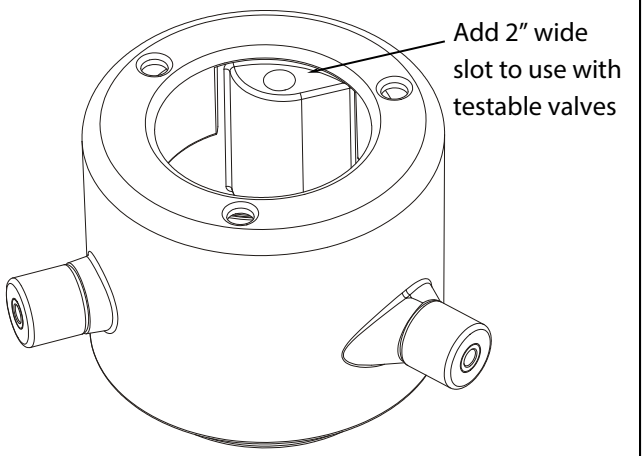
SEE PAGE 9 FOR INSTRUCTIONS USING THE 71SO-TOOLC.

SEE PAGE 10 FOR INSTRUCTIONS USING THE 71SO-TOOLCT.

Note: testable 71SO models ending with a "T" require the 71SO-TOOLCT or modified 71SO-TOOL or 71SO- TOOLC

71SO-TOOL PROCEDURE BELOW,
FOR 71SO-TOOLC, SEE PAGE 9
FOR 71SO-TOOLCT, SEE PAGE 10

Note: 71SO-TOOL can only be used with testable overfill valves if modified as shown below. A 2" wide slot must be added to accommodate cast lug.



71SO-TOOL Modifications for Testable Inlet

STEP 9A: INSERT 71SO-TOOL OVER INLET TUBE

To install the 71SO-TOOL (sold separately) over the inlet tube, first loosen all three knobs, so the tool can pass freely over the inlet tube flange. Align the slot on the tool with the key on the inlet tube and insert the tool down. **See Figure 9A.**

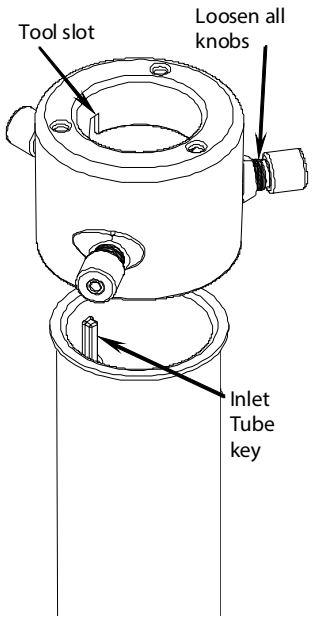


Figure 9A

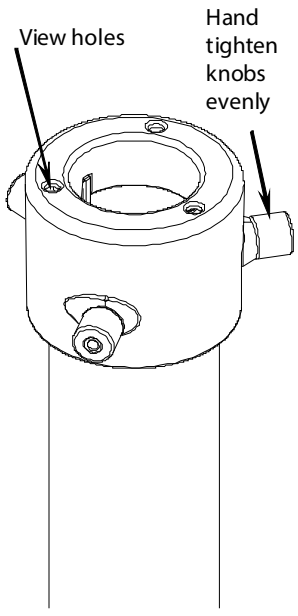


Figure 10A

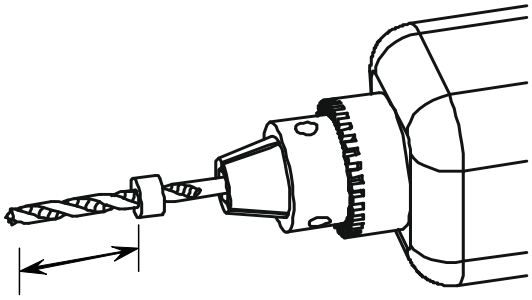
STEP 10A: TIGHTEN THE 71SO-TOOL

Use the three view holes to ensure that the tool seats out flat against the top of the inlet tube. To prevent vertical movement of the tool during drilling, hand tighten all three knobs evenly to the upper drop tube. **See Figure 10A.**

STEP 11A: PREPARE DRILL AND BIT

Confirm that the stop on the 3/16" drill bit supplied with the 71SO-TOOL is in the correct position before drilling. The stop is factory installed at a distance between 2" to 2-1/16" from the tip with the 71SO-TOOL. If the stop is not at the correct position it must be fixed before drilling.

CAUTION: If the drill stop is not in the proper location failure of a pressure decay leak test may result.



Tip to stop dimension must be
2" to 2-1/16".

Figure 11A

STEP 12A: DRILL HOLES

With the inlet tube and 71SO-TOOL in place, carefully drill a 3/16" diameter hole in the upper tube using the drill bushing in the knob as a guide. The drill stop is positioned so it will bottom out against the knob after the bit has drilled through the upper drop tube. If the stop is positioned wrong either no hole will be drilled, or a through hole could potentially be drilled through the inlet tube. If no hole is drilled return to step 11A and check the stop dimension. If a hole is drilled through the inlet tube or into the screw hole the assembly is not salvageable. Drill (2) more holes in the two remaining knobs.

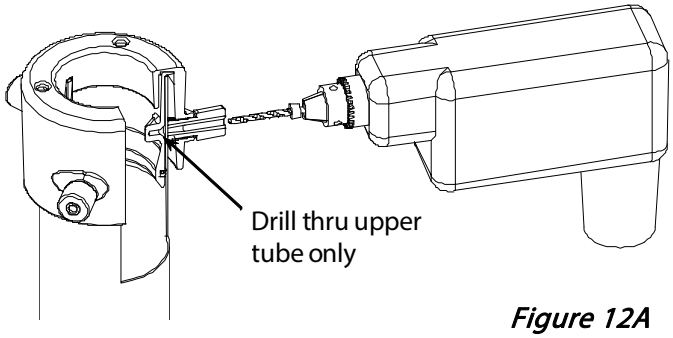
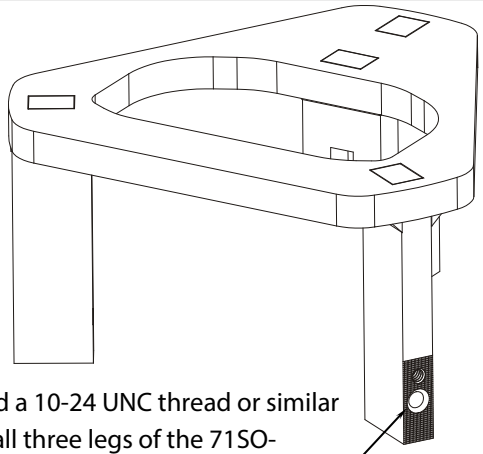


Figure 12A

71SO-TOOLC PROCEDURE BELOW,
FOR 71SO-TOOL, SEE PAGE 8
FOR 71SO-TOOLCT, SEE PAGE 10

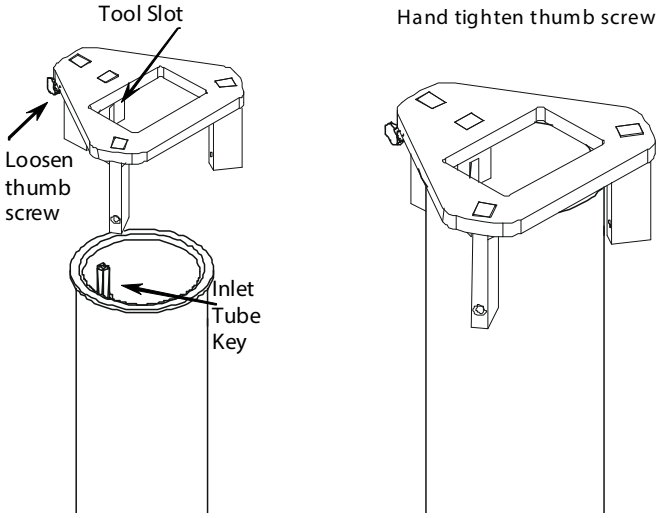
Note: 71SO-TOOLC can only be used with testable overfill valves if modified as shown below.



71SO-TOOLC Modifications for Testable Inlet

STEP 9B: INSERT 71SO-TOOLC OVER INLET TUBE

To install the 71SO-TOOLC (sold separately) over the inlet tube, first loosen the thumb screw, so the tool can pass freely over the inlet tube flange. Align the slot on the tool with the key on the inlet tube and insert the tool down. **See Figure 9B**.



STEP 10B: TIGHTEN THE 71SO-TOOLC

Ensure that the tool seats flat against the top of the inlet tube. To prevent vertical movement of the tool during drilling, hand tighten the thumb screw against the upper drop tube. **See Figure 10B**.

STEP 11B: PREPARE DRILL AND BIT

Confirm that the stop on the 3/16" drill bit supplied with the 71SO-TOOLC is in the correct position before drilling. The stop is factory installed at a distance between 1-3/16" to 1-1/4" from the tip with the 71SO-TOOLC. If the stop is not at the correct position it must be fixed before drilling.

CAUTION: If the drill stop is not in the proper location failure of a pressure decay leak test may result.

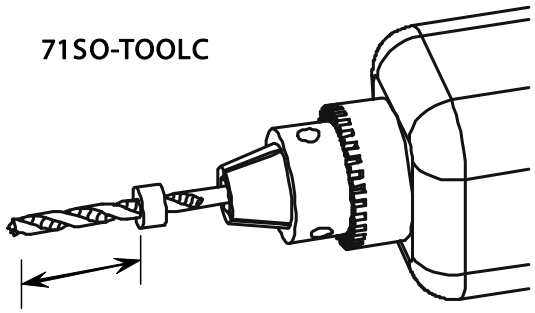


Figure 11B

STEP 12B: DRILL HOLES

With the inlet tube and 71SO-TOOLC in place, carefully drill a 3/16" diameter hole in the upper tube using the hole in the 71SO-TOOLC as a guide. The drill stop is positioned so it will bottom out against the tool after the bit has drilled through the upper drop tube. If the stop is positioned wrong either no hole will be drilled, or a through hole could potentially be drilled through the inlet tube. If no hole is drilled return to step 11B and check the stop dimension. If a hole is drilled through the inlet tube or into the screw hole the assembly is not salvageable. Drill (2) more holes in the two remaining guide holes.

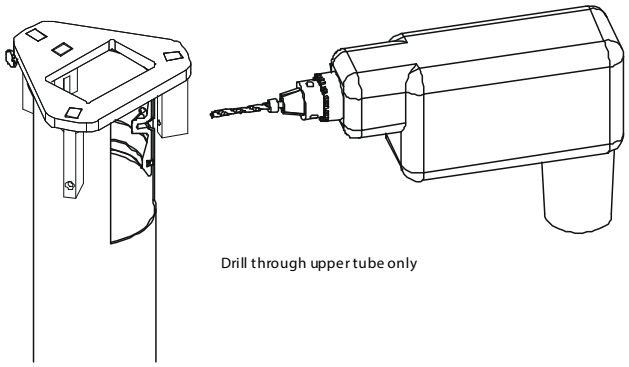


Figure 12B

71SO-TOOLCT PROCEDURE BELOW,
FOR 71SO-TOOL, SEE PAGE 8
FOR 71SO-TOOLC, SEE PAGE 9

STEP 9C: INSERT 71SO-TOOLCT OVER INLET TUBE
To install the 71SO-TOOLCT (sold separately) over the inlet tube, first loosen the thumb screws, so the tool can pass freely over the inlet tube flange. Align the slot on the tool with the key on the inlet tube and insert the tool down. **See Figure 9C** .

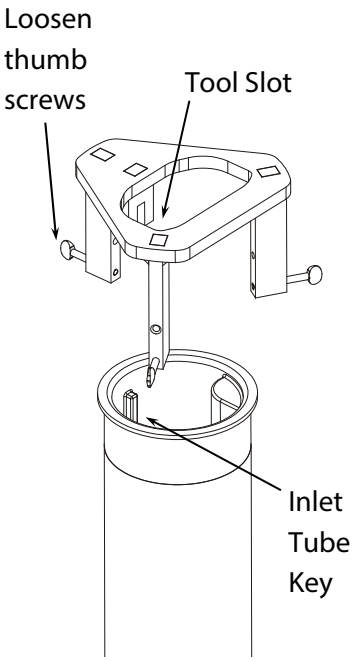


Figure 9C

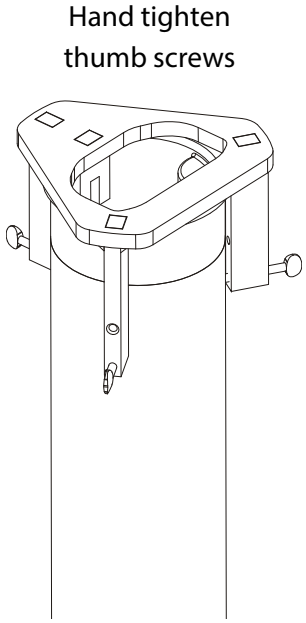
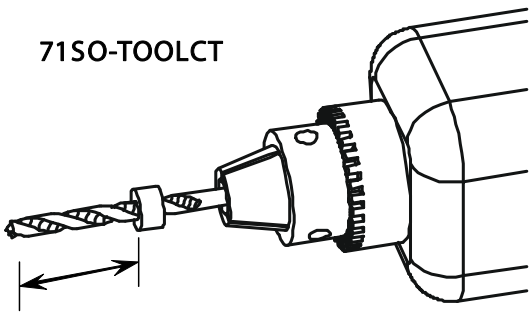


Figure 10C

STEP 10C: TIGHTEN THE 71SO-TOOLCT
Ensure that the tool seats flat against the top of the inlet tube. To prevent vertical movement of the tool during drilling, hand tighten the thumb screws against the upper drop tube. See Figure 10C.

STEP 11C: PREPARE DRILL AND BIT
Confirm that the stop on the 3/16" drill bit supplied with the 71SO-TOOLCT is in the correct position before drilling. The stop is factory installed at a distance between 1-3/16" to 1-1/4" from the tip with the 71SO-TOOLCT. If the stop is not at the correct position it must be fixed before drilling.

CAUTION: If the drill stop is not in the proper location failure of a pressure decay leak test may result.



Tip to stop dimension must be 1-3/16" to 1-1/4"

Figure 11C

STEP 12C: DRILL HOLES
With the inlet tube and 71SO-TOOLCT in place, carefully drill a 3/16" diameter hole in the upper tube using the hole in the 71SO-TOOLCT as a guide. The drill stop is positioned so it will bottom out against the tool after the bit has drilled through the upper drop tube. If the stop is positioned wrong either no hole will be drilled, or a through hole could potentially be drilled through the inlet tube. If no hole is drilled return to step 11C and check the stop dimension. If a hole is drilled through the inlet tube or into the screw hole the assembly is not salvageable. Drill (2) more holes in the two remaining guide holes.

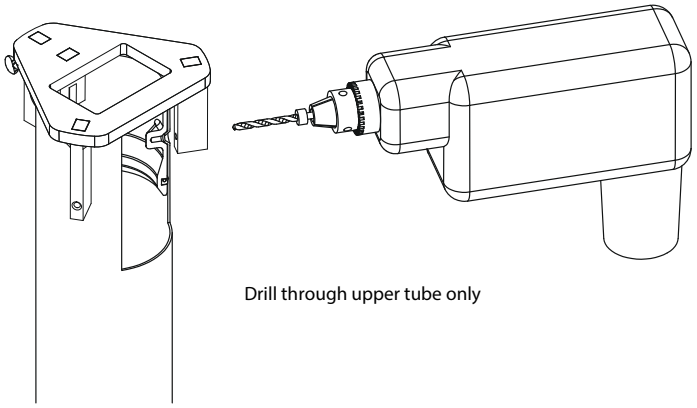


Figure 12C

STEP 13: DIMPLE FIRST HOLE

Remove tool. Remove any chips or burrs from the drilling operation. Place the assembly on a solid surface. Using the punch supplied with the 71SO-TOOL, 71SO-TOOLC, and 71SO-TOOLCT, align the tip of the punch with the drilled hole and dimple the upper drop tube by striking the punch with a hammer until the drop tube is formed into countersunk hole in the inlet tube. After punching, remove any chips that may have fallen into the inlet tube screw hole.

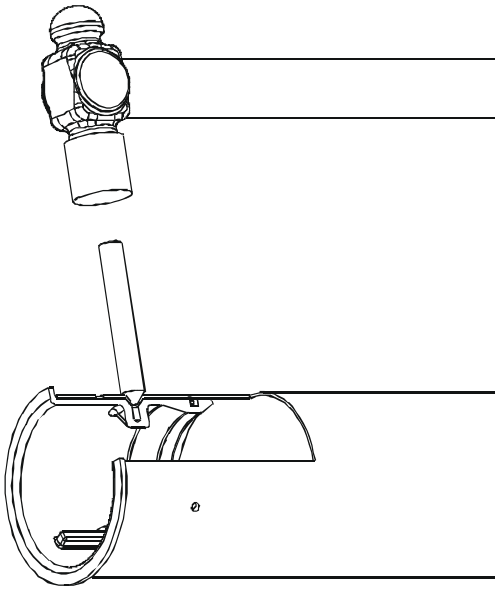


Figure 13

STEP 14: ASSEMBLE FIRST SCREW

Ensure that the drop tube was formed into the countersunk screw hole as shown in Figure 14 if not return to Step 13. Apply black moly grease to screw and tighten first screw into inlet tube with a screwdriver. Use only the taptite screws that are supplied with the unit. Seating torque is 20 in-lbs min. to 35 in-lbs max. Screw head should be flush with the drop tube. Do not over tighten.

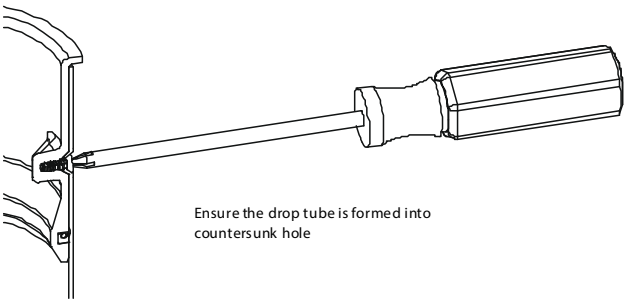


Figure 14

STEP 15: DIMPLE REMAINING HOLES

Remove any chips or burrs from the drilling operation. Dimple the next (2) holes as done in Step 13. Make sure the assembly is on a solid surface when punching. After punching, remove any chips that may have fallen into the inlet tube screw hole.

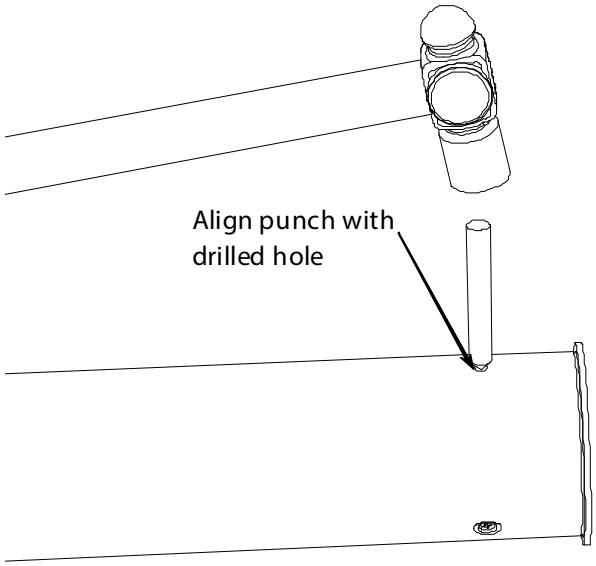


Figure 15

STEP 16: ASSEMBLE OTHER SCREWS

Apply black moly grease to screws and tighten the other (2) screws into inlet tube with a screwdriver as done in Step 14. Use only the taptite screws that are supplied with the unit. Seating torque is 20 in-lbs min. to 35 in-lbs max. Do not over tighten.

STEP 17: APPLY GREASE TO LOWER O-RING AND BODY THREADS

Apply black moly grease to the lower tube o-ring and body threads as shown. Make sure coverage is completely around the o-ring. Install o-ring in groove just above threads.

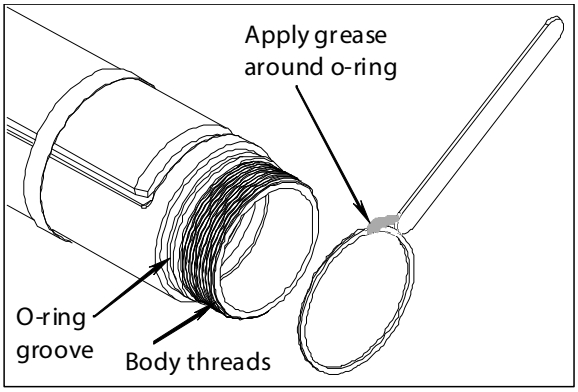


Figure 17

STEP 18: LOWER TUBE ASSEMBLY

If a vise is used, clamp on the valve body casting only to avoid damage to the float and tubes. Thread the lower tube onto the valve body until the lower tube bottoms out on valve body. Tube can be tightened by hand or with a strap wrench. If a strap wrench is used try to position it on the threaded insert portion of the lower tube to prevent damaging the tube.

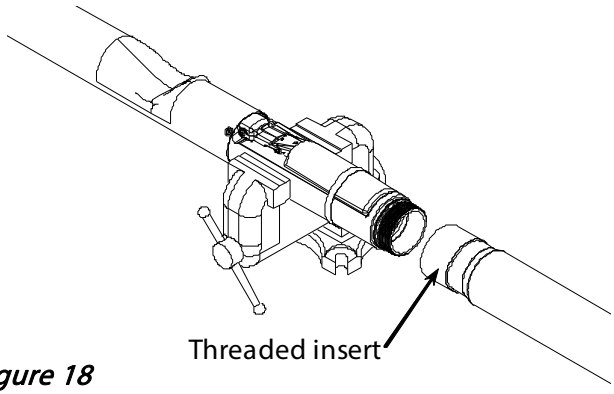


Figure 18

NOTE: Before installing the valve in the tank, a pressure test can be performed on the valve to check for vapor tightness. Seal off both ends of the tube with inflatable plumber's plugs. Apply a maximum 10" W.C. (1/3 PSI) air pressure. If pressure does not hold and a leak can be located with soap solution, do not install the valve. Send the valve back to OPW for warranty evaluation.

CAUTION: Do not over-pressurize. Excess pressure can damage the valve.

STEP 19: CUT LOWER TUBE

Measuring from the underside of the inlet tube flange, mark the overall length of the drop tube a distance of (B) minus 6". Determine dimension (B) from the measurements taken in Step 1, Figure 1 (Top of the Face Seal Adapter below the drain valve outlet in the spill container to the bottom of the tank). Saw off the excess tube at a 45-degree angle or per local codes or requirements and file off any sharp burrs (Refer to Figure 24). **Optional**: Install the OPW Tank Bottom Protector on the lower tube (Refer to Installation instructions supplied with the Tank Bottom Protector).

IMPORTANT: Remove all chips and shavings out of the cut end of the tube. DO NOT remove chips and shavings by dumping thru valve body.

FOR STANDARD VAPOR TIGHT MODELS, PROCEED TO STEP 20 ON PAGE 14.

FOR TESTABLE MODELS, PROCEED TO PAGE 13.

TESTABLE PROCEDURE ONLY, FOR STANDARD MODELS, PROCEED TO NEXT PAGE.

STEP 1T: INSTALL SOCKET ADAPTOR ASSY

Put cable thru threads in inlet tube and out thru cable port on side of inlet tube. Thread the socket adaptor assembly finger tight into the inlet tube. Note: the cable port on the inlet tube must be in line with the float as shown previously in Figure 8A.

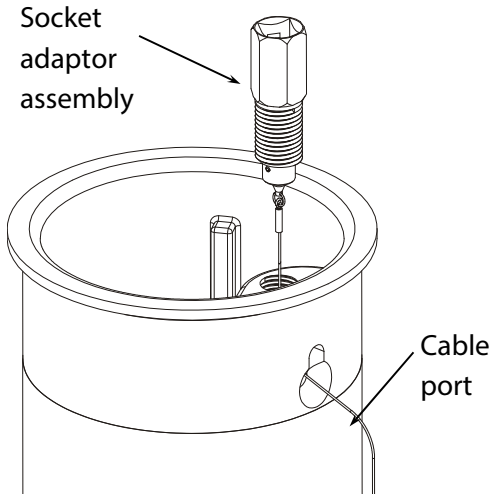


Figure 1T

STEP 2T: PASS CABLE THRU FERRULE

Pass cable thru ferrule. Loop cable and then pass cable back thru ferrule. Keep ferrule loose until cable length is determined in the next step. Note: if cable end frays it may be necessary to trim the cable again to pass thru ferrule.

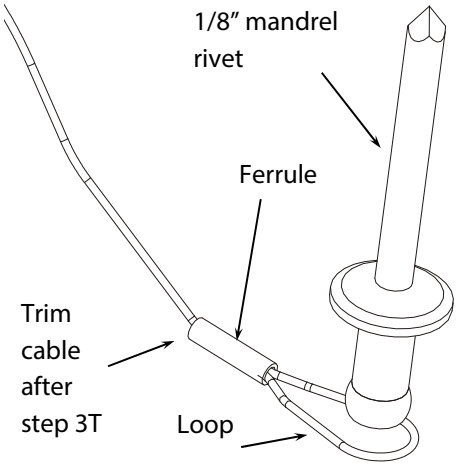


Figure 2T

STEP 3T: DETERMINE CABLE LENGTH

Run cable along upper tube and over the top plate on the float bracket as shown. With the float in the down position (as shown in Figure 3T) align loop in cable with rivet and top hole in float bracket. Use the rivet as a template to size the loop in the cable and pull cable tight and crimp ferrule with crimping tool / pliers onto cable at this location. Trim excess cable with wire cutter / scissors. For reference, from the seam where the upper tube and valve body meet to the end of the cable after trimming will require approximately 3.5" of cable.

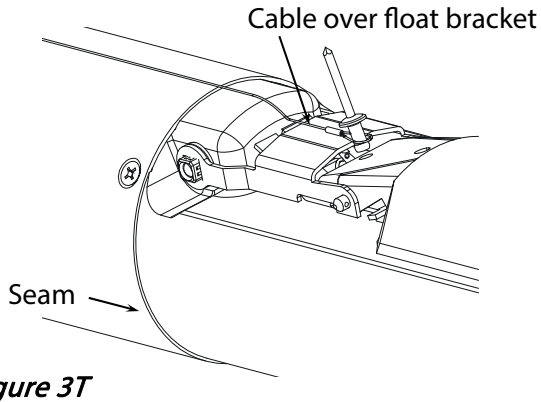


Figure 3T

STEP 4T: ATTACH CABLE TO FLOAT BRACKET

Ensure cable is over the float bracket. Using the supplied rivet align loop in cable with top hole in float bracket and pass rivet thru cable loop and float bracket hole. Using rivet tool for 1/8" dia mandrel attach rivet and cable to the float bracket. See last page for list of replacement cable parts.

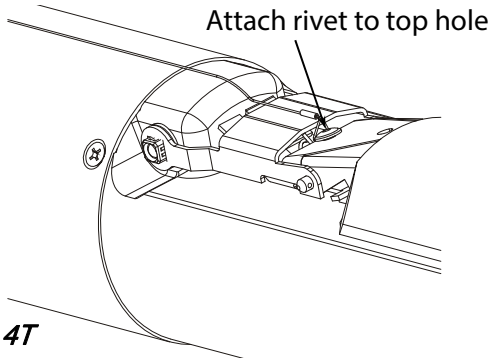


Figure 4T

STEP 5T: ENSURE PROPER CABLE OPERATION

Unthread the socket adaptor assembly from the inlet tube and ensure float and poppet move freely when socket adaptor assembly is pulled on. It should only require 3" to 4" of movement in order to actuate the float and poppet. Thread socket adaptor assembly finger tight into inlet tube after testing.

STEP 20: PREPARE FILL RISER FOR VALVE INSERTION

IMPORTANT: Inspect the riser pipe for any foreign material. Over spray from tank relining or any internal burrs inside of pipe must be removed prior to installation. Failure to have an unobstructed riser pipe may prevent proper installation or operation of the valve. Thoroughly clean top of riser pipe.

STEP 21: REMOVE ELASTIC BAND

Remove the elastic band securing the float to the valve body. The float will move into an outward position.

STEP 22: INSERT DROP TUBE

Make sure the upper O-Ring gasket is under the flange of the inlet tube. Hold the float down against the valve body and slowly insert the drop tube overfill valve into the riser pipe. Do not force valve into the riser pipe. If any obstruction or foreign matter interferes with smooth insertion of the valve, the riser pipe must be cleared.

WARNING

Failure to follow the assembly and installation instructions or use of excessive force to insert the OPW 71SO will VOID THE WARRANTY.

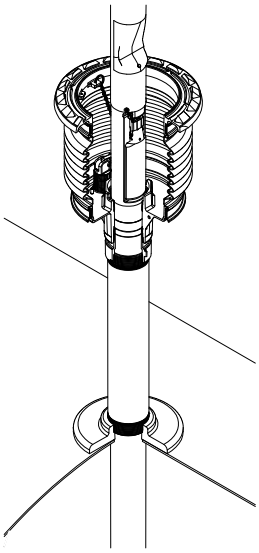


Figure 22

Difficulty in removing the existing fill tube (if there is one) means there may be an obstruction in the riser pipe. Look for burrs, deformations, excess tank lining material or other projections that may interfere with easy insertion of the OPW 71SO. The 71SO is designed for insertion into schedule 40 pipe. If schedule 80 pipe has been used for the riser, the 71SO cannot be installed. If seamed pipe has been used, the internal weld bead may interfere with the OPW 71SO and prevent installation. If the OPW 71SO won't slip in easily DON'T FORCE IT! Damage to the valve may result if excess force is used. Examine the riser pipe carefully; determine the nature of the obstruction; take appropriate steps to remove it.

STEP 23: CHECK INSTALLATION

Insert the drop tube all the way into the tank until the flange and gasket seat onto the top of the Face Seal Adaptor. The float will swing out into the operating position as it passes into the tank.

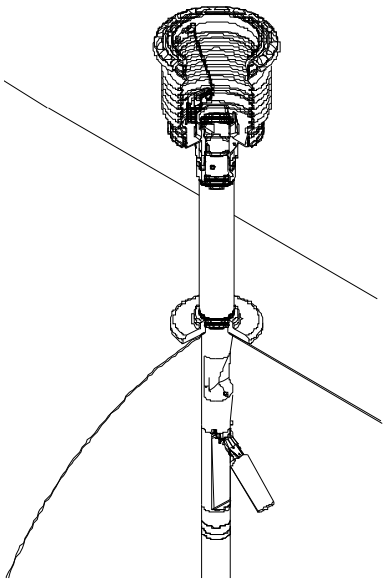


Figure 23

Make sure that the float is aligned along the length of the tank. The length of the tank can easily be determined by locating other manholes or pump boxes that are installed around other tank fittings. Look into the drop tube and align the deflector with the length of the tank.

For testable models only: Unthread the socket adaptor assembly from the inlet tube (a 3/8" square drive extension will attach to the socket adaptor, secure all tools to ensure they don't fall into the tank or valve) and ensure float and poppet move freely when socket adaptor assembly is pulled on. When looking down into the upper tube ensure poppet is visible when socket adaptor is pulled and resets properly when socket adaptor is released. See page 17 for full testing details. If poppet does not actuate freely take appropriate steps to correct before proceeding.

CAUTION: No obstruction in the tank can be within 14" from the center of the riser pipe or the valve may not operate properly (See Figure 24).

STEP 24: ALIGN VALVE

Install the OPW Jack Screw Kit and a 4" NPT nipple to lock the valve in place. Refer to the Installation Instructions supplied with the Jack Screw Kit. **For testable models ensure that the socket adaptor is aligned so it does not interfere with the jack screw kit.** (see Figure 24A). Install the Rotatable Product Adaptor (Refer to Installation Instructions supplied with the Product Adaptor.) Make sure that the valve does not rotate while tightening the adaptor by observing the position of the deflector. **The valve must remain aligned along the length of the tank as in Step 23**. Repeat this step as necessary to assure proper valve alignment.

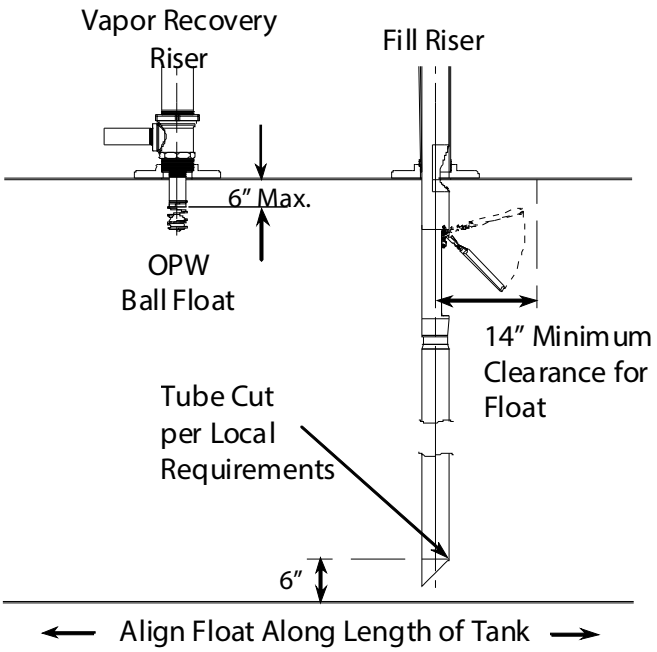
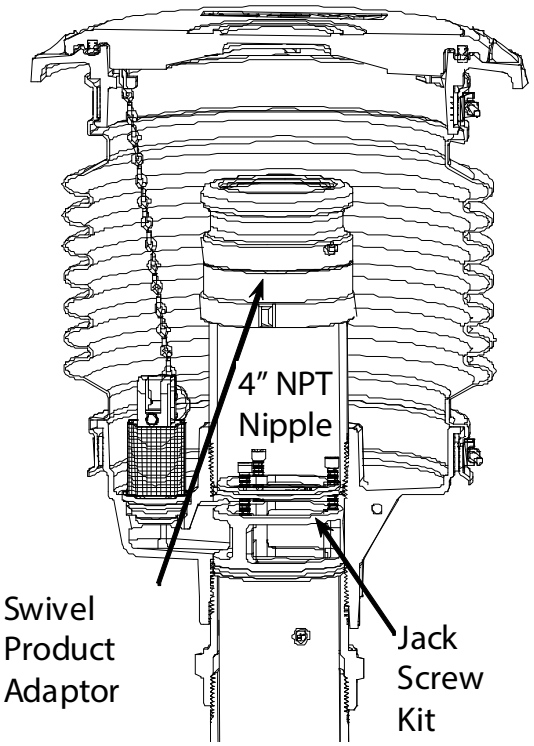


Figure 24



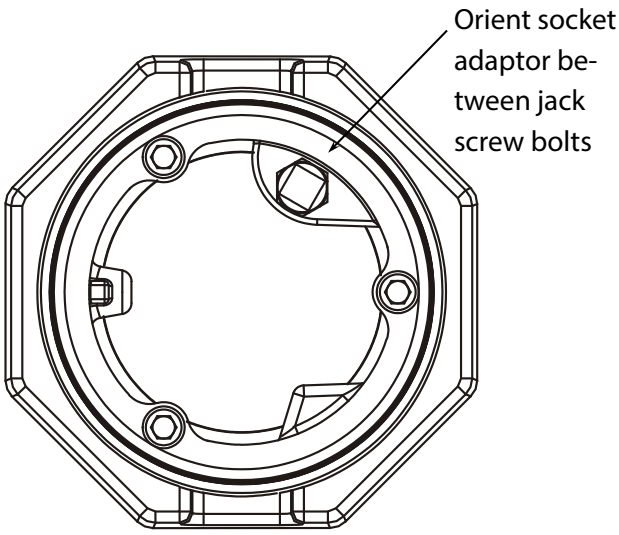


Figure 24A

FOR TESTABLE MODELS ONLY: Check installation again as done in Step 23 to ensure poppet actuates and resets properly. See page 17 for full testing details. Apply pipe dope to the socket adaptor threads. Pipe dope should be a non-hardening gasoline resistant pipe thread seal compound. Install socket adaptor and torque to 3.5 ft-lbs (42 in-lbs) minimum to 5.0 ft-lbs (60 in-lbs) maximum. After installing socket adaptor where required, pressure test testable overfill valve per CARB TP201.1D to ensure valve is vapor tight.

STEP 25: INSTALL WARNING PLATE

Bend the three warning plate ears down then slide the tie wrap over the warning plate ears and position warning plate against riser pipe approximately 1" below the adaptor. Tighten the tie wrap securely. The valve is now fully installed and in operating position.

NOTE: the warning plate includes important warnings, operating parameters, and listing information and must be installed.

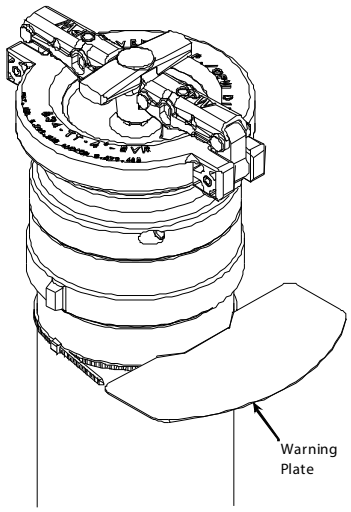


Figure 25

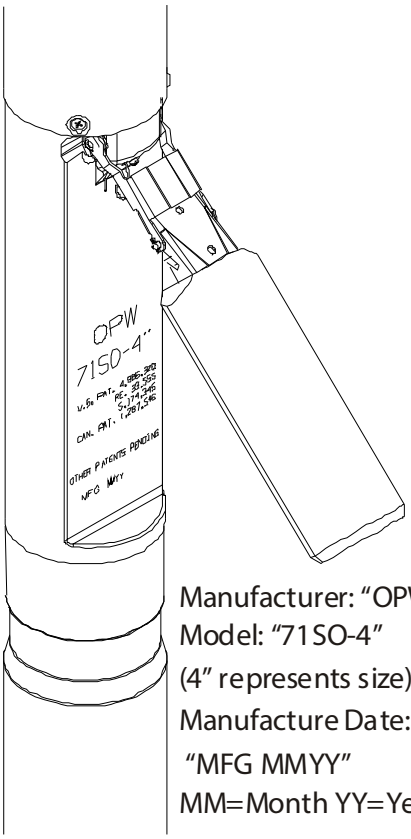
STEP 26: VALVE REMOVAL

The valve can be removed for tank leak testing, inspection, etc., by removing the Rotatable Product Adaptor, the 4" nipple, and the Jack Screw Kit. Reinstall per the above instructions.

For testable models only: It is not necessary to remove the valve to check poppet movement / function. See Page 17 for full testing details.

STEP 27: ELECTRONIC LIQUID LEVEL MONITORING

If an electronic level monitor is installed, it must be calibrated to match the top of the 71SO valve body, which must correlate with the shut off percentage required by the local AHJ of the actual tank capacity.



Manufacturer: "OPW"
Model: "71SO-4"
(4" represents size)
Manufacture Date:
"MFG MMYY"
MM=Month YY=Year

Figure 26 - Product Identification

TEST INSTRUCTIONS
POPPET & FLOAT MOVEMENT
FOR TESTABLE MODELS ONLY

TOOLS NEEDED FOR TESTING:

1. 1/4" square drive extension or 3/8" square drive extension with 3/8" to 1/4" socket adapter.
2. Torque wrench / 1/4" or 3/8" square drive ratchet wrench.
3. Pipe dope.
4. Flashlight (optional).

TEST STEP 1:

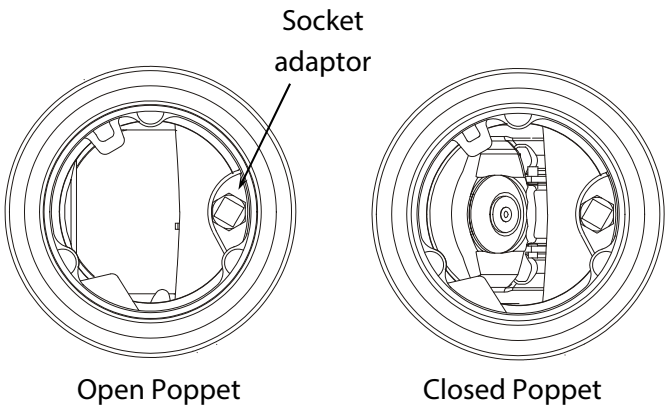
Remove spill container cover and fill cap from fill adapter and look down into the tube and make sure no debris or foreign objects are present. If debris or foreign objects are present take appropriate steps before proceeding. Look down into the tube and ensure poppet is completely protected by the deflection shield. See Test Figure 1. If poppet is exposed and tank is not full the overfill valve should be replaced. A flashlight may help when inspecting the tube.

TEST STEP 2:

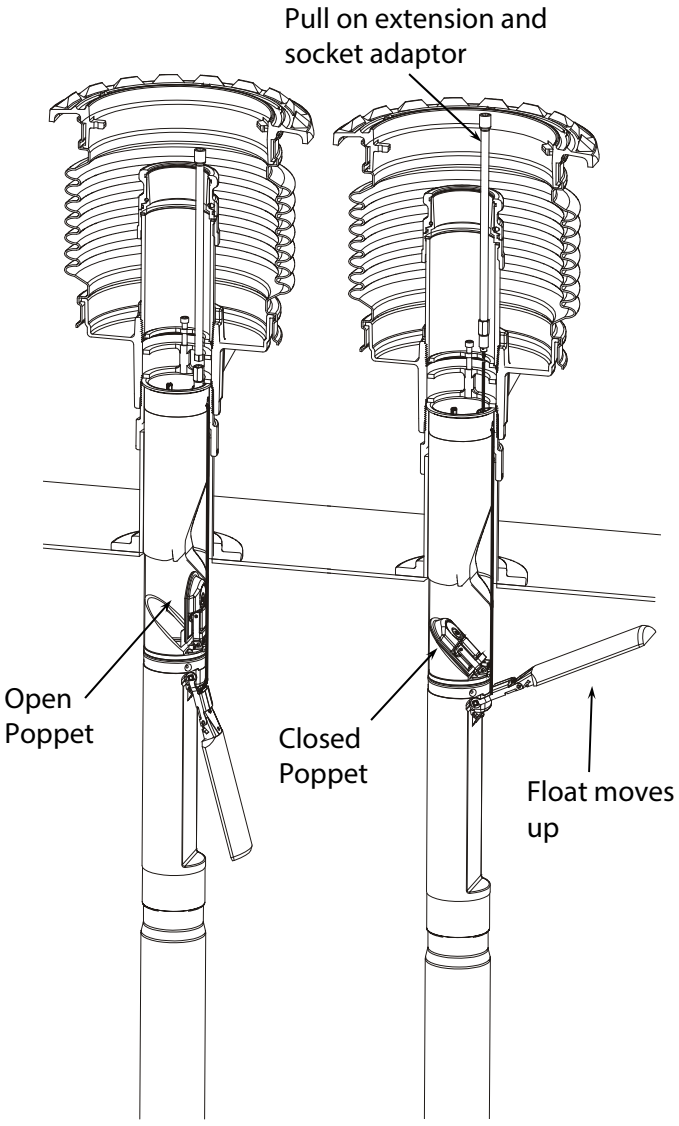
Unthread the socket adaptor assembly from the inlet tube using a 1/4" square drive extension and wrench. The extension will attach to the socket adaptor. Secure all tools to ensure they don't fall into the tank or valve. With the extension still attached pull on the socket adaptor and cable assembly and ensure float and poppet move / function properly. It should only require 3" to 4" of movement and less than 5 lbs of force in order to actuate the float and poppet. When looking down into the upper tube ensure poppet is visible and moves into the flow path (see Test Figure 1 & 2) when socket adaptor is pulled and resets properly when socket adaptor is released. If poppet does not actuate freely take appropriate steps to correct.

TEST STEP 3:

Apply pipe dope to the socket adaptor threads. Pipe dope should be a non-hardening gasoline resistant pipe thread seal compound. Make sure poppet and float have reset properly and are not visible then install socket adaptor and torque to 3.5 ft-lbs (42 in-lbs) minimum to 5.0 ft-lbs (60 in-lbs) maximum. After installing socket adaptor, to ensure vapor tightness, OPW recommends conducting pressure testing per CARB TP201.1D. Some areas may require pressure testing of overfill valve per CARB TP201.1D to ensure valve is vapor tight. If the drop tube fails pressure testing it may be necessary to check the seal at the poppet adaptor threads. Reinstall fill cap and spill container cover after testing.



Test Figure 1



Test Figure 2

PREVENTIVE MAINTENANCE

Annually, inspect the flapper in the 71SO to see that it is open by looking down the drop tube opening (see inspection procedure below). Test the 71SO drop tube seals with CARB procedure TP-201.1D. If the drop tube seal passes testing, no further maintenance is required. If the drop tube fails testing, replace the drop tube seal with OPW P/N: H11931M for 4" Tubes. Re-test the 71SO drop tube with CARB procedure TP-201.1D. The lower tube o-ring seal OPW P/N: H14840M can also be replaced. If this does not correct the leak the 71SO needs to be replaced.

FOR TESTABLE MODELS ONLY: The socket adaptor can be removed and poppet and float movement and function inspected without removing the valve. See Page 17 for full testing details. If replacement parts are needed for testable models the following items are available: OPW P/N 206741 Testable Inlet Tube S/A, 206740 Socket Adaptor and Cable Assembly, and 61SOK -0001 Float Kit.

CAUTION: Do not insert any foreign object into drop tube if flapper is in the closed position. For example, a tank level measuring stick. This will damage the valve and void the Warranty. ALWAYS check flapper location before "sticking" the tank. If flapper is in the closed position, the tank is either overfilled and you need to wait until the liquid level goes down or the 71SO is damaged and needs to be replaced.

Inspection Procedure to Ensure Proper Operation

Note: For testable models valve does not need to be removed from tank. See page 17 for testable instructions.

INSP 1. Remove the overfill valve from the tank as described in step 26.

INSP 2. Visually inspect the valve for damage. Make sure no debris or foreign objects are in or on the valve.

INSP 3. With the float in the normal (down) position, visually inspect the valve to ensure the poppet is not exposed outside the deflection shield. **See Figure 27.**

Good Valve

Bad Valve

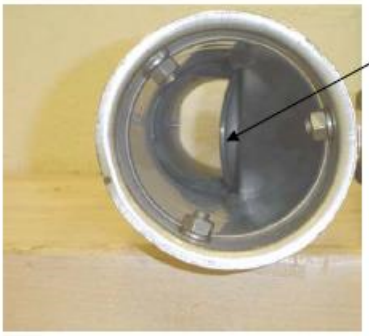


Figure 27

Note: Figure 27 shows poppet location with float arm not activated.

INSP 4. Inspect the float by lifting upward. The float should move freely without any binding. **See Figure 28.**

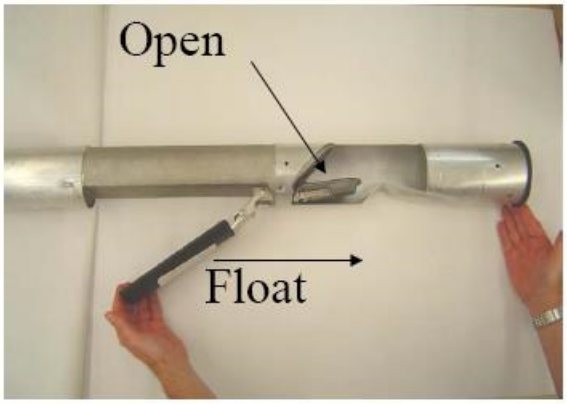


Figure 28

INSP 5. View down the tube to ensure the poppet is moving into the flow path when lifting the float. **See Figure 29.**

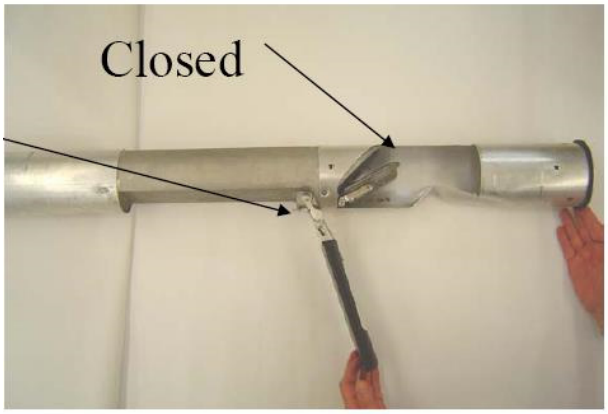


Figure 29

INSP 6. If there is no apparent damage or restrictions reinstall the valve per the above instructions and test per local requirements.

71SO Performance Specifications
This Overfill Prevention Valve has been manufactured and tested to, and met, the following California specifications. Performance Requirement: Leak rate to be less than or equal to 0.17 CFH@2.0" W.C.

Torque Specification
Taptite Screws, #10-24 thread cutting, 20 in-lbs minimum to 35 in-lbs maximum. **Testable Models Only:** Socket Adaptor, 1/4" NPT, 3.5 ft-lbs (42 in-lbs) minimum to 5.0 ft-lbs (60 in-lbs) maximum.

IMPORTANT: Leave these installation instructions and maintenance procedures with the station operator.

Appendix Index

Important: This is meant to be a supplemental worksheet and not a substitute to following the installation instructions. Please contact the Authority Having Jurisdiction (AHJ) and review local, state, and national codes to determine the regulatory requirements governing shut-off capacity in your region, as well as take into account other considerations such as extreme tank tilt and tank flex.

** Appendix D can be used to calculate the 715O upper tube length for Initial or Final Shut-Off percentage without riser or manway height dimensions.*

Important:

1. **Testers and the AHJ should use the confirmation method designated with the original installation method used.**

Appendix A

71SO Overfill Valve Initial Shut Off Level Upper Tube Calculation Worksheet

Important: This is meant to be supplemental worksheet and not a substitute to following the installation manual instructions. All length measurements are in inches. Please contact the Authority Having Jurisdiction (AHJ) and review local, state, and national codes to determine the regulatory requirements governing shut-off capacity in your region, as well as take into account other considerations such as extreme tank tilt.

Desired tank capacity for shut-off: **SO%= _____**

Dipstick Number (Y) on Tank Chart that corresponds to 100% volume = ☐ (Y)

Dipstick Number on Tank Chart that corresponds to SO% (X) = − ☐ (X)

Upper Tube Reference Number Z=Y-X ☐ (Z)

Upper Tube Depth Inside Tank C = Z-2" − 2

Distance from top sealing surface for 71SO Lip[1] to inside the top of Storage Tank[2] ☐ (C)

A=_____

For Non-Testable 71SO models only

In all cases for non-testable 71SO models, the top of the valve body must protrude at least 6 ½" into the tank to provide a minimal clearance for proper operation.[3] Additionally the total Upper Tube Length must be at least 16" of length to include the protective bend in the tube.

Is C less than 6 ½" Yes / No

If **NO, Upper Tube Length (D)**= C + A

If **YES, Upper Tube Length (D)**= 6 ½ "+ A

Upper Tube Length = _____

For Testable 71SO models only

In all cases for Testable 71SO models, the top of the valve body must protrude at least 6 ½" into the tank to provide a minimal clearance for proper operation.[3] Additionally the total Upper Tube Length must be at least 14 ½" of length to include the protective bend in the tube.

Is C less than 6 1/2" Yes / No

If **NO, Upper Tube Length (D)**= C + A – 1 ½ "

If **YES, Upper Tube Length (D)** = 6 ½" + A – 1 ½ "

Upper Tube Length = _____

[1] *Sealing surface may be the top of the Face Seal Adaptor, the built in sealing ledge inside some spill containers, or on non-vapor tight applications the top of the pipe nipple*

[2] *Some Underground Storage tanks utilize a manway system at the top. Make sure to use the top of the storage tank for measurement and not to top of the manway. Consult your underground tank manufacturer for height of the manway*

[3] *This measurement is taken from the seam where the upper tube is attached to the valve body to the inside of the tank top.*

Appendix A (Continued)

Initial Shut-Off Percentage (SO%) Confirmation:

Dipstick Number on the Tank Chart that corresponds to 100% volume
(Y) = _____ (given value from tank chart)

Upper Tube Length (Distance from the 71SO inlet tube flange to seam between valve body and crush tube)
(D) = _____ (measured value)

Distance from top sealing surface for 71SO Lip[1] to inside the top of the Storage Tank[2]
(A) = _____ (measured value)

Upper Tube Depth Inside Tank
(C) = D – A

Upper Tube Reference Number
(Z) = C + 2

Dipstick Number on the Tank Chart that corresponds to SO%
(X) = Y – Z

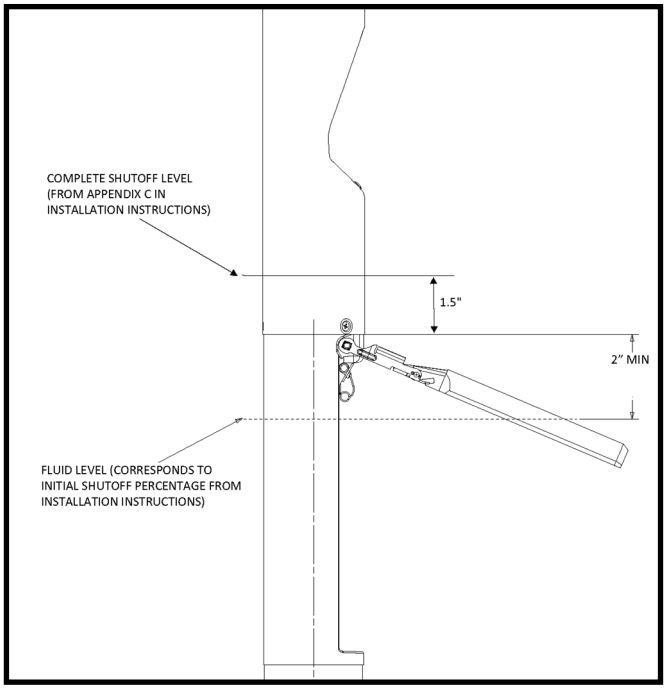
Using the tank calibration chart provided by the tank manufacturer, determine the tank capacity at the calculated (X) dimension and the 100% volume (Y) tank capacity

(X) tank capacity in gallons = _____
(Y) tank capacity in gallons = _____

Initial Shut-off % (SO%) = (X) capacity / (Y) capacity x100 = _____

[1] *Sealing surface may be the top of the Face Seal Adaptor, the built in sealing ledge inside some spill containers, or on non-vapor tight applications the top of the pipe nipple.*

[2] *Some Underground Storage Tanks utilize a manway system at the top. Make sure to use the top of the storage tank for measurement and not to the top of the manway. Consult your underground tank manufacturer for height of the manway.*



Appendix B

71SO Overfill Valve in Tank Initial Shut off Level Worksheet

For Use in Areas Where the AHJ Allows in Tank Testing

Important: This is meant to be supplemental worksheet and not a substitute to following the installation manual instructions. All length measurements are in inches. Please contact the Authority Having Jurisdiction (AHJ) and review local, state, and national codes to determine the regulatory requirements governing shut-off capacity in your region, as well as take into account other considerations such as extreme tank tilt.

Take the following measurements with the valve installed in the tank:

Distance from the 71SO inlet tube flange to the cast lug in the 71SO body (see figures), upper tube length.
Note: the Upper Tube Length must be at least 16" to include the protective bend in the tube.

(D) = _____

Distance from the 71SO inlet tube flange to the top and bottom of lower tube, valve length.
(W) = _____
(U) = _____

Distance from the 71SO inlet tube flange to the bottom of the tank. Note: If a tank bottom protector is present it may be necessary to add this thickness to dimension (OPW 6111 & 61TP models add 0.6")
(B) = _____

From the tank calibration chart provided by tank manufacturer find the dipstick number (Y) which corresponds to the 100% volume.
(Y) = _____

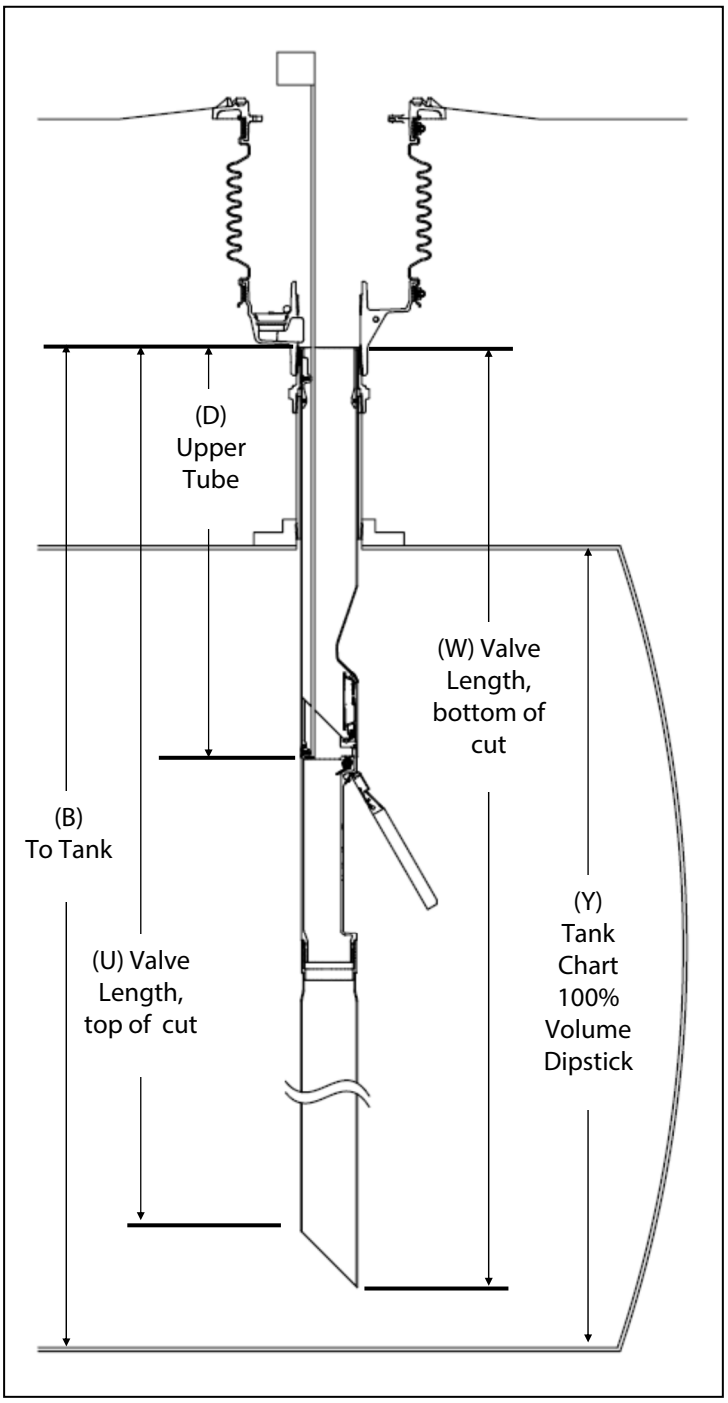
1. To determine shut-off percentage:
Subtract upper tube length (D) from distance to tank bottom (B)
(X) = (B) – (D) - 2" =_____

Using the tank calibration chart provided by the tank manufacturer determine the tank capacity at the calculated (X) dimension and the 100% volume (Y) tank capacity.

(X) tank capacity in gallons = _____

(Y) tank capacity in gallons = _____

SO% = (X) capacity / (Y) capacity x100 = _____



Note: The overfill valve must be installed per AHJ requirements and all applicable local, state, and national codes. If the overfill valve is set above the allowable shut-off percentage the overfill valve must be removed and replaced. For reference 40 CFR part 280 Subpart B Section 280.20 overfill valves should be set to a maximum of 95%.

2. **To determine lower tube distance from tank bottom to bottom of cut:**

Subtract valve length (W) from distance to tank bottom (B)
(V) = (B) – (W) = _____

Note: Lower tube clearance must meet tank manufacturer requirements and all AHJ, local, state, and national codes. Typical clearance is about 4". If lower tube clearance is not met valve must be removed and adjusted to meet these requirements.

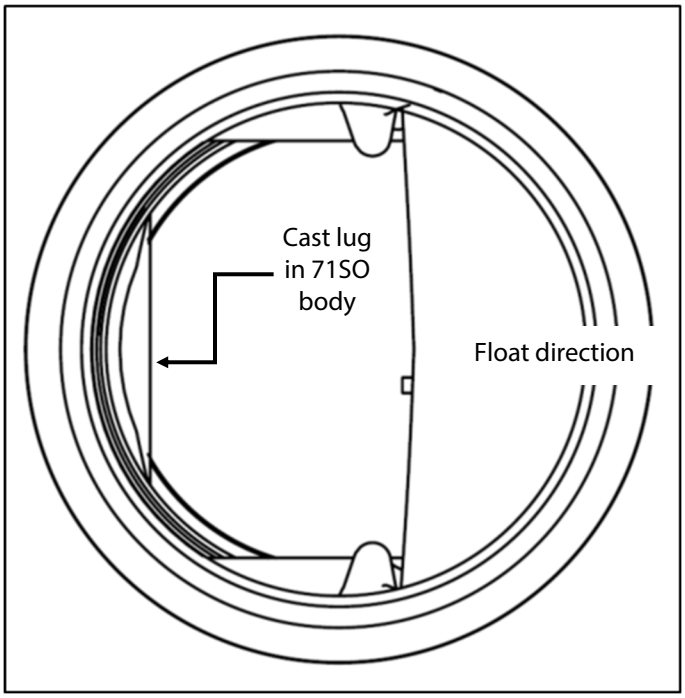
3. **To determine lower tube distance from tank bottom to top of cut:**

Subtract valve length (U) from distance to tank bottom (B)
(T) = (B) – (U) = _____

Note: Lower tube distance from tank bottom to top of cut must meet all AHJ, local, state, and national codes. For reference per 40 CFR 63 subpart CCCCCC / NESHAP the lower tube can be no more than 6" from the bottom of the tank. If lower tube distance is not met valve must be removed and adjusted to meet these requirements.

4. **To determine float alignment:**

Looking into upper tube (see figure) the float should be aligned along the length of the tank. If float is not aligned properly adjustments need to be made.



View into drop tube from above

Appendix C

HOW TO LOCATE THE POSITION OF THE 71SO FOR COMPLETE SHUT-OFF AT A GIVEN TANK CAPACITY

Note: This Appendix only applies when AHJ requirements call for complete shut-off at a given tank capacity. See page 4 for standard measurements.

The length of the upper tube and the placement of the 71SO valve body determine the shut-off point. The sample calculation below will provide for **complete shut-off** at 95%. In all cases, the upper tube length must be a minimum of 6-1/2" plus the length of the riser pipe. All length measurements are in inches.

INSTRUCTIONS

1. Find the tank capacity (in gallons) from the tank calibration chart provided by the tank manufacturer.
2. Calculate 95% of capacity.
3. Locate the 95% volume number on the tank calibration chart.
4. Find the dipstick number (X) which corresponds to the 95% tank volume. And, find the dipstick number (Y) which corresponds to the 100% volume.
5. Subtract the dipstick number (X) from the tank diameter (Y) to find the upper tube reference number (Z).
   (Y) - (X) = (Z)
6. **Add 1.5"** to (Z) to find the upper tube depth E.
   (Z) + 1.5" = E
7. Is E less than 6-1/2"?

NO Upper tube length is E plus the distance from the top of the Face Seal Adaptor installed on the riser pipe to the inside, top lip of the storage tank (A).

Upper Tube Length = E + (A)

For testable models only, ending in "T":
Upper Tube Length = E + (A) – 1-1/2"

YES Upper tube length is 6-1/2" plus the riser pipe measurement (A).

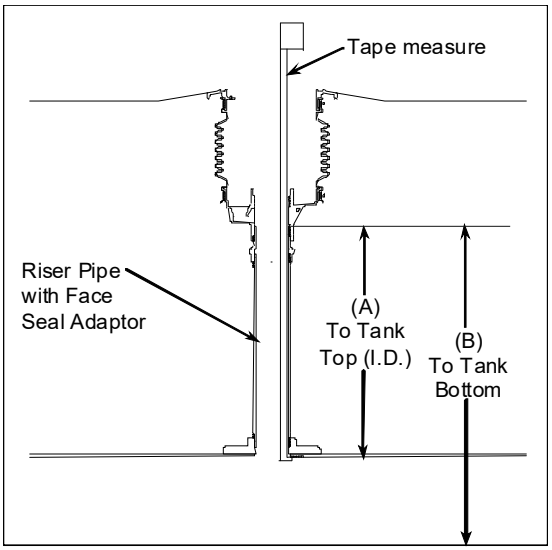
Upper Tube Length = 6-1/2" + (A)

For testable models only, ending in "T":
Upper Tube Length = 6-1/2" + (A) – 1-1/2"

NOTE: You must find the actual tank capacity number that correlates to the 6-1/2" + (A) depth for the station records. This number may also be used or the purposes of calibrating an electronic tank level system.

EXAMPLE

1. For an Owens-Corning Model G-3 Fiberglass® Tank Calibration Chart:
   Tank Capacity - 10,000 gal., nominal 9,403 gal.
   NOTE: Use actual capacity only



2. 95% of actual tank capacity = 0.95 x 9403 gal. = 8933 gal.
3. The closest number which is less than 8933 gal. Is 8910 gal. Choosing the closest number less than 95% of actual capacity ensures that complete shutoff will occur when the tank is no more than 95% full.
4. The calibration chart reading of 8910 gal. corresponds to a dipstick measurement of 82".
5. Dipstick number (X) = 82"
   Tank diameter (Y) = 92"
   (Y) - (X) = (Z) (92 "- 82" = 10")
   (Z) = 10"
6. (Z) + 1.5" = E (10" + 1.5" = 11.5")
   E = 11.5"
7. Is 11.5" less than 6-1/2"?

NO Measure the distance from the top of the FSA-400 Face Seal Adaptor installed on the riser pipe to the inside, top lip of the storage tank and obtain measurement (A).

Upper tube length = E + (A)

For testable models only, ending in "T":
Upper Tube Length = E + (A) – 1-1/2"

Appendix C (Continued)

71SO Overfill Valve Complete Shut Off Level Upper Tube Calculation Worksheet

Important: This is meant to be supplemental worksheet and not a substitute to following the installation manual instructions. All length measurements are in inches. Please contact the Authority Having Jurisdiction (AHJ) and review local, state, and national codes to determine the regulatory requirements governing shut-off capacity in your region, as well as take into account other considerations such as extreme tank tilt.

Note: This Appendix only applies to valves installed per Appendix C. See Appendix A for the standard valve Upper Tube Calculation worksheet.

Desired tank capacity for shut-off: **SO%= _____**

Dipstick Number (Y) on Tank Chart that corresponds to 100% volume = ☐ (Y)

Dipstick Number on Tank Chart that corresponds to SO% (X) = − ☐ (X)

Upper Tube Reference Number Z=Y-X ☐ (Z)

Upper Tube Depth Inside Tank E = Z+1.5" + 1.5

☐ (E)

Distance from top sealing surface for 71SO Lip[1] to inside the top of Storage Tank[2] **A=_____**

For Non-Testable 71SO models only

In all cases for non-testable 71SO models, the top of the valve body must protrude at least 6 ½" into the tank to provide a minimal clearance for proper operation.[3] Additionally the total Upper Tube Length must be at least 16" of length to include the protective bend in the tube.

Is E less than 6 ½" Yes / No

If **NO, Upper Tube Length (D)**= E + A

If **YES, Upper Tube Length (D)**= 6 ½ "+ A

Upper Tube Length = _____

For Testable 71SO models only

In all cases for Testable 71SO models, the top of the valve body must protrude at least 6 ½" into the tank to provide a minimal clearance for proper operation.[3] Additionally the total Upper Tube Length must be at least 14 ½" of length to include the protective bend in the tube.

Is E less than 6 1/2" Yes / No

If **NO, Upper Tube Length (D)**= E + A – 1 ½ "

If **YES, Upper Tube Length (D)** = 6 ½" + A – 1 ½ "

Upper Tube Length = _____

[1] *Sealing surface may be the top of the Face Seal Adaptor, the built in sealing ledge inside some spill containers, or on non-vapor tight applications the top of the pipe nipple.*

[2] *Some Underground Storage tanks utilize a manway system at the top. Make sure to use the top of the storage tank for measurement and not the top of the manway. Consult your underground tank manufacturer for height of the manway.*

[3] *This measurement is taken from the seam where the upper tube is attached to the valve body to the inside of the tank top.*

Appendix C (Continued)

Complete Shut-Off Percentage (SO%) Confirmation:

Dipstick Number on the Tank Chart that corresponds to 100% volume
(Y) = _____ (given value from tank chart)

Upper Tube Length (Distance from the 71SO inlet tube flange to seam between valve body and crush tube)
(D) = _____ (measured value)

Distance from top sealing surface for 71SO Lip[1] to inside the top of the Storage Tank[2]
(A) = _____ (measured value)

Upper Tube Depth Inside Tank
(E) = D – A

Upper Tube Reference Number
(Z) = E - 1.5

Dipstick Number on the Tank Chart that corresponds to SO%
(X) = Y – Z

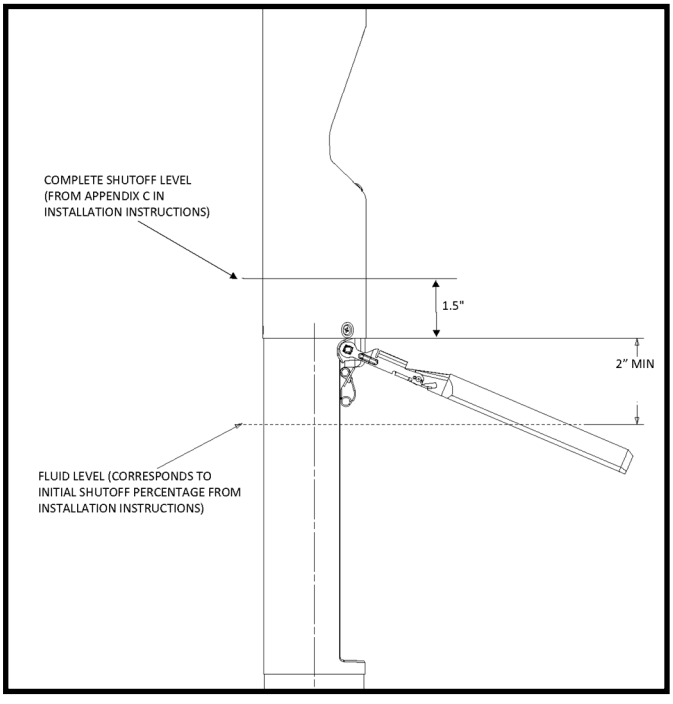
Using the tank calibration chart provided by the tank manufacturer, determine the tank capacity at the calculated (X) dimension and the 100% volume (Y) tank capacity

(X) tank capacity in gallons = _____
(Y) tank capacity in gallons = _____

Initial Shut-off % (SO%) = (X) capacity / (Y) capacity x100 = _____

[1] *Sealing surface may be the top of the Face Seal Adaptor, the built in sealing ledge inside some spill containers, or on non-vapor tight applications the top of the pipe nipple.*

[2] *Some Underground Storage Tanks utilize a manway system at the top. Make sure to use the top of the storage tank for measurement and not to the top of the manway. Consult you underground tank manufacturer for height of the manway.*



Appendix D

71SO Overfill Valve Shut Off Upper Tube Calculation Worksheet

Important: This is meant to be a supplemental worksheet and not a substitute to following the installation manual instructions. All length measurements are in inches. Please contact the Authority Having Jurisdiction (AHJ) and review local, state, and national codes to determine the regulatory requirements governing shut-off capacity in your region, as well as take into account other considerations such as extreme tank tilt and tank flex.

Desired tank capacity for shut-off: **(SO%) = _____**

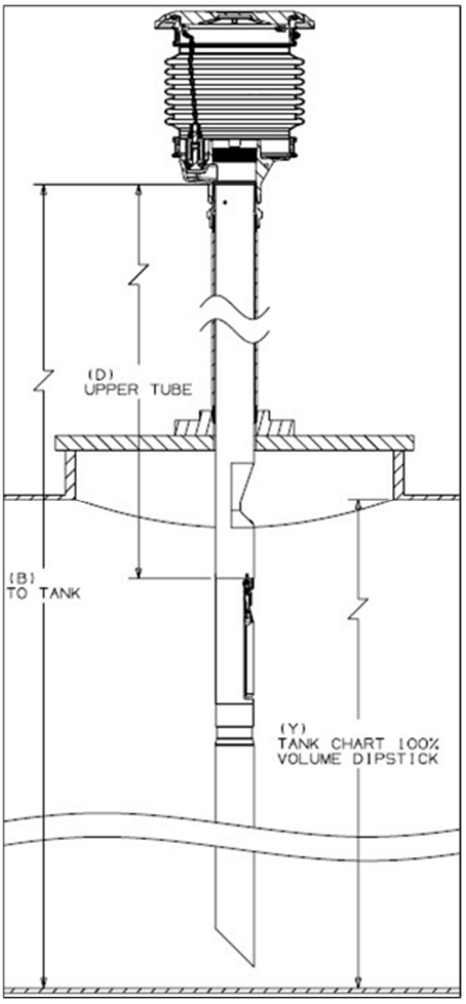
Desired SO% shut off stage (circle one) **Initial / Final**

Dipstick Number (Y) on Tank Chart that corresponds to 100% Volume
(Y) = _____

Tank Chart Dipstick Number equal to or less than corresponding SO%
(X) = _____

Measured distance from 71SO inlet flange sealing surface to the bottom of the tank **(B) = _____**

Upper Tube Depth Inside Tank: *(Initial Shut Off)* **(C)** = (Y) - (X) - 2" = _____
(Final Shut Off) **(E)** = (Y) - (X) + 1.5" = _____



For Non-Testable 71SO Models Only

In all cases for non-testable 71SO models, the top of the valve body must protrude at least 6-1/2" into the tank to provide a minimal clearance for proper operation.[2]

Is C or E less than 6-1/2" Yes / No

If NO, Total Upper Tube Length (D) = (B) – (X) – 2" (*Initial Shut Off)*
(D) = (B) – (X) + 1.5" *(Final Shut Off)*

If YES, Total Upper Tube Length (D) = 6-1/2" + (B) – (Y)
Total Upper Tube Length **(D) = _____**

For Testable 71SO Models Only

In all cases for testable 71SO models, the top of the valve body must protrude at least 6-1/2" into the tank to provide a minimal clearance for proper operation.[2]

Is C or E less than 6-1/2" Yes / No

If NO, Total Upper Tube Length (D) = (B) – (X) – 3.5" *(Initial Shut Off)*
(D) = (B) – (X) *(Final Shut Off)*

If YES, Total Upper Tube Length (D) = 5" + (B) – (Y)
Total Upper Tube Length (D) = _____

Note: The overfill valve must be installed per AHJ requirements and all applicable local, state, and national codes

If the overfill valve is set above the allowable shut-off percentage the overfill valve must be removed and replaced.

[1] *Sealing surface may be the top of the Face Seal Adaptor, the built in sealing ledge inside some spill containers, or on non-vapor tight applications the top of the pipe nipple.*

[2] *This dimension is from the seam where the upper tube is attached to the valve body to the inside of the tank top.*

Appendix D (Continued)

71SO Overfill Valve Shut Off Confirmation Worksheet

Dipstick Number on the Tank Chart that corresponds to 100% volume
(Y) = _____ (given value from tank chart)

Upper Tube Length[1] (Distance from the 71SO inlet tube flange to seam between valve body and crush tube)
(D) = _____ (measured value)

Measured distance from 71SO inlet tube flange[1] to the bottom of the tank
(B) = _____ (measured value)

Tank Chart Dipstick Number equal to or less than corresponding SO%

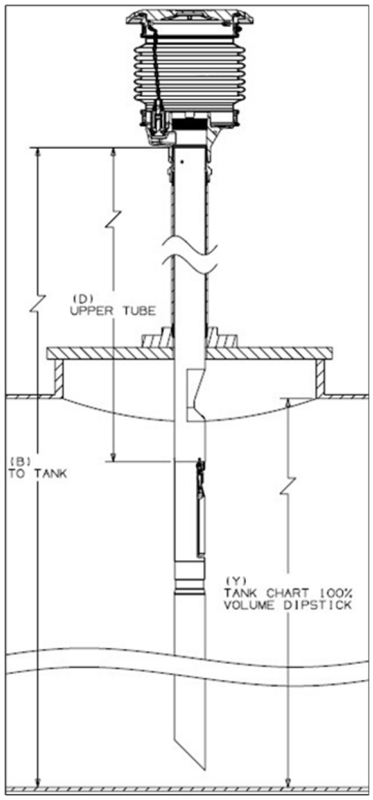
(X) = (B) – (D) – 2" *(Initial Shut Off)*
(X) = (B) – (D) + 1.5" *(Final Shut Off)*

Tank Chart Dipstick Number equal to or less than corresponding SO% **(X) = _____**

Using the tank calibration chart provided by the tank manufacturer determine the tank capacity at the calculated (X) dimension and the 100% volume (Y) tank capacity

(X) tank capacity in gallons = _____
(Y) tank capacity in gallons = _____

Shut-off % (SO%) = (X) capacity / (Y) capacity x 100 = _____



[1] *Sealing surface may be the top of the Face Seal Adaptor, the built in sealing ledge inside some spill containers, or on non-vapor tight applications the top of the pipe nipple.*