



Flapper Valves: Getting the Height Right



What Kinds of Overfill Prevention Equipment Are Installed in Maine?

Gravity Drop, Tight Fill



5-10 %



5 %



85 %

What Kinds of Overfill Prevention Equipment Are Installed in Maine?

How Many Have Both?



X %

What Brands of Flapper Valves Are Installed in Maine?

EBW
Auto-Limiter II



2 %

EMCO
Guardian A1100



1.5 %

OPW
61SO



98 %

Franklin
Defender



0 %

What do the Rules Say About Flapper Valve Operation?

- Automatically shut off flow into the tank when the tank is no more than 95 percent full

Where is the 95% Level?

Tank Diameter (feet)	95% Level (inches below tank top)
7	
8	
9	
10	
12	

Where is the 95% Level?

Tank Diameter (feet)	95% Level (inches below tank top)
7	8
8	
9	
10	
12	

Where is the 95% Level?

Tank Diameter (feet)	95% Level (inches below tank top)
7	8
8	9.5
9	
10	
12	

Where is the 95% Level?

Tank Diameter (feet)	95% Level (inches below tank top)
7	8
8	9.5
9	10.5
10	
12	

Where is the 95% Level?

Tank Diameter (feet)	95% Level (inches below tank top)
7	8
8	9.5
9	10.5
10	11.5
12	

Where is the 95% Level?

Tank Diameter (feet)	95% Level (inches below tank top)
7	8
8	9.5
9	10.5
10	11.5
12	14

What do the Rules Say About Flapper Valve Operation?

- Automatically shut off flow into the tank when the tank is no more than 95 percent full
- ...Automatically shut off flow into the tank so that none of the fittings located on the top of the tank are exposed to product

At What Levels Do These Valves Operate?

EBW
Auto-Limiter II



?? %

EMCO
Guardian A1100



?? %

OPW
6150



?? %

Franklin
Defender



?? %

All of These Valves Have Two Stages: Restriction (R) and Shutoff (S)

EBW
Auto-Limiter II



R: 92 %
S: 95%

EMCO
Guardian A1100



R: ?? %
S: 95%

OPW
61SO



R: 95 %
S: 98%

Franklin
Defender

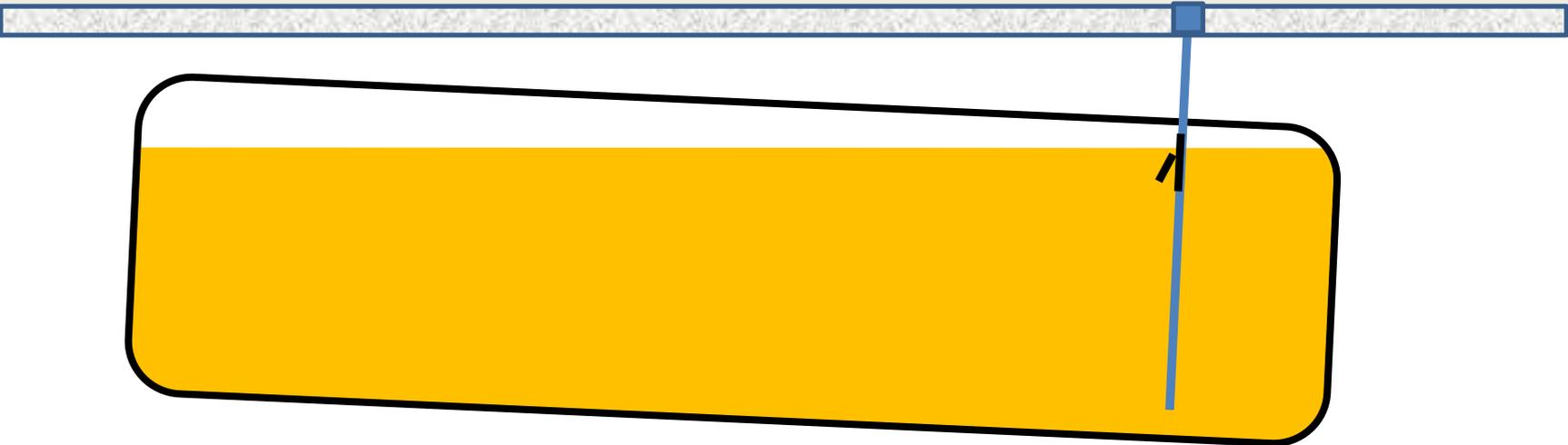


R: 85-92 %
S: 95%

All is Good if Tank is Level...



Even Better if Tank is Tilted to Fill...



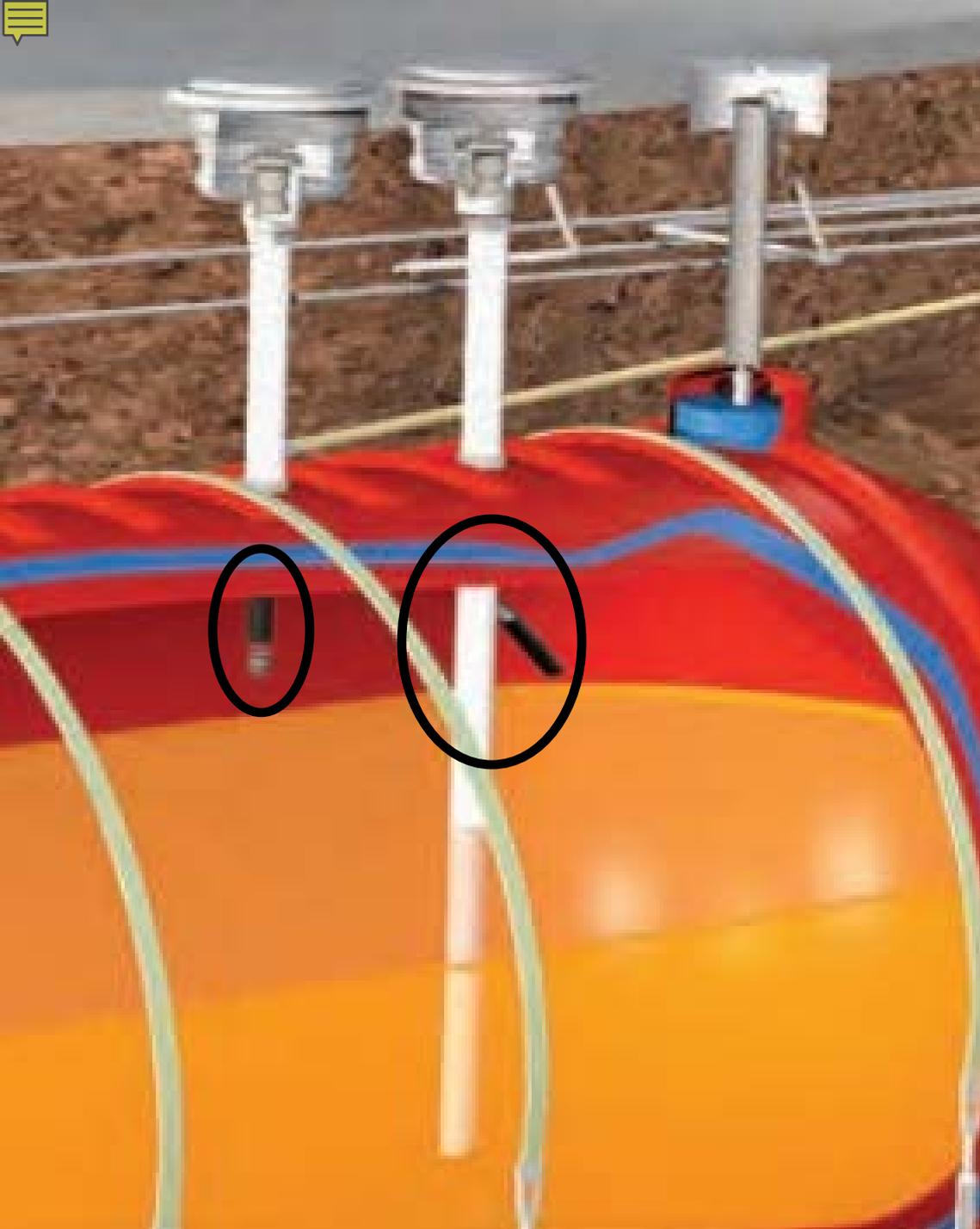
Not so Good if Tank is Tilted Away from Fill

Valve Manufacturers Are Silent About Tank Tilt...

Except for Franklin: “...installing contractor may use best judgment...so none of tank top fittings are exposed to product due to overfilling.”





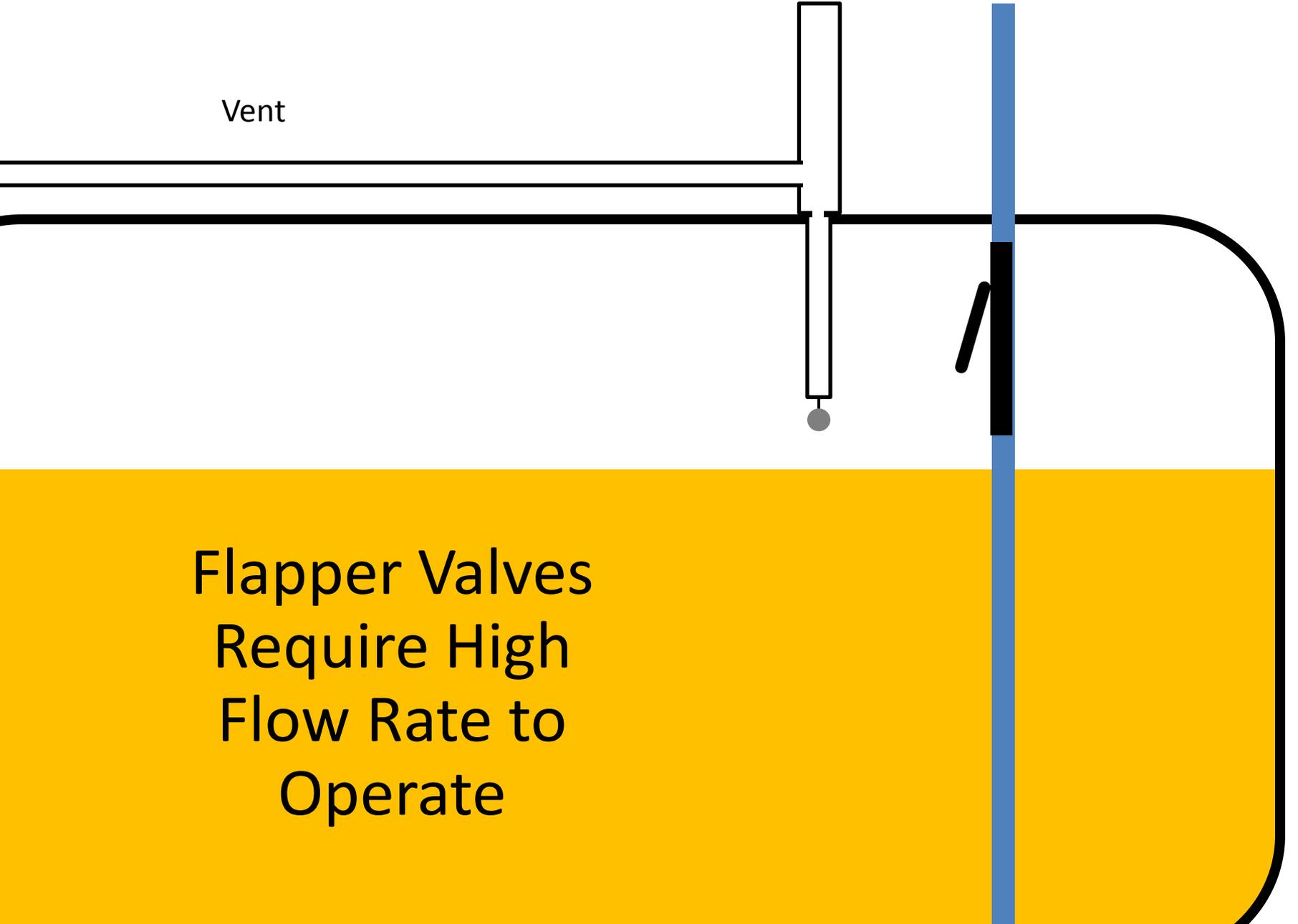


What Happens if
Ball Float Closes
First?

Delivery Flow
Rate Drastically
Reduced

Stage I VR

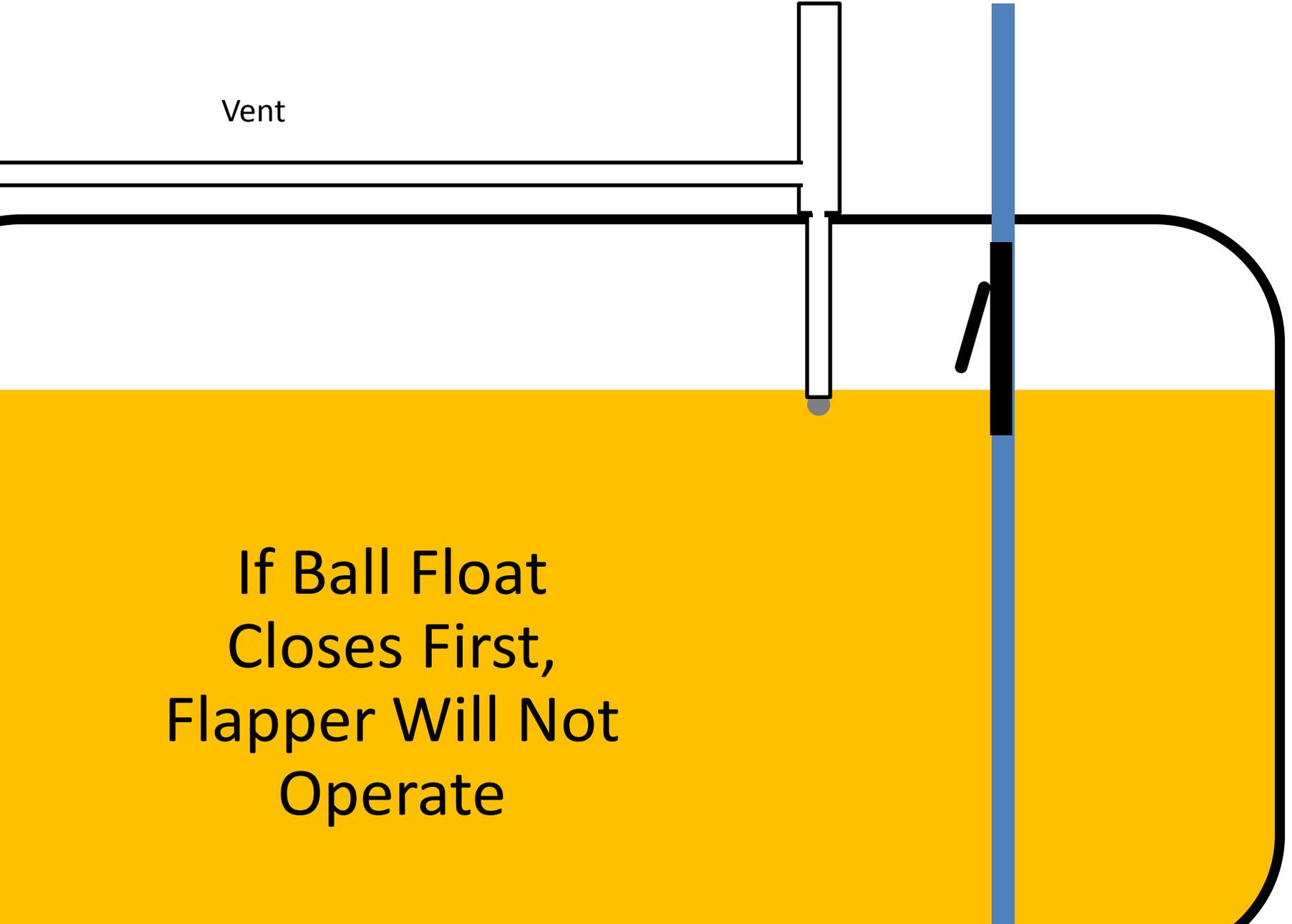
Vent



Flapper Valves
Require High
Flow Rate to
Operate

Stage I VR

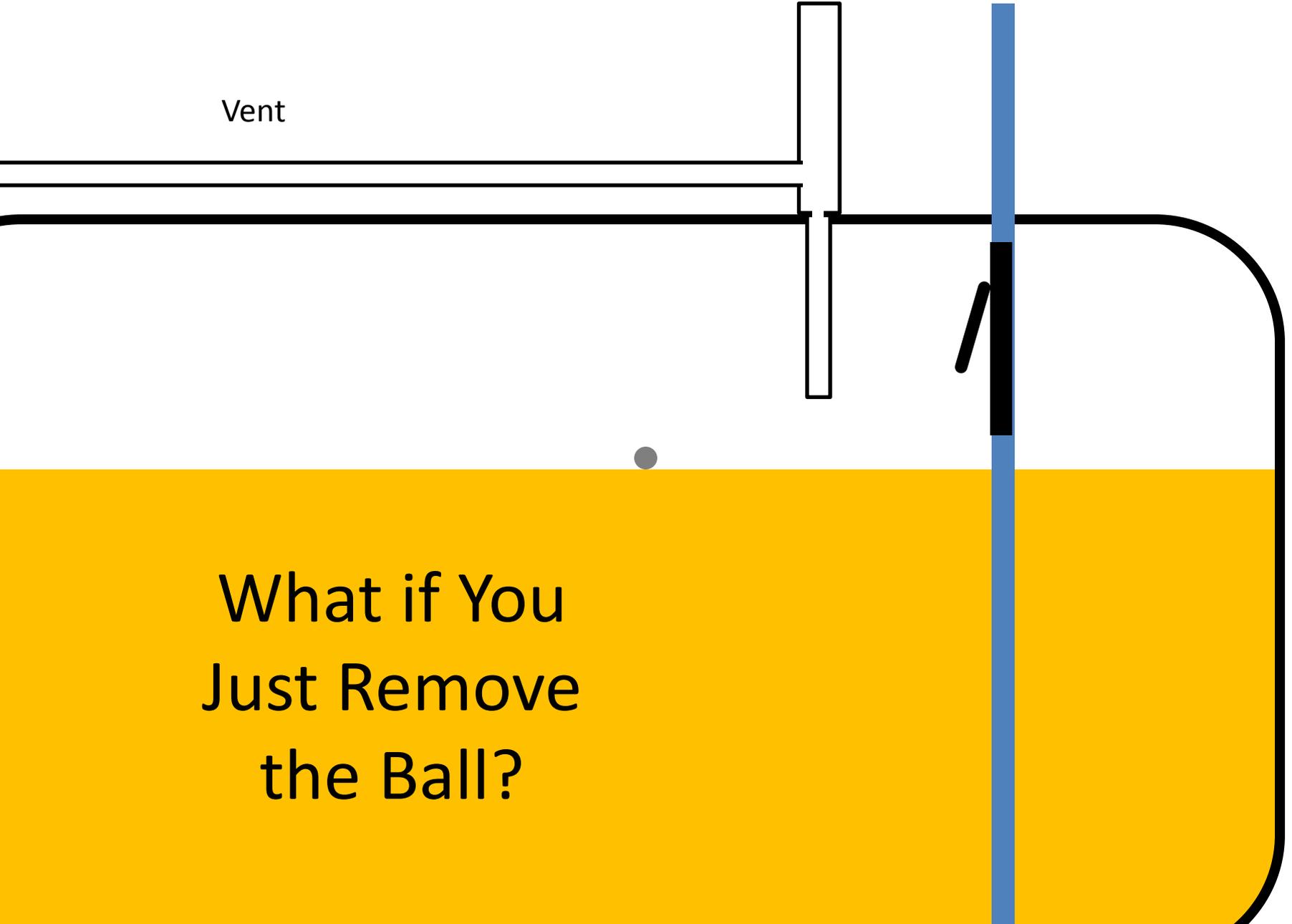
Vent



If Ball Float
Closes First,
Flapper Will Not
Operate

Stage I VR

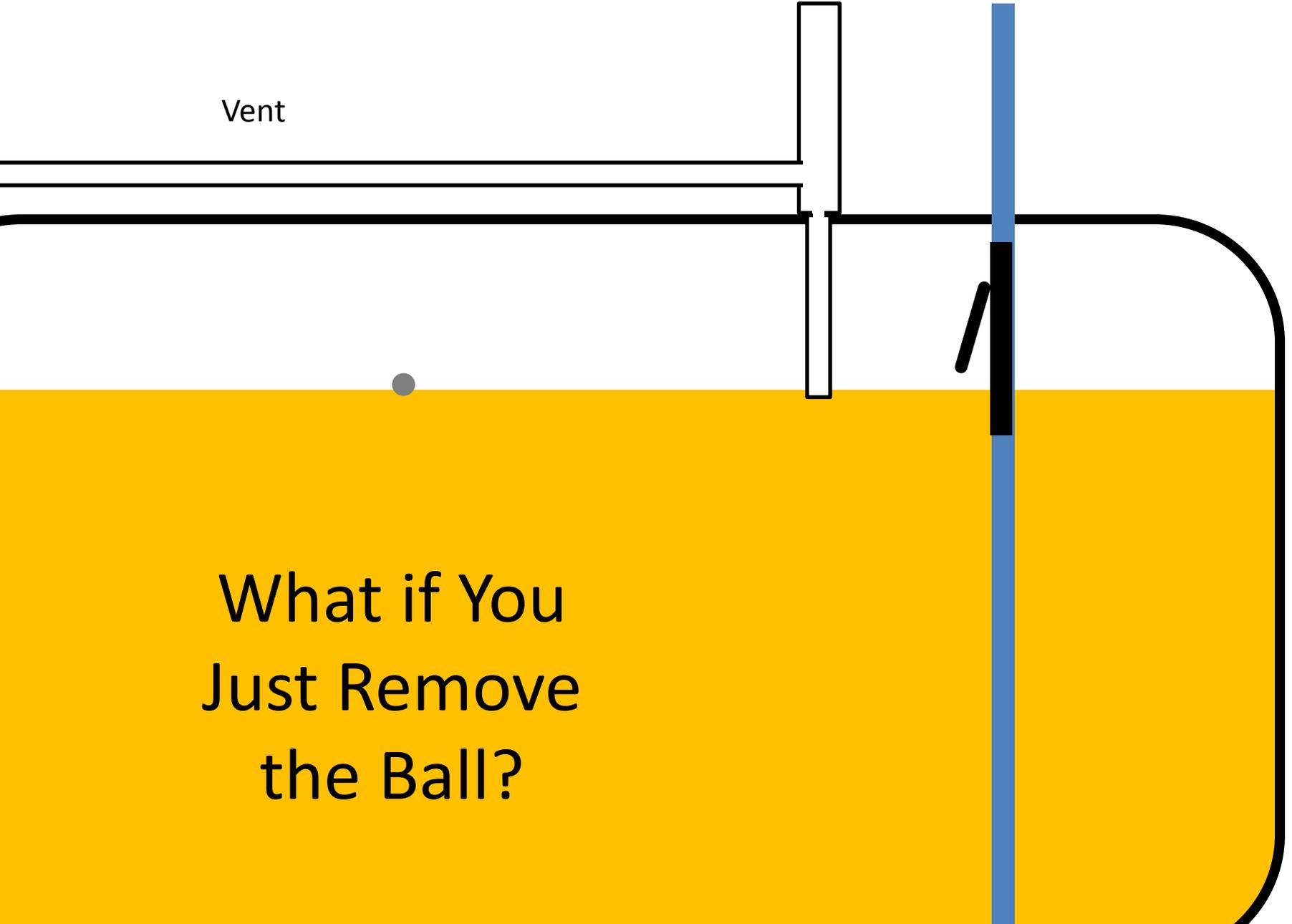
Vent



What if You
Just Remove
the Ball?

Stage I VR

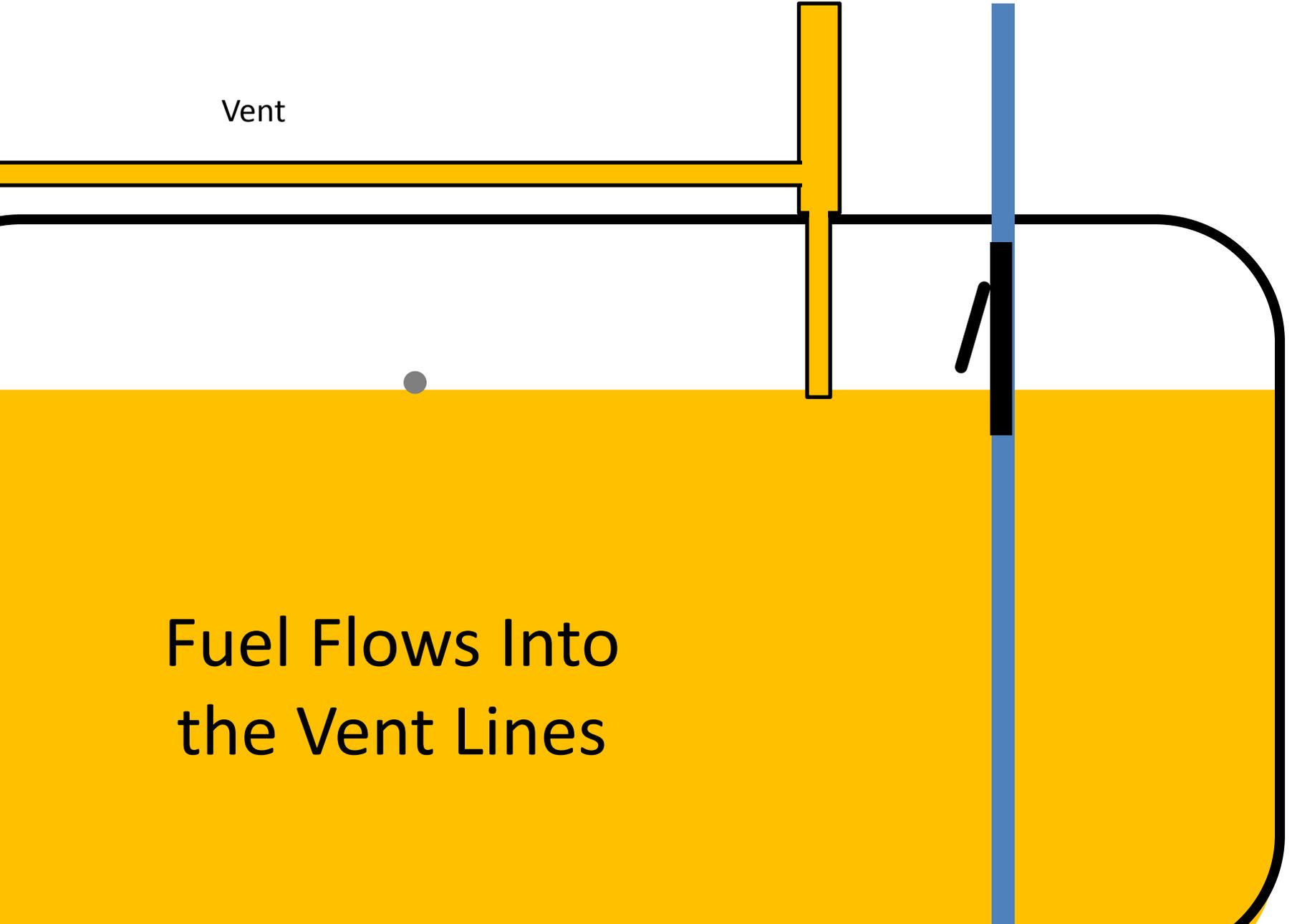
Vent



What if You
Just Remove
the Ball?

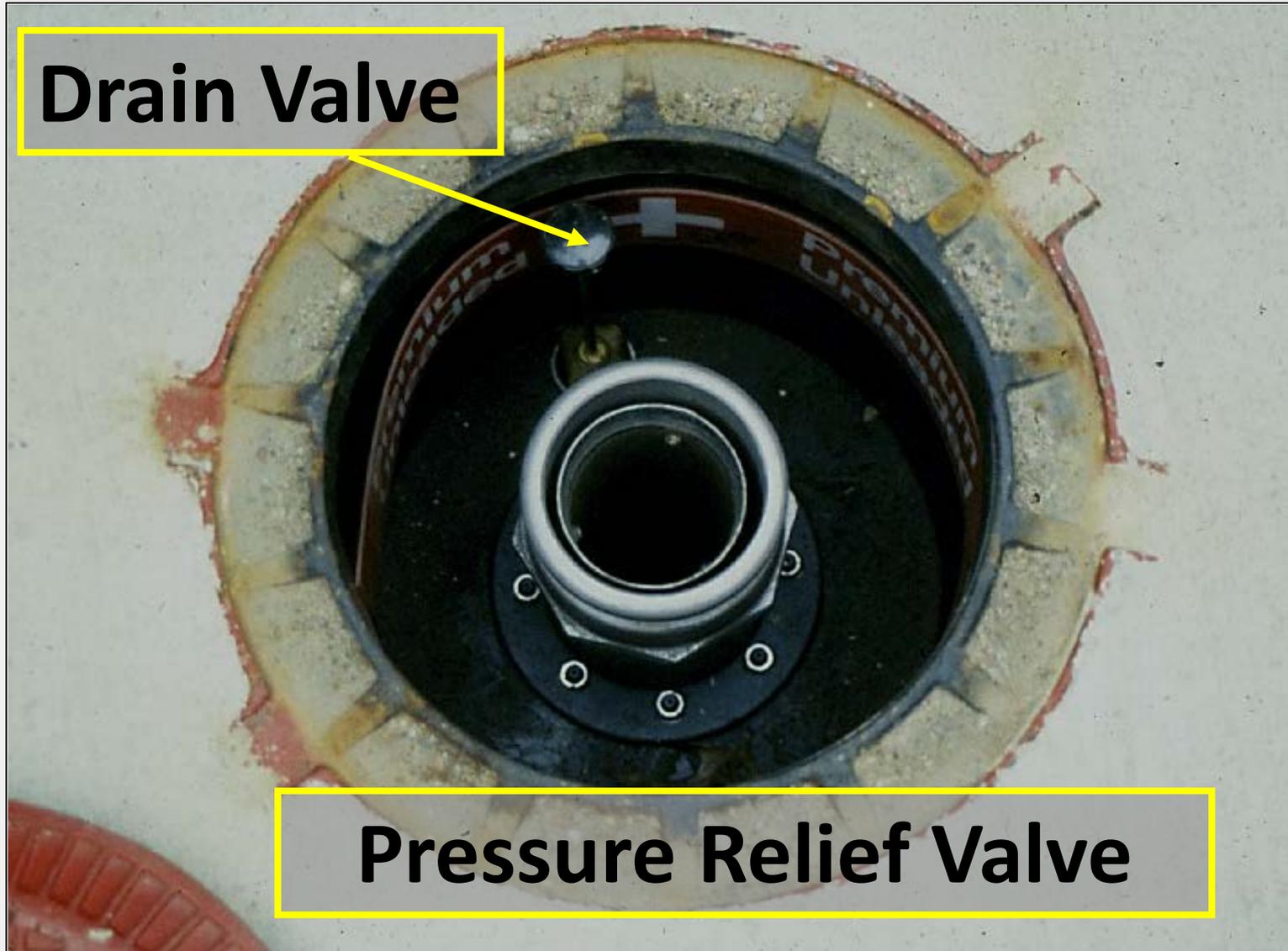
Stage I VR

Vent



Fuel Flows Into
the Vent Lines

How Does a Driver Deal With Hose that Won't Drain?

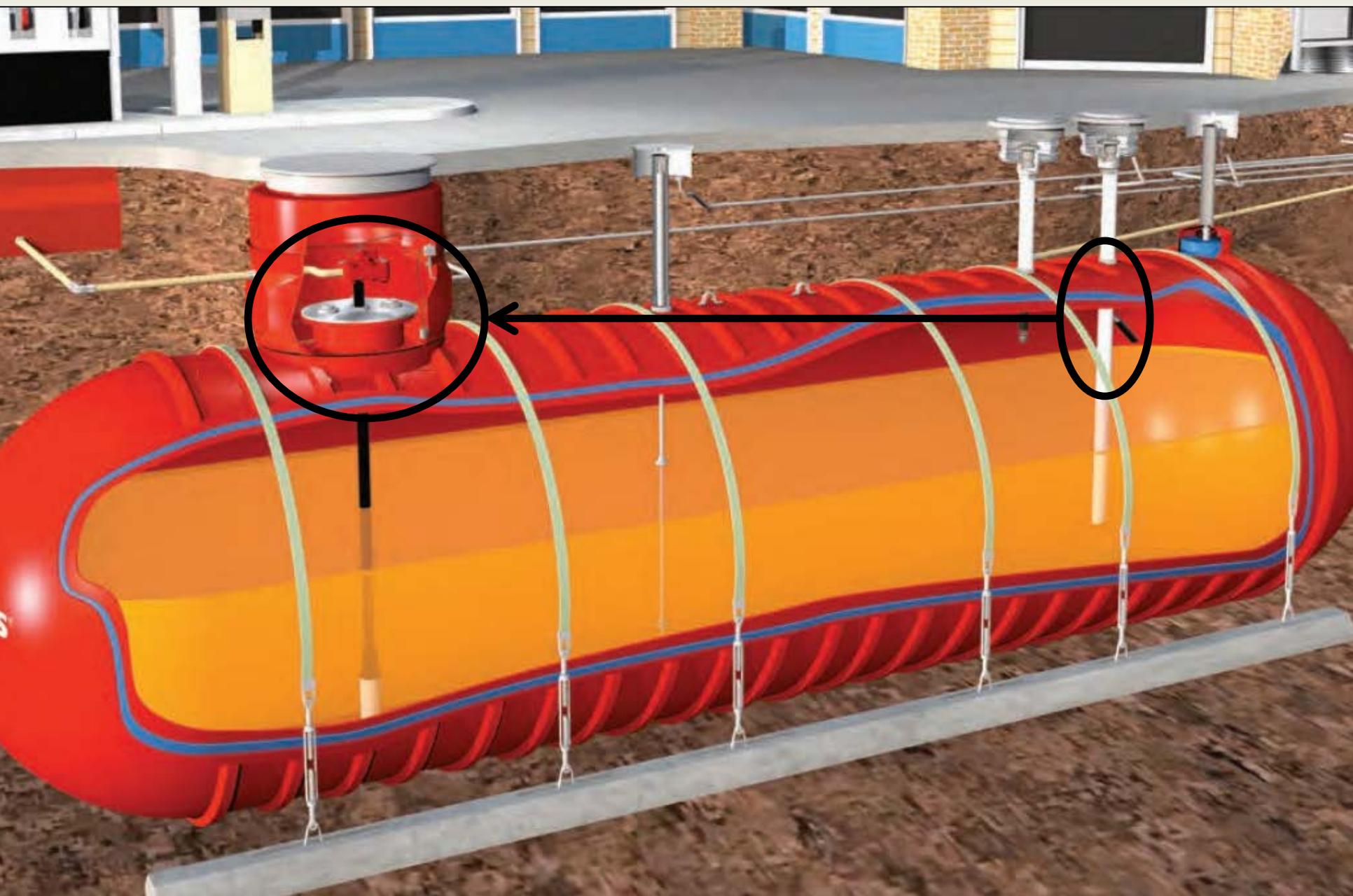


How Does a Driver Deal With Hose that Won't Drain?

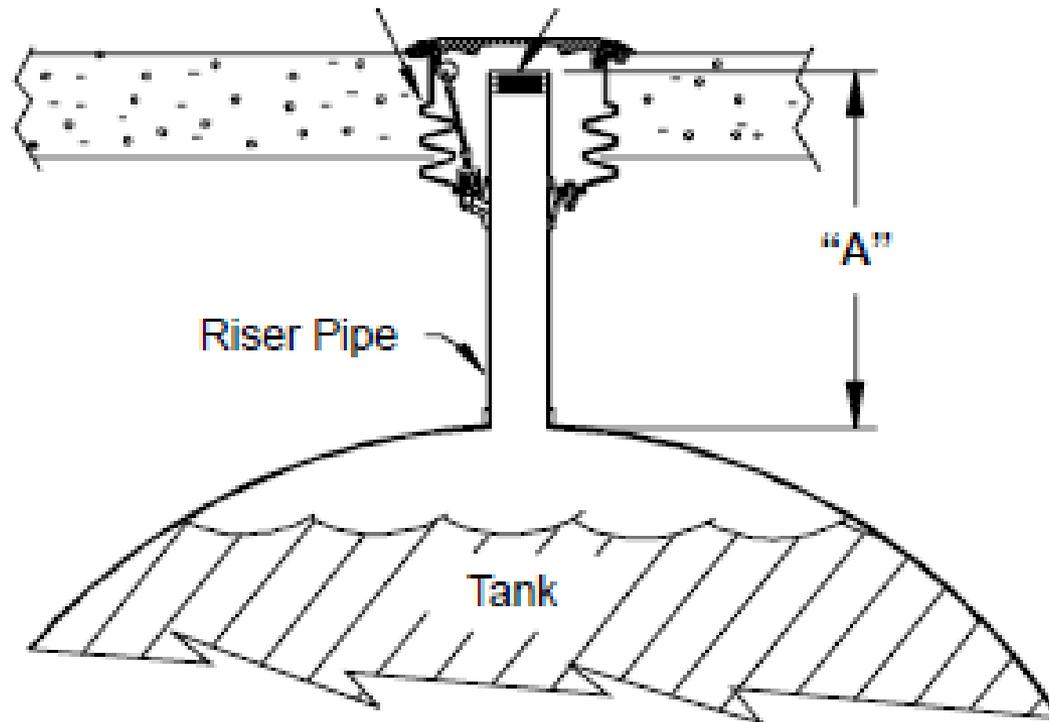


Photo by Kevin Henderson

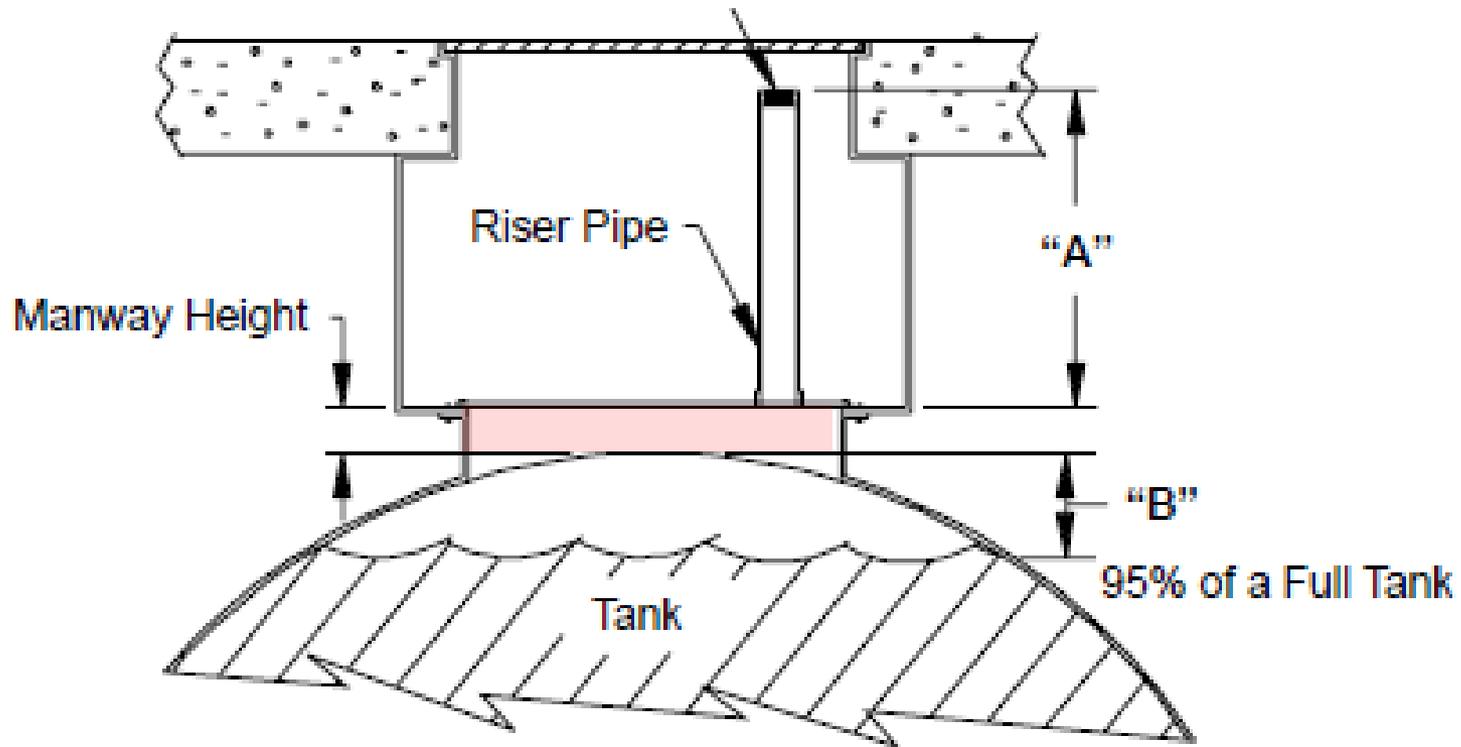
What if Flapper is in a Manway?



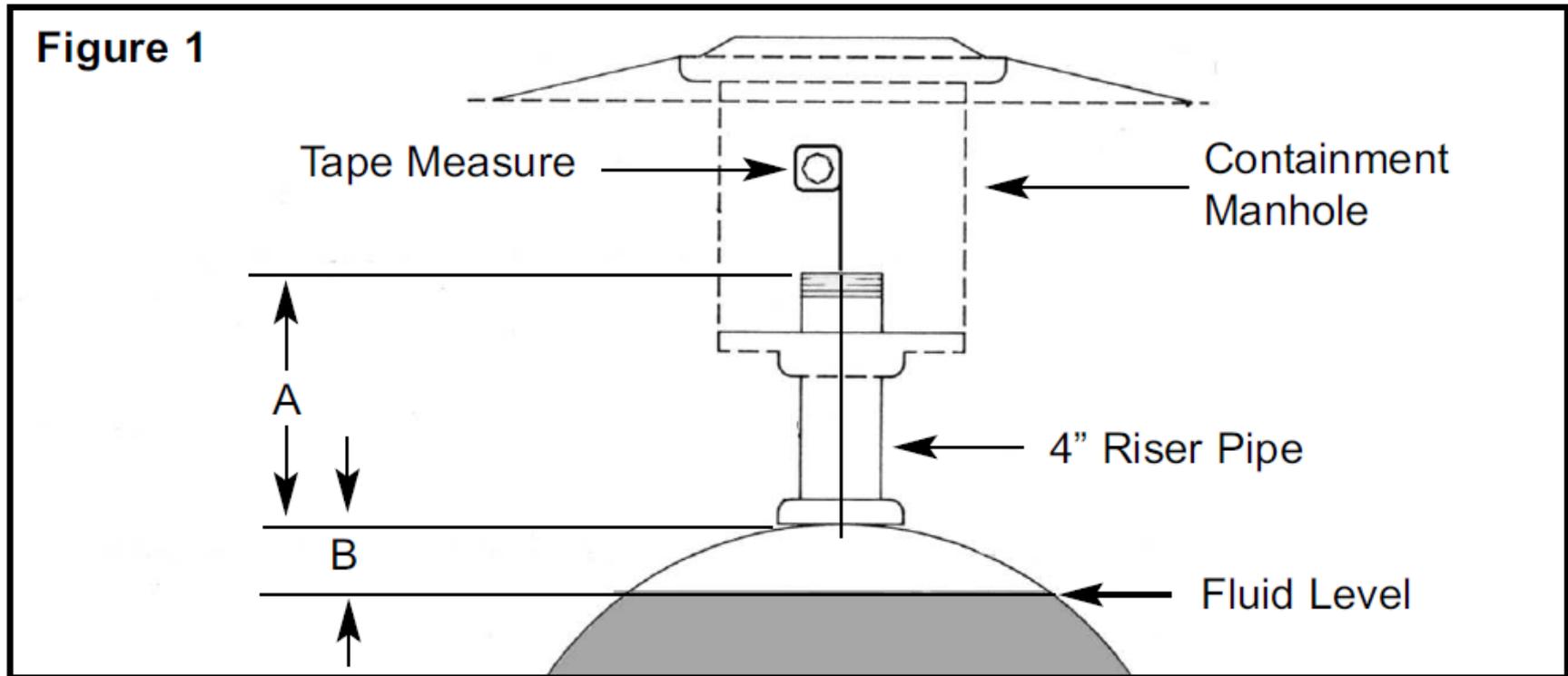
EBW Auto-Limiter II



EBW Auto-Limiter II – in Manway

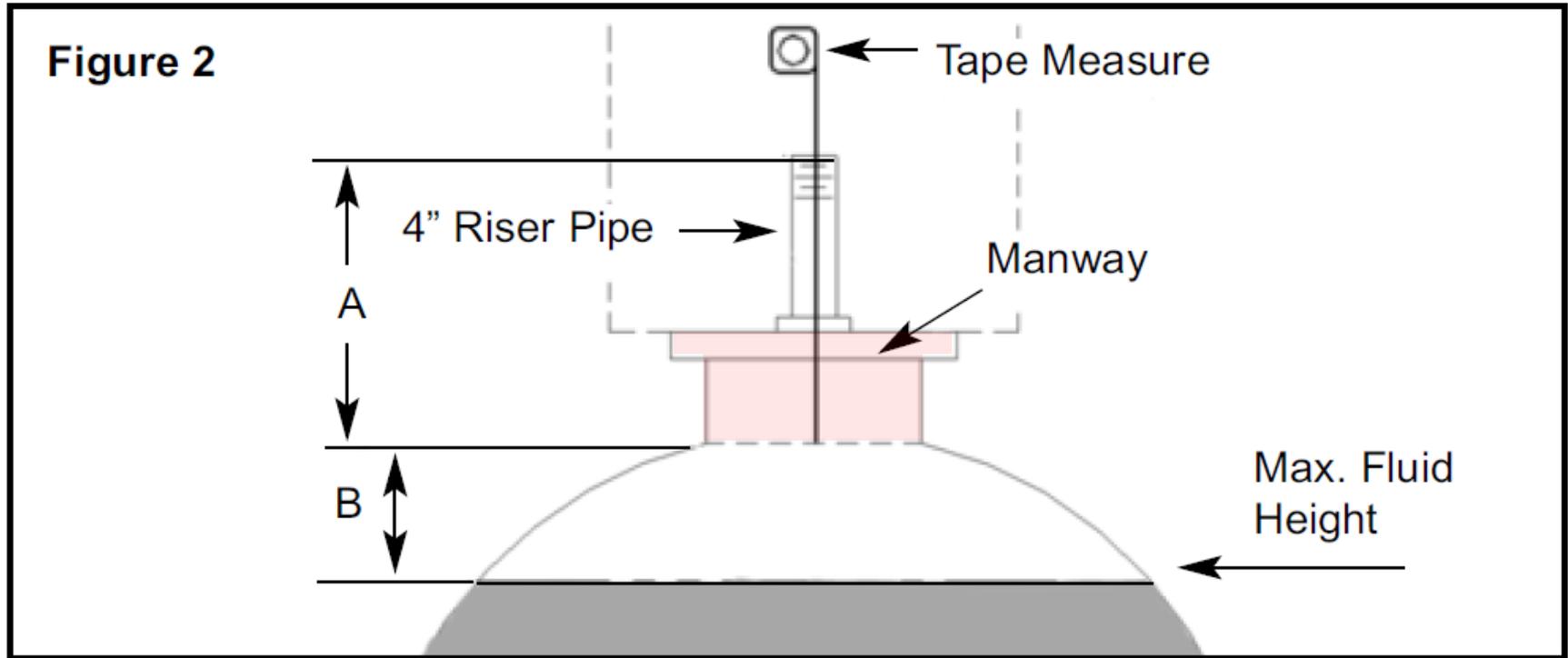


EMCO Guardian A1100



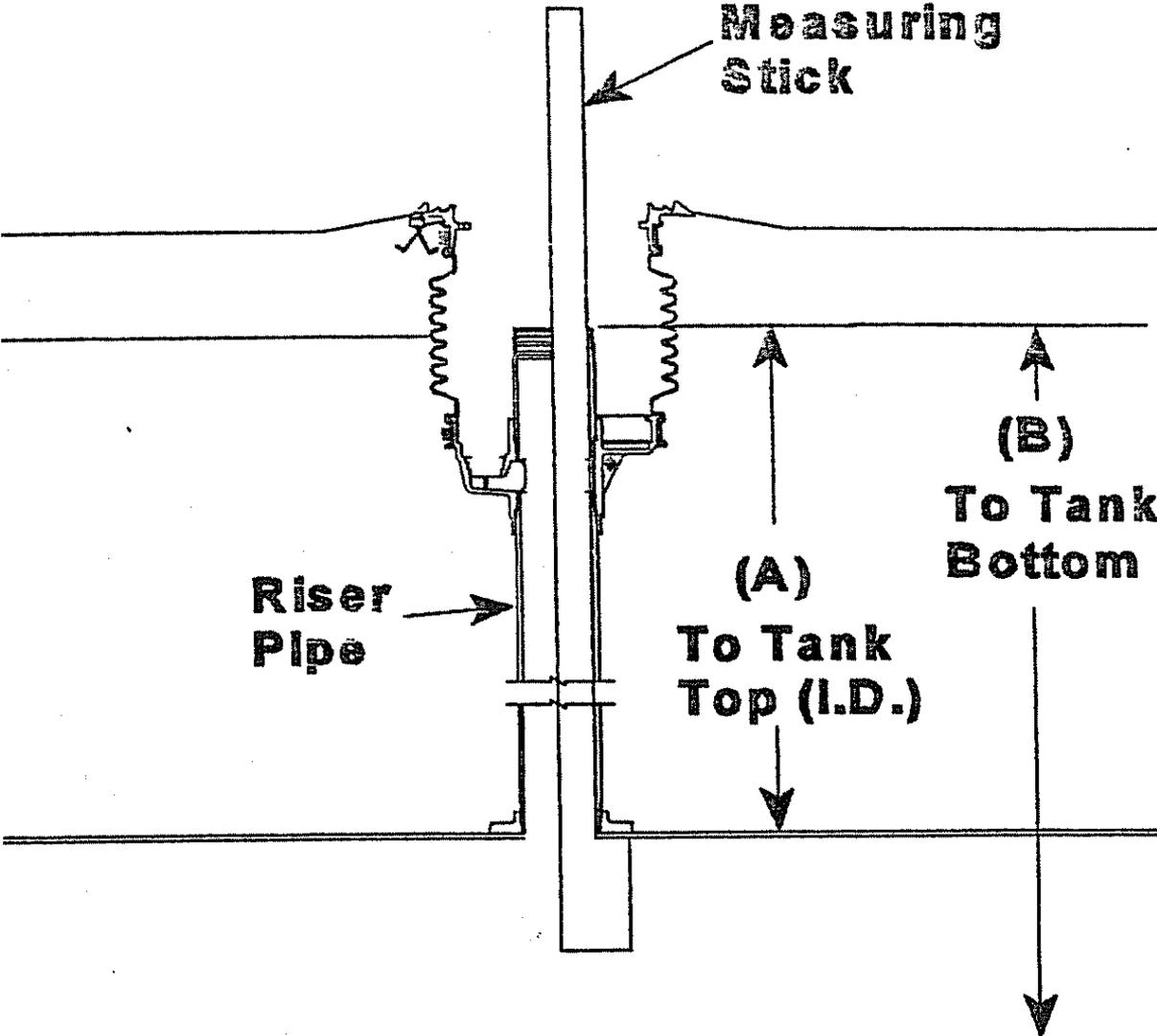
Step 2: Find measurement A which is the distance from the inside top of the tank to the top of the 4" riser pipe as shown in Figure 1. If the tank has a manway, make sure to include the height of the manway when finding Dimension A as shown in Figure 2.

EMCO Guardian A1100 – in Manway



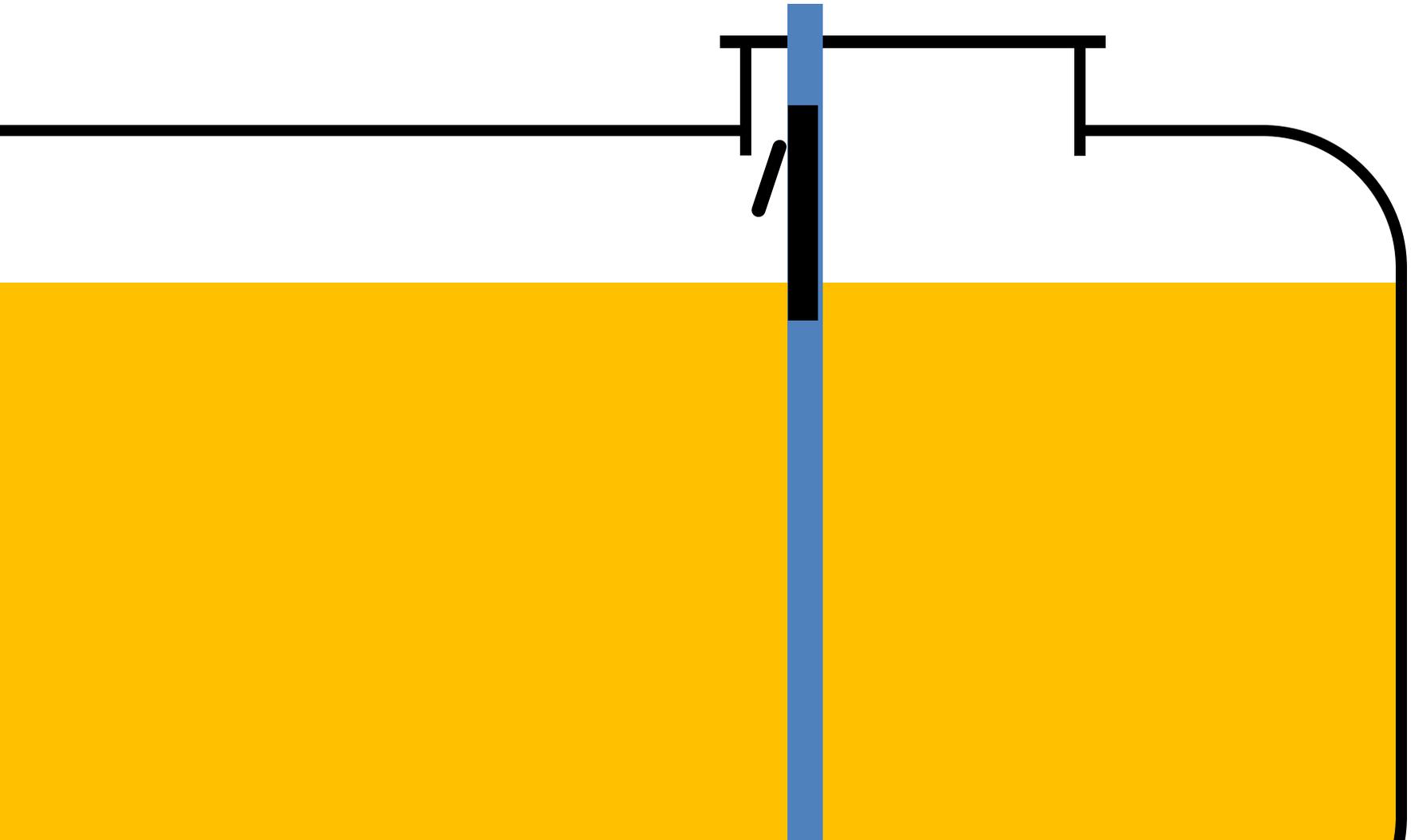
Step 2: Find measurement A which is the distance from the inside top of the tank to the top of the 4" riser pipe as shown in Figure 1. If the tank has a manway, make sure to include the height of the manway when finding Dimension A as shown in Figure 2.

OPW 61SO

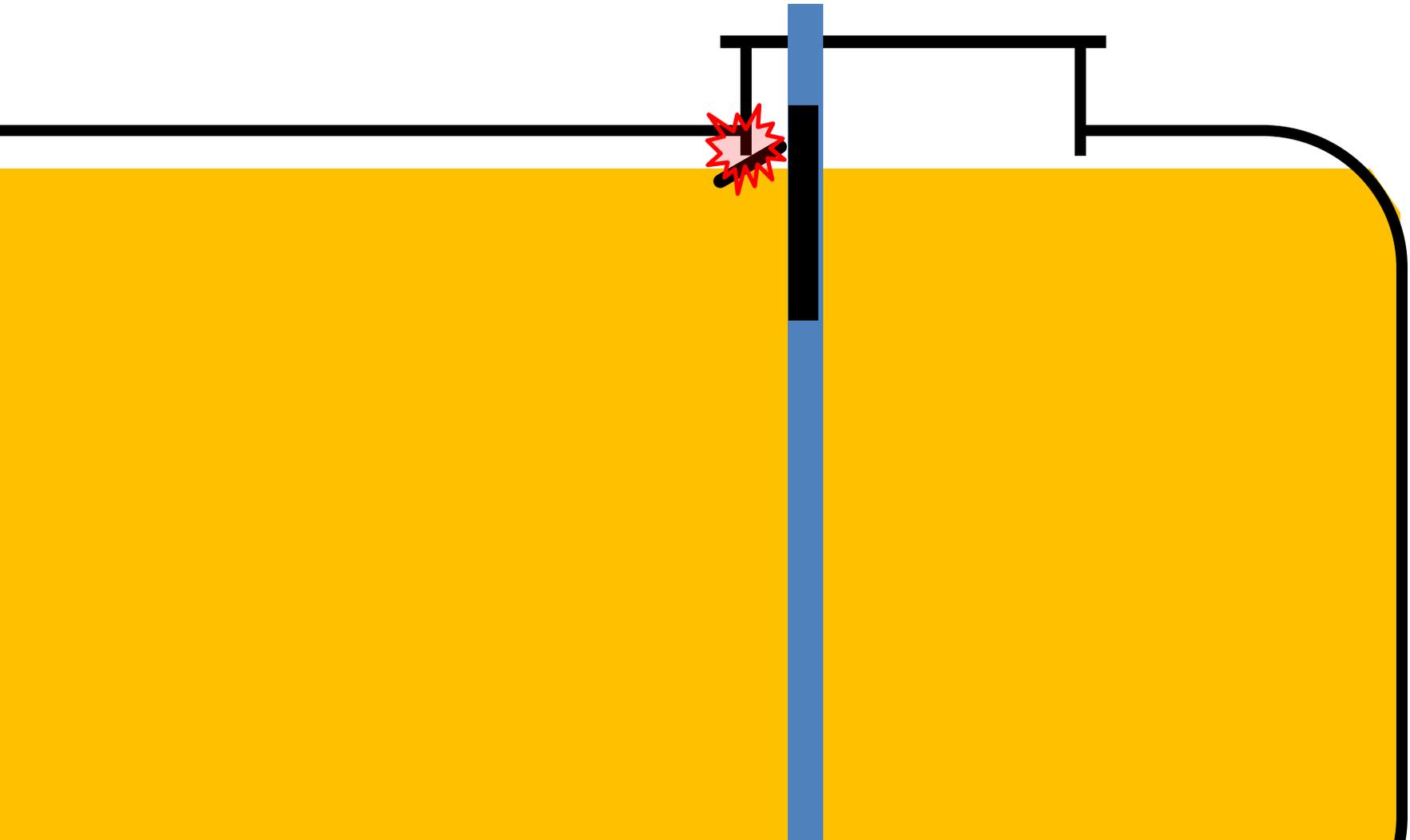


OPW 61SO – in Manway

OPW 61SO – in Manway

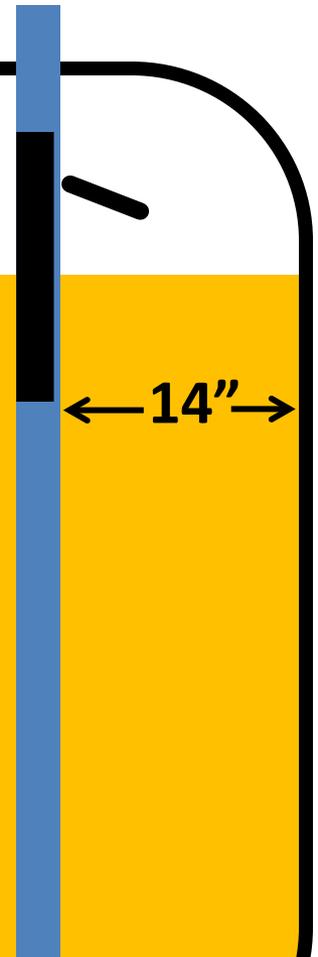


OPW 61SO – in Manway

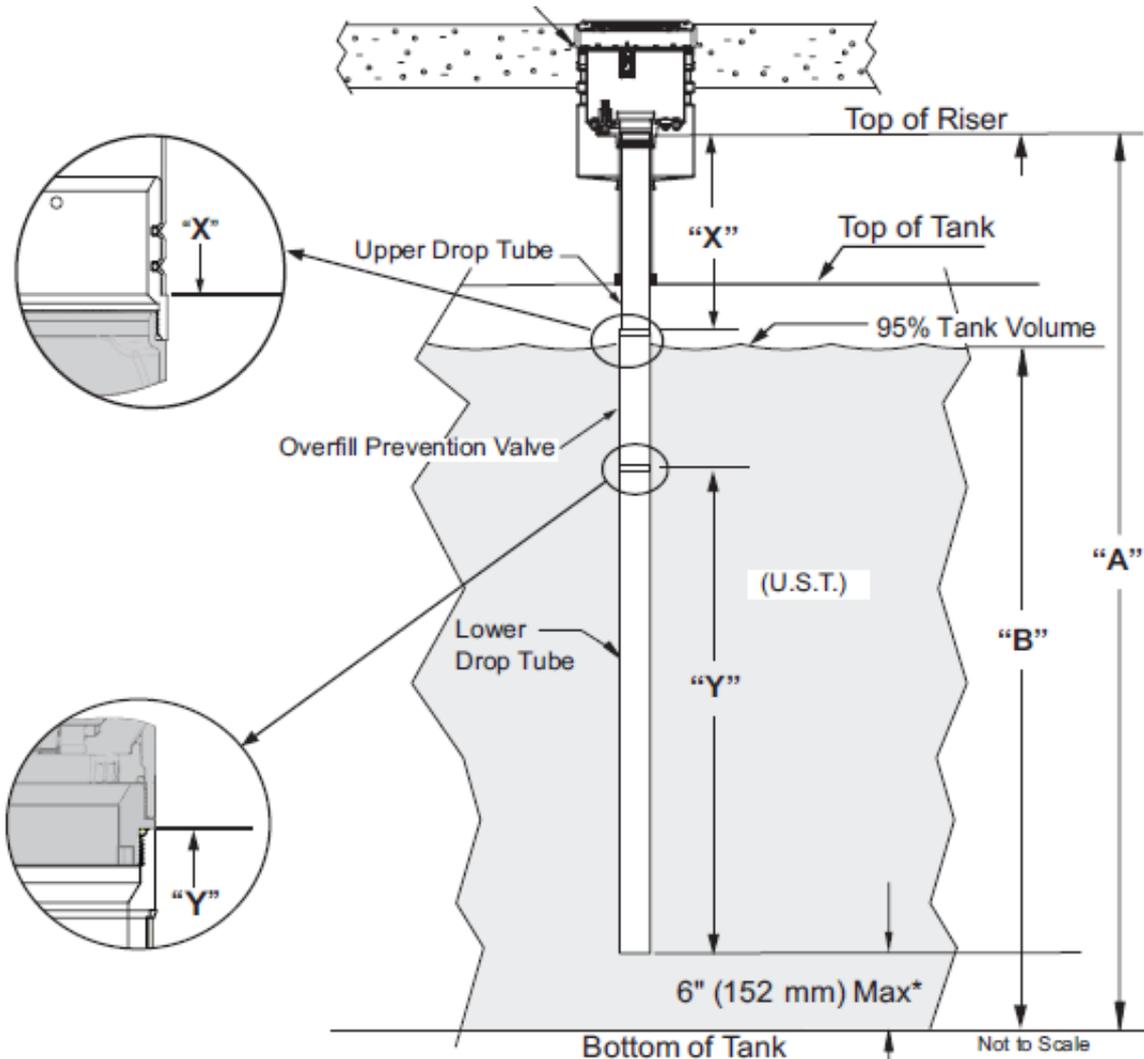


OPW 61SO – Clearance

Float Must Also be Oriented Parallel to Length of Tank



Franklin Fueling Defender



To find Upper Drop Tube length "X"

"A" " Top of riser to bottom of tank

- (Subtract)

"B" " 95% Volume height

- (subtract)

2½" (63.5 mm) Position and mounting adjustment

= (equals)

<p>"X" <input type="text"/></p> <p>Upper Drop Tube Length</p>

Flapper Valve Inspection



EBW Inspection

EBW Auto Limiter II Valve Component Inspection Procedure

EBW's AutoLimiter II drop tube mounted overfill prevention valve includes an inspection port for periodic inspection of the valve components. With the addition of a small, resealable inspection port though, an inspection of the valve's internal flapper assembly can now also be done.

Periodic Auto Limiter Component and Function Inspection

Tools Needed

- #2 Phillips Screwdriver
- Flashlight
- EBW Service Kit (Part #90082)
- Tape Measure or Dipstick

Warning ⚠ The storage tank may be under pressure. Vent the tank prior to removing this drop tube. Highly combustible petroleum vapors are present, so use only non-sparking tools.

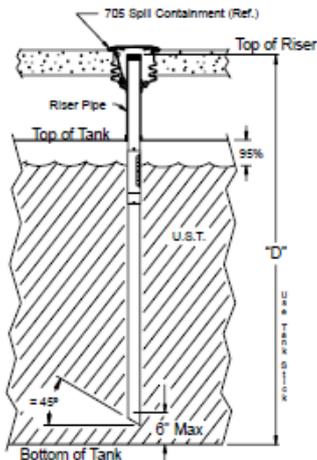


Figure A

1. Remove the fill adapter from the spill containment riser pipe.
2. Using a dip stick or tape measure, determine the height of this flange off the bottom of the tank. Record this dimension.

3. Remove the drop tube/valve assembly from the storage tank fill riser.
4. Place the drop tube assembly on a flat surface with the float side of the overfill valve up.
5. Lay your tape measure or dipstick next to the drop tube aligning the top flange to the dimension number obtained from Step 2. Locate, on the overfill valve assembly, the machined ring adjacent to the upper float. This ring should be identified with a "95%" stamp. Record the dimension on the dip stick or tape measure that aligns with this "95%" identification ring. This is the second stage shutoff point for this valve installation. This should be set for no more than 95% of tank capacity.

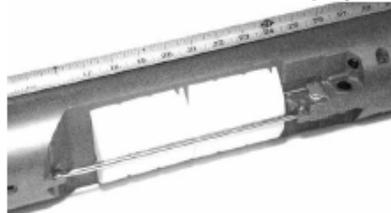


Figure B

6. From the tank chart for this tank, determine the dimension off of the tank bottom for 95% of tank capacity. Compare this determined dimension to the dimension obtained in Step 5. Your calculated 95% capacity dimension should be equal to, or greater than, the actual dimension measured in Step 5. If your calculated dimension is lower, then the installation for this overfill valve is incorrect and needs to be immediately addressed.
7. Locate the Phillips head screw on the right side of the float linkage (Figure C). Remove the screw and save it for reinstallation.



Figure C

8. Inspect the exposed floats for freedom of movement or damage. These floats should slide back and forth on the guide bar freely. If there is any binding, the guide bar may be bent. If necessary, straighten this guide bar (see Figure D).
9. Inspect the linkage connecting the floats to the valve operating mechanism. This linkage should be clean and intact (see Figure D).

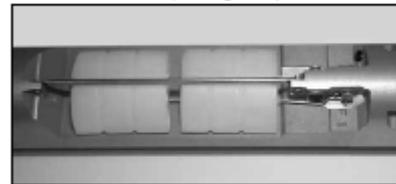


Figure D

10. Insert the 1/8" T-handled hex wrench into the open hole until it makes contact with the internal valve flapper (see Figure E).

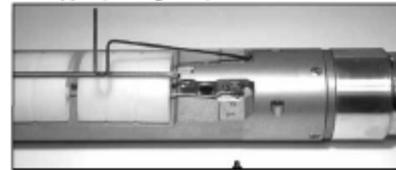


Figure E

11. While holding both floats from sliding away from the inserted hex wrench, lightly try to push the hex wrench further into the hole. The flapper should stay in the locked position and not move closed. If the flapper closes, the latching mechanism is defective and valve must be replaced.
12. Slide the float closest to the hex wrench away from the wrench. You should now be able to easily push the hex wrench further into the hole. This will close the first stage valve flapper (see Figure F).

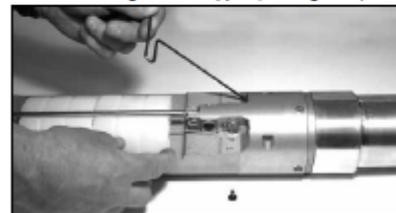


Figure F

13. With the hex wrench inserted until it will not go any further, the first stage valve flapper should stay in the closed position. Using a flashlight, you can now see this by looking in from the top of the drop tube (see Figure G).

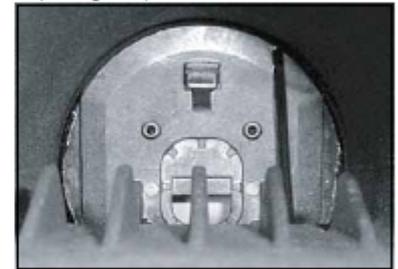


Figure G

14. Slide the second float away from the hex wrench (see Figure H). This will release the valve's second stage flapper (see Figure I).



Figure H

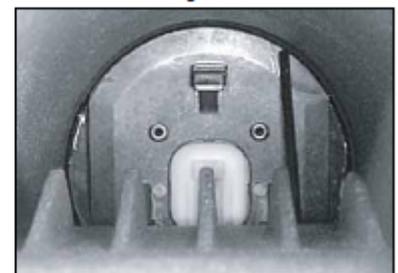
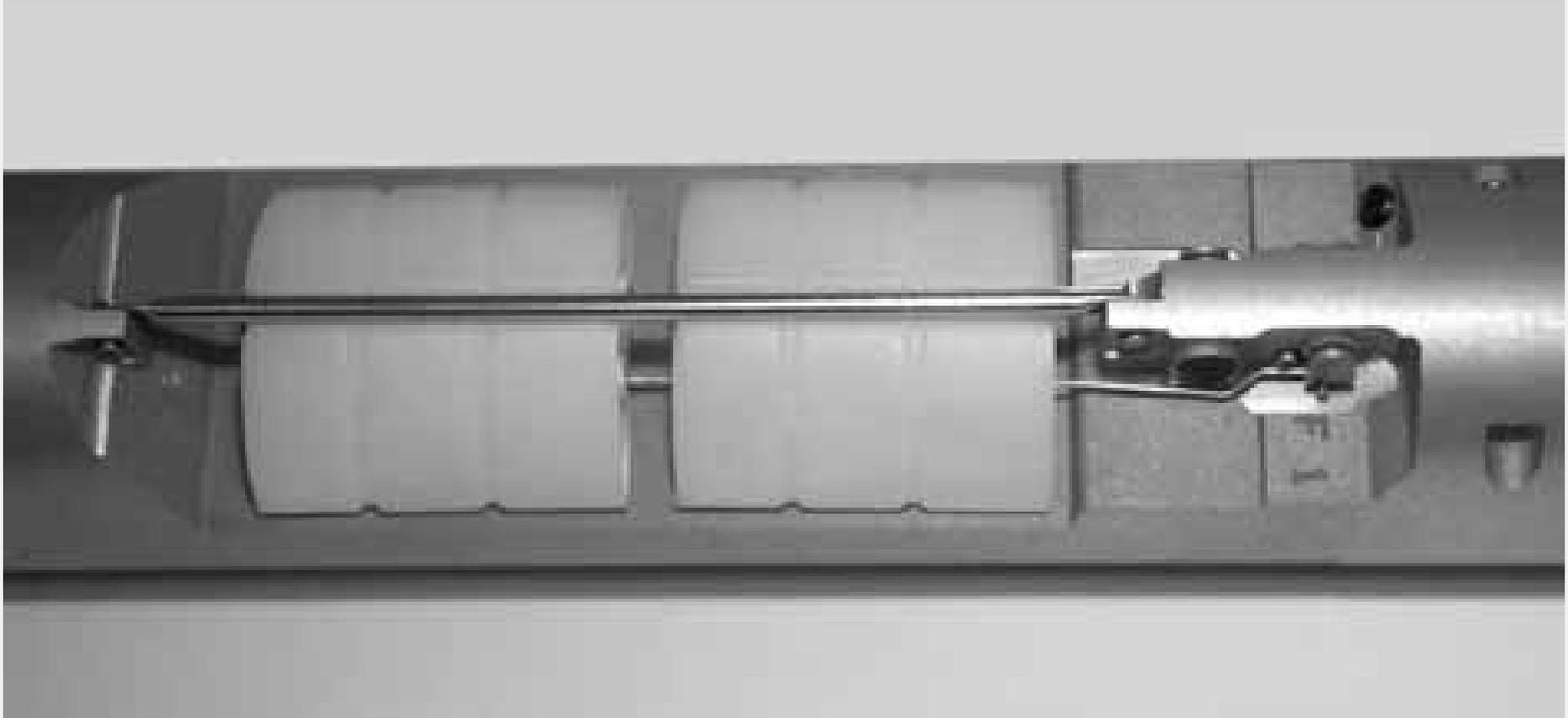


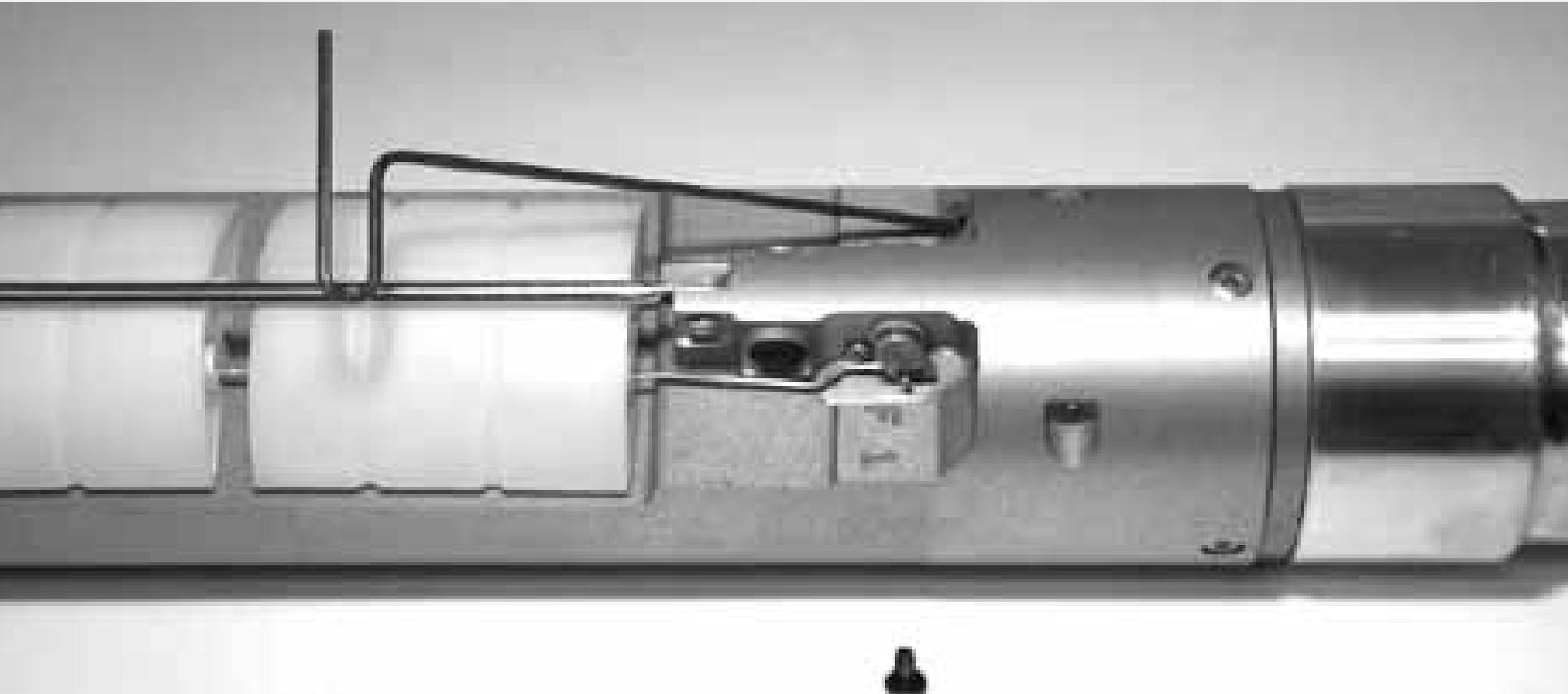
Figure I

15. Remove the hex wrench from the inspection port. The valve's internal flappers should return to their open positions. To verify that the flapper has reset and re-latched, re-insert the hex wrench and repeat Steps 10 & 11. If the flapper did not reset, replace the valve.

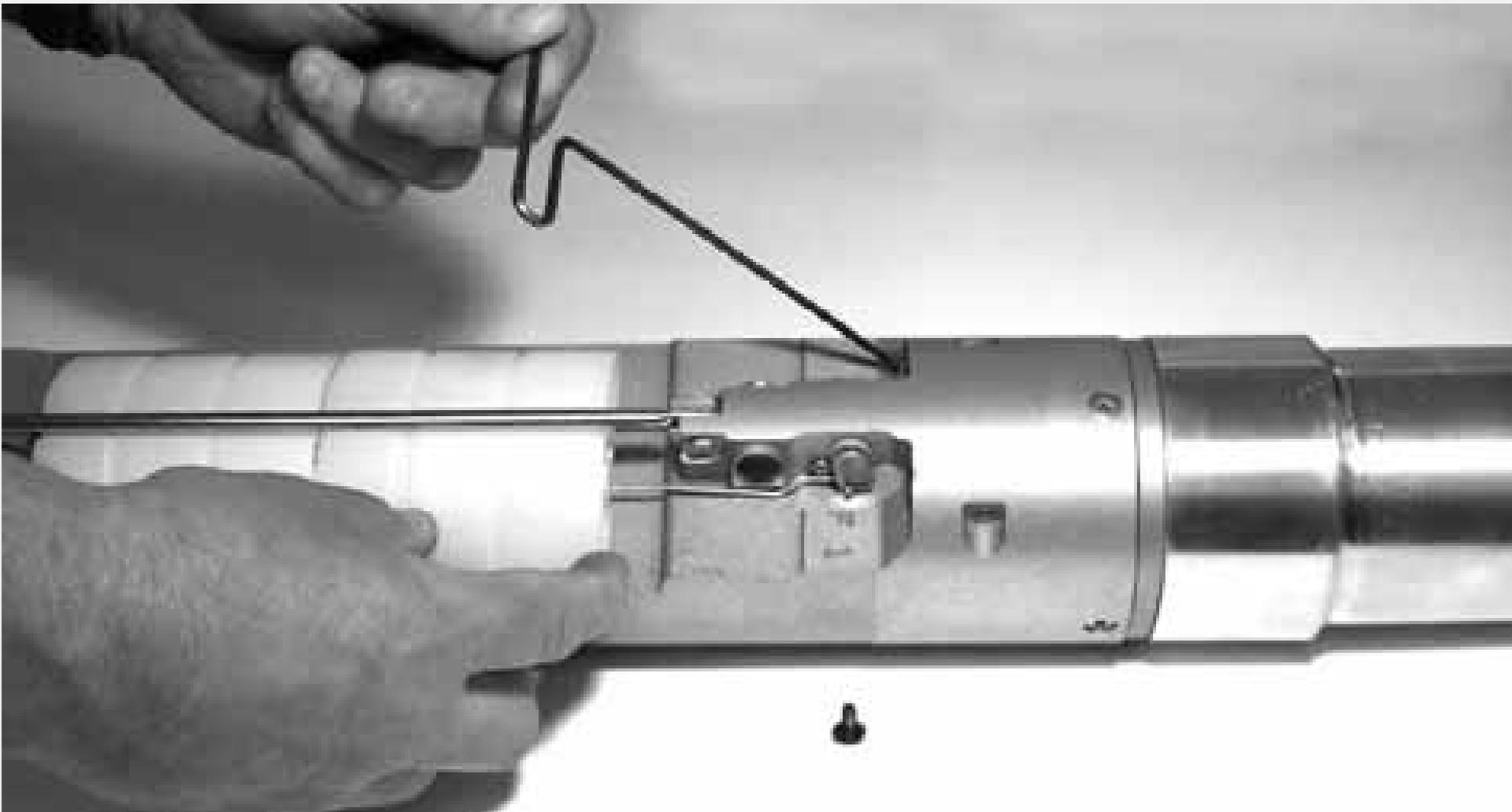
EBW Inspection



EBW Inspection



EBW Inspection



EBW Inspection



EBW Inspection

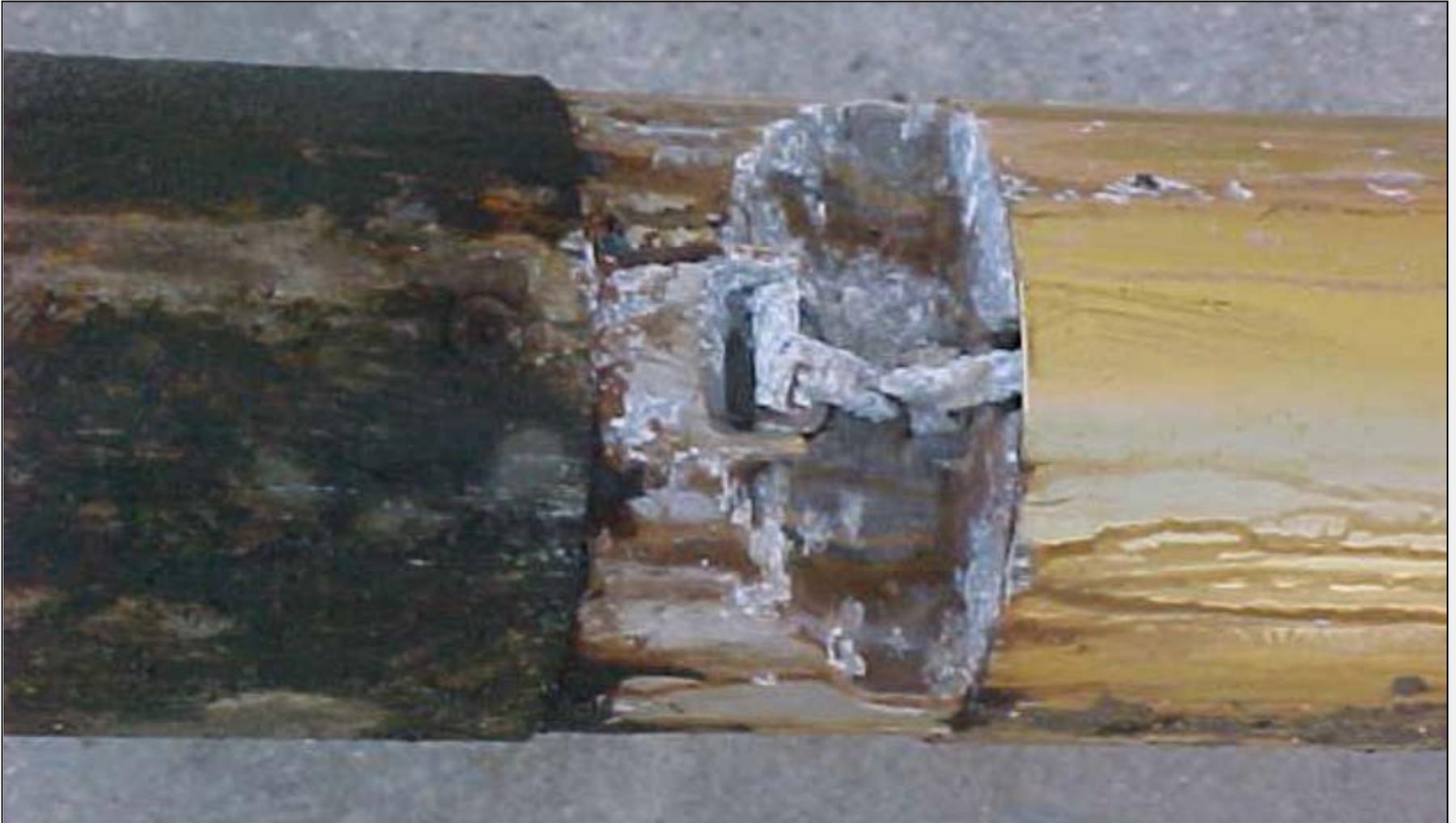


EMCO Inspection

MAINTENANCE

The A1100 Guardian is maintenance free. Periodic inspection of drop tube wear due to corrosion is suggested.

Corrosion Affects More Than Just the Drop Tube...



OPW Inspection

Patent Pending

Testable 7150

Overfill Prevention Valve

Are you Prepared for New EPA Overfill Valve Test Requirements?

Spend 60 Seconds vs 60 Minutes per Tank!



NEW!

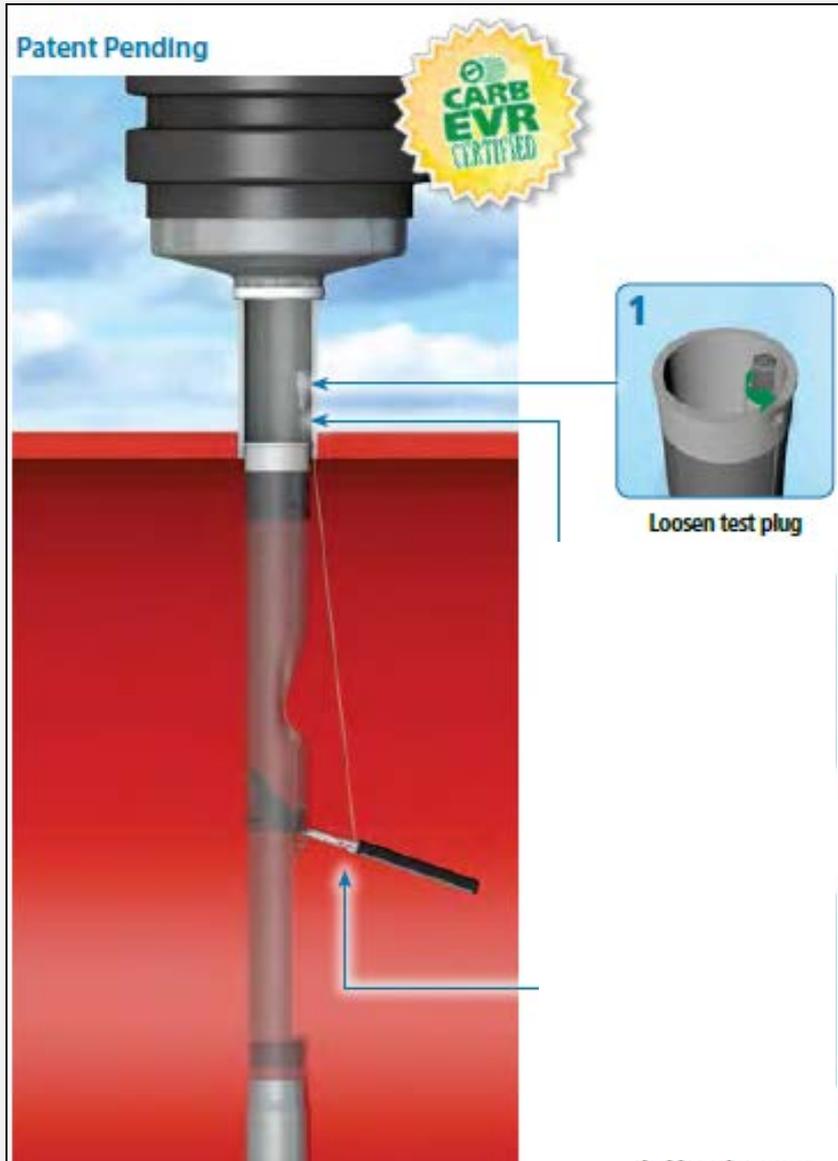
Now you can be with the New OPW Testable 7150 Overfill Prevention Valve

The easiest, most affordable way to ensure overfill compliance

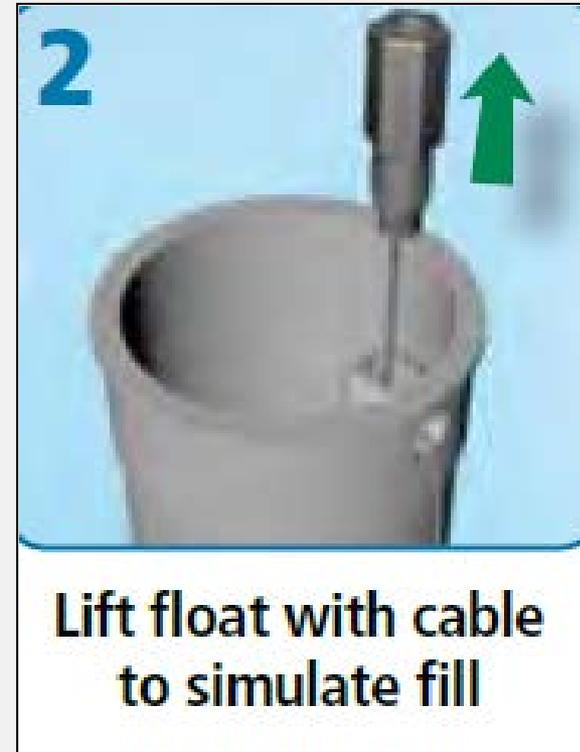
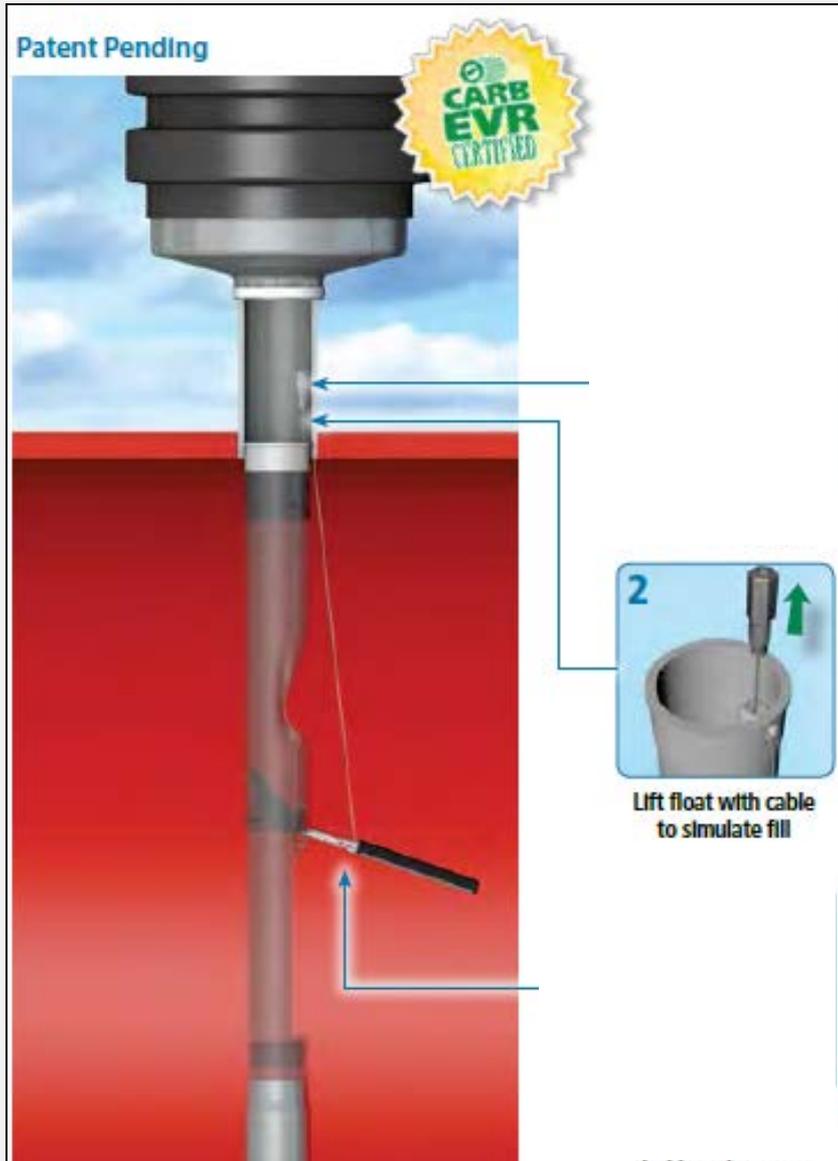
 CARB EVR CERTIFIED

- ◆ UST systems (drop tube, overfill prevention valve, spill containers) must be tested for vapor tightness
- ◆ Overfill prevention valves shut off devices must be manually inspected

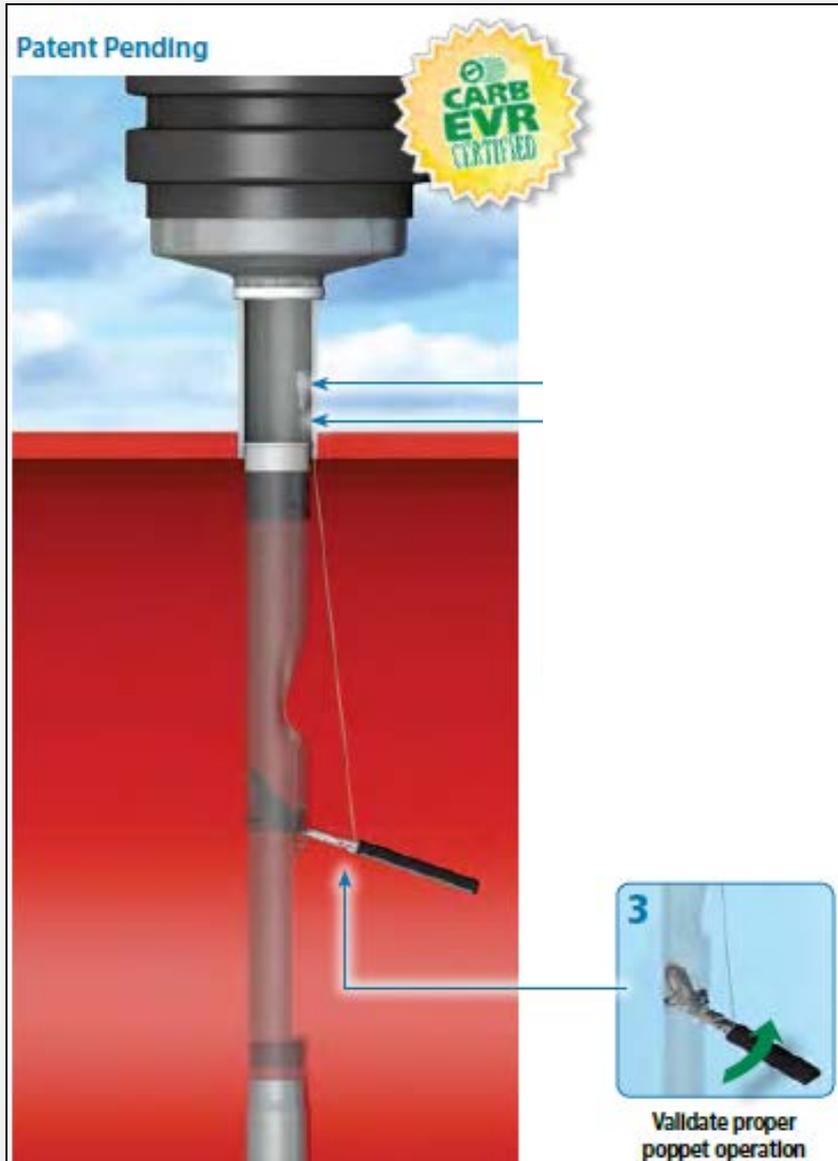
OPW Inspection



OPW Inspection



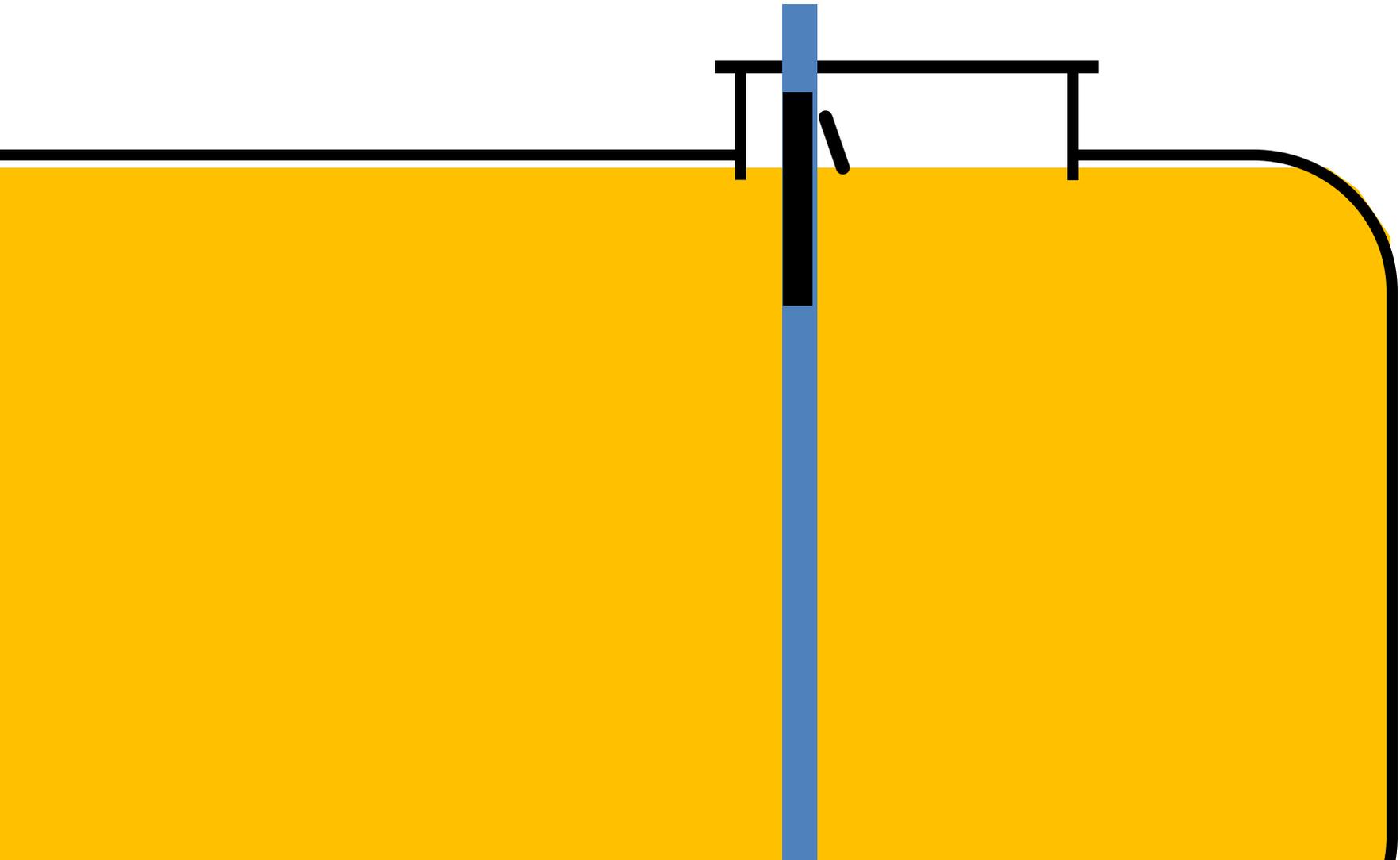
OPW Inspection



What About Corrosion?



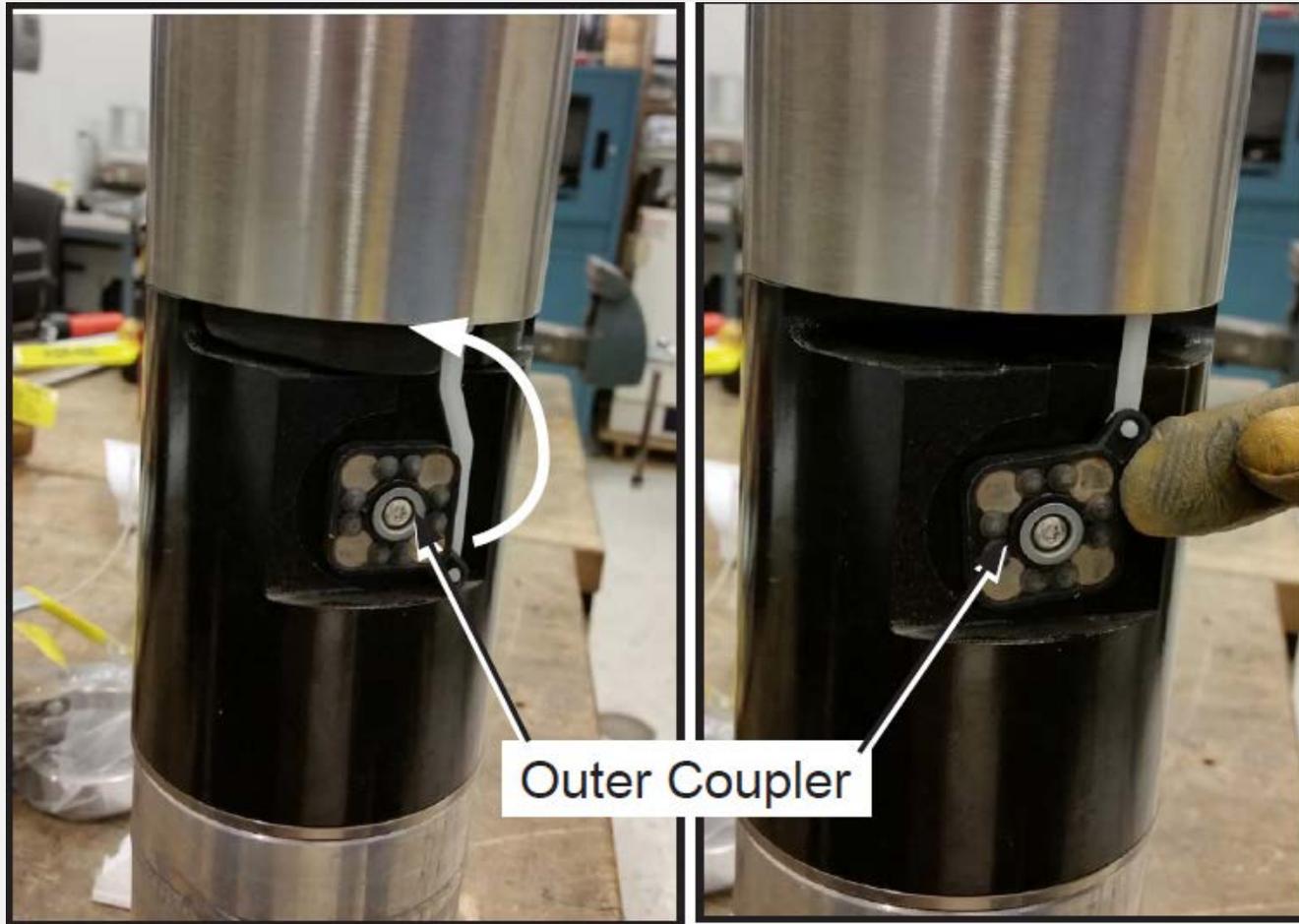
What About Height?



Franklin Fueling Inspection



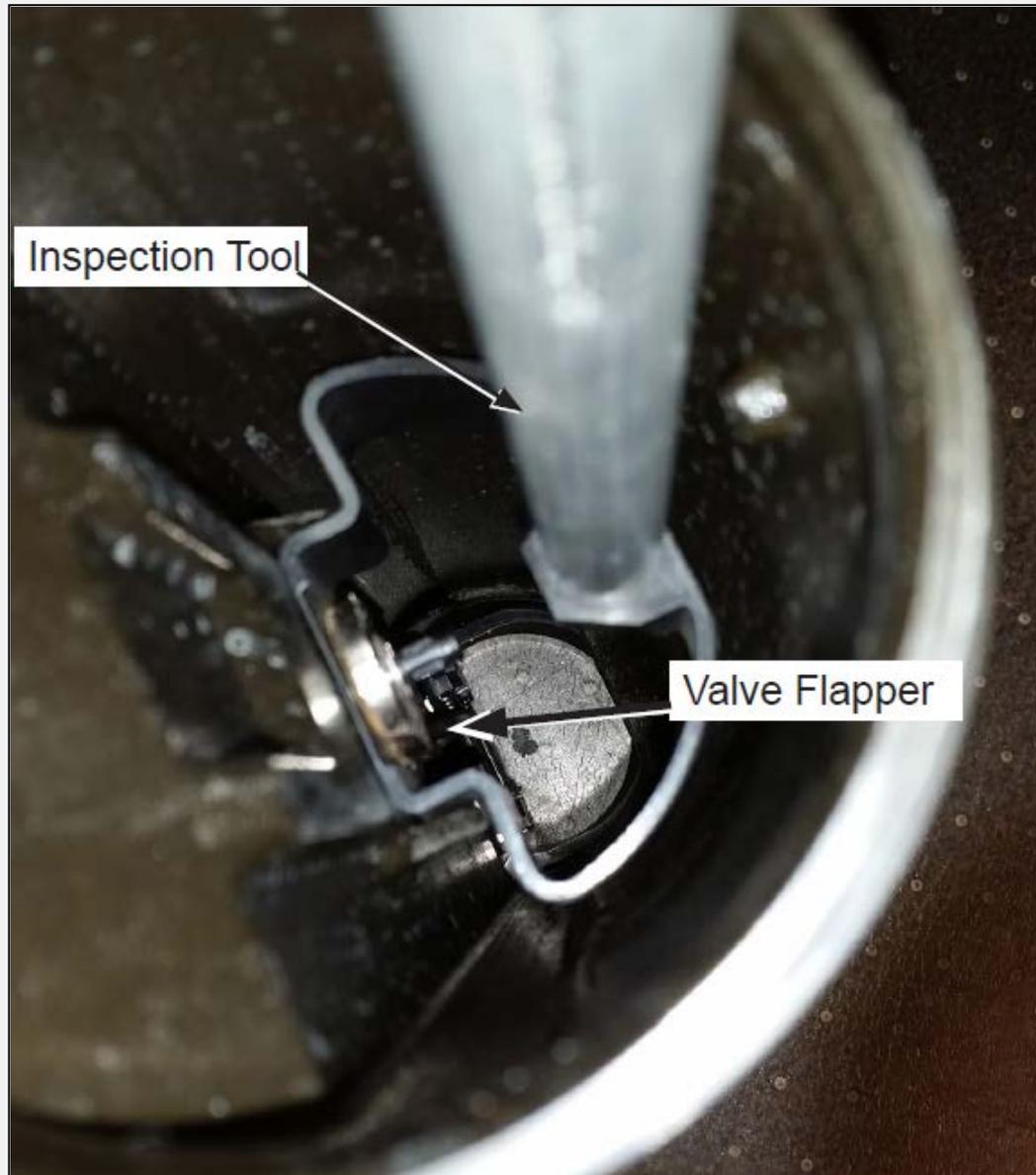
Franklin Fueling Inspection



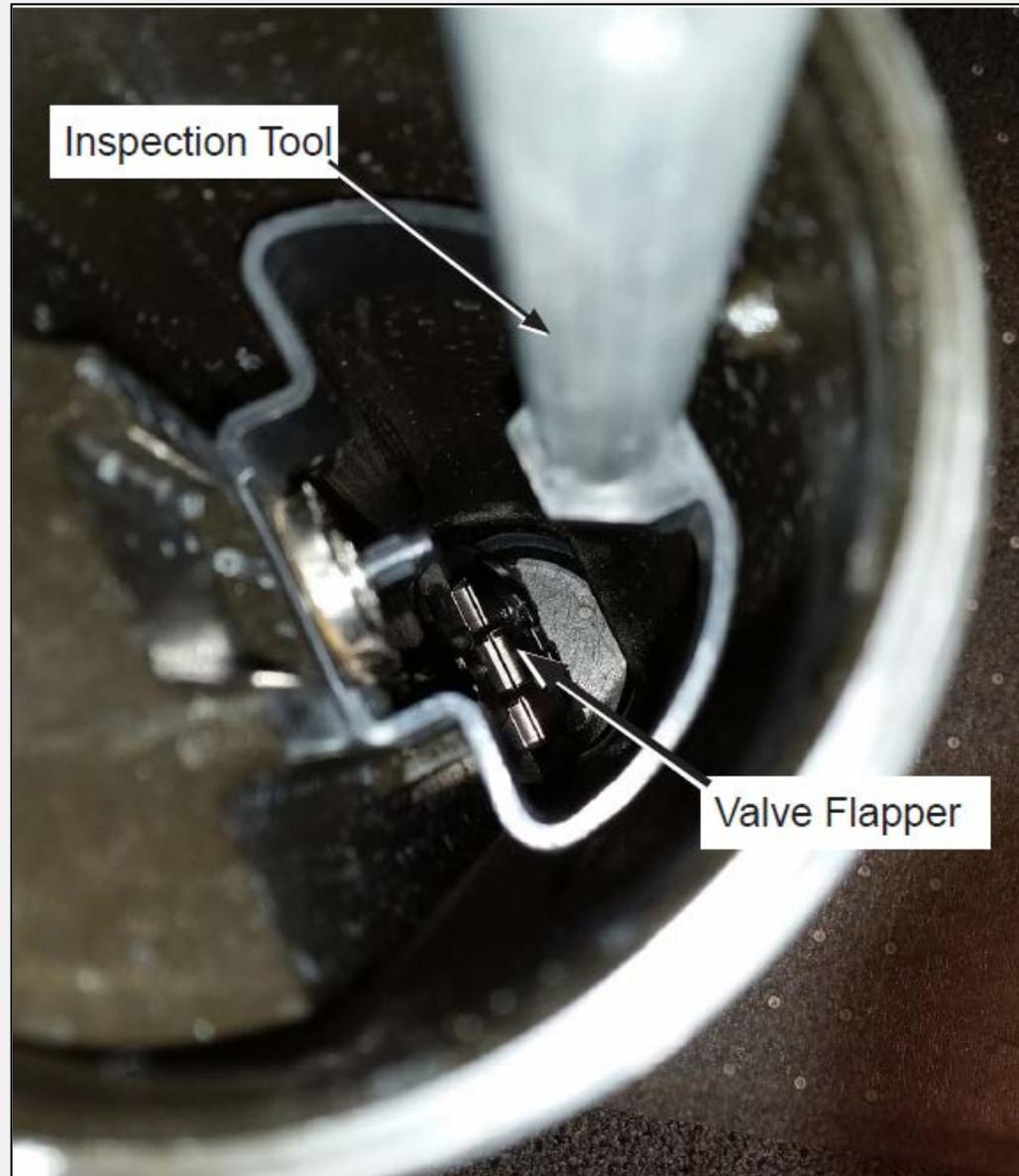
Franklin Fueling Inspection



Franklin Fueling Inspection



Franklin Fueling Inspection



Franklin Fueling Height Inspection

1. Measure Dimension "Z" (Figure 18)

"Z" (Upper drop tube flange to edge of upper tube adapter)

2. Verify using the calculation below

"A" (Drop tube seal surface to bottom of tank)

- (Subtract)

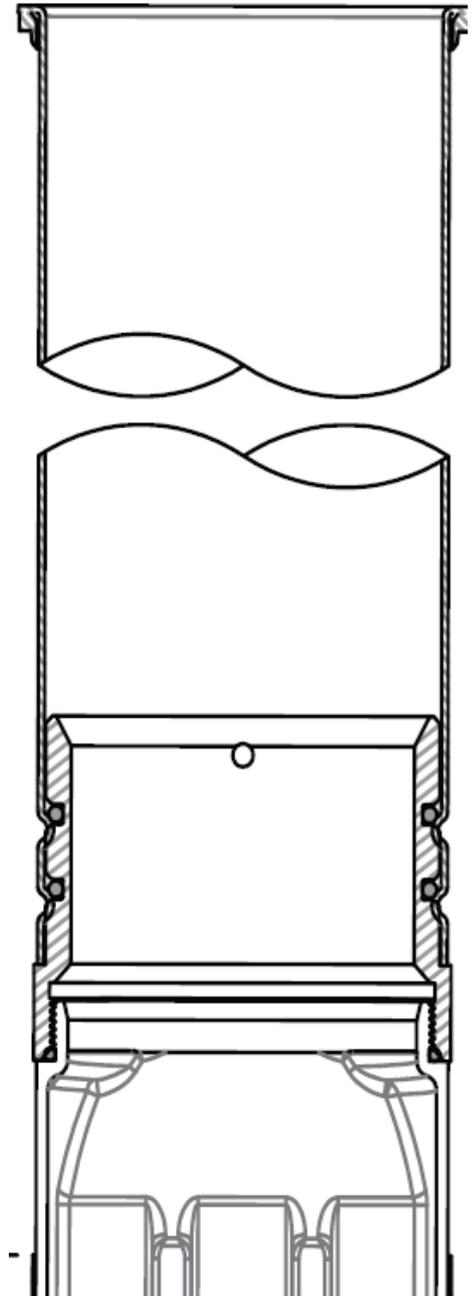
"B" (95% Volume from tank chart)

- (Subtract)

(95% Shutoff level offset)

= (Equals)

Same value as "Z" indicates correct installation



What is the Biggest Obstacle
to Correct Operation of
Flapper Valves?



ERDÜC
6174



Photo by Kevin Henderson

Lunch Time!

