Instructions to fill out a UST-22A form

Step 1:

Before you can complete the operability check you need to obtain the following:

- Determine tank type, i.e. Steel or Fiberglass and whether it is a compartment tank; who manufactured the tank if possible; and when it was manufactured.

Tank Type:	☐ FRP ☐ Steel

- Obtain the correct tank chart from the tank owner or manufacturer. If it is an FRP compartment tank, then you must determine if it is the base tank or end tank and obtain the correct chart for each.

If FRP Compartment tank, select:	☐ Base ☐ End

- Determine the tank chart volume from the tank chart and enter value in the volume field on the UST-22A form.

1. Tank chart volume (gallons):	

If the owner does not have the tank chart or know the manufacturer, then you will need to measure the dimensions (diameter and length) of the tank and get a tank chart created. There are some online tank chart generators for steel tanks that can be used. For FRP tanks there are only two manufacturers so you should be able to obtain a tank chart from either of those companies that meets the dimensions of the tank.

Dipstick Calibration Chart for 10,000 Gallon - 10' Diameter **SW & DWT-I** Tank

DIPSTICK READING	GALLONS	DIPSTICK READING	GALLONS	DIPSTICK READING	GALLONS	DIPSTICK READING	GALLONS	DIPSTICK READING	GALLONS	DIPSTICK READING	GALLONS	DIPSTICK READING	GALLONS
0-1/8"	2	8-1/2"	279	16-7/8"	805	25-1/4"	1498	33-5/8"	2315	42"	3222	50-3/8"	4188
0-1/4"	3	8-5/8"	286	17"	814	25-3/8"	1509	33-3/4"	2328	42-1/8"	3236	50-1/2"	4203
0-3/8"	4	8-3/4"	292	17-1/8"	823	25-1/2"	1521	33-7/8"	2341	42-1/4"	3250	50-5/8"	4217
0-1/2"	6	8-7/8"	298	17-1/4"	833	25-5/8"	1532	34"	2354	42-3/8"	3264	50-3/4"	4232
0-5/8"	7	9"	305	17-3/8"	842	25-3/4"	1544	34-1/8"	2367	42-1/2"	3278	50-7/8"	4247
0-3/4"	9	9-1/8"	311	17-1/2"	851	25-7/8"	1555	34-1/4"	2380	42-5/8"	3292	51"	4262
0-7/8"	11	9-1/4"	318	17-5/8"	861	26"	1567	34-3/8"	2393	42-3/4"	3307	51-1/8"	4276
1"	13	9-3/8"	325	17-3/4"	870	26-1/8"	1578	34-1/2"	2406	42-7/8"	3321	51-1/4"	4291

HOW TO PERFORM CALCUALTIONS FOR **FLAPPER (AUTO SHUT-OFF) DEVICE – GO TO STEP 2**

HOW TO PERFORM CALCUALTIONS FOR **BALL FLOAT DEVICE – GO TO STEP 14**

HOW TO PERFORM CALCUALTIONS FOR **OVERFILL ALARM** (Connected to a monitoring console)– **GO TO STEP 22**

If the overfill device is not one of these standard types, then you will need to contact the UST Section for the steps and required documentation that must be submitted for the overfill operability check.

Step 2: HOW TO PERFORM CALCULATIONS IF A FLAPPER VALVE IS INSTALLED

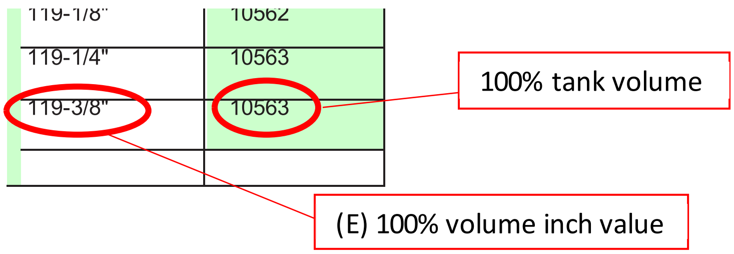
Note: If the tank has a ball float valve, then the flapper valve actuation point must be set lower than the ball float actuation point.

Note: OPW shut-off devices must be a minimum of 5.0 inches from the inside of the top of the tank.

Take the 100% tank volume on the tank chart and multiply it by 0.95 if a flapper valve is being used. For this example, we will use the tank volume of 10,563 gallons from tank chart below

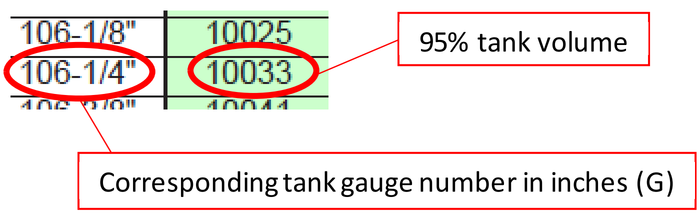
(E) X 0.95 = (F) (maximum gallons for flapper valve to be set)

For this example: 10,563 X 0.95 = 10,034.85 gallons



Step 3:

Find the resulting volume (F) on the tank chart. If that exact volume is not listed, then find the next smaller volume below that value. In the example below that would be 10,033 gallons.



Step 4:

Take the number (G) you got in inches from step 3 and subtract it from the tank stick inch value that corresponds to the number (E) on the same line as 100% tank volume.

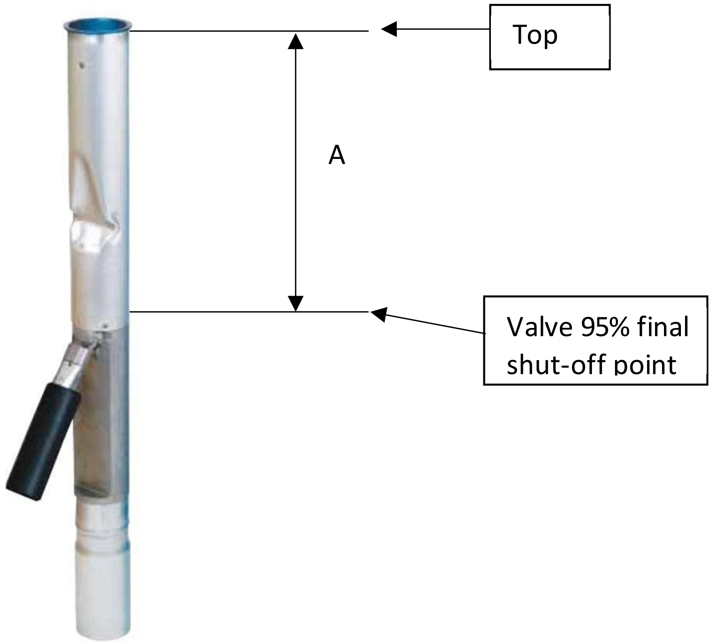
(E) – (G) = (H) For this example: 119 3/8" – 106 1/4" = 13 1/8" (required minimum overfill prevention device length)

Step 5:

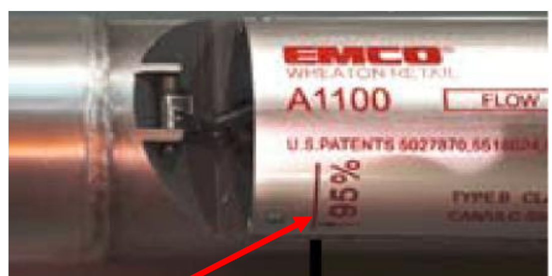
The number (H) from step 4 indicates the minimum length to set the overfill prevention device from the inside of the top of the tank. This is also the minimum actuation point. Note: For some flapper valves, the manufacturer has a minimum depth that the flapper must be in the tank so you also need to consult the installation instructions for the valve.

Step 6:

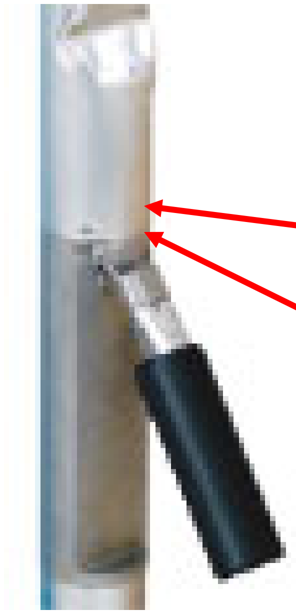
Remove the overfill device from the tank and measure (A) to the flapper valve final shut-off point from the top of where the overfill device is attached. For this example, the measurement is A=58" from the top to the final shut-off point.



Note: Emco Wheaton and Franklin Fueling overfill prevention devices have the 95% final shut-off point marked on the outside of the shut-off valve assembly.



95% Final Shut-off

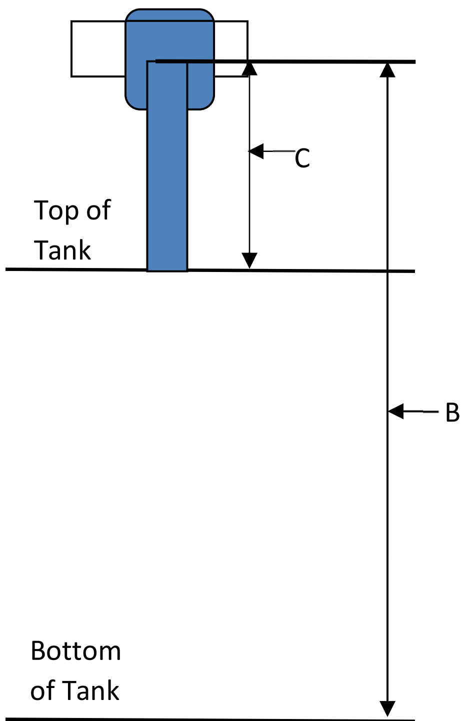


Note: For OPW overfill prevention devices, the 95% final shut-off point is located 1.5 inches above the bottom of the upper tube. Initial shutoff at 95% does not meet the standards for overfill in 15A NCAC 2N without verifying tank tilt also.

95% Final Shut-off is 1.5 inches above the seam.

Seam at the bottom of the upper tube

Note: OPW shut-off devices must be a minimum of 6.5 inches from the inside of the top of the tank.



Step 7:

Measure from the top of the stand pipe to the bottom of the tank (B).

For this example, we will use a measurement of B =162 3/8" from the top of the stand pipe to the bottom of the tank.

Step 8:

Measure from the top of the stand pipe to the inside of the top of the tank (C).

For this example, we will use C = 43" from the top of the stand pipe to the top of the tank.

Step 9:

Subtract the number in step 8 from the number in step 7 to get the tank diameter (D) (Tank diameter in inches from the tank chart) goes on the UST-22A. The example in this step is to verify the tank diameter.

(B) – (C) = (D)   Example: 162 3/8"-43" = 119 3/8" tank diameter.

Step 10:

Take the number in Step 8 (C) and subtract it from the number in step 6 (A). This gives you the length of the overfill prevention device (Current length from tank top to flapper shutoff valve).

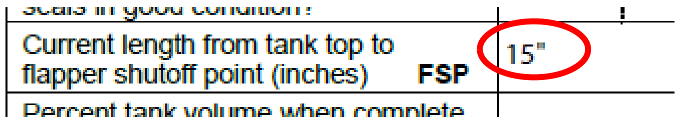
(A) – (C) = (I)   For this example: 58” – 43” = 15”

Is the length (I) longer than the minimum length (H). If **YES** then continue to step 11. If **NO** then tank tilt* will have to be calculated or new overfill prevention equipment installed at the correct height and Steps 2 thru 11 completed again.

*For “Tank Tilt Determination” and “Overfill Prevention Equipment Inspection Procedures” refer to page 2 and 3 of the UST-22A form.

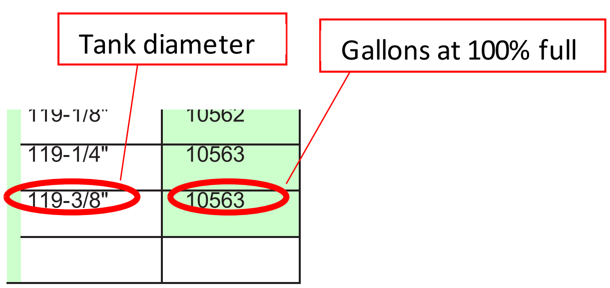
Step 11:

Fill in the number from Step 10 (I) on the row for “Current length from tank top to flapper shutoff point (inches) on the UST-22A form.

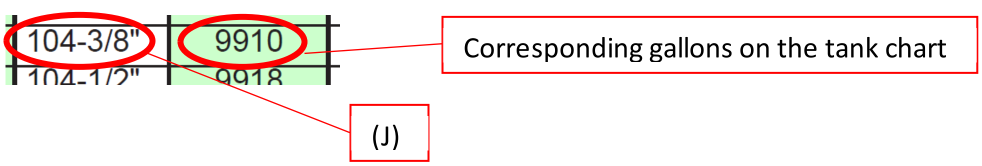


Step 12:

Take the tank diameter (D) and subtract the current overfill length number you calculated in Step 10 (I).
(D) – (I) = (J)   For this example: 119 3/8”- 15” = 104 3/8”



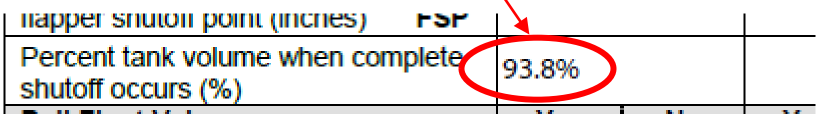
Next look at the tank chart for the gallons that corresponds with that number.



Step 13:

Take the tank chart volume that corresponds to (J) and divide it by the gallons for the tank to be completely full. Then multiply that number by 100. This will give you the answer for the row labelled "Percent tank volume when complete shutoff occurs (%)".

9910/10563= 0.938 0.938 X 100 = 93.8%



Passing overfill prevention device % volume levels

Flapper Valve/Auto Shut Off Device: 95% volume or less (without tank tilt determination)

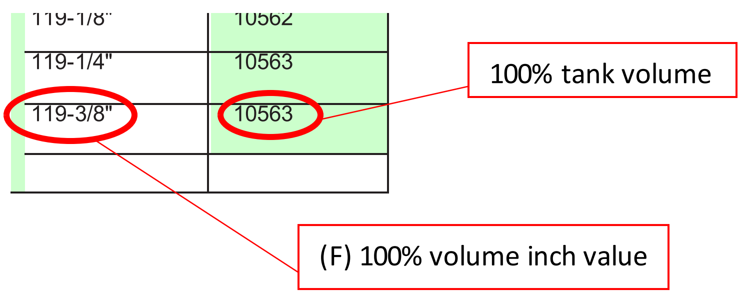
Note: OPW shut-off devices must be a minimum of 6.5 inches from the inside of the top of the tank.

Step 14: HOW TO PERFORM CALCULATIONS IF A BALL FLOAT IS INSTALLED

Take the 100% tank volume on the tank chart and multiply it by 0.9 if you have a ball float installed.

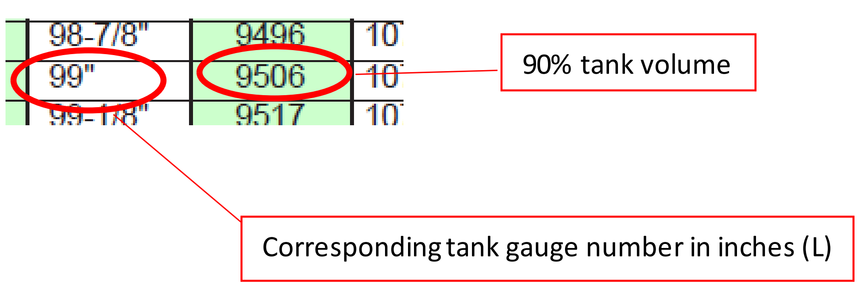
(E) X 0.9 = 90% tank volume in gallons (maximum gallons for ball float to be set)

For this example: (E) 10563 X 0.9= 9506.7 gallons



Step 15:

Find the resulting volume (K) on the tank chart. If that exact volume is not listed, then find the next smaller volume below that value. In the example below that would be



Step 16:

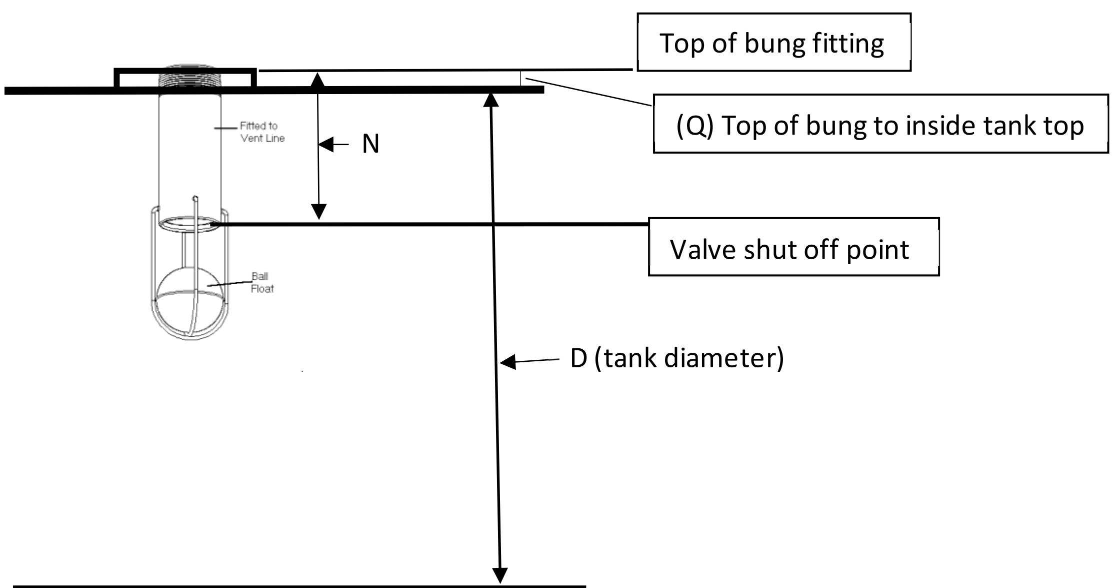
Take the number (L) you got in inches from step 15 and subtract it from the number (F) in inches, from step 14, on the same line as 100% tank volume.

(F) – (L) = (M)   For this example: 119 3/8” – 99” = 20 3/8” (required minimum ball float valve length)

The number (M) above indicates the minimum length to set the ball float valve from the inside of the top of the tank. This is also the minimum actuation point.

Step 17:

Remove the swivel adapter or cap from over the ball float and then remove the ball float vent valve. Next measure (N) which is the distance from the ball float valve shut off point (bottom of the tube) to the top of the threads on the ball float valve tube. For this example, assume the measurement is N= 28” from the top of the threads on the ball float valve tube to the valve shut off point (bottom of the tube). While the ball float vent valve is removed, measure the dimension (Q) from the inside top of the tank to the top of the threaded tank bung fitting. For this example, assume 4” for (Q).



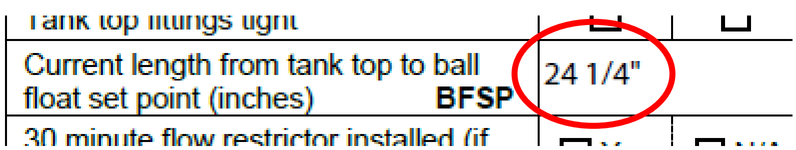
Once all dimensions are measured, check the ball float vent valve for any damage.

Step 18:

Next subtract (Q) from (N) and add back in ¼”. This will give us the length of the ball float vent valve into the tank.

(N) – (Q) + ¼” = (R) For this example: 28” – 4” + ¼” = 24 ¼ ”

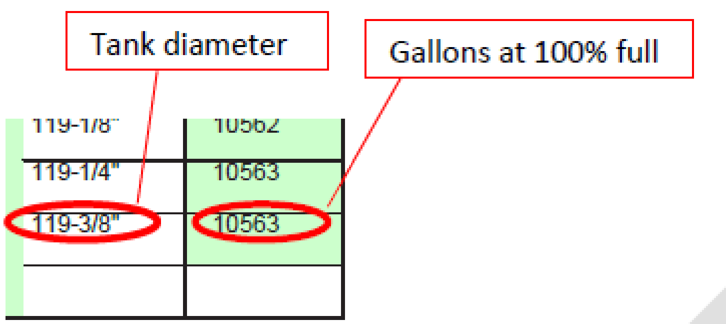
Once (R) is calculated it should be compared to (M) in step 16 above. (R) should be a larger number than (M) for the ball float valve to meet the minimum criteria for ball float valve length. In this example (R) is 24 ¼” and (M) is 20 3/8”, so the ball float vent valve is long enough. Fill in the number (R) on the row for “Current length from tank top to ball float set point (inches)” on the UST-22A



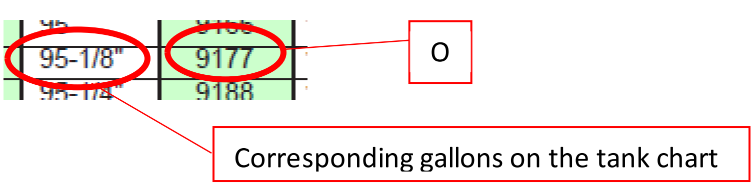
Step 19:

Take the tank diameter (D) and subtract the current ball float length number you calculated in Step 18 (R).

(D) –(R) = (O) For this example: 119 3/8” – 24 1/4” = 95 1/8”



Next look at the tank chart for the gallons that corresponds with the height the ball float vent valve is set at.



Step 20:

Take the tank chart volume that corresponds with O (height corresponding to the level the ball float is set at) and divide it by the tank volume at 100% and then multiply by 100 to obtain the volume the ball float is set at. This will give you the answer for the row labelled “Percent tank volume when flow restriction occurs (%)” if using a **BFSP**.

(O) / (E) = Percent when tank volume flow restriction occurs

For this example: 9177 / (E) 10563 = 0.868 0.868 X 100 = 86.8%

ball float set at more than 90%)		
Percent tank volume when flow restriction occurs (%)	86.8%	
High Level Alarm (HLA)	**Yes**	**N**

The ball float vent valve is set at 86.8% which meets the criteria for the correct tank volume of 90% or less.

Passing overfill prevention device % volume levels

Ball Float Valve: 90% volume or less (without 30-minute flow restrictor kit)

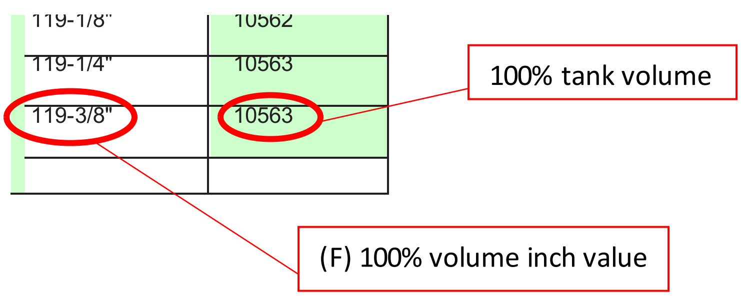
If all questions are answered YES (30 minute flow restrictor kit installed only has to be answered yes if the ball float is set higher than 90%) and the overfill prevention device is set at the appropriate level or lower, then the inspection result is pass. If any questions are answered No and/or the overfill prevention device is set higher than the appropriate level, then the inspection result is a fail.

Step 21: HOW TO PERFORM CALCULATIONS IF AN OVERFILL ALARM IS INSTALLED

Take the 100% tank volume on the tank chart and multiply it by 0.9 if you have an overfill alarm installed.

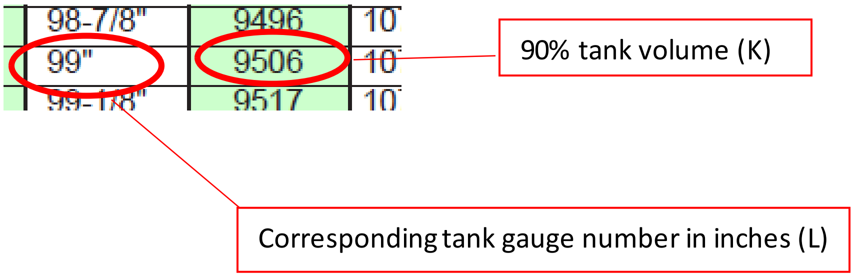
(E) X 0.9 = 90% tank volume in gallons (maximum gallons for overfill alarm to be set)

For this example: (E) 10563 X 0.9= 9506.7 gallons



Step 22:

Find the resulting volume (K) on the tank chart. If that exact volume is not listed, then find the next smaller volume below that value. In the example below that would be 9506 gallons. The tank volume (K) indicates the maximum volume to set the product float on the tank probe for the tank.



Step 23:

Next measure the product level in the tank manually and compare to the console reading to confirm ATG accuracy. If it is incorrect, the equipment needs to be repaired before proceeding.

Step 24:

Verify that the overfill alarm on the ATG is set to provide a warning when the tank is no more than 90% full. Use (K) fuel/product level from Step 22 to ensure the ATG is programmed to the correct level.

Step 25:

Verify on the ATG console that the overfill alarm circuit is operational. Also verify that the remote alarm box at the fill ports is still operational.

Step 26:

Activate the overfill alarm warning to verify its operation. If found defective, repair before proceeding.

Step 27:

Remove the ATG probe cap and disconnect the cable from the ATG. And then carefully remove the probe from the tank. Make sure floats do not catch on the riser.

Step 28:

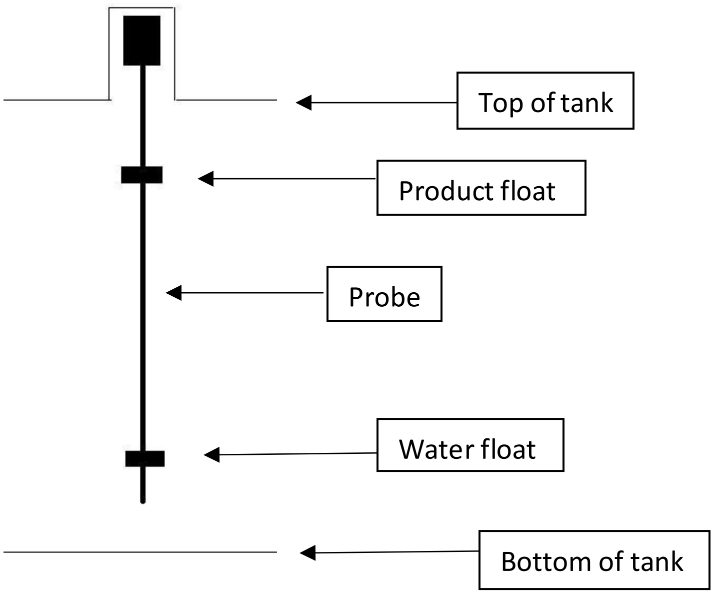
Inspect the probe. The floats must move freely on the stem without binding. If any parts are damaged or missing, repairs must be made before proceeding

Step 29:

Reconnect the probe cable.

Step 30:

Set the product float in the middle of the probe. Slowly move the product float up the probe until the overfill alarm is triggered. You should hear this outside when the alarm sounds the overfill warning. If the float is moved too quickly, it may not trigger the alarm. Document the volume on the ATG console where the overfill alarm was triggered.



Step 31:

Measure the length of the probe from the bottom of the stem to the point the 90% alarm activates.

Step 32:

Record the level in inches from the bottom of the stem when the alarm is triggered (Line 7)

7. Inch level from bottom of stem when 90% alarm is triggered.	99

Step 33:

Using the tank chart, convert the level in inches from the bottom of stem when the alarm is triggered to tank volume at which the alarm is activated.

90-1/8"	8712	98-7/8"	9496
90-1/4"	8724	99"	9506
90-3/8"	8737	99-1/8"	9517

Step 34:

Record tank volume at inch level in Line 7. (Line 8).

8. Tank volume at inch level in Line 7.	9506

Step 35:

To get the percent tank volume when alarm occurs, divide the volume at which the alarm activates (Line 8) by the maximum tank chart volume (Line 1).

Ex) 9,506/10,563 = .899 = 89.9%

Step 36:

Record the percent tank volume when the alarm occurs (%) (Line9) and attach alarm setup.

9. Percent tank volume when alarm occurs (%) (attach alarm setup) (Line 8 / Line 1) X 100	89.9

Step 37:

Clear the alarm condition.

Step 38:

Reinstall the ATG probe.

Step 39: Pass/Fail Criteria for an Overfill Alarm

The overfill alarm must activate at 90% full or less to pass.

The fuel level on the console must agree with the gauge stick reading to pass.

The overfill alarm must activate in test mode to pass.

	Pass	Fail
Inspection Result	☒	☐