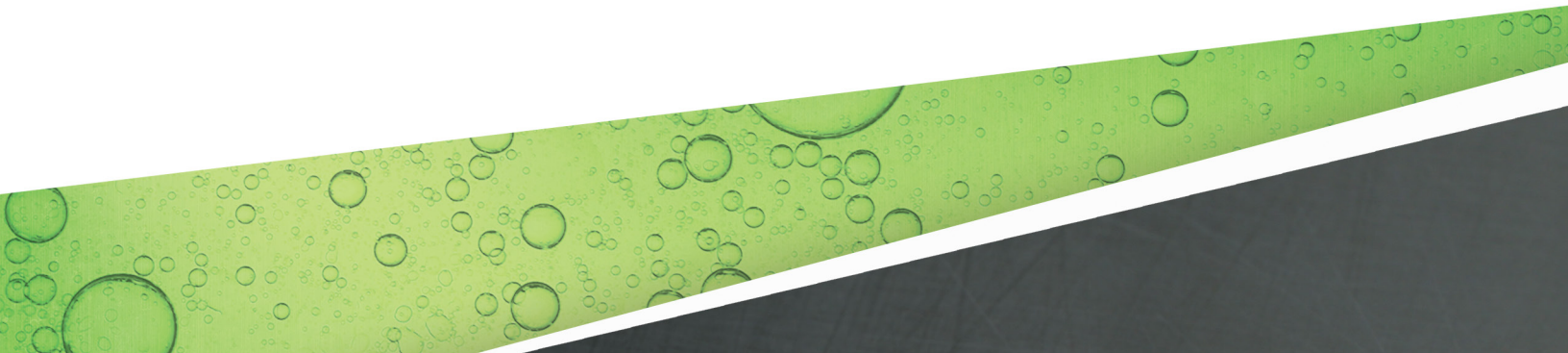


DEFENDER SERIES® BELOW GRADE DOUBLE WALL SPILL CONTAINER

INSTALLATION GUIDE



The information in this publication is provided for reference only. While every effort has been made to ensure the reliability and accuracy of the information contained in this manual at the time of printing, we recommend that you refer to “franklinfueling.com” for the most current version of this manual. All product specifications, as well as the information contained in this publication, are subject to change without notice. Franklin Fueling Systems does not assume responsibility and expressly disclaims liability for loss, damage, or expense arising out of, or in any way connected with, installation, operation, use, or maintenance by using this manual. Franklin Fueling Systems assumes no responsibility for any infringement of patents or other rights of third parties that may result from use of this manual or the products. We make no warranty of any kind with regard to this material, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose.

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Introduction

Conventions used in this manual

This manual includes safety precautions and other important information presented in the following format:

NOTE: This provides helpful supplementary information.

IMPORTANT: This provides instructions to avoid damaging hardware or a potential hazard to the environment, for example: fuel leakage from equipment that could harm the environment.

⚠ CAUTION: This indicates a potentially hazardous situation that could result in minor or moderate injury if not avoided. This may also be used to alert against unsafe practices.

⚠ WARNING: This indicates a potentially hazardous situation that could result in severe injury or death if not avoided.

⚠ DANGER: This indicates an imminently hazardous situation that will result in death if not avoided.

Questions and concerns

In case of emergency, follow the procedures established by your facility. If you have questions or concerns about safety or need assistance, use the information below to contact Franklin Fueling Systems:

Web: franklinfueling.com

Telephone:

USA and Canada: +1.608.838.8786, +1.800.225.9787

USA Technical Support: 1.800.984.6266

UK: +44 (0) 1473.243300

Mexico: 001.800.738.7610

China: +86.10.8565.4566

Operating precautions

Franklin Fueling Systems (FFS) equipment is designed to be installed in areas where volatile liquids such as gasoline and diesel fuel are present. Working in such a hazardous environment presents a risk of severe injury or death if you do not follow standard industry practices and the instructions in this manual. Before you work with or install the equipment covered in this manual, or any related equipment, read this entire manual, particularly the following precautions:

IMPORTANT: To help prevent spillage from an underground storage tank, make sure the delivery equipment is well-maintained, that there is a proper connection, and that the fill adaptor is tight. Delivery personnel should inspect delivery elbows and hoses for damage and missing parts.

⚠ CAUTION: Use only original FFS parts. Substituting non-FFS parts could cause the device to fail, which could create a hazardous condition and/or harm the environment.

⚠ WARNING: Follow all codes that govern how you install and service this product and the entire system. Always lock out and tag electrical circuit breakers while installing or servicing this equipment and related equipment. A potentially lethal electrical shock hazard and the possibility of an explosion or fire from a spark can result if the electrical circuit breakers are accidentally turned on while you are installing or servicing this product. Refer to this manual (and documentation for related equipment) for complete installation and safety information.

⚠ WARNING: Before you enter a containment sump, check for the presence of hydrocarbon vapors. Inhaling these vapors can make you dizzy or unconscious, and if ignited, they can explode and cause serious injury or death. Containment sumps are designed to trap hazardous liquid spills and prevent environmental contamination, so they can accumulate dangerous amounts of hydrocarbon vapors. Check the atmosphere in the sump regularly while you are working in it. If vapors reach unsafe levels, exit the sump and ventilate it with fresh air before you resume working. Always have another person standing by for assistance.

⚠ WARNING: Follow all federal, state, and local laws governing the installation of this product and its associated systems. When no other regulations apply, follow NFPA codes 30, 30A, and 70 from the National Fire Protection Association. Failure to follow these codes could result in severe injury, death, serious property damage, and/or environmental contamination.

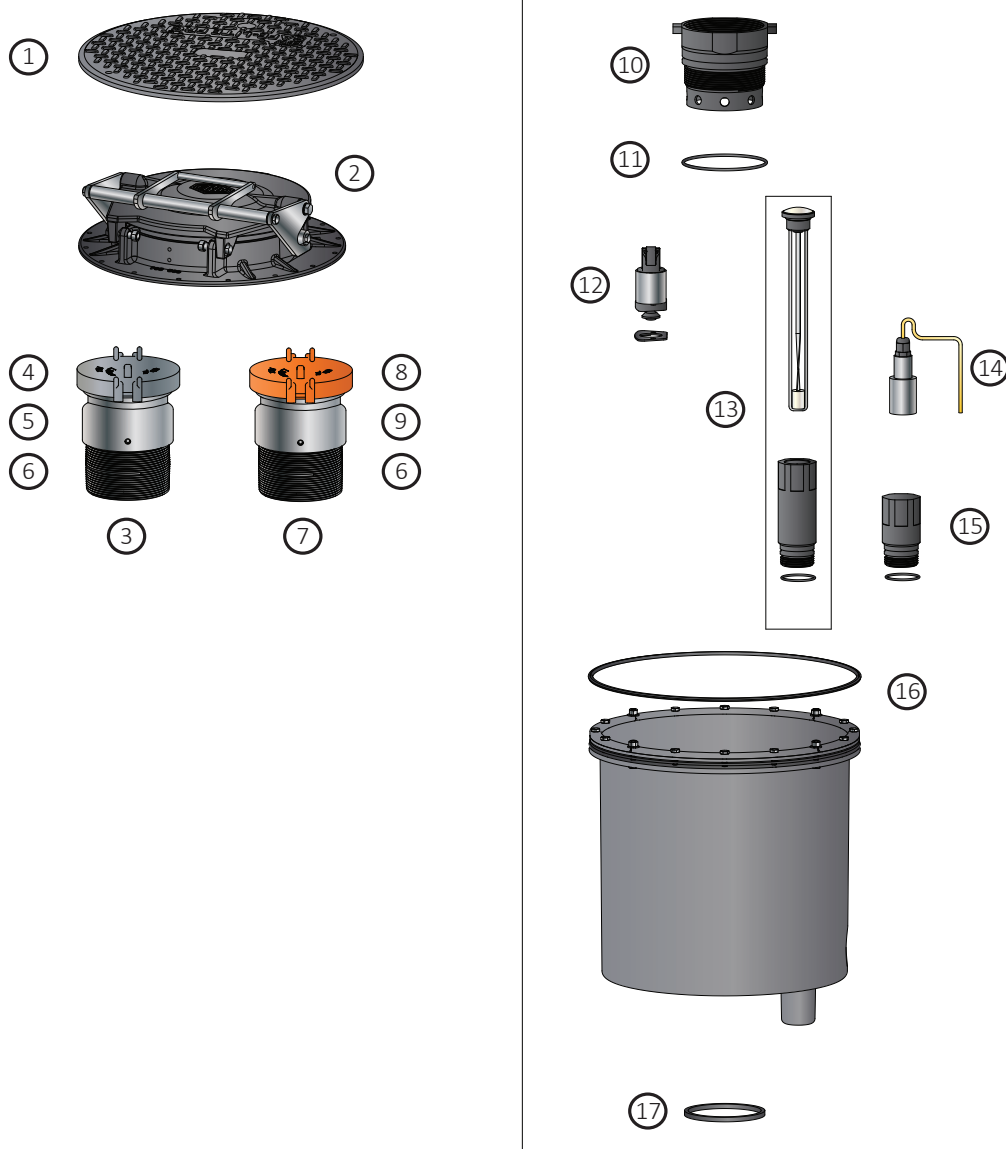
⚠ WARNING: Always secure the work area from moving vehicles. The equipment in this manual is usually mounted underground, so reduced visibility puts service personnel working on it in danger from moving vehicles that enter the work area. To help prevent this safety hazard, secure the area by using a service truck (or some other vehicle) to block access to the work area.

⚠ WARNING: Discharge static electricity from the product to ground before you install it, and make sure it is properly grounded while in service.

⚠ WARNING: Make sure you check the installation location for potential ignition sources such as radio waves, ionizing radiation, and ultrasound sonic waves. If you identify any potential ignition sources, you must make sure safety measure are implemented.

⚠ WARNING: Defender Series® spill containment products are used with tanks containing gasoline or other flammable substances. Follow the recommendations in PEI's "RP100: Recommended Practices for Installation of Underground Liquid Storage Systems." Failure to do so could result in severe injury, death, property damage, and/or environmental contamination.

Replacement parts



#	Model	Description	#	Model	Description
1	78130401	Cover, 18", fiberglass (black)	10	70550901EC	DT riser clamp assembly
2	705587901	Lock down cover assembly	11	1103939	DT riser gasket
3	70541202	Fill riser cap and adapter kit	12	70533729	Pull-to-push drain valve kit
4	77720102	Top seal fill cap	2	70553301	l ² monitor and inspection port kit
5	SWF-100-SS	Fill swivel adapter	14	TSP-ULS	Electronic leak detection sensor
6	70521307	4" x 2.88" close nipple	15	70553302	Sensor inspection port
7	70541302	Vapor riser, cap, and adapter kit	16	70550311	Spill container seal ring gasket
8	30430103	Top seal vapor cap	17	602256001	Tank riser gasket
9	SWV-101-SS	Vapor swivel adapter			

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Below Grade Spill Container

Equipment required

- T-Handle Wrench (T-7001)
- Double-Ended Installation Tool (T-7106)
- DW Vacuum Test Kit (T-7107)
- 1/2" Socket or nut driver
- 1/2" Drive torque wrench
- Silicone-based O-ring lubricant
- Non-hardening thread sealant (approved for use with gasoline and oil)

Torque specifications

Location	Ft-lbs (N-m)
Spill container to UST riser pipe	125-150 (170-203)
Drop tube riser clamp to spill container	75-100 (102-136)

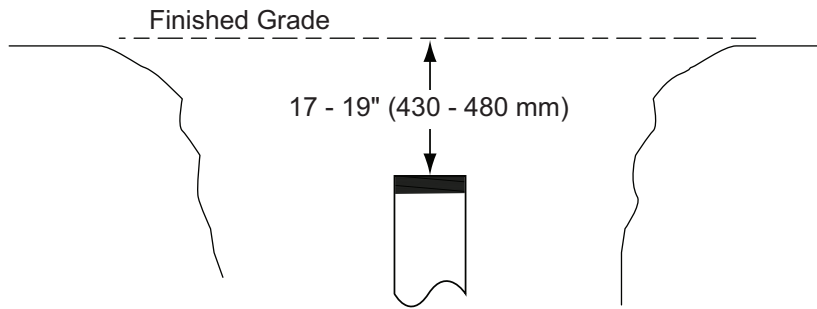
Preparation

New site application

1. Lay a string line or straight edge across the tank riser, at finished grade height.
2. Cut the riser pipe so that the top edge will be 17-19" (430 - 480 mm) from finished grade. The actual height (elevated grade) of the container will be 1.0" (25.4 mm) above finished grade, to ensure proper water runoff (sloped dome).

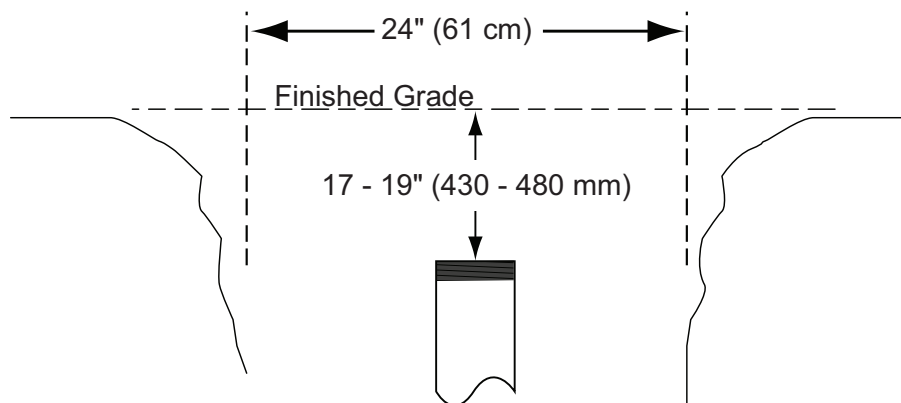
IMPORTANT: If you intend to use a M/F 4x4 adapter, take into account the height of the adapter, 1.75" (45 mm) installed.

IMPORTANT: Cut the riser pipe square/perpendicular to ensure a flat sealing surface.



Retrofit application

1. Remove an appropriate size section of concrete around the existing spill container. The minimum recommended size is a 36" (914 mm) square around each spill container.
2. Remove the existing spill container.
3. Excavate a 24" (610 mm) diameter by 24" (610 mm) deep (measured from top of riser) around the riser pipe.



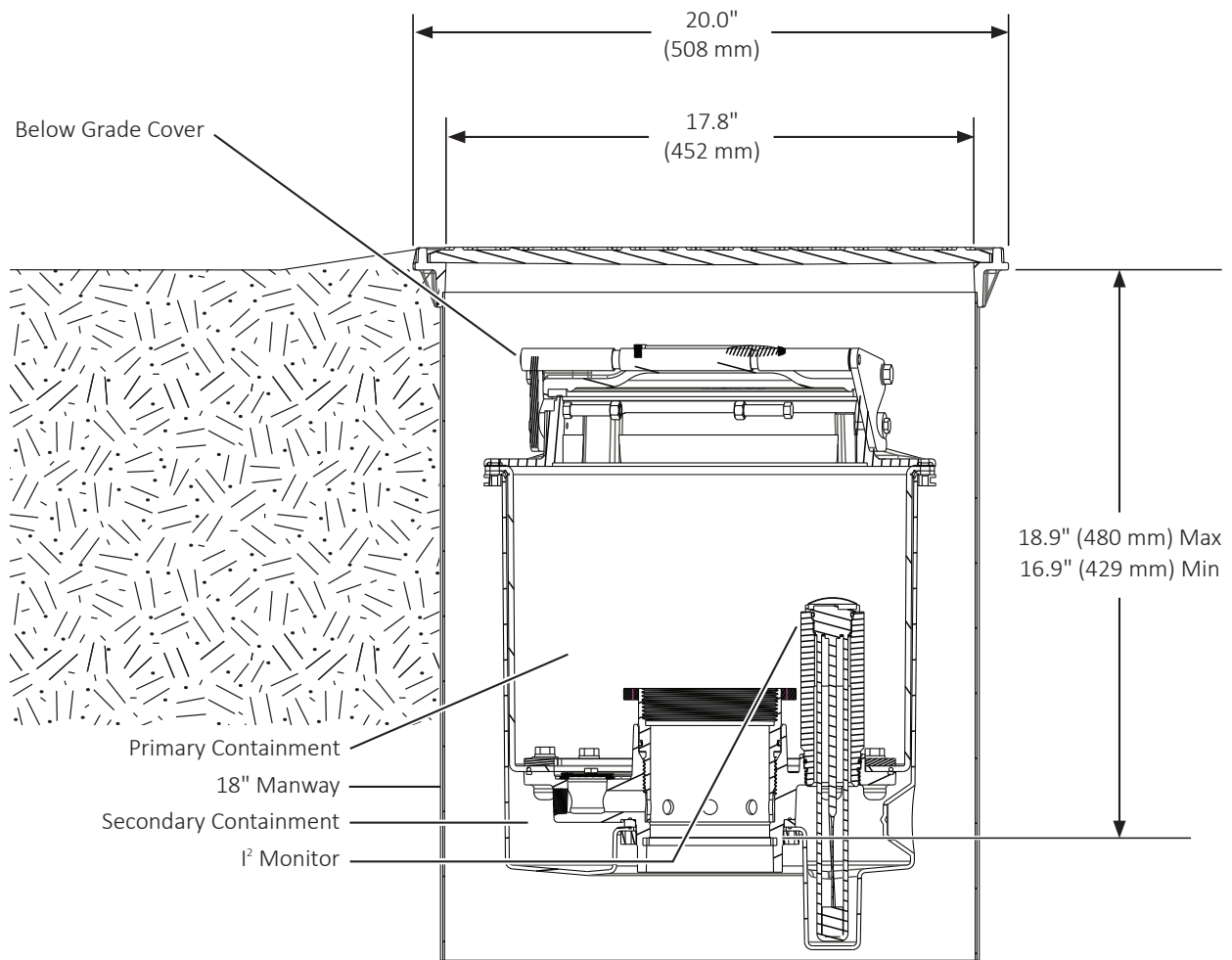
4. Check the height of the riser pipe compared to finished grade level. Lay a straight edge across the excavated area and measure from grade to the top of the riser pipe. The riser pipe must be between 17 - 19" (430 - 480 mm) below grade.
5. Make sure the riser pipe was cut square/perpendicular to ensure a flat sealing surface.
 - If the pipe end is not square, you can use an M/F 4x4 adapter to provide an effective sealing surface (as long as the length of riser pipe allows for it). The M/F 4x4 can also be used if the riser pipe is too short.
 - If the riser pipe is too long, re-cut or replace it to obtain the appropriate length.

Electronic sensor preparation

Measure at least 10 feet (3 meters) of cable from the end spill container cord grip, and mark it with a marker or piece of tape. This is the minimum amount of cable you can leave loose inside the manyway to allow for installation and removal of the spill container. The rest of the length is available to connect to another sump or junction box.

IMPORTANT: Do not loosen the cord grip on the spill container because it will compromise the seal integrity of the factory tested interstitial space.

Installation



IMPORTANT: Inspect the spill container assembly for damage before you install it.

IMPORTANT: Do not disassemble the spill container subassembly. All the seals are factory tested to ensure the integrity of the containment space.

IMPORTANT: Make sure the spill container O-rings and seals are well-lubricated and free of nicks, cuts, dirt, and debris before you perform the installation.

Electronic sensor models

IMPORTANT: Make sure you orient the cover so that it opens towards filling vehicles.

1. If necessary, remove the cover/ring assembly, and then reorient and reinstall it. Tighten the mounting bolts to 40-50 in-lbs of torque.
2. Locate the spill container subassembly and remove the DT (Drop Tube) Riser Clamp Adapter. Use the round end of the T-7106 double ended tightening tool and the T-7001 T-Handle. The slots on the tool will engage with the lugs on the DT Riser Clamp Adapter.

3. Feed the sensor cable through the conduit penetration as far as the 10 foot (3 meter) mark previously made in the preparation section.
4. Wrap excess cable counterclockwise around the riser at least 7 times. This will help prevent the cable from binding when the spill container is threaded onto the riser.
5. Install the spill container onto the tank riser.

If using NPSM (straight threads) containers, apply grease or anti-sieze compound onto the threads. Torque containers to 75-100 Ft Lbs using the T-7106 tool. If using NPT (taper thread) containers, apply a non-hardening pipe thread sealant to the tank riser threads. Tighten the container using the T-7106 tool.

6. Measure from the top of the backfill to 1 inch above the final grade.

⚠ WARNING: Before you cut the skirt and ring assembly, you must move it to a well-ventilated area where there is no access of any kind to tanks, gasoline, gas vapor, diesel fuel, or any other flammable products.

7. Cut the number of inches (or centimeters) measured in the previous step off of the bottom of the skirt and ring assembly.
8. Place the styrofoam collar over the cover and ring assembly.
9. Place the skirt and ring assembly around the styrofoam collar.
10. Adjust the height of the top edge to the elevated grade, which should be approximately 1" (25.4 mm) above finished grade level (1" (25.4 mm) of rain runoff dome).
11. Install the conduit into the conduit penetration and feed the sensor wire through the conduit.

Non-sensor models

IMPORTANT: Make sure you orient the cover so that it opens towards filling vehicles.

1. If necessary, remove the cover/ring assembly, and then reorient and reinstall it. Tighten the mounting bolts to 40-50 in-lbs of torque
2. Remove the DT Riser Clamp Adapter from the spill container assembly.
3. Use the round end of the T-7106 double ended tightening tool and the T-7001 T-Handle. The slots on the tool will engage with the lugs on the DT Riser Clamp Adapter.
4. If you are working with NPT or BPST threads, apply a non-hardening thread sealant to the tank riser. If you are working with NPSM threads, do not apply a thread sealant. Proceed to the next step.
5. Thread the spill container onto the assembly to the tank riser and tighten using square end of the T-7106 double-ended installation tool and the T-7001 T-Handle. Torque to 125-150 ft-lbs (170-203 N-m) using a 1/2" drive torque wrench.
6. Perform a tightness test using a leak detecting solution at the tank riser/spill container joint.

All models

1. If needed, support the skirt and ring assembly with backfill.

If backfill is not available, temporarily support the concrete ring with 2x4s underneath the outer edge.

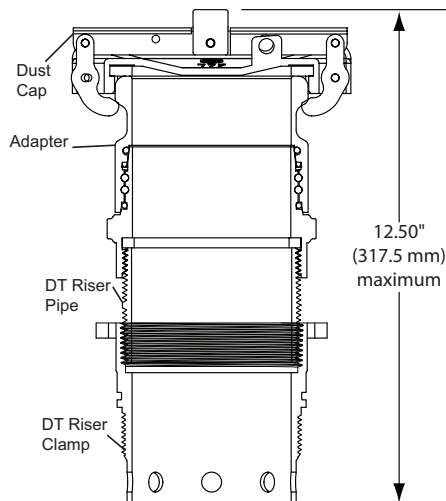
IMPORTANT: For retrofit installations, make sure the drop tube is cut to the appropriate length.

2. Put the drop tube through the spill container so the gasket seats on the sealing ledge.

IMPORTANT: If the unit was ordered with the riser, cap, and fill/vapor adapter, they should all be pre-assembled to the DT Riser Clamp Adapter. Go to step 8.

NOTE: Use only the flats on the top of the DT Riser Clamp Adapter for tightening.

3. Cut and thread the DT Riser Pipe. The overall length of the DT Riser Clamp Adapter assembly including the adapter and dust cap should be no more than 12.5" (317.5 mm).



4. Apply a thread sealant between the pipe nipple and the DT Riser Clamp.
5. Torque to the manufacturer's recommended value using the correct tools.
6. Install the DT Riser Clamp Adapter in the spill container using the round end of the T-7106 double ended tightening tool and T-7001 T-Handle. Torque to 75-100 ft-lbs (101.7 N-m–135.6 N-m). The slots on the tool engage the lugs on the DT riser clamp adapter.
7. Install fill/vapor dust cap.

NOTE: Verify that when the dust cap is installed, it does not interfere with the underside of the spill container lid.

8. Make sure the gravel guard/concrete ring assembly is still at elevated grade height. Adjust if necessary.
9. Perform the integrity test after you add backfill but before you pour concrete. (See Integrity Testing later in this chapter for more information.)
10. Install the skirt and ring assembly.
11. Pour concrete around the skirt and ring assembly. Make sure you dome the concrete at least 1" (2.54 cm) to allow for adequate runoff.

Integrity testing

All Defender Series® spill containers are integrity tested at the factory. We recommend that the containment integrity be re-confirmed. Always test per local codes. If local codes do not specify a procedure, or refers to the manufacturer's test recommendations.

NOTE: If you have a double wall spill container, perform the Hydrostatic Test or the Vacuum Interstitial Test.

Hydrostatic Test

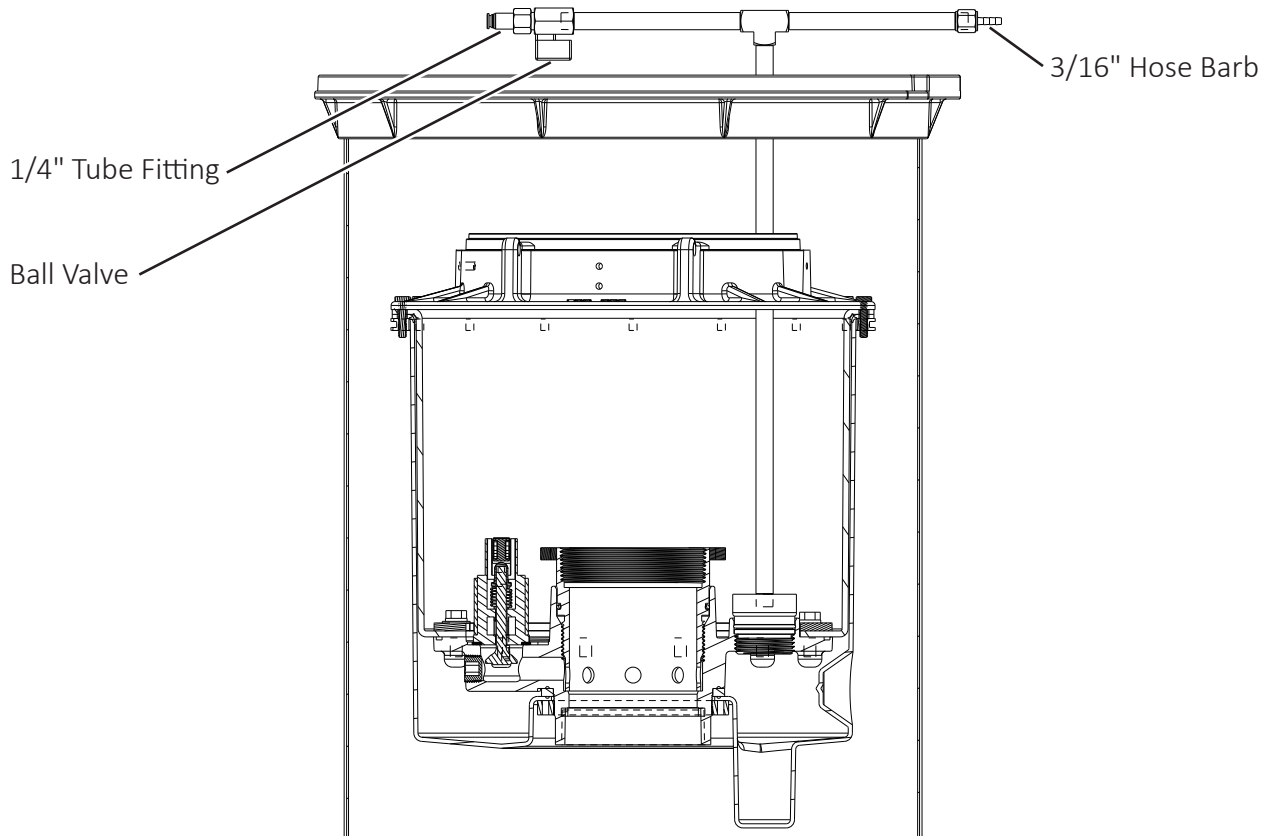
1. Fill the spill container with water until the level is just below the ring of bolts on the edge of the bucket assembly of the snow plow ring.



2. After 1 hour, if there is no detectable drop in water level, the spill container has passed the test.

Vacuum Interstitial Test

1. Remove the Inspection Port Pipe from the spill container.
2. Install the T-7107 DW Vacuum Test Kit into the inspection port (hand tight).
 - Make sure the O-ring is properly lubricated, clean of dirt and debris, and the ID sealing surface of the inspection port is clean of dirt and debris.
 - If the unit includes an electronic sensor, it does not need to be removed.



3. Connect the vacuum source to the 1/4" tube fitting (Push-Lok/ Push-to-connect).
4. Connect the manometer to the 3/16" hose barb.
5. Close the ball valve.
6. Apply vacuum source (using a pump or generator) and SLOWLY open the ball valve until the manometer reads 30 inches of water column (WC) (7.472 kPa), then close the ball valve.
7. Wait approximately 1 minute to allow the interstitial space to stabilize.
8. If needed, reapply the vacuum source to obtain 30" WC (7.472 kPa).
9. Allow spill container to rest undisturbed for 5 minutes while under vacuum.
10. Check the manometer reading after 5 minutes. If it reads above 26" WC (6.476 kPa), the interstitial space has passed the test.
11. If the manometer reads less than 26" WC
12. (6.476 kPa), check all the connections and repeat the test. Otherwise contact Franklin Fueling Systems Technical Service.

Integrity testing recommendations

Test upon installation and thereafter per local codes. Otherwise, test every 3 years.

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Maintenance

Maintenance and inspection recommendations

Monthly

1. Clean any sand, gravel, or dirt from the snow plow ring. Buildup of material will prevent the manhole lid from sitting flat and diverting rain water. In addition to water infiltration, this can lead to premature lid failures and tripping hazards.
2. Inspect the cover gasket and replace it if necessary.
3. Inspect the spill container for the presence of liquid. If any is present, identify the material (water or fuel) and dispose of it according to your local, regional, state, or national code.
4. Inspect the primary spill container and the drain valve screen for any foreign material collecting in the bottom of the tank. Remove any large objects (leaves, rags, etc.) and wipe the bottom of the tank with a disposable rag.
5. Inspect the spill container for damage. Verify that all components are functioning properly.
6. Inspect the Interstitial space for the presence of liquid:
 - If it is installed with the I² monitor, check the yellow indicator position. If the yellow indicator is positioned below the white area on the gauge face, liquid is not detected
 - If it is installed with the TSP-ULS electronic sensor, check the tank gauge equipment in the station. Confirm the sensor status is normal and does not show an alarm condition.
 - If liquid is detected, identify and properly dispose of the liquid. Confirm the status of the interstitial space by performing the Vacuum Interstitial Integrity Procedure.

Yearly

1. Inspect the interstitial monitoring equipment.
 - If it is installed with the I² monitor, test the operation of the float/indicator mechanism. Remove the I² monitor/port pipe assembly by unscrewing it from the tank adapter. Manually move the float up and down and verify that the float moves freely and the indicator arrow rotates.
 - If it is installed with the TSP-ULS electronic sensor, check to see that it is functioning properly. Remove the inspection port pipe from the tank adapter to gain access to the sensor. Remove the sensor from the interstitial space and turn it upside down to raise the float. Verify with the tank gauge in the station that a sensor alarm occurred. If it did, the sensor is operating properly. Reinstall the sensor and the inspection port pipe.
2. Record inspection results per local codes.

Spill container subassembly replacement

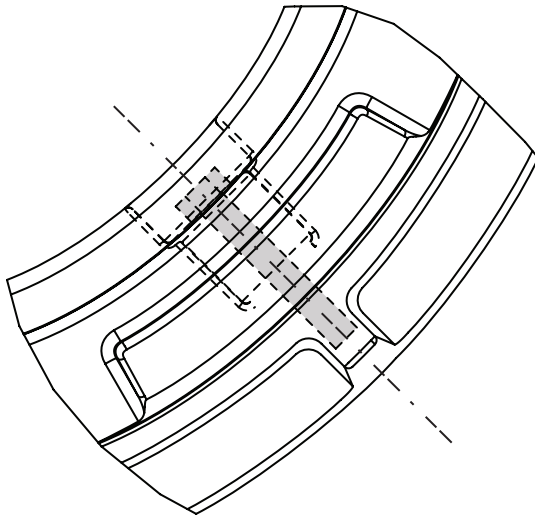
Remove the old subassembly

1. Remove cover.
2. Unthread the snow plow ring bolts using a 1/2" (13 mm) socket or nut-driver, until the heads of the bolts extend past the ID approximately 1/2" (13 mm).
3. Pull up the snow plow ring firmly to break the seal between the O-ring and the concrete ring.
4. Remove the dust cap.
5. Use the round end of the T-7106 double-ended installation tool and T-7001 T-Handle to remove the DT riser clamp adapter.
6. Remove the drop tube assembly.
7. Use the square end of the T-7106 double-ended installation tool and the T-7001 T-Handle to unthread the spill container assembly.
8. Pull up firmly and evenly on the spill container to remove the spill container from the concrete ring/gravel guard.

Install the new subassembly

1. Clean the ID of the concrete ring (sealing surface) thoroughly and lubricate with a silicone based O-ring lubricant or spray.
2. Apply a non-hardening thread sealant to the tank riser.
3. Lubricate the seal on the outside of the spill container with a silicone based O-ring lubricant.
4. Evenly push down on the spill container subassembly to seat the seal-ring, and slide it down to where the container meets the tank riser.
5. Thread on the spill container subassembly to the tank riser.
Use the square end of the T-7106 double-ended installation tool and The T-7001 T-Handle. Torque to 125-150 ft-lbs (169.5 - 203.4 N-m) using a 1/2" (13 mm) drive torque wrench.
6. Reinstall the drop tube assembly.
Check the drop tube gasket and replace if necessary.
7. Reinstall the DT Riser Clamp Adapter into the spill container.
Use the round end of the T-7106 double ended tightening tool and T-7001 T-Handle. The slots on the tool will engage with the lugs on the DT riser clamp adapter. Torque to 75-100 ft-lbs (102-136 N-m).

8. Reinstall the snow plow ring into the concrete ring.
 - a. Replace and lubricate the O-ring.
 - b. Align the four bolts to the ribs on the concrete ring.



- c. Push down on the snow plow ring to seat the O-ring.
 - d. Use the 1/2" (13 mm) socket or nut driver to tighten the four bolts hand tight into the concrete ring.
9. Reinstall the dust cap.
10. Reinstall the cover.



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