

R-TANK® HD / SD INSTALLATION GUIDE

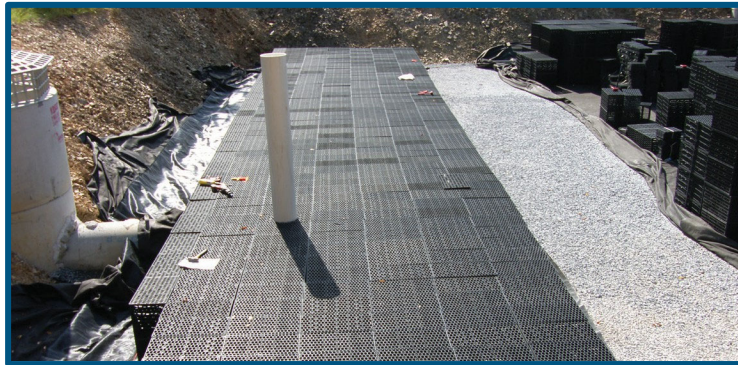
Typical Materials and Tools:

- Dead blow mallets to assemble units
- Reciprocating saw to cut inspection ports
- Acceptable fill materials per specification section 2.03
- R-tank modules
- Inspection port and pipe boot kits
- Geotextile fabric, geogrid (if required), liner (if required)

Typical Equipment:

- Forklift and other equipment/tools necessary to unload box truck
- Pallet jack (to unload material from box truck)
- Walk-behind trench roller or walk-behind plate compactor
- Low ground pressure tracked skid steer
- Low ground pressure dozer, 7.0 psi max operating pressure
- Roller – 6-ton max gross vehicle weight

Note: This list does not include equipment or tools needed to excavate or level the floor of the excavation.



Important Notes

- Review installation procedures and coordinate with other construction activities. Follow all local, state, and federal regulation requirements.
- This installation guide is based on a typical installation and provides the minimum requirements for proper installation. A pre-construction consultation should be coordinated with a Ferguson Waterworks representative to review installation practices on-site.
- Geotextiles can be damaged by extreme heat. Smoking is not permissible on/near the system, and tools using a flame to tack geotextile overlaps, such as propane torches, are prohibited.

On-Site Storage

- Protect R-Tank and other materials from damage during delivery. Storage of materials should be on smooth surfaces, free from dirt, mud and debris.
- When time from delivery to installation exceeds two weeks, store UV-sensitive materials under a tarp to protect from sunlight.

STEP 1: EXCAVATION

Mark and excavate the location of the R-Tank system per design layouts. Excavate the designated surveyed area according to plans following all relevant local, state and OSHA guidelines.

Typical Excavations Should Include:

- Two-foot perimeter around R-Tank to allow for proper compaction of backfill
- Enough depth to accommodate the engineer specified base below the R-Tank

Subgrade Preparation:

- Prepare the subgrade according to plans.
- Base of excavation must be uniform, level, free of debris, and soft or yielding subgrade areas. If the subgrade is pumping or appears excessively soft, the design engineer should be consulted.
- Compact to as required by engineer. A minimum bearing capacity of 2,000 psf must be achieved prior to beginning installation of R-Tank modules.

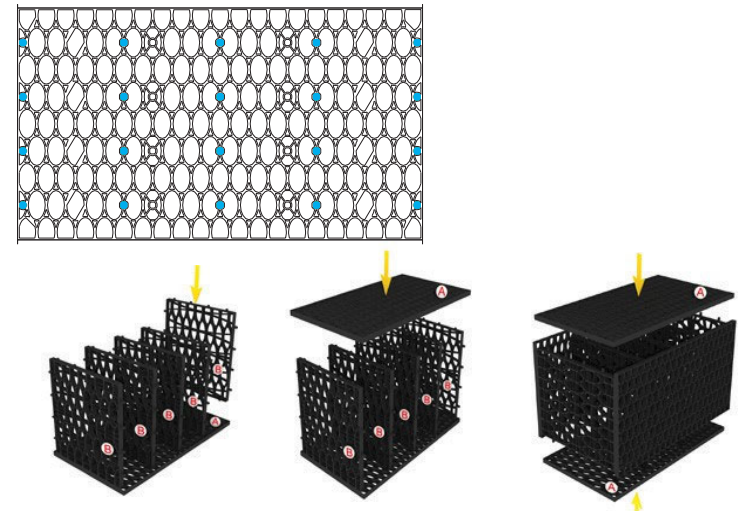


STEP 2: ASSEMBLE R-TANK UNITS

Complete directions are provided below, and there is a video available by searching YouTube for “R-Tank assembly”.

Typical R-Tank HD / SD Unit:

- Place a large plate on a flat and sturdy surface.
- Insert five (5) small plates to large plate. The plates should use the corresponding locations shown in blue dots. Be sure the large dimension of the oval pattern is facing vertical on the small plates.
- Place the second large plate on top of the small panels. Align the pins and firmly connect the panel to the small plates using a dead blow mallet.
- Firmly attach the remaining two (2) plates to the sides by aligning the pins and using a dead blow mallet. This completes a Single module.
- To build a Single + Mini module (or taller), follow the directions above, using the top of the Single module as your first large plate to connect additional small plates.



TIP:

Assembling the R-Tank units (Step 2) during excavation may save time during the installation but requires additional material handling and space. If time allows, consider assembling modules in the completed excavation to reduce labor/ material handling costs.

STEP 3: PREPARE BASE

Creating a smooth, level platform will allow for faster installation of R-Tank modules, as they will fit together evenly, eliminating detail work that can delay your progress.

Typical Base Preparation:

- If present, remove standing water in the excavation as it will prevent proper base preparation.
- Place a, minimum 3", layer of free draining base material per R-Tank specifications.
- Grade and level base as shown on plans with no more than 1/2" variance (+/- 1/4"). Base must be smooth and free of debris and large rocks.



STEP 4: INSTALL R-TANK UNITS

Check the plans to see if geotextile is required to be placed between the base and the R-Tank units. It is required on most projects, but not all.

Place Geotextile Layer:

- Cut strips of geotextile to the proper length. Adjacent panels of material should be overlapped by 12" or more, as shown on the plans.
- Patch any holes made in the Geotextile by placing a small patch of fabric over the damaged area. The patch must be large enough to cover the damaged area with at least 12" of overlap on undamaged material.
- If a liner and/or additional geotextile is required per plans, install these now as shown on the project plans.

R-Tank Unit Placement:

- Mark the geotextile fabric, ensuring units are placed square. Care should be taken to note any connections, ports, etc.
- Begin placing R-Tanks in the corner of the marked area.
- The large side plate of the tank should be placed on the perimeter of the system (see submittal drawings).
- Install Treatment Rows and Inspection Port units, as needed
- Continue placing standard R-Tank modules until all units have been placed.



TIP:

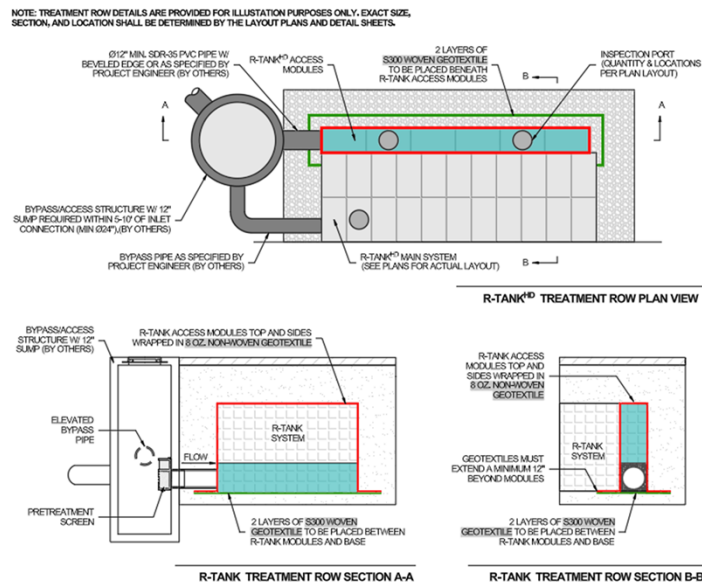
Occasional minor gaps or variations in the height of between units ($< \frac{1}{2}$ ") are acceptable, but reasonable efforts should be made to minimize these variations. If gaps or height variations persist through three or more adjacent units, remove the modules and pull back the textile to repair base.

STEP 4A: INSTALL TREATMENT ROWS (HD ONLY)

Some systems may include Treatment Rows at the inlet connections. Review the submittal drawings to determine if Treatment Rows are included. If Treatment Rows are included, use the following instructions, otherwise proceed with the remaining R-Tank unit placement.

R-Tank Treatment Rows:

- Place two layers of S200 woven geotextile (or as shown on plans) over the geotextile envelope and beneath the area where the Treatment Row is to be installed. These layers must extend beyond the Treatment Row modules by 6" minimum on all sides. This fabric is utilized instead of the fabric under the standard units.
- Place the R-Tank Access units onto the S200 fabric to form the Treatment Row.
- Install any Inspection Port Access units.
- Place a pipe boot onto the 10" SDR-35 inlet pipe, leaving it loose to adjust later in the process. The lap on the boot should be adjacent the modules.
- Inserting the SDR-35 pipe into the round opening in the end of the module. The pipe should penetrate approximately 6" into the module, but no less than 3". It may be necessary to bevel and/or lubricate the pipe to slide into the module.
- Cap the Treatment Row using 8 oz nonwoven geotextile (or as shown on plans) to cover the top and sides of the Treatment Row. Walk material into the corners along the bottom edge of the Treatment Row. This cap material should drape onto the base and completely cover the woven geotextile.



STEP 4B: INSTALL INSPECTION PORTS

Inspection ports are vital to the ability to maintain and ventilate a subsurface stormwater system. Check plans for size and location of the inspection port.

R-Tank Inspection Port Unit Preparation:

- Inspection port units can be prepared in advance.
- To accommodate the inspection port, remove the center interior small wall. Using your reciprocating saw, cut a circular hole the same size as the pipe in the center of the horizontal R-Tank plates between the internal plates. All horizontally oriented plates will need to be cut EXCEPT FOR THE BOTTOM PLATE. See Table 1 for the number of horizontal plates that will need to be cut for your specific module.
- Insert the non-corrosive anti-scour pad in the bottom of the R-Tank (should fit directly below the Inspection Port).
- Reassemble the R-Tank when cutting is completed.

R-Tank Inspection Port Unit Placement:

- Identify the location of all ports and place the R-Tank unit for each location. Ports are typically installed at each connection point and spread throughout larger systems.
- Once the unit is placed, complete the rest of the unit placement.

R-Tank Inspection Port Installation:

- Prior to enclosing the units in geotextile fabric, install the inspection port pipe and pipe boot.
- Cut the pipe to length, leaving enough excess to trim the top when final grade is reached. Inspection port pipes should contain a doghouse opening, see submittal drawings for opening dimensions and location.
- Drill several 1" diameter holes (air vents) into the pipe right below where the top of the R-Tank system and pipe meet when installed.
- Install the boot onto the pipe, leaving the band clamps loose so that final adjustments may be made when enclosing the units with geotextile fabric.
- Temporarily seal the opening on top of the pipe with a cap or temporary lid to prevent debris from entering the system during construction.
- Place the pipe into the previously prepared unit.



Table 1: Horizontal Large Plate Cuts

HD Module	Horizontal Plate Cuts	SD Module	Horizontal Plate Cuts
Single	1	Single	1
Single + Mini	2	Double	2
Double	2	Triple	3
Double + Mini	3	Quad	4
Triple	3	Penta	5
Triple + Mini	4	Hex	6
Quad	4	Septa	7
Quad + Mini	5	Octo	8
Penta	5	Nano	9
		Decka	10

STEP 5: SEAL R-TANK WITH GEOTEXTILE

Properly wrapping the R-Tank units prevents backfill material from entering the storage volume within the tank.

Typical Unit Wrapping:

- Clean off any debris that may be lying on top of the exposed geotextile around the perimeter of the R-Tank.
- Cut additional strips of geotextile, as needed, to fully enclose the R-Tank units. The geotextile should overlap at least 12" at all seams or as shown on plans.
- Fold geotextile for outside corners and lay excess material flat against R-Tank. Leave corners loose to avoid creating weak spots in the material.
- Walk bottom edge of geotextile along the sides of R-Tank to eliminate gaps between the fabric and the bottom corner of the R-Tank.
- Use duct tape, sandbags or other ballast to temporarily secure corners and overlaps.

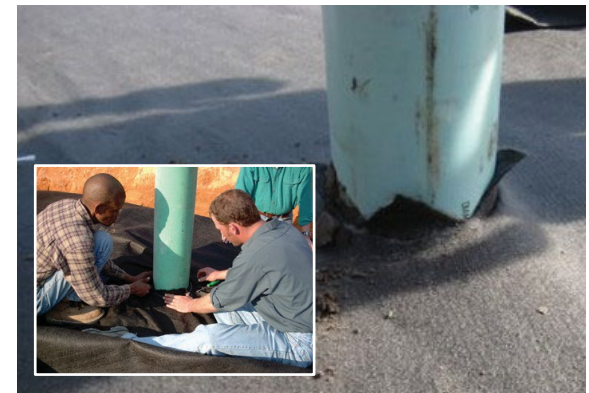
Inspection Port Penetration:

- Where the geotextile intersects an Inspection Port, cut an "X" into the geotextile and pull it over the pipe. The flaps of the "X" should point AWAY from the R-Tank.
- Secure the flaps to the pipe with a stainless-steel band clamp.
- Slide the provided pipe boot into place and secure with a stainless-steel band clamp.
- Use duct tape, sandbags or other ballast to temporarily secure the overlaps.

Inlet/Outlet Pipe Penetration:

- Where the inlet and outlet pipes connect to the R-Tank, cut an "X" into the geotextile so that the pipe makes DIRECT contact with the R-Tank.
- Pull the flaps of the "X" over the pipe so that the flaps of the "X" point AWAY from the R-Tank. Use a stainless-steel band clamp to seal the flaps to the pipe.
- Install pipe boot kits onto the inlet and outlet pipes. Adjust boots so that the fabric lays snug against the R-Tank. Tighten the band clamps with a screw/nut driver.
- Use duct tape to secure the boot flap to the outside of the geotextile envelope.

WARNING: Inlet and outlet pipes must make direct contact with the R-Tank, allowing water to flow directly into or out of the R-Tank without filtering through the geotextile. Failing to correctly connect pipes will cause the system to malfunction.



TIP:

Take special care with inside corners on the footprint of the system. Cut geotextile as needed to ensure that it lays flat against the R-Tank. Use additional pieces of geotextile to seal the corner and any cuts that are made (12" overlap).

STEP 6: BACKFILL SIDES

Following proper side backfilling methods and performing proper compaction prevents units eliminates gaps between units and ensures proper stability of the overall installation.

Typical Side Backfill Placement:

- Place backfill material (see R-Tank specification) around perimeter of the R-Tank.
- Distribute the material evenly, without exceeded a single 12" lift, to prevent shoving of the R-Tank units.
- Use a trench roller or plate compactor to compact backfill.
- Continue placing and compacting backfill in 12" lifts until the material reaches the top of the R-Tank units.



STEP 7: BACKFILL TOP

Typical Top Backfill Placement:

- Dump backfill material (see R-Tank specification) adjacent to the R-Tank and place the material onto the system using low ground pressure skid steers or dozers. Reference the R-Tank submittal drawings for more information on construction equipment limits and minimum cover depths.
- Lightly compact top backfill to 95% standard proctor density (or as shown on plans) using your walk-behind trench roller. Alternately, a roller (maximum gross vehicle weight of six tons) may be used. Roller must remain in static mode until a minimum of 24" of cover has been placed over the modules. Sheep foot rollers should not be used.

WARNING: Dump trucks should not drive over or dump material on top of the R-Tank.

WARNING: Some materials will compact significantly while others may shove excessively as you work. Caution should be used to ensure the minimum material thickness is maintained while operating over the R-Tank units.

WARNING: It is recommended that the equipment drive straight on and back straight off the system during backfill placement. Turning movements are likely to shove the backfill material, reducing the thickness of the lift and potentially damaging the R-tank units.



TIP:

When pushing backfill over R-Tank units, work in the direction of the geotextile overlap to avoid shoving material between the fabric layers.

STEP 8: PLACE GEOGRID AND FINAL COVER PLACEMENT

R-Tank installations for vehicular loading applications include a layer of geogrid to ensure uniform load distribution through the cover layers.

Typical Geogrid Placement:

- Review submittal drawings to determine if geogrid is required. If note, proceed to final cover placement.
- Place the geogrid as shown on plans. Overlap adjacent panels by 18" minimum or as specified. Roll out Geogrid over the top of the system, with the edges of the grid extending 5' from R-Tank footprint or 3' beyond the edge of excavation.
- If metallic tape has been specified (used to locate the system), install it now.

Typical Final Cover Placement:

- If additional cover or pavement base is required by the plans, begin placing and compacting material as discussed in Step 9. To achieve proper compaction requirements, it may be beneficial to begin placing the final cover layers of material in 6" lifts.
- Push cover material parallel to the geogrid for best results. All cover material must meet requirements of the R-Tank specification. Pavement base cross-sections, materials, and compaction requirements are determined by the engineer of record.



STEP 9: SECURE THE INSTALLATION

Construction loads are often the heaviest loads that ever drive over the R-Tank System, and there are many construction vehicles that exceed the HS20 standard. To prevent damage from these vehicles, the installation should be secured to prevent unauthorized traffic.

Typical Methods for Securing an Installation:

- Projects nearing completion (within three months) should use warning tape or temporary fencing to secure the installation.
- For larger projects with ongoing construction activities, consider a more durable method for preventing unauthorized traffic from accessing the system, such as jersey barriers.
- Regardless of what method is selected to secure the installation, it must remain in place until construction activity has concluded and no further access of vehicles exceeding the HS20 standard is necessary.



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