

Guidelines for On-Site Installation

Rainstore3 Water Harvest

with Impermeable Liner

Product Arrival

Ensure that Invisible Structures, Inc. has received, reviewed and approved of all final plans, details and specifications of each project installation, prior to requesting shipment of product. Approval shall be issued in writing and must be in hands of contractor prior to installation beginning.

Product will be delivered to the site via Truck, usually enclosed tractor trailer, to provide maximum product protection and cleanliness. Product must be removed from the end opening. Product will be loaded and strapped on pallets, and be of low weight to allow grab and pull from the front to the rear by sliding on the trailer floor. An outdoor forklift, or skid steer with forks, is best used to lower pallets from trailer to ground.

Product delivery should be scheduled to arrive just before hole excavation is complete. Request construction observation and guidance by Invisible Structures, Inc. staff, or other authorized representative, with at least 2 weeks notice if possible.

Site Preparation

Complete Hole Excavation

1. Ensure hole is larger than storage structure - 0.75 m per side.
2. Ensure there are no sharp objects larger than a pea on sides or bottom.
3. Ensure there is side cave-in protection by grading or structural means, as required by safety codes.
4. Ensure hole bottom is level, compacted, and covered with sand (75 mm).

Prepare Secure Storage Area

1. Identify relatively flat staging area, close to excavation, secure from traffic and damage. Invisible Structures, Inc. sales staff can help to determine surface area needed for storage on each project.
2. Keep product clean from surface drainage, leaves, dust, etc., as determined by water quality to be stored.
3. If product installation is delayed for a few weeks, or longer, protect from UV light with tarp.

Liner Installation

Place protective fabric layer (8 oz min.) on the bottom and sides of the excavation.

Place waterproof geomembrane liner over fabric.

1. Follow manufacturer's guidelines for handling, alignment and protection, including proper installation air temperature.
2. All workers walking on liner surface shall wear soft soled shoes, and inspect soles for imbedded objects in tread prior to each and every entry onto surface.
3. Place protective fabric layer (8 oz) on liner to receive Rainstore3 cells.

Product Placement

Product cells will be preassembled to finished depth, and may be stacked in groups on pallets for shipping and handling on site. Keep pallets intact until placed adjacent to excavation.

Custom lifting tools are available (with deposit) for rapid lifting and placement of cells onto liner by equipment operator and one assistant.

1. Equipment shall be excavator, or similar, with long extension boom or arm to reach over side and well into center of excavation if possible.
2. Cells shall be delivered and placed with smooth sided grid down and rings up.
3. Cells shall be placed adjacent to each other with joints maintaining relatively straight lines, according to plan layout and dimensions.
4. If product cells must be cut to form angles, or vertical openings for inspection ports, pump access, etc., then cut grid segments close to ring/column walls, with care taken to avoid any remaining grid segments oriented toward liner surfaces. Columns must remain intact to maintain structural integrity.
5. If layers become loose from other layers above or below, then effort shall be made to recompress layers together, taking care to align guide tabs before compression. Placement of final fill cover will ensure compression and a level structural surface.
6. Place any internal pipe or other devices at this time before the cells are covered.
7. Place magnetic sensitive markers at corners and other locations that must be found after the structure is covered. Note these locations on site plans for future record.
8. Inspect and remove any broken segments of product along the outside edges of the structure.

Enclose Structure Liner

1. Place protective fabric layer along sides of structure to protect liner from any broken product edges. If entire columns have been removed to create angled sides, then place a layer of high tensile strength geogrid material between product cells (top to bottom) and fabric layer, securing geogrid to product with plastic wire ties or similar device. The geogrid will span gaps between remaining columns and prevent excessive sag or stretching of fabric and liner.
2. Place liner loosely on top of the structure to allow access to sides.
3. Identify locations of any inlet, outlet or overflow devices on the liner and install properly sized and manufactured boots of the same liner material. Cut openings into liner and interior fabric layer (geogrid can remain intact if encountered). Secure boot device to liner wall with adhesive, heat, or otherwise per liner manufacturer's instructions.
4. Secure liner sides and top, by welding, adhesion, or folding corners (large flat sheet liners), taking care to avoid pressure on joints or creation of sharp folds that can be stressed or cracked by backfilling operations.
5. Attach and secure inlet and outlet devices by inserting into boots, and sealing with stainless steel hose clamps (usually two). Place proper backfill below and around devices as required for proper support and protection.
6. Place outer protective fabric layer (8 oz min.) to protect liner from backfill materials and placement.

Backfill and Cover Operations

1. Place clean and free flowing (no clods or debris allowed) backfill along sides of structure, in lifts less than 12" thick, compacting with small vibrating roller, tamping pad, or jumping jack, as appropriate. Take care to avoid contact with protective fabric, liner, structure, or outlet/inlet devices. Bring compacted side

- backfill flush with top of structure.
2. Test validity of liner structure by filling enclosure with water, and observing maintenance of water level over at least a 24 hour period. If no leakage has occurred, then remaining installation steps can proceed. If presence of a leak is observed, effort shall be made to identify the location, and reconstruction with patching or other means to close the leak(s) shall be made, and verified before construction continues.
 3. Place protective geotextile fabric layer over the entire top of the structure, extending well beyond side backfill excavation line, with overlapped joints at least 10" wide.
 4. Place geogrid liner over the top fabric layer (8 oz min.), extending well beyond side backfill excavation line, with joints overlapped per geogrid manufacturer's instructions.
 5. Place top backfill material (roadbase, structural fill, or topsoil) over the geogrid and surface of the Rainstore3 structure carefully.
 - Avoid use of any material with sharp components that might penetrate fabric and liner materials.
 - Avoid placement by driving vehicles over structure with insufficient compacted cover depth.
 - Avoid direct contact of structure liner materials with any tire or track vehicle, bucket, blade, or other equipment component.
 6. Spread cover materials and compact in lifts of 6" to 8" depths. Compact as required for final surface use, but do not exceed 95% Proctor.
 - Minimum final cover depth shall be 12".
 - Maximum cover depth shall be 36" when placed below pavement applications.
 - Cover depths exceeding 36" must be reviewed and approved by Invisible Structures, Inc. prior to ordering of product, with requests accompanied by plans and soil reports, and written statement of surface application.

Presence of Invisible Structures, Inc. staff or agents shall not imply responsibility beyond the warranty of Rainstore3 products and their suitability for installation. Responsibility for other products, materials, installation and maintenance remain with appropriate manufacturers, sales representatives, and/or contractors.

Please call or contact Invisible Structures, Inc. technical support staff if you should have any questions or issues with these Guidelines.

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