



Stormcrete[®] Modular Precast Porous Concrete Stormwater System

Handling and Installation Manual



1. Recommended Equipment

In addition to the typical earthmoving, materials handling and grading equipment, the following hand tools should also be available –

- 2 or 4-way chains, cables or straps rated to lift the slabs – refer to Table 2 for the number of lifting points and the slab weights
- Cordless impact wrench or ratchet wrench with 3/4” socket for installing and removing lifting swivel bolts
- Lifting swivels supplied by manufacturer
- Rakes and shovels for levelling screed stone
- 1.25” minimum diameter screed rails
- 2”x4” or other material to use as a screed
- Plastic plugs and slab spacers supplied by manufacturer.
- Backpack blower to keep slabs surface clean during and after installation.
- Diamond Bladed Masonry Cutoff Saw (6” cutting depth min. – typically requires a minimum 16” diameter blade – check saw specifications).



2. Offloading and Storage

- Prior to offloading a delivery truck the slabs on the truck shall be carefully inspected for any damage. Any observed damage shall be immediately reported to the delivery driver and the quantity and type of damage shall be noted on the delivery ticket.
- Offloading should be performed by a **trained** and **experienced** equipment operator. Due to the unique structural properties of porous concrete, extra care should be taken when handling the slabs.
- A forklift or similar equipment should be used when offloading *Stormcrete*[®] slabs. It is recommended that the equipment be fitted with forks. ***Chains, cables or slings should never be wrapped around slabs for offloading or installation.***
- Slabs should be offloaded evenly from both sides of the truck to ensure that the trailer does not become unstable.
- Slabs delivered on pallets should be offloaded as shipped. Slabs delivered on dunnage must be picked from the highest level of dunnage. **Never pick up slabs with more than one layer of dunnage.** (Please see Table 1 for *Stormcrete*[®] slab sizes, shipping configurations and corresponding weights).

Slab Size	Number of slabs per pallet/dunnage	Number of slabs per stack	Approx. Slab Weight (lbs.)	Approx. Lift Weight (lbs.)
5' x 4' x 6"	3	9	1290	3870
5' x 2' x 6"	6	9	645	3870
4' x 2.5' x 6"	6	9	645	3870

Table 1

- Stored slabs must be placed on a level or nearly level stable surface. In dusty environments slabs should be covered to prevent dust and debris from settling on slab surfaces.



- Allow approximately 1 s.f. of storage area for every 3 s.f. of Stormcrete® Slabs purchased.
- When stacking or restacking slabs 4” by 4” timbers should be placed parallel to one another and **located directly beneath imbedded lifting points. Do not place timbers in the middle of the slabs or on the ends.** Timbers should be at a minimum 1” thicker than the fork thickness. Place timbers between each double stack of slabs (see image below).
- Lower slabs evenly such that the slab comes into contact with both timbers simultaneously. To prevent edge damage, slabs should be set flat on timbers so that one edge does not contact timbers while opposite edge is supported by forks.



3. Sub-Base Preparation

Reservoir Layer Placement:

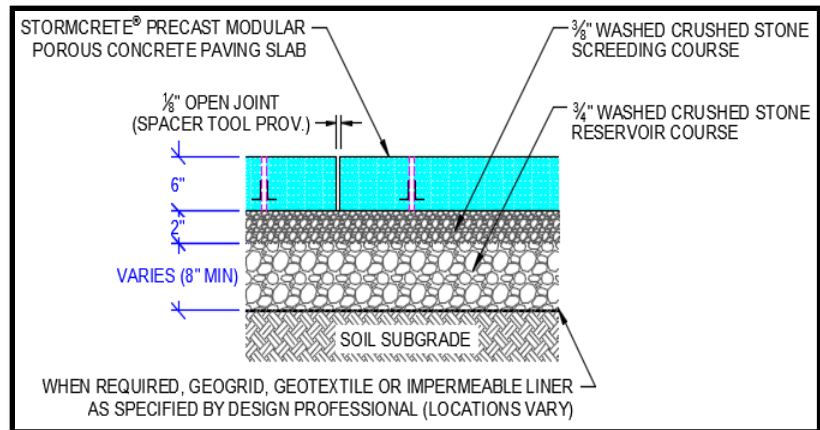
Reservoir layer shall not be placed and/or compact in rain or snow, or on saturated or frozen subgrade.

In all cases reservoir stone shall be placed and compacted against rigid lateral boundaries, i.e., in situ, undisturbed native soils, fill materials compacted to 98% Standard Proctor density or concrete curb and headers. Compaction of reservoir stone against any flexible boundaries shall not be permitted.



Although the approved plans shall govern over installation details and specifications, the following instructions are provided by the manufacturer as minimum guidelines:

- Reservoir stone layer shall be constructed per approved drawings using 3/4" or AASHTO No. 57 crushed angular stone. The stone must be washed and free of fines.



- Compact reservoir storage layer in maximum 12" lifts, with a minimum of two complete coverages, one pass each in mutually perpendicular directions, with a 3 to 5 ton smooth, single or double drum roller operated in vibratory mode. Following vibratory compaction, repeat two complete coverage's, one pass each in mutually perpendicular directions, with the roller operated in static mode. Continue static rolling until there is no visible movement, weaving or deflection in the surface of the storage reservoir layer.
- For small areas inaccessible by large rollers follow the above directions using a walk-behind plate compactor. Repeat two complete coverages in each direction.
- The surface tolerance of the compacted storage reservoir layer shall be +/- 3/4 in. under a 10 ft. straightedge.
- Where specified on the design plans, place geotextile on prepared subgrade side slopes and extend a maximum of 1 foot under the bottom of the storage reservoir. Do not place geotextile under other areas of infiltrating system unless specified on the approved plans. Secure in place to prevent disturbance from vehicles and/or worker foot traffic.



Screeding Layer Placement

It is critical that the crushed stone leveling course surface be SCREEDED flat so that the slabs are fully supported with no bridging or mounding beneath. Crushed stone base shall not be placed and/or screeded in rain or snow, or on saturated or frozen subbase.

- Screeding layer shall be placed per approved drawings using 3/8" crushed angular stone or No. 8 Stone. The stone must be washed and free of fines.
- Place and spread the stone evenly over the reservoir course to a thickness of +/- 2". Level the surface of crushed stone (screeding is strongly recommended).



- Screenshot using a minimum 1.25" diameter rigid screed rail placed adjacent or below the slab location with the top of the rails set at the screeding level.

- Do not compact or disturb leveled screeding layer (if screed rails are placed in panel locations, carefully remove them to prevent disturbance to the leveling base layer).
- The uniformity of the leveling (base) layer determines the differential settlement between precast porous concrete paving slabs.
- The slab installation contractor **should not correct deficiencies in the leveling layer by shimming** with additional stone rather the slabs should be lifted out and the entire area should be re-leveled.



4. Setting Stormcrete® Porous Concrete Slabs

Recommended Lifting Hardware

- Slabs shall only be lifted and placed using supplied hoist ring swivels. 2 or 4-way chains, wire rope or nylon straps rated for the lift weight shall be used per the manufacturer’s recommendations to lift slabs – do not exceed minimum recommended angle for lifting chains.



- Swivels shall be securely bolted snug to the slab. Check to ensure that the bolt extends the full depth of the lifting socket. To avoid damage to the surface do not over-tighten bolts. (An electric impact wrench with a 3/4” socket is the most efficient way to attach and remove the swivels).



Individual slabs should only be lifted by equipment that is rated for the slab weights shown in the adjacent table:

Slab Dimension (ft)	Max Slab Weight (lbs.)	Lifting Points
5' x 4' x 6"	1290	4
5' x 2' x 6"	645	2
4' x 2.5' x 6"	645	2

Chains, cables or slings should never be wrapped around slabs for placement under any circumstances.



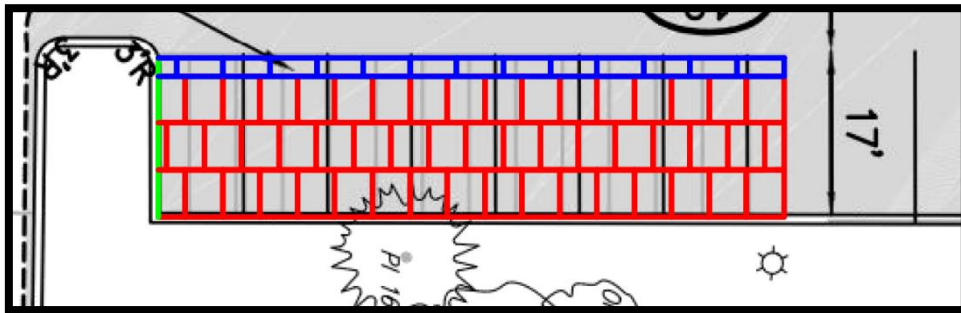
Placing Slabs

Precast porous concrete slabs shall not be placed in heavy rain or snow, or on saturated or frozen base.

Because the units are precast in a controlled environment, they are delivered to the site pre-cured which allows them to be parked or driven on immediately after placement. They may also be placed year-round, in almost any type of weather or temperature conditions.

WARNING! – ENSURE THAT PLASTIC SPACER THAT ARE USED TO SEPARATE SLABS IN A STACK ARE REMOVED FROM THE BOTTOM OF ALL SLABS BEFORE SLAB PLACEMENT.

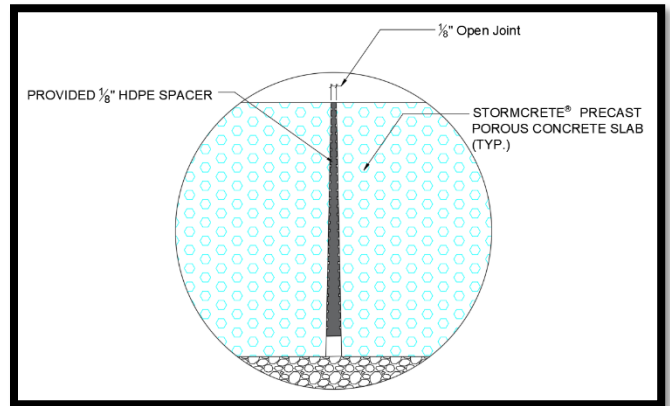
- Whenever possible place slabs in a staggered pattern(s) as shown below or as depicted on approved drawings.



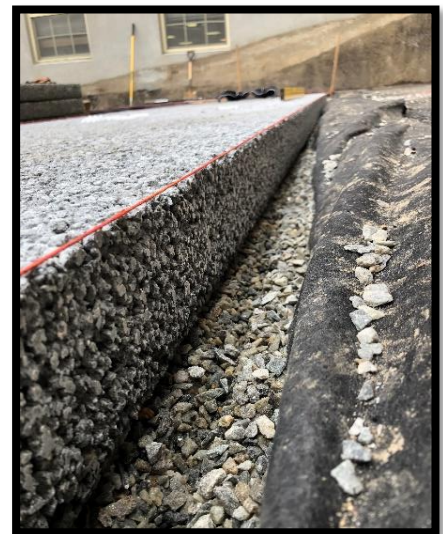
- On gutter applications a string line shall be used to ensure that the curbing is straight enough to allow for proper placement of the slabs. If the existing curbing does not follow a straight alignment then the slabs should follow the alignment of a string line placed mostly parallel to the curb and ½” away from the point that is furthest toward the roadway to allow for a minimum ½” joint.
- Guide units into place by hand, being careful not to pinch fingers. Horizontal adjustments can be made with wood wedges, levers, and rubber mallets as needed (If pry bars are used they should never come into direct contact with the top corner of the slab).



- Adjacent slabs shall be separated from each other by the placement of (2) 3/8" thick High-Density Polyethylene tapered spacers (thick end down) (Part No. 18SP) supplied by the manufacturer. Spacer shall be trimmed to the right height to fit and adhered to previously placed slab with a construction adhesive such as Liquid Nails Heavy Duty Construction Adhesive or approved equal.



- Care should be taken to place adjacent slabs at same elevation (i.e. level to each other). Slab surfaces shall not deviate by more than 1/8" vertically and horizontally from one to the next.
- Placed Slabs should maintain consistent 1/8" joint widths and horizontal and vertical alignments should be continuously straightened as necessary as paving proceeds.
- Joints between adjacent rows of panels shall be staggered when possible.



- Keep slabs covered until all adjacent areas are stabilized to prevent dust and debris from reducing porosity of slabs. A backpack blower should be employed throughout the installation process to keep slab surfaces clean. Place erosion and sediment control barriers to prevent eroding areas from draining onto slabs.
- Whenever possible set slabs with equipment positioned next to slab area and not on previously installed slabs. When it is necessary to position equipment on slabs during setting use only light machines equipped with either rubber tires or rubber tracks.



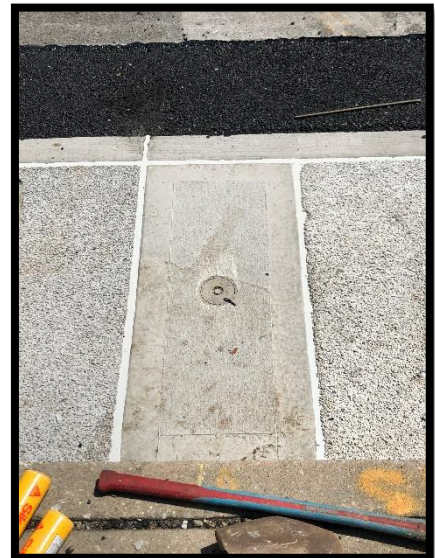
- Immediately after the Stormcrete® system has been placed; use provided ½” nylon caps (Part No. 12NC) to fill imbedded lifting points. Care should be taken to make sure the plastic caps are flush with the surface; do not press caps down into the imbedded lifting points.



- Keep equipment off unrestrained paving slabs and subgrade material.
- Report any damage immediately to the project design professional.

Cutting

- When required, cut slabs with a diamond bladed masonry saw with a plunge depth of 6” minimum.
- If field adjustments are required, slabs should be cut as indicated on the approved drawings.
- Cut slabs shall be no narrower than 18” and cutting shall occur so that a minimum of two embedded lifters remain for safe lifting and setting.
- Cutting should be performed away from sub-base material and other slabs. Do not cut slabs while in a stack or on top of another slab.
- Cover adjacent areas of slab being cut to prevent dust and debris from entering into the porous concrete.
- Slab layouts shall be planned to minimize or eliminate locations where utility structures intersect with slab joints. Whole and half slabs shall be used in combination with cast in place collars to surround utilities.



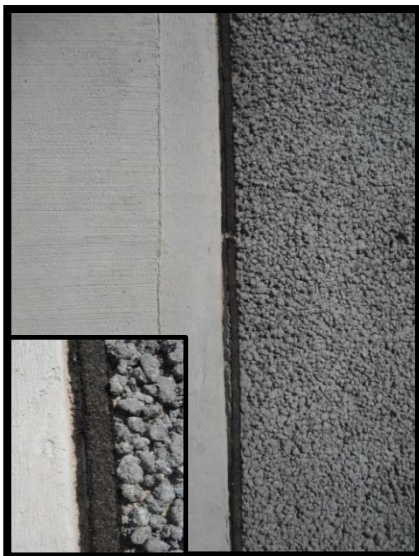


Grade Breaks

- Stormcrete® slabs should be placed on a level sub-base. If grade breaks are present, ensure that they occur at an open joint.
- If a grade break does not occur at an open joint cut the slab to create an open joint at the break. If cutting is required reference the cutting section above.

Edge Restraints

- **NEVER** place fluid material (asphalt, concrete, soil, etc.) directly up against the Stormcrete® slabs. Fluid materials shall be separated from Stormcrete® slabs by the use of a ½” preformed expansion joint material conforming to ASTM D1751 Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction



- Install edge restraints per approved drawings and manufacturer’s recommendations at the indicated locations and elevations.
- Anchor edge restraints directly to finished leveling layer in accordance with the manufacturer’s requirements.
- The use of loose stone as a filler material adjacent to slabs should be avoided in favor of expansion joint material conforming to ASTM D1751 Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (preferred).
- When placing Stormcrete® Precast Porous Concrete slabs against existing concrete structures where it is not possible to pre-install ½” expansion joint material joints may be filled with No.8 clean washed gravel beneath closed cell foam backer rod and a maximum depth of ½” of elastomeric sealant such as



Sikasil 728 RCS Limestone joint filler or approved equal. In all cases the use of a preformed expansion joint material conforming to ASTM D1751 Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction is preferred.

5. SLAB PROTECTION & FINAL INSPECTION

- After work in the section is complete, the contractor shall be responsible for protecting the precast porous paving slab system from damage and/or contamination from mud, dirt, grass cuttings and accumulation of foliage and debris through the duration of construction. This should include a regular vacuum sweeping schedule. It is important that you do not attempt to wash the construction area clean. This will result in loose debris draining into the slabs/stone.
- Any slabs cracked or damaged during installation shall be replaced with new ones at the installers cost.
- Reset slabs not in conformance with specified installation tolerances.
- Check for and remove any accumulation of sediment or debris observed. This can be done by manually sweeping, vacuum sweepers, and in some cases, backpack blowers.



- Check final surface elevations of set slabs for conformance to design drawings. Slab surfaces shall not deviate by more than 1/8" vertically from one to the next and to adjacent surfaces.
- The surface elevation of set slabs shall be flush with manholes or the top of utility structures.



6. STORMCRETE® PRECAST POROUS CONCRETE INSTALLATION TRAINING PROGRAM

- Installation contractors are strongly encouraged to participate in the Stormcrete® Precast Porous Concrete Installation Training Program. This program ensures that Installers are properly trained in the installation of Stormcrete® products. Installers successfully completing the Training Program shall receive a certificate valid for 2 years and shall be responsible for reviewing the Handling and Installation Manual and Training Program Test Questions (with correct answers) with Laborers under their employ.