

# Installation guide

## Interlocking Concrete Pavement

### INSTALLATION OUTLINE

#### 01 EXCAVATION

- A. Before excavating, call all the local utility companies (e.g., phone, gas, electrical) to ensure that the area in which you plan to dig is clear of underground cables or wires. If any are found, please notify the appropriate companies before you begin.
- B. When excavating, it is important to achieve a slope in increments of 1.5% ( $\frac{3}{16}$ " per ft./5 mm per 300 mm), which will allow for proper drainage. The excavation should mirror the final grade of pavement.
- C. The width of the base behind the edge should be equivalent to the thickness of the base.
- D. Using a rake, grade the bottom of the excavated area. If the natural soil is granular or sandy, we recommend that you compact the soil with a vibrating plate. If the soil is clay-like, change the soil with a blend of lime and crushed stone prior to compaction. Next, cover it with a layer of geotextile fabric to prevent the contamination of the base (clay and 0- $\frac{3}{4}$ " [0-20 mm] crushed stone).

#### 02 FOUNDATION

- A. Install a 0- $\frac{3}{4}$ " (0-20 mm) crushed stone base, in 4" (100 mm) lifts with a minimum 5,000 lbf (22 kN) vibrating plate compactor.
- B. To facilitate compacting, wet the base material thoroughly and compact with a vibrating plate proceeding in all directions. Continue this process until you have achieved the desired height. At this stage, you can verify the final height with the help of a paver.
- C. Base tolerance  $\pm \frac{3}{8}$ " (10 mm) for every 10' (3-m) increment.

#### 03 THE SETTING BED

- A. On the compacted crushed base, install two pipes with an outside diameter of 1" (25 mm). Grade the concrete sand with the help of a straight edge (or Quick-E leveler). If the base is not properly graded and smooth, imperfections will be evident in the finishing grade of the pavement.
- B. Bedding sand should not be compacted until all paving stones have been laid down. Passing the vibrating plate over the paving stones causes them to settle approximately  $\frac{3}{8}$ " (10 mm) into the bedding sand.

#### 04 INSTALLATION OF PAVING STONES

- A. Once the choice of paving stones and the design have been finalized, we recommended that you start installing the pavers at a 90-degree angle. To do so, proceed as follows: measure a first horizontal line of 3' (1-m) and a second line of 4' (1.2 m) perpendicular to the first. Connect a third straight line of 5' (1.5 m) which will form a triangle. The result will be a perfect 90-degree angle. While installing the paving stones, walk on the installed pavers, and fill in gaps caused by the pipes with concrete sand.
- B. It is always recommended that you use more than two cubes at a time in order to maximize the color blend. Furthermore, you should proceed with the cubes from top to bottom.
- C. You may use a chalk line to mark the stones to be cut along the borders, using a guillotine or a concrete saw. When cutting paving stones, we recommend that you wear protective ear and eyewear.
- D. Once you finish installing the paving stones, you can then install Tundra, Avignon, Belgik or Pietra curbstone on the granular base. To keep curbs in place, add mortar along the back to form a 45-degree angle between the ground and the curbstone or, when available, using the plastic retention system. In a vehicular traffic application, the mortar must be reinforced using steel rods.

#### 05 FILLING IN JOINTS

- A. Spread out the polymer stabilizer sand on the paving stones and sweep in between joints in all directions.
- B. Pass a vibrating plate in all directions to allow sand to penetrate between the joints.
- C. Sweep once more and remove excess sand. Follow the instructions exactly as indicated on the polymer stabilizer sand packaging.

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## Interlocking Concrete Pavement



### VIBRATING PLATE ALERT!

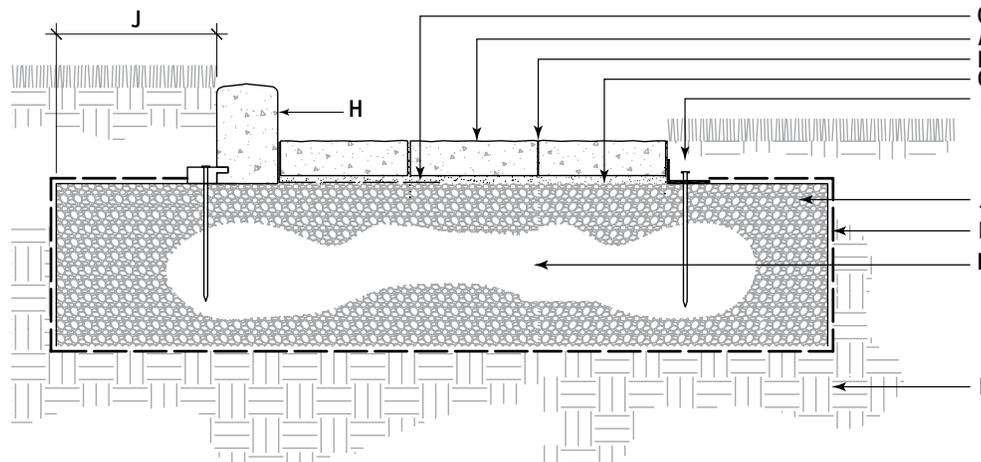
Avoid scuffs on paver surfaces. Pavers with embossed surfaces (high and low points) are more susceptible to scuff marks from plate compactors. Techo-Bloc recommends the use of urethane mats between the plate and the paver surface when compacting. Techo-Bloc will not be held responsible for compaction scuffs or burns on pavers.

### NOTE: STABILIZING SAND

Approximate surface coverage per 50 lbs. (22.7 kg) bag. Available in graphite grey and sandy beige.

PRODUCTS	sq. ft.	sq. m
Antika and Permea	21	2
Allegro	38	3.5
Athena	42	4
Blu 80 mm	76.5	7.11
Blu 60 mm (6"×13") 60×330×165	42.63	3.96
Elena, Hera, Trias	64	6
Flagstone	66	6.13
Linea small rectangles	57.80	5.37
Linea large rectangles	78.25	7.27

PRODUCTS	sq. ft.	sq. m
Mista Random	50.4	4.69
Mista Square	65.6	6.10
Olympia	55	5
San Marino small rectangles	57.80	5.37
San Marino large rectangles	78.25	7.27
Villagio	18.50	1.72
Villagio Grande	22.75	2.11



**INTERLOCKING CONCRETE PAVEMENT INSTALLATION**  
Typical cross section

- A TECHO-BLOC PRECAST PAVING STONES ASTM C936, (CSA A231.2). PAVES SURFACE PITCH FOR POSITIVE DRAINAGE (MINIMUM 2%, 1/4" / FT. [6 mm / 300 mm])
- B SAND JOINT FILL (ASTM C144), (CSA A179)
- C SAND SETTING BED: 1" (25 mm) BEFORE COMPACTION (ASTM C33), (CSA A23.1)
- D BASE STONE DEPTH VARIES WITH SOIL TYPE, CLIMATE, LOAD AND WATER TABLE
- E GEOTEXTILE
- F SUBGRADE SOIL: CLASSIFIED AND PROPERLY GRADED
- G GEOTEXTILE STRIP TO PREVENT DOWNWARD SAND MIGRATION
- H EDGE RESTRAINT (TECHO-BLOC PRECAST CONCRETE EDGES: AVIGNON, BELGIK, PIETRA, OR TUNDRA)
- I EDGE RESTRAINT (PVC, ALUMINUM) ANCHORED TO BASE STONE
- J BASE STONE EXTENDS BEYOND EDGE OF PAVEMENT TO A MINIMUM OF 6" (150 mm) OR EQUAL TO DEPTH OF BASE STONE



# Installation guide

## Segmental Permeable Pavement

### INSTALLATION OUTLINE

#### 01 DATA COLLECTION

- A. Determine the size, shape, and intended use of finished areas (i.e. residential driveway, secondary commercial parking, etc.).
- B. Classify sub-grade soils.
- C. Document all existing conditions (i.e. fixed points, existing grades, site contours, etc.).
- D. Document soil type, location, and elevation of below grade and overhead utilities both public and private.
- E. Ensure public utilities are marked through the use of a locating service.
- F. Determine the cross section design of the system based on soil type and application, showing proposed sub-grade and finished grade elevations and all geotextiles and drainage pipes needed for the construction.
- G. Establish the type, location, and elevation of relief structures if required (i.e. overflow pipe discharging to rain garden, etc.).
- H. Determine the curb or edge restraint type, elevation, and location.
- I. Choose a pattern appropriate to the application (traffic type and load).

#### 02 EXCAVATION

- A. Before digging, contact the concerned companies if wires or pipes are located in the area to be excavated.
- B. Excavation depth is determined from the foundation thickness according to the project specifications (foundation thickness is determined by a qualified engineer based on structural and hydrological analyses).
- C. Although the slope of the sub-grade will depend on the drainage design and infiltration type, a minimum slope of 0.5% ( $\frac{1}{16}$ " per ft., or 5 mm per meter) is recommended.
- D. The distance that the excavated area should extend beyond the area to be paved should be one to 1.5 times the thickness of the foundation. This extra space will ensure the stability of the pavers near the edge and the edge restraints.
- E. Level the bottom of the excavated area with a rake.

Compaction will reduce the permeability of the sub-grade and it should be executed according to the project specifications. If compaction is not specified, care should be taken to maintain undisturbed soil infiltration during excavation and construction. Stabilization of the sub-grade may be required with weak, continually saturated soils, or when subject to high traffic conditions. If the compaction or stabilization of sub-grade is necessary, reduced infiltration may require drainage pipes within the sub-base to conform to storm water drainage requirements.

#### 03 GEOTEXTILE, IMPERMEABLE LINERS, AND DRAIN PIPES

- A. Use the geotextile specified and install it according to project specifications. The use of a woven geotextile with bi-axel strength that meets design criteria is recommended.
- B. Place the geotextile on the bottom and sides of the soil sub-grade. Eliminate wrinkles in the geotextile and ensure it is not damaged during construction.
- C. Overlap of geotextile should be a minimum of 2' (600 mm) in the direction of drainage. Overlapping should be "shingle" style with respect to any slope direction and base stone distribution direction. Keep properly tensioned, eliminate wrinkles, and avoid damaging fabric (no spikes).
- D. If impermeable liners are required, install them according to project specifications and manufacturer's instructions. Impermeable liners are used when full exfiltration from the reservoir (sub-base and base) into the underlying sub-grade is not allowed (no infiltration design). Perforated drainage pipes are usually required in no infiltration and partial infiltration designs.
- E. If drainage pipes are required, install them according to project specifications. The aggregate cover over drainage pipes should be at least 12" (300 mm) to protect them from damage during sub-base or base compaction.

#### 04 SUB-BASE

For residential pedestrian applications, the sub-base may not be required and then only ASTM No. 57 (CSA 5-28) aggregate base layer with a minimum thickness of 6" (150 mm) can be used (use a thicker base for additional water storage). Refer to Base (see below 06).

# Installation guide

## Segmental Permeable Pavement

When traffic load, soil conditions, and climate require greater than 12" (300 mm) of base or volume requirements for detention are higher, a sub-base may be required. Use sub-base ASTM No. 2 or No. 3 (CSA 40-80) meeting the following requirements:

- 90% fractured symmetrical particles
  - Less than 5% passing the 200 sieve
  - Industry hardness tested
- A. Moisten, spread and compact the ASTM No. 2 (CSA 40-80) aggregate sub-base in minimum 6" (150 mm) lifts (without distorting or damaging the geotextile) according to the project specifications.
  - B. Make at least two passes in the vibratory mode followed by at least two passes in the static mode with a minimum 10 ton (9 metric ton) vibratory roller, until there is no visible movement of the aggregate. Alternately, a 13,500 lbf (60 kN) plate compactor can be used to compact the ASTM No. 2 (CSA 40-80) aggregate sub-base.
  - C. Do not allow the compactor to crush the aggregate.
  - D. Surface tolerance of the ASTM No. 2 (CSA 40-80) sub-base should be  $\pm 2 \frac{1}{2}$ " (64 mm) over 10' (3 m).

### 05 EDGE RESTRAINT

- A. Install edge restraint according to project specifications.
- B. Depending on the design, the top of the edge restraint can be hidden or exposed.
- C. Install Avignon, Belgik, Pietra, Tundra or Universal edge units. Cast-in-place concrete or precast concrete curbs should be considered in vehicular use applications (commercial/ industrial driveways, parking lots or streets).
- D. Edge restraint may rest on an open-graded or dense-graded aggregate base.

### 06 BASE

- A. Moisten, spread and compact the ASTM No. 57 (CSA 5-28) aggregate base layer in one 4" (100 mm) thick lift.
- B. Make a minimum of two passes in vibratory mode followed by at least two in static mode with a minimum 10 ton (9 metric ton) vibratory roller, until there is no visible movement of the aggregate. Alternately, a 13,500 lbf (60 kN) plate compactor can be used to compact the ASTM No. 57 (CSA 5-28) aggregate base.
- C. Do not allow the compactor to crush the aggregate.
- D. Surface tolerance of the ASTM No. 57 (CSA 5-28) base should be  $\pm 1$ " (25 mm) over 10' (3 m). Verify prior to setting bed installation.

### 07 BEDDING COURSE

- A. Moisten, spread and screed the ASTM No. 8 (CSA 2.5-10) aggregate bedding layer in one 2" (50 mm) thick lift.
- B. Surface tolerance of the ASTM No. 8 (CSA 2.5-10) bedding course should be  $\pm \frac{3}{8}$ " (10 mm) over 10' (3 m).
- C. Construction equipment and pedestrian traffic on the screeded bedding course should not be permitted.

### 08 PAVER

- A. Pavers should be placed in the pattern shown on the drawings. Lay units hand tight to designated laying patterns. Units have lugs to maintain consistent joint width.
- B. In sloped conditions, it is preferable to start laying from the bottom in an uphill direction.
- C. The minimum slope recommended for permeable pavement surface is 1%.
- D. Inflow pavers can be installed with the TB100SI (Techo-Bloc mechanical tool) to expedite installation.
- E. When subject to vehicular traffic, cut units should not be smaller than  $\frac{1}{3}$  of a whole paver. When using cut pieces, maintain joint.
- F. In vehicular applications, pattern strength will increase if laying pattern is perpendicular to traffic flow.

### 09 JOINT FILL

- A. Fill the paver joint openings with ASTM No. 8 (CSA 2.5-10) aggregate (or No. 89, No. 9 depending on joint width). Sweep stone to fill joints. Surface must be swept clean prior to compaction.

# Installation guide

## Segmental Permeable Pavement

- B. Compact with a minimum 5,000 lbf (22 kN) plate compactor (two passes minimum). The installation of a neoprene pad is recommended to protect the texture of the paving units.
- C. Do not compact within 6' (1.8 m) of unrestrained edges of the pavers.
- D. Apply additional aggregate to fill the joint openings if needed and compact.
- E. Surface tolerance of compacted pavers should be  $\pm 3/8"$  (10 mm) over 10' (3 m).

PRODUCTS	JOINT FILL MATERIAL	(lbs/sq. ft.)	(kg/sq. m)
<b>Inflo</b>	ASTM No. 8 (CSA 2.5 - 10) (1/4")	2.1	10.3
<b>Mista random</b>	ASTM No. 9 (CSA 2.5 - 5) (1/8")	1.0	5.0
<b>Permea</b>	ASTM No. 8 (CSA 2.5 - 10) (1/4")	2.8	13.6
<b>Victorien permeable</b>	ASTM No. 9 (CSA 2.5 - 5) (1/8")	1.7	8.5
<b>Villagio</b>	ASTM No. 8 (CSA 2.5 - 10) (1/4")	2.1	10.2
<b>Villagio Grande</b>	ASTM No. 9 (CSA 2.5 - 5) (1/8")	2.0	9.9

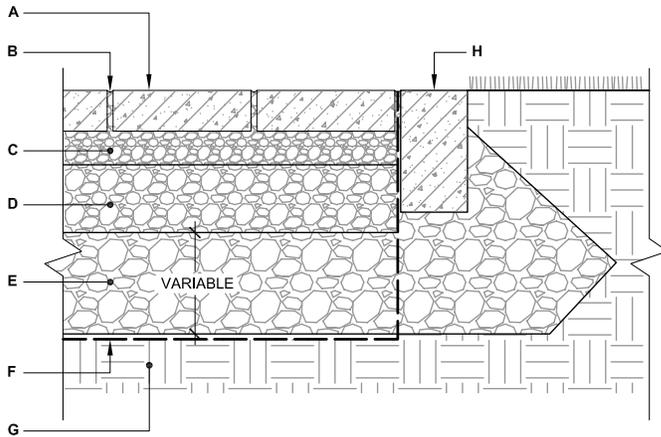
Approximate quantity of clean stone required per sq. ft. or sq. m

### 10 POST INSTALLATION PROTECTION

Prevent contamination of the porous (permeable) pavement system from fine aggregates and debris by maintaining Erosion and Sedimentation (E&S) measures at the perimeter.

# Installation guide

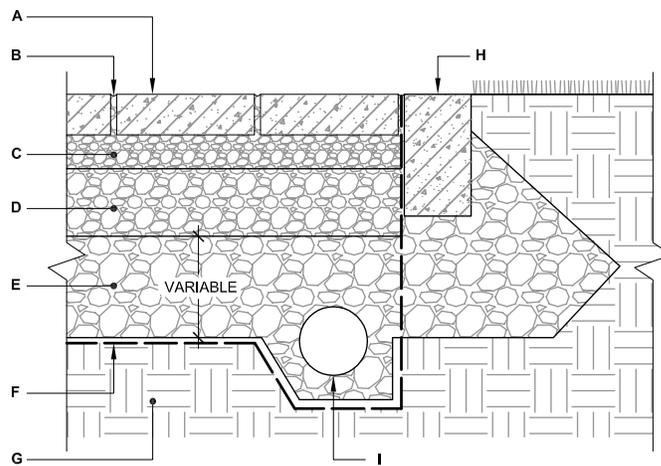
## Segmental Permeable Pavement



- A. PERMEABLE PAVER FROM TECO-BLOC (INFLO, MISTA RANDOM, PERMEA OR VICTORIEN PERMEABLE)
- B. JOINT FILLING MATERIAL  
ASTM No 8 (CSA 2.5-10 mm) AGGREGATE
- C. BEDDING COURSE 1½" to 2" (40 to 50 mm)  
ASTM No 8 (CSA 2.5-10 mm) AGGREGATE
- D. BASE COURSE 4" (100 mm)  
ASTM No 57 (CSA 5-28 mm) AGGREGATE
- E. SUBBASE COURSE  
ASTM No 2 (CSA 40-80 mm) AGGREGATE
- F. GEOTEXTILE
- G. SUBGRADE
- H. CONCRETE EDGE

### SEGMENTAL PERMEABLE PAVEMENT – FULL INFILTRATION

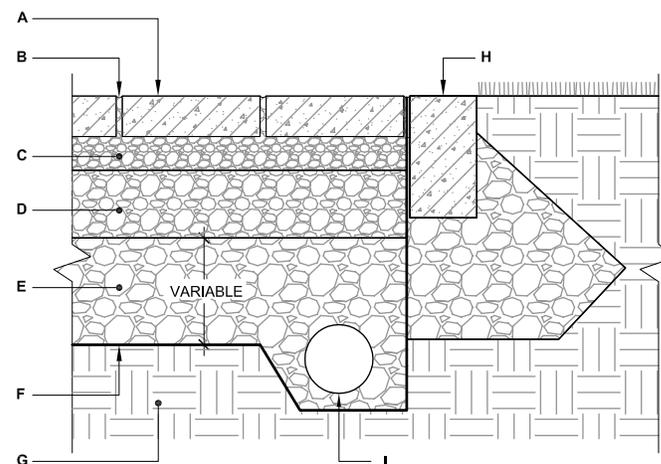
Typical cross section



- A. PERMEABLE PAVER FROM TECO-BLOC (INFLO, MISTA RANDOM, PERMEA OR VICTORIEN PERMEABLE)
- B. JOINT FILLING MATERIAL  
ASTM No 8 (CSA 2.5-10 mm) AGGREGATE
- C. BEDDING COURSE 1½" to 2" (40 to 50 mm)  
ASTM No 8 (CSA 2.5-10 mm) AGGREGATE
- D. BASE COURSE 4" (100 mm)  
ASTM No 57 (CSA 5-28 mm) AGGREGATE
- E. SUBBASE COURSE  
ASTM No 2 (CSA 40-80 mm) AGGREGATE
- F. GEOTEXTILE
- G. SUBGRADE
- H. CONCRETE EDGE
- I. PERFORATED DRAIN CONNECTED TO DRAINAGE SYSTEM

### SEGMENTAL PERMEABLE PAVEMENT – PARTIAL INFILTRATION

Typical cross section



- A. PERMEABLE PAVER FROM TECO-BLOC (INFLO, MISTA RANDOM, PERMEA OR VICTORIEN PERMEABLE)
- B. JOINT FILLING MATERIAL  
ASTM No 8 (CSA 2.5-10 mm) AGGREGATE
- C. BEDDING COURSE 1½" to 2" (40 to 50 mm)  
ASTM No 8 (CSA 2.5-10 mm) AGGREGATE
- D. BASE COURSE 4" (100 mm)  
ASTM No 57 (CSA 5-28 mm) AGGREGATE
- E. SUBBASE COURSE  
ASTM No 2 (CSA 40-80 mm) AGGREGATE
- F. IMPERMEABLE MEMBRANE
- G. SUBGRADE
- H. CONCRETE EDGE
- I. PERFORATED DRAIN CONNECTED TO DRAINAGE SYSTEM

### SEGMENTAL PERMEABLE PAVEMENT – NO INFILTRATION

Typical cross section