

**TERREWALKS®**  
**Installation Manual**

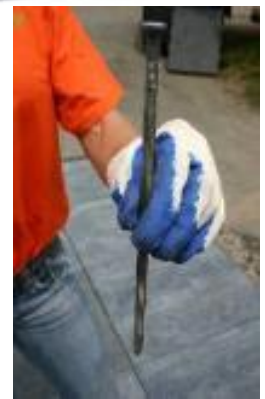
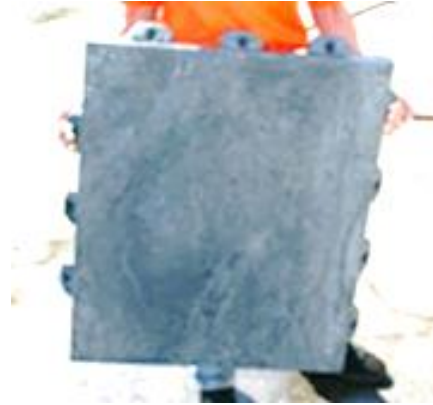
# Overview



- 1) Break out existing concrete (use jackhammers near trees) and clean out loose soil
  - 2) Conduct tree root inspection (if applicable)
  - 3) If new site excavate native soil to 4" depth (more depth required for vehicular traffic or heavy loads). Place optional layer of geotextile (dependent on soils engineer recommendation)
  - 4) Confirm paver base/base course material has good drainage
  - 5) Place base material and compact to 90-95% (Refer to FHA Chapter 4, Designing Sidewalks Guidelines;. Refer to ICPI tech specifications for applicable sub base applications)
  - 6) Place and secure top layer of 6-8 oz. non-woven pervious geotextile
  - 7) Use a heat gun to measure the temperature of the pavers, and calculate their spacing need per the spacing guide. Throughout the install, measure heat of pavers and adjust spacing accordingly.
  - 8) Connect and place sets of TERREWALKS® with proper spacing
  - 9) Use dowels or wood shims to assure proper spacing
  - 10) Drive spike through hole in extended tabs on both outside edges and secure into base; 2 plastic spikes per paver. Do not spike internal joints unless driveway, or walkway to be used for heavy load/vehicular traffic)
- Final step: Remove shims and walk on TERREWALKS®.

- Each site is different. Consider the following site elements:
  - Accessibility
  - Traffic control
  - Security
  - Utilities
  - Adjacent trees and tree root growth
  - Soil type and conditions
  - Climate conditions
  - Refer to guidelines per:  
[http://www.fhwa.dot.gov/environment/bicycle\\_pedestrian/publications/sidewalks/index.cfm](http://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/sidewalks/index.cfm) (cut and paste)

## Shipped TERREWALKS® product includes



- TERREWALKS® (5 square feet each, 24" x 30" x 1.75", 25 pounds)
- ECO-BORDER Recycled Plastic spikes (two per paver) OR PERMALOC Spiral Steel Spikes (1 per paver)
- Step-by-Step Installation Manual and PowerPoint (electronic; hard copy upon request)

## Customer / contractor provides



- Paver base/base course aggregate with good drainage (minimum fines, masonry sand only if needed to increase drainage). Refer to Sieve Analysis (page 25)
- Non-woven pervious (punched) geotextile fabric, minimum 6–8 ounce, for top layer and possibly below base course depending on soil stability
- Optional geo-cells or geo grids, if needed for soil stability
- Infrared battery operated heat gun
- Spacing devices (spacers, shims, dowels, etc)

# Guidelines to installing TERREWALKS®

- TERREWALKS® is an interconnected open-grid modular paving system
- TERREWALKS® should be installed/supervised by an experienced interlocking paver professional
- Use specified base materials. Refer to Sieve Analysis (Slide 31)
  - Follow guidelines per:  
[http://www.fhwa.dot.gov/environment/bicycle\\_pedestrian/publications/sidewalks/index.cfm](http://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/sidewalks/index.cfm) (cut and paste)
- Follow base and sub base guidelines per: [www.icpi.org/techspec/1025/state](http://www.icpi.org/techspec/1025/state) (cut and paste, enter state)
- Attain sufficient compaction: 90%-95%
- Measure paver temperature with heat gun throughout install and follow spacing guide
- Evaluate need for intermittent increased spacing in long lengths, or widths exceeding three pavers, particularly when proximate hardscape makes adequate spacing difficult
- Leave spacers/shims in place until job is completed
- If removing hardscape, on one end leave 4 inches more in place than site length
- Be cautious near trees to avoid damage to trunk and roots



## Step one: break out

- Break out existing concrete. Excavation depth depends on site use – pedestrian or vehicle. Typical pedestrian base depth required is 4”
- Concrete removal should not remove or tear tree roots
- Excavation that may remove roots shall not occur until after roots have been pruned on the tree side
- Clear an additional 1.5” on outside edges for tabs extending beyond panel edge
- Whatever length of the site, you may wish to leave 4 inches more in place on one end. This allows a final cut to accommodate variables and transition



## Step two: tree roots

- Assess need for tree root pruning. **WORK WITH CONSULTING ARBORIST**
- Roots can be left intact greater than 1.75 inches below finished grade. A string line can be pulled across the opening to measure depth of roots. If the sidewalk is so close that the trunk flare encroaches on the sidewalk area, the sidewalk can be meandered away from the trunk flare. Panels can be cut to meet design (See Special Section)
- Directional root prune when necessary. Prune roots as far away from tree trunk as possible. Improper or excessive root pruning may result in tree instability and risk of failure, or tree health decline, including death
- TERREWALKS® require less than 50% excavation than for concrete and 25% less excavation than for concrete and compacted base





## Step three: site preparation

- If new site, excavate and rough grade native soil to 4" depth\* and compact with vibra plate compactor
- When removing existing concrete, typically a depth of 4" will remain; clean away loose soil\*. Tree roots are not affected unless in top 1.75" of space
- Always use caution when working around trees and tree roots. Damage to roots and bark results in decay and often irreversible damage to tree

*\*Heavy loads require greater than 4" depth, and possibly geo-cell or geo-grid support. Consult with your representative or ESB LLC. on case by case basis.*



## Setting string lines and compaction

- String lines should be set to finish grade elevation following concrete removal (or excavation)
- Determine how much settling of base material depth will occur during compaction. (This is the most critical step in a sound installation. TERREWALKS® will not “make up” for irregularities, and will reflect in the panel in a void or rocking.)
- Confirm that equipment will achieve 90%-95% compaction. Pervious aggregate allows high compaction while pore space is still retained



## Use the correct base materials

- Paver base/base course aggregate with good drainage (minimum fines, masonry sand only if needed to increase drainage). Refer to Sieve Analysis. Test porosity by hosing down or pouring bucket of water on surface to confirm drainage and no pooling. (Blend with up to 20% angular/masonry sand if needed.)
- Non-woven pervious (punched) geotextile fabric, minimum 6–8 ounce, for top layer, and possibly below base course depending on soil stability
- Unlike interlocking concrete pavers, sand should not be used in the base (unless as additive) or seams of TERREWALKS®
- Recycled concrete and asphalt are unsuitable for base and will bind up



## Step four: base (bottom & leveling layer)

- Apply a 2.25" layer of paver base/base course that has been tested for drainage and compaction. (Refer to Sieve Analysis)
- Add aggregate in two or more lifts, wet down with water, and compact (90%-95%) for proper results
- Grade and compact 1.75" below string line (pavers are 1.75" in depth)
- Lay non-woven pervious geotextile fabric. Geotextile is 12.5' wide. Cut width according to the width of installation plus 6.5 inches to extend up and over sides. Temporarily secure.
- FAILURE TO USE CORRECT BASE MATERIALS AND COMPACT BASE MATERIALS ACCORDING TO INSTRUCTIONS MAY RESULT IN UNSTABLE INSTALLATION, PANEL OFFSET, PRODUCT DEFORMATION, OR SINKING NEXT TO HARDSCAPE



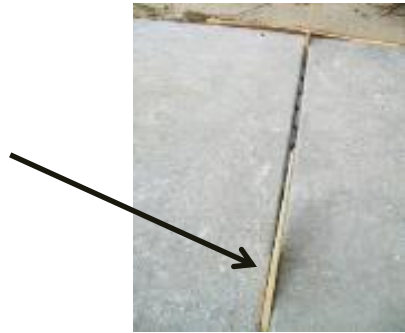
# Step five: Installing pavers - Overview

TERREWALKS® pavers have interlocking tabs on all sides.  
(The 24" side does not interlock with the 30" side.)

24" side: 2 tabs + 3 tabs  
30" side: 3 tabs + 4 tabs



- Successful installation requires temperature measurement and seam spacing
- Seams must be spaced end-to-end and width-to-width, and against hardscape
- Spacing requires "spacers"--shims, dowels, or rigid spacing device--to hold pavers in place throughout the installation
- Leave spacers in place until installation is completed. When site is staked and backfilled, spacers may be removed





## Step five, cont'd: Installing pavers – Calculating Spacing

- A): Lay out pavers for minimum 30 minutes prior to interlocking. Pavers in direct sunlight will have expanded and require less spacing. Pavers in shade will be cooler and require more spacing. Paver temperature and outdoor temperature are not the same, and **paver temperature must be measured**.



- B): Measure Paver Temperature

With an infrared battery operated thermometer, point and squeeze. Note the temperature on the dial. If part of the paver is in sun, and the other in shade, there will be two different temperatures. Get one consistent reading.

- C) : Calculate spacing needs per the Spacing Guide.

Continue taking paver temperature at intervals throughout the day; pavers may expand or contract as ambient temperature or other conditions change. Pavers warm up and cool down quickly.





# Step five, cont'd: Installing pavers – SPACING GUIDE

PAVER TEMPERATURE	SEAM SPACE 24" SIDE	SEAM SPACE 30" SIDE	GENERAL CONSIDERATIONS
60° -85°	3/16" (.1875")	1/4" (.25")	Periodic 5/8' seams should be made in climates where temperatures exceed 105°, sites in direct sunlight, or sites enclosed in hardscapes – particularly when enclosed on both sides. Additional intermittent increased spacing may be needed lengthwise & widthwise if hardscape proximities make adequate spacing difficult.
85° -115°	3/16" (.1875")	3/16" (.1875")	
115° and above	1/8" (.125")	1/8" (.125")	
0° - 60°	1/4" (.25")	1/4" (.25")	
Subzero	If site remains at <=0°, seams should be 3/16"; if range exceeds 100° additional spacing is needed and extra expansion joints will be required.		<b>NOTE: SPACING APPLIES TO ALL SEAMS, BETWEEN PAVERS, AND NEXT TO EXISTING OR NEW POUR HARDSCAPE.</b>



## Spacing reminders

- **FAILURE TO PROVIDE SPACING ACCORDING TO INSTRUCTIONS MAY RESULT IN PAVER BOWING DUE TO CROWDING, WHICH MAY CAUSE TEMPORARY OR PERMANENT PRODUCT DEFORMATION**
- Pavers *to the right and below* were “wedged” tight against the hardscape, causing them to bow when expanding in high heat



REMEMBER: MEASURE TEMPERATURE OF PAVERS THROUGHOUT INSTALL. PAVERS WARM UP AND COOL DOWN QUICKLY.



Improperly installed pavers will rise but not separate, break or crack. Pavers need to be reset with proper spacing.

## Step six: method of laying pavers



- Individual pavers do not “drop” into place
- To “insert” a single paver, adjacent pavers need to be slightly pulled out to allow the interconnection



## Step six, cont'd: method of laying pavers

- When working on installations more than 5' wide, place the installation over a sheet of geotextile, and as rows of pavers are assembled side by side, slide the row into place





## Step seven: tie-in #1 – to existing concrete

- When abutting against existing concrete sidewalk or curb, cut off paver tabs and install with proper seam spacing against hardscape
- To prevent downward movement set dowel into concrete at a level of elevation so that paver sits atop dowel as a ledge, or support
- If no dowel or bookend is possible, reinforce compaction in limited areas. Sand cement slurry can be used



## Step seven: tie-in #2 – book end concrete pour

- When pouring new concrete against pavers, leave tabs in place and set shim to ensure proper spacing against fresh concrete





## Step eight: checking pavers and base

- Walk on each paver checking for base stability, compaction, and proper spacing
- Make sure pavers are at same height as existing concrete
- Make sure no drop out exists beneath any paver
- Pay special attention to pavers and base next to hardscape
- Make corrections by resetting, filling, and compacting base material as needed



## Step nine: securing with spikes

- Using a spike, a tool or a drill, open and slightly enlarge hole in the tab, making it an oval, so that the spike will sit inside the hole not touching all sides
- Drive spike through hole in tab, through extended geotextile, and into ground at the center of each paver. (Two plastic spikes per paver, or one steel spike per paver, outside edges only.)
- Do not drive spikes into tree roots



## Step ten: replacing adjacent landscape

- When installation is complete, backfill the adjacent ground with grass, sod, grass seed, gravel or stone.
- Make sure all tabs are completely covered



## Base specifications and preparation

- Permeable base material specifications (Sieve Analysis)
- Base prep for storm water management
- Base preparation for heavy loads
- Base preparation for slope and soil stability

# Permeable base material specifications (Sieve Analysis)

Base Course: Sandy gravel material from local sources commonly used for road base construction, passing the following sieve analysis.

<u>Sieve</u>	<u>%Passing</u>
1"	100
3/4"	90-100
3/8"	70-80
#4	55-70
#10	45-55
#40	25-35
#200	3-8

Sources of material can include either "pit run" or "crusher run." Crusher run material will generally require sharp sand to be added to mixture (33% by volume) to ensure long-term porosity. If unable to find local sources to meet this sieve analysis, an alternative mixture can be created by mixing 2/3 crushed drainage rock (0.75" diameter) with 1/3 coarse, well-draining sand (AASHTO M6 or ASTM C-33)

Alternative materials such as crushed shell, lime rock, and/or crushed lava may be considered for base course use, provided they are mixed with sharp sand (33%), and brought to proper compaction. **Note: Crushed shell and lime rock alone can set up like concrete without sand added**

## Before placing base, consider: storm water management

- Most installations must consider storm water management
- TERREWALKS® are an open grid, modular pavement system. A 1/16<sup>th</sup>” rise on the platform directs water to the seams. The optimum performance of storm water capture and drainage is contingent on proper preparation and drainage of the base
- Follow Soils’ Engineer evaluation regarding need for French drains, sheet drains or other method for drainage
- Follow base and sub base guidelines per:  
[www.icpi.org/techspec/1025/state](http://www.icpi.org/techspec/1025/state) (cut and paste)



# Before placing base, consider: heavy loads

- Follow base and sub base guidelines per: [www.icpi.org/techspec/1025/state](http://www.icpi.org/techspec/1025/state) (cut and paste)
- Heavy loads will require greater than 4" depth, and possibly geo-cell or geo-grid support. Consult with your representative or ESB-LLC.
- Place layer of geotextile on bottom of the trench, which keeps native earth from flowing into the crushed rock layer and stabilizes base
- Geotextile is 12.5' wide. Cut width according to the width of installation plus 10 inches. Extend fabric up and out on both sides. (Base material will secure fabric)



## Before placing base, consider: slope and soil stability

- TERREWALKS® is an interlocking modular pavement system which is affixed to the base with spikes. Slopes are subject to shifting, erosion, water and gravel collection and other actions which may disrupt and dislocate TERREWALKS® pavers
- Several companies offer geotextile fabrics and geogrid products which are appropriate for these applications. Geotextiles range in cost from ~\$0.11 /sq. ft. and geogrids cost ~\$2.50 /sq. ft., depending upon thickness and use.
- Please consult with representative or TERRECON, Inc. on a case by case basis

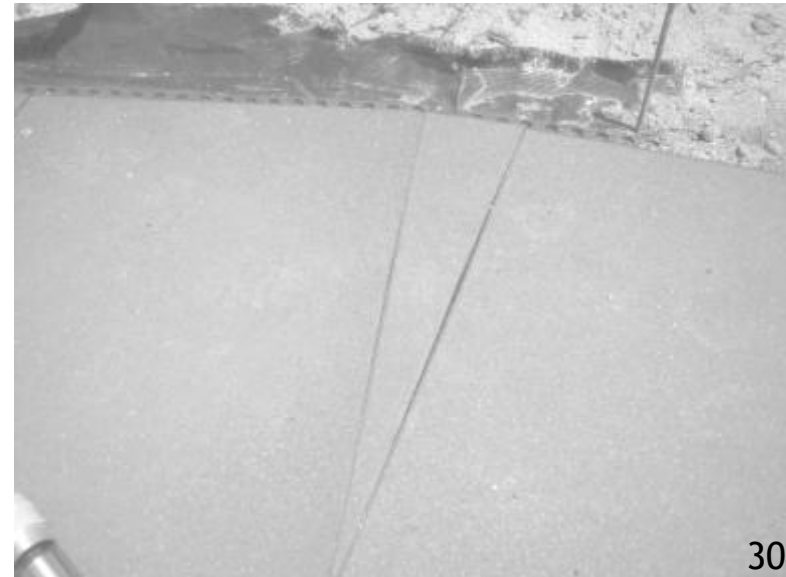
## Special conditions: cutting (overview)

- TERREWALKS® may be cut with a Skill Saw, or jig saw
- When dealing with curves, it is essential to cut the radius as needed and not torque or force the paver(s) into position
- The following section deals with:
  - Curves, radii
  - Utility covers, boxes, and poles
  - Extended curbs, walls or hardscapes



## Special conditions: cutting (curves)

- Measure and mark
- Maintain seam spacing at all times
- Some radii can be best achieved by cutting and inserting pie wedge sections (secure wedge with caulking if needed)





## Special conditions: cutting (tree roots)

- Removing portions of TERREWALKS® is a procedure often recommended by arborists to avoid root pruning and to accommodate large roots. TERREWALKS® are easily cut and in most cases are stable without staking



## Special conditions: cutting (utility covers, boxes, and poles)

- Pavers have been cut on curve with jigsaw
- All joints around utility cover are cold and unattached
- Seam is filled with caulking





## Special conditions: cutting (utility covers, boxes, and poles, cont'd)

- In these instances, seam required foam cording prior to filling with caulking or aggregate



## Special conditions: cutting (extended curbs, walls, or hardscapes)

- When installing along extended hardscape, follow same protocol as for tie-in:
  - Cut off paver tabs and install with proper seam spacing against hardscape
- To prevent downward movement set dowel into concrete at a level of elevation so that paver sits atop dowel as a ledge, or support
- If no dowel or bookend is possible, reinforce compaction in limited areas
  - Sand cement slurry can be used



## Special conditions: temporary use

- If site will be in place for more than one month, follow preparation and installation protocol as for permanent applications.
- For short term applications (construction, events, etc.) TERREWALKS® may be installed on top of grass, gravel, ground or hardscape, without base prep. Use of non-woven geotextile is recommended. Interconnect and spike per permanent installation protocol.



## Storing TERREWALKS®

- TERREWALKS® must be stored on a flat surface
- When stacking TERREWALKS®, alternate top side-up and bottom side-up. Do not stack TERREWALKS® top side-up only.
- Occasionally edges of TERREWALKS® on top of skid will bend down due to pressure of shrink wrap. Flip and place on flat surface to recover flatness; may also weight under other pavers.
- If storing TERREWALKS® for over two weeks, loosen steel strapping
- Do not store TERREWALKS® near high heat
- TERREWALKS® may be stored outside
- If planning on storing TERREWALKS® for an extended time, notify TERRECON prior to shipping for special packaging
- Do not leave unbound material on job site unattended

