SKYPAVER™
COMPOSITE ROOF PAVERS

GUIDE FOR DESIGNERS & INSTALLATION GUIDE

NOTE: The contents of this guide are considered accurate at time of posting. All information contained within should be validated for accuracy as it relates to specific project conditions or requirements. Validate all specific conditions with your Regional Technical Coordinator prior to its use.

Contents

General Guidelines

SkyPaver Composite Roof Pavers should be installed in accordance with the local building codes and the installation guidelines included below. Holcim Building Envelope (HBE) accepts no liability or responsibility for the improper installation of this product. SkyPaver Composite Roof Pavers ("pavers") may not be suitable for every application, and it is the sole responsibility of the installer to be sure that the pavers are appropriate for the intended use. Since all installations are unique, it is also the installer's responsibility to determine specific requirements for each flat roof application. HBE recommends that all applications be reviewed by a licensed architect, engineer, or local building official prior to installation.

Tools and Equipment

- Safety Glasses, Gloves, Ear Plugs
- Marker
- Hand Dolly
- Edging
- Caulking Gun
- Adhesive – see recommended adhesives on Page 9 of this guide.
- Utility Knife
- Jigsaw or Miter Saw:
    1) 5-6 tpi jigsaw blade
    2) 10"-24 tooth miter saw blade
    3) 12"-32 tooth miter saw blade

STOP! Read this section before you start!

- Do not install where standing, above-ground water conditions are anticipated. Proper subbase grading and other storm-water management designs should prevent the appearance of water at grade-level. In areas where small pooling occurs, adhesive can be used to affix the pavers to the grids to increase installation integrity.
- Do not install where high volume vehicle traffic is expected (e.g., crosswalk). SkyPaver Pavers are designed for low volume, low speed vehicle traffic (e.g., driveways, parking lots).
- Do not install for use as a fire pit. Grills and fire bowls may be used when placed over a fire mat to prevent any damage from embers.
- Failure to install SkyPaver Pavers in accordance with applicable building codes and this Installation Guide may lead to personal injury, affect product performance, and void the product warranty.

Extreme Heat Warning

Be aware of excessive heat on the surface of the SkyPaver products from external sources, such as but not limited to, fire or reflection of sunlight from energy-efficient window products. Low-emissivity (Low-E) glass can potentially harm SkyPaver products. Low-E glass is designed to prevent passive heat gain within a structure and can cause unusual heat buildup on exterior surfaces. This extreme elevation of surface temperatures, which exceeds that of normal exposure, can cause SkyPaver products to melt, sag, warp, discolor, increase expansion/contraction, and accelerate weathering.

Current or potential SkyPaver customers that have concerns about damage by Low-E glass should contact the manufacturer of the product which contains Low-E glass for a solution to reduce or eliminate the effects of reflected sunlight.

Excessive Construction Debris

It is important during construction, the Paver surface stays clear from excessive build-up of dirt, sand, and dust from tile, concrete, landscape blocks, or any other masonry products. If these materials are not removed immediately, the Paver surface will become difficult to clean and can potentially damage the Paver's surface finish.

IMPORTANT: Do not use SkyPaver Pavers as a work surface.

Expansion and Contraction

SkyPaver Composite Roof Pavers will expand and contract with temperature change (like other composite materials). To allow for this movement:

Resurfacing Paver

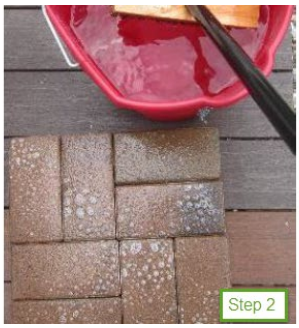
1) When installing at ambient temperatures below 70 °F, leave a ⅝" (16 mm) gap between all protrusions.
2) When installing at ambient temperatures above 70 °F, leave a ½" (13 mm) gap between all protrusions

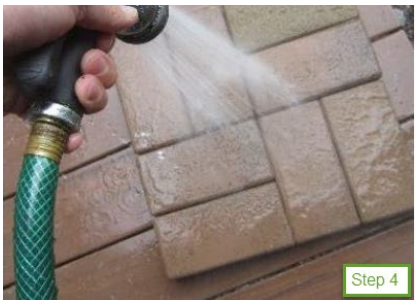
Storage & Handling

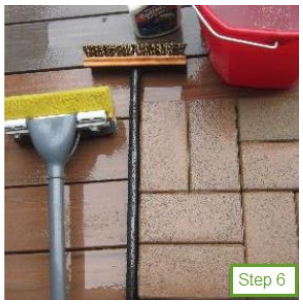
- Store SkyPaver Paver products on a flat and level surface.
- SkyPaver Pavers are shipped from the manufacturer in a protective cover. Replace the cover over any remaining product if it is removed. If the covering is no longer available, take care to keep the product free from dirt and debris.
- If stored outdoors, the product must be covered with non-translucent material.

Care & Maintenance

- SkyPaver Pavers require no maintenance other than occasional necessary clean-up from spills or periodic maintenance cleanings as desired.
- Most surface spills and stains can be cleaned using household cleaners and warm water.
- Chemical spills (e.g., petroleum, paint) should be cleaned as soon as possible with an appropriate industrial cleaner and rinsed thoroughly with water. Chemical spills or stains left untreated over extended periods of time may degrade the surface finish and integrity of the product and are not covered under warranty.
- SkyPaver Pavers can be cleaned using a pressure washer. Be sure to use a wide fan and keep the tip far enough away from the surface to not score the product.
- Always check the compatibility of cleaning products with plastics and rubber prior to using on SkyPaver Pavers
- Removing scuff marks from SkyPavers using Dawn Dish Soap or Chomp Gutter Cleaner and a stiff natural fiber brush. Some color variations may occur after cleaning the pavers. This color change is not covered under the warranty.
    1) Work in small, controlled areas. Do not let cleaner dry or evaporate without thoroughly rinsing. Apply cleaner to pavers, modestly wetting surface.
    2) Let cleaner sit on product for 30 to 60 seconds prior to scrubbing.
    3) Thoroughly scrub pavers in both directions vertically and horizontally) with a wet, stiff, natural fiber brush.
    4) Rinse thoroughly from paver system and entire roof system below to drain. Dried cleaner may leave a white residue that would need to be cleaned again.
    5) Optional - Sponge dry the surface to remove all residual standing water.
    6) Allow to totally air dry. It may be necessary to spot treat any areas missed.







Substrate Requirements

SkyPaver Pavers are a luxurious, minimal maintenance covering that installs over an existing or new flat roof. SkyPaver Pavers are not a structural replacement for flat roof surfaces and are not suited for all flat roof applications. Please consider wind-uplift and fire rating guidelines, along with the weight capacity of the roof when designing a project. Always consult your SkyPaver Representative for the recommended rooftop adhesion guidelines for your specific project.

SkyPaver Pavers are designed to be installed over a fully adhered roofing membrane, and on a structural flat roof surface. SkyPavers are not a structural replacement for flat roof surfaces, and therefore, should never be used as the structural element of the roof, as a ballast system, or in pedestal applications. Prior to installing, be sure to verify that both the roof structure and roofing system can support the addition of SkyPaver Pavers.

Sub-Structure Requirements

- The roof structure must meet all required codes.
- The system is designed for installation over a “low-sloped’ roof (between ⅛" (3 mm) per foot and ½" (13 mm) per foot slope).
- The roof must have adequate drainage to meet local codes.
- Elevate SkyDrain™ Sheet must be installed over the roofing membrane.
  NOTE: A drainage mat is required for flat roof applications over waterproofing membranes. It serves to both protect the membrane from abrasion and allows a pathway for water to escape to the drains.
- The deck surface must be free from substantial undulations or “waves.”
- Door and other thresholds must be able to accommodate the minimum added height.

Design, Pattern and Color Choice

Calculate Square Footage

Measure the dimensions of the area to be resurfaced and calculate the total square footage. Be sure to add extra to the measured square footage to allow for scrap and to have a few extras on hand in case of future damage.

Calculate Amount of SkyPaver Product Required:

A full grid of SkyPaver Pavers includes a 16" x 16" (406 mm x 406 mm) grid filled with pavers (4 to 16 pavers depending on their size). Each grid covers 1.78 ft². To calculate how many grids are needed, divide the total square footage of the project by 1.78.

Measurements Length x width = ft²	Required Number of Grids		
	Single Color Blend	Two Color Blend	Three Color Blend
50 ft²	29 Grids	30 (15 of each color)	30 (10 of each color)
100 ft²	57 Grids	58 (29 of each color)	57 (19 of each color)
250 ft²	141 Grids	142 (71 of each color)	141 (47 of each color)
500 ft²	282 Grids	282 (141 of each color)	282 (94 of each color)

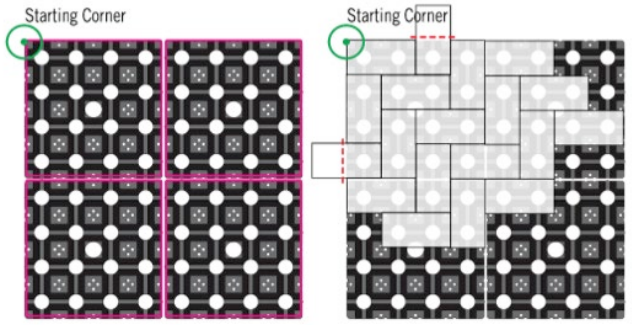
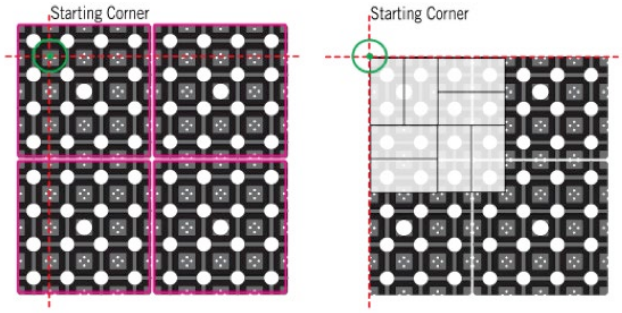
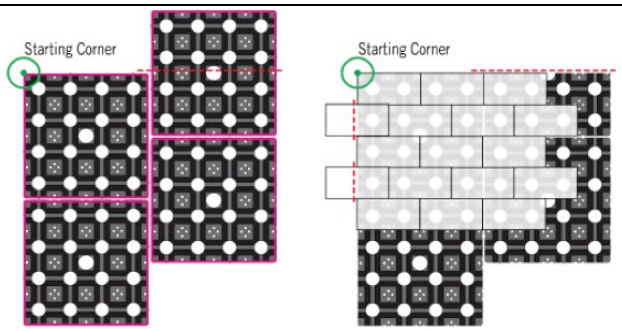
Choose Pattern

SkyPaver Pavers can be installed in a multitude of different patterns and combinations. Designs can include small and large repeating patterns. Some example patterns are provided below: At least one paver must

connect two grids in each direction. The herringbone pattern does this without needing to specially orientate the grids.

IMPORTANT: At least one paver must connect two grids in each direction. Installation grids must be orientated to allow the pattern of pavers to interlock grids in both directions. Mix multiple pallets of the same color within an installation to disperse any potential slight variations in shade.

For all installations, regardless of the pattern selected, at least one paver must connect two grids in each direction. The Herringbone pattern achieves this connection without needing to specially orientate the grids. The Basketweave Pattern requires additional grids and Running Bond Pattern requires reorientation of the grids in an offset pattern. The following information describes how the grids must be orientated for each of these patterns to assure overlap in all directions:

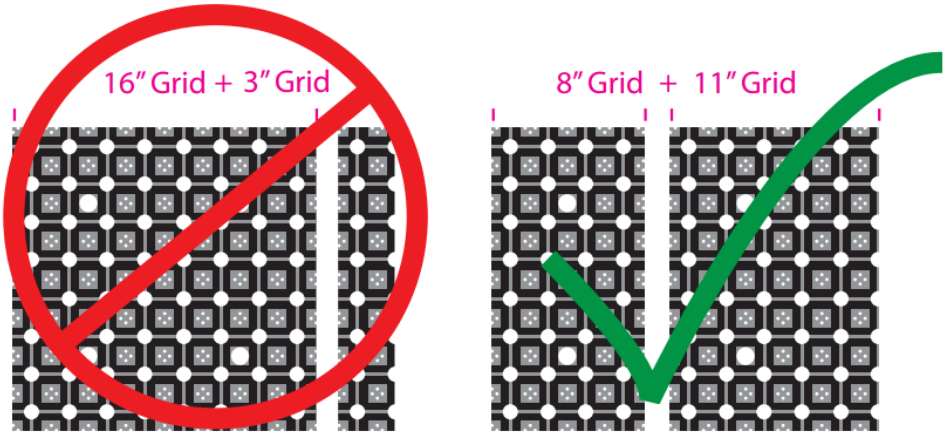
Paver Patterns	
Herringbone Most popular and easiest to install pattern. Pavers will interlock grids in both directions. • Lay the installation grids as illustrated at left. • Start laying pavers at the starting corner.	
Basketweave Simplest installation method for a basketweave pattern, but will require extra installation grids. • The initial paver must be laid 4" (102 mm) down and 4" (102 mm) over from the top left corner of the grid. This will shift the pattern over and assure at least one paver will connect two grids in both directions The leftover grid can either be trimmed off, or a 4" (102 mm) border can be used to fill in the extra space.	
Running Bond This pattern requires staggering the grids to assure the pavers will connect them in both directions. • The starting paver can be laid in the top left corner, but the next column of grids must be staggered halfway down. • Each half of the cut grid can be used.	

Laying SkyPaver Pavers

- Choose your starting point based on the project dimensions and desired look, keeping in mind any cutting that may need to happen.

- Begin by laying a handful of SkyPaver installation grids in the arrangement that matches your pattern to ensure pavers overlap grids in both directions.
- To increase installation speed, order extra installation grids to get started.
- Bring over grids full of pavers, dump them next to where they will be placed into the grid, and place the empty grids into place.
- If mixing colors, bring over the ratio of colors being used and dump them in front of the person laying pavers. For example, for a pattern using 40% Boardwalk, 40% Olive, and 20% Waterwheel. The carrier would bring over two grids of Boardwalk, two grids of Olive, and one grid of Waterwheel each time.
- Begin laying pavers in the desired pattern; ensuring pavers are overlapping grids in both directions.
- When the edge is reached, grids can be cut to fit using a jigsaw or miter saw, and a low tooth count wood ripping blade.
- Continue laying pavers until all full pavers (i.e., not cut or trimmed) are installed.
- If the perimeter grid is less than 4", cut 4" or 8" off the interior adjacent grid to increase the size of the perimeter grid. See example below.

Reminder: Installation grids must be oriented to allow the pattern of pavers to interlock grids in both directions. One example of cutting grids for optimal layout.



Cutting Individual Grids and Pavers

- Pavers can be cut to any shape using a jigsaw or miter saw, and a low tooth count wood ripping blade.
- If using a miter saw, it works best to place the paver on a grid while cutting it. This allows the person cutting the product to both have more support holding the paver and keep their fingers farther away from the blade. Short, quick motions with a miter saw also work better. Slow, continuous cuts may cause binding and warping of the blade.
- For pavers cut to dimensions smaller than half a paver, adhere the paver to the grid using a recommended adhesive.
- Use the recommended cutting equipment (see page 2).
- Cut pavers individually using a spare grid to hold it in place.
- Grids are cut like pavers; however, they cut easier due to their thickness.
- IMPORTANT: ALWAYS WEAR SAFETY GLASSES, GLOVES, AND EAR PLUGS WHEN TRIMMING PAVERS OR GRIDS.
- Obey all safety and operational instructions that came with your cutting equipment.

Reminder: Always wear safety glasses and ear plugs when trimming pavers or grids. Obey all safety and operational instructions that came with the cutting equipment.

Installation of SkyDrain Sheet

Use of the Elevate SkyDrain Sheet is required for all applications. The SkyDrain Sheet serves to both protect the membrane from abrasion and allows a pathway for water to escape to the drains.

- Before beginning installation, inspect and approve quality of subsurface waterproofing and insulation to ensure that it is acceptable for subsurface drain installation and that the plaza has adequate slope to drain the area properly.
- Clean the area of any loose debris.
- Start at the edge and install the drainage mat with the fabric flap facing the perimeter edge, and the length of the roll going with the slope of the roof (ensure it is flat and does not curl).
- Cut it to length so that there is a ½" (13 mm) gap between the material and all walls and protrusions.
- Rows of the SkyDrain sheet will abut one another.
- Offset seams of the grids and seams of the SkyDrain Sheet for best results.
- Apply a bead of construction adhesive 0.125" to 0.25" (3 mm to 6 mm) in a zigzag pattern along the edge of the strip of drainage mat without the fabric overlap. Install the next strip of drainage mat — overlapping and bonding the fabric flap onto the previous strip.
- Repeat the procedure until the entire plaza deck floor is covered.
- Remove excess material from the last strip without eliminating the fabric overlap.
- Cut out the SkyDrain Sheet Drain around roof drains to allow water to escape.
- DO NOT adhere SkyDrain Sheet to the waterproofing membrane.

  NOTE: For small undulations in the flat roof surface, scrap pieces of Elevate RubberGard EPDM membrane can be used as shims. This can help create a smoother top surface once the paver system is installed.

Installation of SkyPaver Grids

REMINDER: Installation grids must be orientated to allow the pattern of pavers to interlock grids in both directions. Please refer to “Choose Pattern” for more information.

- Begin laying grids from the starting point of your choice, on top of the already installed Elevate SkyDrain Sheet.
- Lay out initial installation grids on the Elevate SkyDrain Sheet, based on desired pattern (using extra grids can reduce installation time). To increase installation speed, it is recommended to purchase ten extra installation grids to get started.
- As pavers are brought over and installed, the grids from those pavers will continuously be laid out across the install.
- Grids can be cut to fit with the same cutting tools used for the pavers (e.g., miter saw or jigsaw).

  NOTE: If the ending grid is less than 4" (102 mm), cut off 4" (102 mm) or 8" (203 mm) of the grid before it, so the ending grids can be longer and will connect into the install with overlapping pavers (e.g. instead of a 16" (406 mm) grid then a 3" (76 mm) grid, create an 8" (203 mm) grid and an 11" (279 mm) grid).

Installation of SkyPavers

- Bring stacks of pavers on the grids over to the starting point.
- Empty pavers off the grid.
- Lay pavers using chosen pattern into the grids (mixing different colors if desired).
- **IMPORTANT:** Ensure that all grids are being connected by pavers in all directions.
- Take empty grids and lay them out in the continued orientation needed for your pattern.
- Continue laying pavers until all full pavers (i.e., not cut or trimmed) are installed.
- If multiple pallets of the same color are used, it is recommended to mix them throughout the installation area. SkyPavers are produced from up to 95% recycled materials, which can create slight color variations.

Adhering Pavers to the Grid

In certain cases, pavers must be adhered to the grid. Reasons for adhering pavers to the grid include use of cut pavers, wind uplift conditions, around drains or where potential standing water could exist, and near stairways and roof access points. Perimeter paver securement is addressed below. Consult your Quality Building Services Technical Department for recommendations in all applications where wind uplift is a concern.

- Using a recommended adhesive, place a ⅛" (3 mm) bead across the top ribs of the grid.
  NOTE: Recommended adhesives are TiteBond PROvantage Landscape Adhesive and TiteBond GREENchoice Construction Adhesive.
- Place the paver in the grid and press down firmly.
- Let pavers sit undisturbed for duration of adhesive cure time, typically at least 72 hours.
- A 28 oz. (.83 L) tube of adhesive may cover approximately 355' (108.2 m) using a ⅛" (3 mm) diameter bead. This amount may vary based on product selection and application rate.

IMPORTANT: Always try the adhesive on a small portion of the install, allow for proper curing and ensure that the adhesive is performing as desired before applying to the entire project. Follow all adhesive manufacturers' installation instructions and consult with them for any further information.

Securement of Perimeter Pavers

Each application is different, and the perimeter must be secured accordingly. For most applications that end at a wall or parapet, securement of the pavers at the perimeter is typically not required. However, Holcim recommends adhering a minimum of 16" (406 mm) around the perimeter for all applications, as a safety measure. For applications where winds above 55 mph are anticipated, contact the Technical Services Department for job-specific information. For applications that do not end at a wall or parapet, a skirt board or trim board may be installed to cap off the unfinished edge of the paver system. The use of Edge Flashing may also provide additional edge securement, and SkyPavers may be used in conjunction with Elevate SkyScape edge flashing products, where appropriate. Contact Holcim for further details.

Install Bullnose Pavers

- Use a recommended construction adhesive (see Page 10 of this guide) between the accessory pavers and the grid.
- When installations call for a bullnose paver a construction grade adhesive is required to keep all pavers from shifting or being removed from the grid portion of the SkyPaver System. See TIS 1934 for further installation procedures.
- Bullnose pavers are made to finish off the paver grid with a finished edge look. The bullnose pavers will be installed using a construction grade adhesive to keep them in place until they have been set up. These pavers hang over the grid piece to make a smooth transition to a lower surface.

Finishing the Project

SkyPaver Composite Roof Pavers may be edged using Elevate SkyScape Edge Flashing. See www.holcimelevate.com for information regarding SkyScape Edge Flashing. SkyPaver Pavers should NOT be filled with joint sand when installed on a flat roof.

The techniques shown above should be used for the best results. Results may vary as expansion and contraction could still occur, and drainage systems are unique to each flat roof. Holcim Building Envelope claims no liability or responsibility for the improper installation of this product. Since all installations are unique, it is the sole responsibility of the installer to determine specific requirements regarding each flat roof application. Holcim recommends that all designs be reviewed by a licensed architect, engineer, or local building official before installation. Please contact the Technical Services Department prior to installation if you have question or concerns.