



SkyScape™ Vegetative Roof Systems Design & Installation Guide

January 2024

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. Specific codes, uplifts or other factors may result in changes to the information contained within this document. Validate all specific conditions with a Regional Technical Coordinator prior to its use.

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This guide describes considerations necessary for appropriate design and installation of **SkyScape Vegetative Roof Systems** and outlines the minimum requirements for a **Red Shield Warranty**. Statements in this guide are provided in good faith and with the expectation that a design professional will be consulted prior to commencement of any vegetative roof system project.

NOTE:

- To be eligible for warranty, all roofing systems and vegetative roof systems must meet the Holcim technical standards, warranty requirements, and system specifications for the system type selected.
- For complete technical information, including Technical Information Sheets, Detail Drawings, and sample warranties, please refer to the Holcim Solutions and Products US, LLC, Building Envelope Division website at www.holcimelevate.com. Local code and/or insurance requirements may require specific enhancements.

ROOFING SYSTEM DESIGN

Holcim can provide a broad scope of roofing system design assistance and product recommendations to architects, consultants, and other specifiers; however, Holcim does not engage in the practice of architecture or engineering.

A. General

1. A minimum roof slope of ¼":12" (2%) is required. Contact Technical Services regarding installations at slopes greater than 2":12" (17%). See also the section of this guide regarding SkyScape Steep-Slope Vegetative Roof Systems for general recommendations regarding enhancements necessary for slopes greater than 2":12" (17%).
2. Precautions must be taken when SkyScape systems are installed in high wind areas as shown in the ASCE-07 Peak Wind Gust maps. Contact Technical Services for additional requirements for projects in these areas.

B. Deck

1. A certified Structural Engineer should be consulted during the design phase to determine the structural load capacity of the project deck.
2. Load should account for the maximum potential weight of the SkyScape Vegetative Roof System under full wet conditions.

C. Insulation

1. Insulation thickness should always achieve the ASHRAE 90.1 R-value recommended for the project location.
2. Elevate ISO 95+™ / ISO GARD™ GL, either 20 psi or 25 psi, in 2 layers of at least 1" (25.4 mm) each, is recommended.

D. Cover board

Elevate ISO GARD HD 120 psi high-density polyiso coverboard, or a minimum ¼" (6.4 mm) glass mat gypsum board, should be installed using an Elevate polyurethane foam adhesive such as I.S.O. Twin Pack™, I.S.O. FIX™ II, I.S.O. Stick™, I.S.O. Spray™ R, or Twin Jet. **NOTE:** 80 psi can also be approved depending on the depth and load of the garden systems (4" module, contact regional technical coordinator for more information).

E. Membrane

1. Elevate SkyScape Vegetative Roof Systems may be installed over any of the following Elevate fully adhered roofing membranes:
 - a. UltraPly TPO
 - .045" or .060" UltraPly
 - .080" UltraPly Platinum
 - UltraPly TPO XR110 and XR115 fleece-backed
 - b. RubberGard EPDM
 - .045" or .060" Non-Reinforced RubberGard
 - .060" or .075" RubberGard MAX Reinforced
 - .090" RubberGard Platinum Membrane
 - c. Elevate Modified Bitumen
 - 2 plies of SBS Premium Base
 - SBS Premium Base and SBS Cap

SKYSCAPE VEGETATIVE ROOF SYSTEMS & PRODUCTS

A. Root Barriers

1. Additional root barriers are not required when fully adhered Elevate UltraPly TPO is installed as the roofing membrane. All thicknesses of this Elevate membrane have been tested and approved as root barriers according to the guidelines established by Forschungsgesellschaft Landschaftsentwicklung Landschaftsbau (FLL).
 - UltraPly TPO does not need to be stripped in; however, all seams should be carefully inspected to ensure that they are fully welded prior to installation of the SkyScape Vegetative Roof System.
2. A sacrificial layer of Elevate UltraPly TPO (completed seams are required), or SkyScape Root Barrier with seams taped using SkyScape Root Barrier Tape, is required when installing SkyScape over a Elevate EPDM or SBS roofing membrane.

B. SkyScape Pregrown Modular System

1. Module

- a. SkyScape Modules are made from recycled high-density polyethylene.
 - 12" x 24" x 4" (305 x 610 x 102 mm) Lightweight
 - 12" x 24" x 4" (305 x 610 x 102 mm) (4" module)
 - 12" x 24" x 6" (305 x 610 x 152 mm) (6" module)
 - 12" x 24" x 8" (305 x 610 x 203 mm) (8" module)
- b. Module floor features unitized design for optimal balance between water retention and drainage.
- c. Modules interlock possible on all four sides, creating a monolithic system.
- d. Modules maintain their shape under hydraulic pressure and growing media mass.
- e. Irrigation sprinkler rotator heads can be installed into the SkyScape Modules creating an integrated irrigation system.

2. Growing Media

- a. SkyScape Growing Media is blended at our regional blending locations.
- b. Modules are set in place and filled with media in the field.
- c. Modules achieve 4" (102 mm), 6" (152 mm), or 8" (203 mm) growing media depth at time of planting.

3. Plants

- a. A blend of rooftop-hardy Sedum varieties is planted in the SkyScape Module and is field-grown in open country to promote plant hardiness.
- b. Custom plants called out in a project's specification may be added to our standard Sedum blend. Holcim can provide design assistance in selecting custom plants that complement the base plantings.
- c. The SkyScape Pregrown Modular System arrives fully grown and ready to install.
- d. Delivered weight of each SkyScape Pregrown Module:
 - 4" module Lightweight: <math>23 \text{ lb/ft}^2 \text{ (112.3 kg/m^2</math>
 - 4" module: 23 – 25 lb/ft² (112.3 – 122 kg/m²)
 - 6" module: 28 – 34 lb/ft² (136.7 – 166 kg/m²)
 - 8" module: 38 – 44 lb/ft² (188.5 – 214.8 kg/m²)

C. SkyScape Built-In-Place Systems

1. SkyScape Extensive System

a. Drainage

- SkyScape 0.5" (13 mm) Drainage Panel, with engineered cup design for the optimal water retention needed for extensive systems.
- Geotextile factory-bonded to the underside of the panel.
- Filter Fabric factory-bonded to the top of the panel.

b. Growing Media

- SkyScape Growing Media, 3" – 6" (76 – 152 mm) depth
- Blended regionally to fit the growing conditions inherent to the project's climatic zone.

- c. Plants
 - SkyScape Sedum Mats are recommended, either as the entire planting, or as a base for selected custom plants.
 - Custom plants recommended are hardy Sedums or succulents; Holcim can provide design assistance in selecting custom plants that complement the base plantings.
2. SkyScape Semi-Intensive System
- a. Drainage
 - SkyScape 0.5" or 1" (13 or 25 mm) Drainage Panel, with engineered cup design for the optimal water retention needed for semi-intensive systems.
 - Geotextile factory-bonded to the underside of the panel.
 - Filter Fabric factory-bonded to the top of the panel.
 - b. Growing Media
 - SkyScape Growing Media, 6" – 8" (152 – 203 mm) depth
 - Blended regionally to fit the growing conditions inherent to the project's climatic zone.
 - c. Plants
 - Hardy Sedum varieties are typical, with additional custom plants for a truly "designed" vegetative roof.
 - Custom plants may include sedum plugs, ornamental perennials, grasses, bulbs, and the SkyScape Sedum Mat. Holcim can provide design assistance in selecting custom plants that complement the base plantings.
 - Irrigation is recommended for Semi-Intensive Systems.
3. SkyScape Intensive System
- a. Drainage
 - SkyScape 1" (25 mm) High Performance Drainage Panel or 1" (25 mm) roll drainboard, engineered in a unitized design for optimal water retention needed for intensive systems.
 - Filter fabric is bonded to the top side of the air void layer in the 1" (25 mm) roll drainboard. 1" (25 mm) High Performance Drainage panel requires filter fabric.
 - b. Growing Media
 - SkyScape Growing Media, 8" (203 mm) or greater depth.
 - Blended regionally to fit the growing conditions inherent to the project's climatic zone.
 - c. Plants
 - SkyScape Sedum Mat, ornamental perennials, grasses, bulbs, native forbs, shrubs, and small trees may all be included, as approved by the designer.
 - It is important that designers take into consideration the unique characteristics of the microenvironment of a rooftop, and the ways in which rooftop gardens differ from gardens at ground level. Conditions on a rooftop can include increased wind speeds, drier conditions than on ground level at the same location, lack of natural ground-level overhead protection such as trees, potential emissions from rooftop units and pipes, drainage that is unique to each roof, and many others. Holcim offers design assistance to help inform the designer of the unique properties of the project rooftop environment, and suggest designs, systems, and products that can help successfully realize the designer's intent and vision for the garden space.
 - To ensure that the rooftop garden thrives and proliferates, Intensive Systems require a robust and proactive maintenance schedule following installation and lasting throughout the life of the system. The maintenance plan for rooftop gardens should always include irrigation. Holcim can assist in the creation of a maintenance plan unique to the design of the project, including an irrigation plan and products.

4. SkyScape Accessories

a. Edge Flashing

- Edge Flashing for Built-In-Place Systems
 - Aluminum with natural mill finish
 - Three standard sizes:
 - 4.5" x 3.25" x 10' (114 mm x 83 mm x 3 m)
 - 6.5" x 3.25" x 10' (165 mm x 83 mm x 3 m)
 - 8.5" x 3.25" x 10' (216 mm x 83 mm x 3 m)
 - Custom sizes and colors are available to meet any design condition. Please contact Technical Services with requests.

b. Irrigation Integration

Module Systems: SkyScape MP Sprinkler Rotator Heads can be installed into the module on site using simple cuts. The modules have an integrated pipe channel below that the pipes/hose can run through (by others). SkyScape MP Sprinkler Rotator Heads can be installed into the module on site using simple cuts.

c. SkyPaver™ Composite Roof Pavers

- Made from recycled tires and plastics (95% recycled content), SkyPaver Composite Roof Pavers are an outstanding complement to SkyScape Vegetative Roof Systems. SkyPavers will not chip, crack, or stain, providing long-term durability and strength.
- SkyPavers weigh less than 1/3 the weight of concrete pavers per square foot, allowing for quicker staging and installation as compared to concrete pavers.
- Each paver is 4" x 8" (102 x 203 mm) and sets snugly into a 16" x 16" (406 x 406 mm) SkyPaver grid. Each grid holds eight (8) pavers each. See the SkyPaver Installation Instructions available online for further information on installing the SkyPaver System.
- Available in four (4) colors, multiple designs can be created by laying the pavers on the grids in various patterns.
- SkyPavers can also be used to fill vegetative-free zones at roof edges and around penetrations, drains, and other deck protrusions.
- May be used to create walkways, or for use as a plaza deck.
- See the Holcim Solutions and Products US, LLC website for more information.

d. Elevate Pedestal & Paver Systems

- Elevate 24" x 2" x 1 7/8" (610 x 51 x 48 mm) concrete pavers come in 3 finishes, each finish with 6 – 7 colors, have outstanding compressive strength (8,000 psi or 55.2 MPa), and can create a beautiful, finished surface within and around a vegetative roof system.
- Pavers can also be used to fill vegetative-free zones at roof edges and around penetrations, drains, and other deck protrusions.
- Pavers may be set either on Elevate Fixed Height Pedestals, or a no-slope paver area may be created by using Elevate Screwjack Adjustable Pedestals.
- May be used to create walkways, or for use as a plaza deck.

MAINTENANCE AND WARRANTY

A. Maintenance

1. Maintenance is essential to vegetative roof systems, as each installation creates a living system on the roof. Like any living system, vegetative roof systems must have proper care and feeding to survive.
2. The SkyScape Maintenance Guide, available online at www.holcimelevate.com, provides general guidelines for the care of SkyScape Pregrown Modular and SkyScape Extensive Systems. Semi-Intensive and Intensive Systems, due to the nature of their designs, require project-specific maintenance plans that go beyond the scope of the Maintenance Guide. Holcim can assist you in creating a unique maintenance plan for your Semi- Intensive or Intensive vegetative roof system.

B. Red Shield Warranty

1. Holcim provides a single-source Red Shield Warranty covering both the roofing system and vegetative roof system.
2. When SkyScape is installed in conjunction with a newly installed roofing system that is receiving a Red Shield Warranty, SkyScape will be included as a Rider.
3. When SkyScape is installed over an existing roofing system that is already under warranty, SkyScape will be covered under a separate SkyScape Red Shield Warranty.
4. The SkyScape Vegetative Roof System must be installed by a licensed Red Shield Installer to be eligible for a Red Shield Warranty.
5. The SkyScape Warranty options shown below may be purchased in any combination.
6. All warranty requirements, as indicated in the relevant Design Guide and Maintenance Guide for each system type must be followed.
7. Only Holcim brand products are covered in the Red Shield Warranty.
8. See the table below for available SkyScape Warranty coverage descriptions, including Materials, Overburden, and 2-Year Plant Growth coverages.

| SkyScape Red Shield Warranty | |
|------------------------------|---|
| SkyScape Warranty Options | Coverage Description |
| A. Materials | Elevate SkyScape components will not deteriorate to the point of failure; covers modules, drainage panels, edge metal, accessories, and engineered growth medium, for the length of the Red Shield Warranty (up to 30 years). Includes plant growth will be at least 80% of original planting for first 90 days after installation. |
| B. Overburden | Holcim will remove and replace the SkyScape System overburden to locate and repair a properly reported leak. |
| C. 2-Year Plant Growth | Elevate plants will cover at least 50% of the garden roof area 12 months from the date of installation, and at least 80% of the garden roof area 24 months from the date of installation, or Holcim or its agent will plant additional vegetation to achieve the stated percentages. General maintenance as outlined in the SkyScape Maintenance Guide must be followed to continue warranty coverage throughout the entire two-year period, and the required reports submitted to Holcim at the end of years one and two following installation. |

CONTRIBUTION TO LEED® GREEN BUILDING CERTIFICATION PROGRAM

SkyScape Vegetative Roof Systems can help contribute points towards LEED certification and other green building initiatives. Please refer to the current U.S. Green Building Council certification guidelines to determine potential point allocations.

SKYSCAPE VEGETATIVE ROOF SYSTEM INSTALLATION

The following section outlines the procedures for installing SkyScape Vegetative Roof Systems. For complete technical information, including Technical Information Sheets, Detail Drawings, and warranty samples, please consult the Holcim website at www.holcimelevate.com

IMPORTANT! WHEN TO INSTALL:

- **SkyScape installations in most U.S. and Canadian climatic zones should only be scheduled after April 15 and before October 15.** These dates can vary regionally, and some system types and planting methods can be more conducive to a cool-weather installation; please contact your Technical Advisor for guidance prior to installation.
- Do not install a SkyScape Vegetative Roof System when the ambient daytime temperature is below 45 °F (7 °C) or above 95 °F (35 °C). Installing outside of this temperature range can cause catastrophic damage to plants; Holcim reserves the right to refuse to warranty any SkyScape Vegetative Roof System installed under these conditions. Some system types and planting methods can be more conducive to a cool-weather installation; please contact your Technical Advisor for guidance prior to installation.

A. Prior to Installation

1. Inspection
2. The roofing system must be inspected by a Holcim Technical Representative, and all punch list items noted during the inspection must be fully completed.
3. Never install a SkyScape system if any punch list items noted during the roofing system inspection are outstanding.

B. Leak Detection/Flood Tests

1. Leak detection systems are not required. When specified, leak detection systems must be installed during the roofing system installation. Install leak detection systems according to manufacturer instructions. Holcim is not liable for any damage caused by the installation or operation of a leak detection system.
2. Flood tests are not required. When specified, Holcim recommends that flood tests be executed under the supervision of a roof consultant or other roofing professional, to ensure that no damage to the roofing system results from the test. Holcim is not liable for any damage caused by a flood test.

C. Surface Preparation

Prior to installation remove all debris, dirt, or foreign material from the membrane surface.

D. Roofing System Protection

All members of the installation crew should follow all the steps necessary to protect the roofing system during SkyScape installation:

1. Use a protective temporary layer over all installation traffic areas of the roof. This layer may be a tarp, scrap roofing membrane, plywood or OSB. Move the protective layer to cover additional traffic areas as the installation progresses.
2. Sharp-edge tools (shovels, spades, trowels, etc.) are not needed for SkyScape installations, and should not be brought to the roof.
3. When installing SkyScape Extensive, Semi-Intensive, and Intensive Systems, rakes are necessary to evenly spread SkyScape Growing Media. Care should be taken to keep rake points from contacting roof membrane and flashings.
4. Shears are necessary for cutting SkyScape Module or Drainage Panel materials to fit around deck protrusions, design curves or angles, roof penetrations, drains, etc. Always cut SkyScape materials while away from roofing membrane and flashings, and never cut these materials when they are in contact with the roofing membrane or flashings.

E. Staging

1. SkyScape Pregrown Modules

- Install all Pregrown Modules on the day they are delivered.
- Modules that cannot be installed on the day of delivery must be unstacked from their pallets and laid individually in a cool, shaded location. Lightly water all modules stored overnight.

2. Drainage Panels

- Rolls should be staged in a safe location and secured from the wind.
- Stack rolls no more than three (3) high to avoid misshaping.

3. Growing Media

- All Growing Media should be installed upon delivery.
- If overnight storage is required, media should be stored on an inorganic surface (parking lot, driveway, etc.) to avoid contamination. Tarp any loose media and weigh down tarp edges to protect it from the wind.

4. Plants

- Install all plants on the day they are delivered.
- Any plants that cannot be installed on the day of delivery must be unstacked from pallets and laid individually in a cool, shaded location. Lightly water all plants stored overnight.

5. Edging

- Metal edging must be stacked flat and away from roof edges.
- Boxes of edging should be stacked no higher than five (5) boxes high.
- Edging stored overnight may need to be covered by a tarp that is held down at corners and edges, to help prevent displacement from the roof by wind.

6. Pavers

- Pavers and any paver accessories (grids, pedestals, shims, etc.) should be stored in their original containers.
- SkyPavers weigh less than $\frac{1}{3}$ the weight of concrete pavers and may be stacked in their original pallets. However, the containers should be spread out across the roof area to avoid the possibility of point-loading.
- Concrete pavers can create high dead loads. Vary the placement of stored concrete pavers across the roof area to avoid overloading the structure and any possible roofing system damage.

SKYSCAPE PREGROWN MODULE SYSTEM INSTALLATION

A. Root Barrier

1. Refer to Section II.A. to determine if required.
2. Install root barrier continually over finished membrane surface, including all vertical surfaces and projections.
3. Overlap and seal with Manufacturer's tape all side and end laps a minimum of 4" (102 mm) and allow for root barrier to reach up all verticals 1" (25 mm) above the intended soil line and secure.

B. Inspection Chambers

Install inspection chamber centered over drains, ensuring that the bottom inner edge of the chamber is outside of the outer edge of the drain flange.

C. Pregrown Modules

1. Install modules on roof surface, working top to bottom and left to right. Modules should be installed according to the layout provided by the designer in the project's construction drawings.
2. When SkyScape Pregrown Module System integrated irrigation is used, insert lateral lines of irrigation system into quick-fit couplers on outside edge of pre-plumbed modules as per vegetative system irrigation drawings in the project's construction documents.
3. Secure the modules to any inspection chamber using screw provided, and in accordance with inspection chamber installation instructions provided in the product container.

D. Irrigation piping grid

Install main lines, valves, valve boxes and controller wires in accordance with irrigation drawings.

E. Edging

1. Install edging along perimeter border between vegetation-free area and vegetated area.
2. Connect edging pieces together with pins included with edging shipment.
3. If bends or corners are needed use tin snips, or some other sharp cutting instrument to cut out the pie shaped piece from the bottom edge where the bend needs to be.

F. Water the installed system thoroughly.

SKYSCAPE EXTENSIVE, SEMI-INTENSIVE, AND INTENSIVE BUILT-IN-PLACE SYSTEM INSTALLATION

A. Root Barrier

1. Refer to Section II.A. to determine if required.
2. Install root barrier continually over finished membrane surface, including all vertical surfaces and projections.
3. Overlap and seal with Manufacturer's tape all side and end laps a minimum of 4" (102 mm) and allow for root barrier to reach up all verticals 1" (25 mm) above the intended soil line and secure.

- B. Edge Flashing
 1. Install edging along perimeter border between vegetation-free area and vegetated area.
 2. Ensure base flange is pointed towards the vegetated areas.
 3. Secure edge of foot-wide filter fabric trim to edging surface.
- C. Drainage Panels
 1. Lay retention/drainage board panels over root barrier if needed up to vertical edging.
 2. Cut tightly around any projections, drains, etc.
- D. Inspection Chambers
 1. Install inspection chamber centered over drains directly on the insulation board. Ensure the bottom inner edge of the chamber is outside of the outer edge of the drain flange.
 2. Install vertical drains around the outside of inspection chamber.
 3. Install filter fabric over vertical drains and over lip of inspection chamber.
- E. Cut slits in fabric to fit around locking pins and adhere to top inside edge with SkyScape Root Barrier Tape.
- F. Irrigation Lines and Sprinkler Bodies (by others)
 1. Lay lateral lines per zone as per irrigation drawings.
 2. Install sprinkler bodies in locations as per irrigation drawings.
 3. Install main lines, valves, valve boxes and controller wires in accordance with irrigation drawings.
- G. Growing Media
 1. Blower Truck
 - Growing media must be installed using a truck-mounted, integrated, pneumatic blower unit. To ensure accuracy, the unit should be powered by its own separate diesel power unit, not PTO driven, and equipped with at least one computer-controlled supplemental granular injection system.
 - The unit must be capable of uniformly applying materials and injected products at a rate greater than 15 yd³/hour (11.5 m³/hour) at least to a vertical limit of 150' (45.7 m) and must also be equipped with an application hose capable of extending 300' (91.4 m) from the blower truck.
 2. Super Sacks

Crane sacks approximately 4 – 5' (1.2 – 1.5 m) above roof surface. Cut sacks on the underside and allow media to deposit slowly onto drainage panels. For sacks with built-in nozzles, open nozzle end and allow media to deposit slowly onto drainage panels.
 3. Vegetation
 - Prior to installing any vegetation, moisten the growing media thoroughly.
 - Plant Plugs, Custom Plants, Native Plants:
 - Dig a hole in excess of the size of the root ball after extracting it from the pot. Cover root ball ensure plants are planted to their full root depth and gently tamp in place.
 - Custom plants, shrubs, forbs, grasses, herbs, trees, and other custom planting may have specific installation instructions, which will be provided for you by Holcim prior to delivery of the plants. Contact your Technical Advisor for further information.
 - Mulch may be applied 1 – 2" (25 – 51 mm) deep as a protective layer and to assist with moisture retention.
 4. Sedum Cuttings

Spread cuttings overgrowth media at the prescribed rate (5 – 10 lb/100 ft² or 2.4 – 4.9 kg/10 m² is typical). Water thoroughly and continue a watering program for the first three months following installation. Installation of Sedum Cuttings before April 15th after October 15th should not be attempted in any climatic zone.
 5. Pre-grown sedum mats
 - Lay pre-vegetated mats over the moist growing media, ensuring edges are firmly butted together.
 - Trim to fit neatly around projections and edges.
 - Dispose of excess mat, or reuse it in other locations to fill in.
 - Water the installed system thoroughly.

WALKWAY PADS

A. Where Required

1. In addition to pavers, Elevate walkway pads may be used to provide protect to your Garden Roof.
2. Walkway pads or pavers are required at all roof access points and areas where traffic and/or maintenance will occur monthly or more often.

B. Available Walkway Pads

1. Elevate EPDM QuickSeam Walkway Pads are a high-quality rubber with QuickSeam Tape factory laminated to the bottom.
2. The Elevate UltraPly TPO Premium Walkway Pad is a non-reinforced walkway composed of thermoplastic material. The pad is produced into 30" (762 mm) wide by 50' (15 m) long rolls. The pad has a textured surface and a smooth bottom surface for easy welding to UltraPly TPO roof membrane.
3. The Elevate X-Tred Walkway Pad is white and highly specialized to provide safe access for essential rooftop services while maintaining the integrity of the roof surface. X-Tred Walkway Pads are impact resistant in extremely cold climates. The top ribs have a "diamond cut" surface to give permanent slip-resistance and a surer underfoot grip. The effective combination of an open grid format and 9/16" (14 mm) above ground height enables self-draining and makes X-Tred very efficient wherever water puddles may occur. The pad is 30" (762 mm) wide x 30' (9 m) long x 0.54" (13.7 mm) thick.

This guide is meant to highlight Elevate products and specifications provided by Holcim Solutions and Products US, LLC, Building Envelope Division and is subject to change without notice. Holcim takes responsibility for furnishing quality materials which meet published Elevate product specifications or other technical documents, subject to normal roof manufacturing tolerances. Neither Holcim nor its representatives practice architecture. Holcim Solutions & Products US, LLC, Building Envelope Division offers no opinion on and expressly disclaims any responsibility for the soundness of any structure. Holcim accepts no liability for structural failure or resultant damages. Consult a competent structural engineer prior to installation if the structural soundness or structural ability to properly support a planned installation is in question. No Holcim representative is authorized to vary this disclaimer.