

Attachment Guide and Supplemental Increased Wind Speed Warranty Attachment Guide

October 2023

NOTE: The contents of this guide are considered accurate at the 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 Holcim Regional Technical Coordinator prior to its use.

Table of Contents

Introduction	5
Substrate and Substrate Requirements	5
General	5
Minimum Fastener Pullout Resistance for Specific System	6
Criterial for Field Testing Mechanical Attachment to Various Deck Substrates	7
Building Configuration	7
Large Wall Opening	8
Roof Zone Definition – Factory Mutual (FM)	9
Roof Slopes > 7° (> 1.5")	
Prescriptive Enhancement Options – Perimeter and Corner	10
Adhered Membrane – Insulation Enhancement	10
Mechanically Attached Membrane	11
Factory Mutual (FM) InvisiWeld Attachment Rates	11
Invisiweld Attached Membrane Securement Prescriptive Enhancements	11
Base Sheet Attachment Over FM Approved Deck Types	12
Mechanically Attached Membrane – Preliminary Insulation Securement	12
ASCE 7 – Basic Wind Speeds for Risk/Occupancy Category	12
ASCE – American Society of Civil Engineers – Roof Zones	13
ASCE 7-10 (IBC 2015/2012)	13
ASCE 7-10 Perimeter and Corner Definition - Examples	13
ASCE 7-16 (IBC 2018)	
ASCE 7-16 Perimeter and Corner Definition - Examples	13
Insulation Attachment	16
Attachment of Insulation to Substrate – Adhered Membrane	16
Mechanical Attachment of Insulation to Substrate – Mechanically Attached Membrane	17
Attachment of Vacuum Insulated Panels (VIP) – Adhered Membrane Only	17
Insulation Mechanical Attachment Patterns	
EPS Fanfold Attachment	
Insulation Adhesive Attachment Patterns	20
Criteria for Field Testing Insulation Adhesives for Adhesion to Deck Substrates	21
Retarders – Air and Vapor Definition	21
Vapor Retarder (Barrier)	22
Air Barrier (Retarder)	22

V-Force™ Application	23
Attachment Rate Requirements for Plate Bonded Systems with an Air Barrier	24
Modified Bitumen Base Sheet Attachment	25
General	25
Base Sheet Attachment with any Modified Bitumen Base Sheet	26
Base Sheet Attachment, Coiled Metal Batten, with a SBS Torch Cap	27
Base Sheet Attachment, MB 2" Barbed Plates, with a SBS Torch Cap	27
Single-Ply Membrane Attachment	28
Acceptable Fastener and Plate Guidelines	28
Perimeter Enhancements	
Peel Stops	31
Factory Mutual (FM) Attachment Layout Examples	31
Layouts in Chart Form – Elevate Standard Warranty Requirements	33
InvisiWeld Attachment	35
General	35
Induction Welded Membrane	35
Heat Welded Membrane Seams	36
InvisiWeld Fastener Patterns	36
InvisiWeld Warranty Requirements	
InvisiWeld Enhancement Requirements	
Metal Building Re-Cover (MBR) – InvisiWeld Attachment Rates – Standard Warranty	40
Metal Building Re-Cover – Mechanically Attached FM Enhancement Options	
Factory Mutual Loss Prevention Data Sheet 1-31 – 3.1.4.1	40
Standing Seam Roof (SSR) Factory Mutual (FM) Inseam Enhancement Options	41
Ballast Warranty Requirements	41
Elevate Increased Wind Speed Warranty Minimum Attachment Rate Guide	43
Alaska, Hawaii, and International Projects	43
Metal Roofing	43
Asphalt or Mod-Bit Roofing	43
General Notes	44
Edge Metal Requirements	45
Hurricane-Prone Regions and Special Wind Regions	46
Increased Wind Speed Warranty Attachment Requirements	47
Ballasted Roofing Systems	49

Stone, Elevate Ballast Pavers, and Heavy-Weight (90 lb) Paver Ballast	
Half Sheet Information	
Warranty	49
Increased Wind Speed System Options – UltraPly TPO	49
Increased Wind Speed System Options – Elevate PVC and PVC KEE	53
Increased Wind Speed System Options	53
Increased Wind Speed System Options – RubberGard™ MAX EPDM	56
Increased Wind Speed System Options – Base Sheets	59
V-Force™ Application – Increased Wind Speed	60

Introduction

The purpose of this guide is to reinforce installation techniques. The following guide is a supplement to be used in conjunction with the other technical information located on the Elevate_{TM} website (<u>www.HolcimElevate.com</u>). Reference to the specific Design Guide, Quick Specifications, Application Guide, Details, Technical Information Sheets (TIS), and other Specifications is necessary to ensure that the finished roof system is installed in compliance with Elevate requirements.

The following document outlines the required attachment rates and conditions that Holcim Solutions and Products US, LLC looks for to issue a warranty. When the project requires specific codes and/or uplifts to be met the attachment rates below may not be appropriate. Review of the specific project conditions and specifications should be completed, and all pertinent information must be provided to Holcim prior to the project being bid or installed. Failure to do so may result in required changes to the bids, products used, installation and/or possible denial of warranty coverage. Not all conditions are covered in this document. Please contact a Elevate Sales Representative or a Holcim Regional Technical Coordinator for conditions or information not found in this document.

Due to unknown variables associated with each building structure, Holcim suggests a licensed engineer to verify all attachment rates are appropriate for the specific project requirements. It is the responsibility of the Architect, Design Professional, Engineer and/or Building Owner to verify that the installed roofing system and related components are installed to meet the specified requirements of the International Building Code, State and Local codes and other related requirements. It is the responsibility of the specifier to review local, state, and regional codes to determine their impact on the specified system. Drainage must be evaluated by the specifier in accordance with all applicable codes. For code compliance, increased fastening density may be required depending upon project wind speed and wind uplift requirement. Subject to code requirement, it is recommended that a minimum roof slope of 1/8" per horizontal foot be provided to serve long-term aesthetics.

IF A PROPOSED APPLICATION FALLS OUTSIDE OF THIS SPECIFICATION, CONTACT A HOLCIM REGIONAL TECHNICAL COORDINATOR FOR ADDITIONAL INFORMATION.

Within Elevate Specifications, reference is made to Elevate's Mechanically Attached Systems. Mechanically Attached Systems include:

- Batten in The Seam (BITS) Batten Bar or plates in the seam of the membrane.
 Plates are only allowed with reinforced membranes.
- Mechanically Anchored System (Non-Reinforced Membrane) MAS

 Lay out sheet battens on membrane, strip in
- Mechanically Anchored System (Reinforced Membrane) Reinforced MAS

 Lay out sheet, set plates or battens on membrane, strip in
- Reinforced Mechanically Attached Strip RMA

 \circ Lay out strips over insulation; attach strip using plate or battens, place membrane over the strips.

Substrate and Substrate Requirements

General

- 1. The Elevate roof system depends on a suitable substrate to perform its intended function of weatherproofing the building.
- It is the roofing contractor's responsibility for ensuring that the substrate is acceptable for the Elevate roof system.
- 2. The substrate to which the Elevate roof system is installed must:
 - Be structurally sound
 - Be dry, smooth, flat, and clean
 - Be free of sharp fins, or foreign materials that could damage the membrane
 - Meet the minimum requirements for the system
- 3. When using asphalt to adhere to insulation to a structural concrete substrate, the concrete must be primed with an ASTM D 41 asphalt primer. The primer is applied at a rate of 1½ to 2 gallons per 100 ft² (0.61 to 0.82 L/m²). Proper flashing off times should be considered in all adhesive applications.

4. Acceptable substrates include but may not be limited to:

- 22-gauge steel decking, minimum 33 ksi
- Structural Concrete, minimum 2,500 psi
- Wood Plank minimum ³/₄", Plywood minimum 15/32" or OSB minimum 7/16" thickness
- Cementitious Wood Fiber, minimum 2" thick
- Gypsum, minimum 2" thick
- Light Weight Insulation Concrete over Steel Pan or Structural Concrete, minimum 2" thick

Minimum Fastener Pullout Resistance for Specific System

The information listed in the chart below is for use with the referenced roof deck, fastener type, minimum pullout values and required penetration depths based on fasteners type. These values are in reference to mechanically attached insulation/cover boards under adhered membranes or mechanically attached membrane assemblies. If a listed value cannot be met, please contact a Holcim Regional Technical Coordinator to discuss. The information below is valid for Red Shield Warranties for up to 20 years. Contact a Holcim Regional Technical Coordinator for requirements on specific conditions or longer warranty terms.

Fastener Pullout Requirements – Material and Deck Type Minimum Pullout ⁽³⁾ **Deck Type** Material Fastener Minimum Penetration 300 lb (136.1 Kg) Insulation All Purpose (AP) ³/₄" through deck Steel, min. 22 gauge Heavy Duty (HD) ³/₄" through deck or heavier (2) Membrane 400 lb (181.4 Kg) AccuTrac Kit ³/₄" through deck #12 Belted ³/₄" through deck 300 lb (136.1 Kg) #15 Belted ³/₄" through deck Insulation Steel, less than 22 gauge (1)(2) HailGard ³/₄" through deck N/A Heavy Duty Plus (HD+) 1" through deck Membrane 300 lb (136.1 Kg) Heavy Duty (HD) HailGard 1" into the deck Insulation Structural Concrete 2,500 psi or greater (min. 2") Membrane 400 lb (181.4 Kg) **Concrete Drive** 1¹/₄" into the deck Insulation 300 lb (136.1 Kg) All Purpose (AP) Wood Plank, 3/4" minimum Membrane 400 lb (181.4 Kg) Heavy Duty (HD) AccuTrac Kit 300 lb (136.1 Kg) Oriented Strand Board (OSB). Insulation 1" into or #12 Belted min. 7/16" thick through deck Membrane 400 lb (181.4 Kg) #15 Belted 300 lb (136.1 Kg) Nail Driver Insulation Plywood, min. 15/32" thick HailGard Membrane 400 lb (181.4 Kg) Insulation 300 lb (136.1 Kg) Heavy Duty (HD) Lightweight Insulating ³/₄" through pan 400 lb (181.4 Kg) HailGard Membrane Concrete over Steel Pan Nailed B.S. 40 lb (18.1 Kg) 1.7" LWC Base Ply Fastener* Base Sheets Only Lightweight Insulating Insulation 300 lb (136.1 Kg) Heavy Duty (HD) HailGard 1" into Concrete Deck 400 lb (181.4 Kg) Concrete over Structural Membrane Concrete Drive 1¹/₄" into Concrete Deck Concrete Nailed B.S. 40 lb (18.1 Kg) 1.7" LWC Base Ply Fastener* **Base Sheets Only** Insulation 300 lb (136.1 Kg) Gypsum, **Polymer Fastener** 1" into the deck Membrane N/A min. 2" thick Nailed B.S. 40 lb (18.1 Kg) 1.2" LWC Base Ply Fastener* Base Sheets Only Insulation 300 lb (136.1 Kg) 1" into the deck Polymer Fastener Cementitious Wood Fiber, Membrane N/A Min. 2" thick Nailed B.S. 40 lb (18.1 Kg) 1.2" LWC Base Ply Fastener* **Base Sheets Only** Base Sheet Attached to Deck 300 lb (136.1 Kg See approved fasteners See approved fasteners with Plates and Fasteners

NOTE:

1. Steel Decks 22 gauge or less may require additional fastening enhancements if min. pull values cannot be met.

2. Mechanically Attached Systems are not approved over corrugated steel decking.

3. Systems using Invisiweld Plates will require the fasteners to achieve a minimum of 400 lb pull resistance.

4. When Oriented Strand Board (OSB) is to be used the smooth side of the board should be facing up.

*For the attachment of base sheets only. Insulation may not be attached with the LWC Base Ply Fasteners

Holcim does not approve of or recognize the results of destructive testing by others for the purposes of project close-out or to satisfy contract requirements. Any damage caused by such testing may prevent Holcim from issuing a warranty. Holcim is not responsible for costs associated with repairs or enhancements performed to the roof system as a result of testing.

Criterial for Field Testing Mechanical Attachment to Various Deck Substrates

Fastener pull tests should be performed in accordance with the requirements listed within ANSI/SPRI FX-1, Standard Field Test Procedure for Determining the Withdrawal Resistance of Roofing Fasteners. All pull tests should be documented via Pullout Test Report and provided to Holcim. Official pullout results may impact the required fastening rates for the project.

Building Configuration

BUILDING, ENCLOSED; BUILDING, OPEN; BUILDING, PARTIALLY ENCLOSED; BUILDING, PARTIALLY OPEN: These definitions relate to the proper selection of internal pressure coefficients, (GCpi). "Enclosed," "open," and "partially enclosed" buildings are specifically defined. All other buildings are considered to be "partially open" by definition, although there may be large openings in two or more walls. An example of this would be a parking garage through which the wind can easily pass but which does not meet the definition for either an open or a partially enclosed building. The internal pressure coefficient for such a building would be ±0.18, and the internal pressures would act on the solid areas of the walls and roof. The standard also specifies that a building that meets both the "open" and "partially enclosed" definitions should be considered "open".

ENCLOSED: A building that has the total area of openings in each wall, which receives positive external pressure, less than or equal to 4 sq ft (0.37 m2) or 1% of the area of that wall, whichever is smaller.

PARTIALLY ENCLOSED: A building that complies with both of the following conditions:

- 1. The total area of openings in a wall that receives positive external pressure exceeds the sum of the areas of openings in the balance of the building envelope (walls and roof) by more than 10%.
- The total area of openings in a wall that receives positive external pressure exceeds 4 ft2 (0.37 m2) or 1% of the area of that wall, whichever is smaller, and the percentage of openings in the balance of the building envelope does not exceed 20%.

OPEN: A building that has each wall at least 80% open.

• A building that meets both the "open" and "partially enclosed" definitions should be considered "open."

PARTIALLY OPEN: A building that does not comply with the requirements for open, partially enclosed, or enclosed buildings.

• An example of this would be a parking garage through which the wind can easily pass but which does not meet the definition for either an open or a partially enclosed building.

Large Wall Opening

ASCE 7 should be consulted to determine the appropriate building configuration, enclosed, partially enclosed or open. The building configuration impacts the appropriate design and attachment required for the roofing system. If an existing building is altered, adding large openings, change of use, etc., adjustments may need to be made to accommodate the changes.

The large wall opening enhancement is required when the sum of the various opening areas (w x h) is greater than 10% of the wall area.

Perimeter 1/2 sheets are required in the hatched area as shown in the diagram below. It is common installation practice to extend the perimeter along this entire building plan dimension to accommodate this rule, but it not required. For warranty purposes Holcim finds it acceptable to utilize battens, plates, and fasteners or Invisiweld attachment methods for this enhancement.



Roof Zone Definition - Factory Mutual (FM)

The following diagrams are referenced from the FM Global Property Lost Prevention Data Sheets 1-28 and 1-29. This outlines how to determine the minimum required roof zone areas based on the building size and relative conditions.



Roof Slopes > 7° (> 1.5")

For roof slopes $> 7^{\circ}$ (> 1.5"), depending on the slope. The width (a) of the various perimeter and corner zones for these steeper sloped roofs equals the lesser of 10% of the building width or 0.4h, but not less than 4% of the width or 3 ft (0.9 m). See FM Global Property Loss Prevention Data Sheet 1-28 for your specific conditions.



NOTE: The buildings do not abut if there is any horizontal separation.

Prescriptive Enhancement Options – Perimeter and Corner

Adhered Membrane – Insulation Enhancement

Insulation	Enhancement – Choose One
Option 1:	Use a system that is rated adequate for Zone 3 in all areas of the roof.
Option 2:	Prescriptive enhancements for Zones 2 and 3
Limitations:	 Zone 1 rating in any location does not exceed Class 1-90 Building is in non-tropical cyclone-prone region and Zone 1 rating does not exceed Class 1-105
For either of	the above conditions, increase the securement over the Zone 1 rating as follows:
Assemblies u	ising insulation fasteners:
Zone 2:	Increase number of fasteners per board by 50% minimum, but at least one fastener per 2 ft ²
Zone 3:	Install one fastener per 1 ft ²
NOTE: Round	up to the next whole fastener if necessary.
Components	adhered with adhesives applied in ribbons, spots, etc.:
Zone 2:	Install rows not more than 67% of the Zone 1 spacing between rows, or area
Zone 3:	Install rows not more than 50% of the Zone 1 spacing between rows, or area
NOTE: Round	the bead spacing down to the next whole number. 8.71 in o.c. beads spacing would be rounded down to 8 in o.c.

Membrane Securement Enhancements - In Seam

Prescriptively enhance by reducing the distance between rows of roof cover fasteners and stress plates or batten bars from the Zone 1 spacing using the following:

Zone 2: Ensure distance between rows is not more than 67% of the FM approved spacing used for Zone 1

Zone 3: Ensure distance between rows is not more than 50% of the FM approved spacing used for Zone 1

NOTE: For metal decks install all rows of roof cover fasteners perpendicular to the ribs of the roof deck to better distribute the wind load and prevent deck failure.

Example:

A 75 psf rated assembly using a 10' sheet size for Zone 1 (Field), decrease the row spacing for Zone 2 (Perimeter) by no more than 67% and Zone 3 (Corner) by no more than 50% of the field sheet span. (Always round down.)

Zone 1 (Field): 10' Sheets at 114" o.c. rows of fasteners

Zone 2 (Perimeter): 114" rows x .67 = 76.38" rows = Max 76" o.c. rows

Zone 3 (Corner): 114" rows x .5 = 57.5" rows = Max 57" o.c. rows

Factory Mutual (FM) InvisiWeld Attachment Rates

FM attachment requirements and patterns may differ from those required by Holcim. The more stringent attachment rates should be used in this case. If the project is FM insured, then consult a Holcim Regional Technical Coordinator to discuss differences between the two. The attachment rates listed below are based off listed assemblies within RoofNav and are believed to be current. All assemblies and attachment rates should be validated against current information and tested assemblies before using for bidding or installation.

Uplift Rating	Field	Perimeter	Corner	Assembly/RoofNav (See Notes)
1-90	6	9	12	TPO, ISO, Steel Deck
	5.33 Contributory Area (CA)	Reduce the field CA by no less than 67%	Reduce the field CA by no less than 50%	Field Rates based on listed tested assembly: 250651-0-0

NOTE:

- 2. Building is in non-tropical cyclone-prone region and Field/Zone 1 rating does not exceed Class 1-105.
- 3. Validate all attachment rates against tested assemblies. See table below for example.
- 4. Rates above are based on contributory area rates.
- 5. 0.045" (1.14 mm) thick TPO or 0.050" (1.27 mm) thick PVC/PVC KEE approved for 15-year warranties.
- 6. 0.060" (1.52 mm) thick or greater membrane required for 20-year or greater warranties.
- 7. 0.060" (1.52 mm) thick or greater membrane required for any increased wind speed warranties.
- 8. 0.080" (2.03 mm) thick UltraPly TPO required for 25 and 30-year warranties.
- 9. PVC/PVC KEE is limited to 20-year warranties with Invisiweld attachment.
- 10. If RoofNav listing has linear rows listed instead of contributory area, decrease the spacing between rows by a minimum 67% for the perimeters and 50% for the corners. These assemblies may still require preliminary securement fasteners to be installed. See the RoofNav listing for details.

Invisiweld Attached Membrane Securement Prescriptive Enhancements

Membrane Securement Enhancements – Invisiweld

Prescriptively enhance by reducing the distance between rows of roof cover fasteners and stress plates from the Zone 1 spacing using the following:

- Zone 2: Decrease spacing between fastener points in one or both directions.
- Zone 2: Ensure the total tributary area to each fastener is not more than 67% of the FM approved spacing used for Zone 1. Zone 3: Decrease spacing between fastener points in one or both directions.

Ensure the total tributary area to each fastener is not more than 50% of the FM approved spacing used for Zone 1. **NOTE:**

- Pre-securement of the insulation may be required.
- See tested assembly for validation.
- When rows of fasteners are used Install all rows of roof cover fasteners perpendicular to the ribs of the roof deck to better distribute the wind load and prevent deck failure.

^{1.} Field/Zone 1 rating in any location does not exceed Class 1-90.

Example:

(Based on FM LPDS 1-29, Section 2.2.10.11.1B3-4)

Zone 1: 6 fasteners per board per tested assembly (tributary area of 5.33 sq. ft. per fastener)

Zone 2: 9 fasteners per board (tributary area of 3.56 sq. ft. per fastener)

Zone 3: 12 fasteners per board (tributary area of 2.67 sq. ft. per fastener)

Base Sheet Attachment Over FM Approved Deck Types

The table below outlines the options for prescriptive enhancement options for base sheet attachment over FM approved deck types. For non-FM approved deck types, like wood, see FM Global Property Loss Prevention Data Sheet 1-29, Section 2.2.10.14.4.

Base Sheet - Mechanically Attached - Choose One

Option 1 Use assembly that is rated to meet/exceed Zone 3 across the whole roof.

- Option 2 Use assembly that is rated to meet/exceed each zone.
- Option 3 Reduce the spacing between rows of fasteners by using one intermediate row in Zone 2 and Zone 3.

Option 4 Reduce the area per fasteners to no more than 67% of the FM approved spacing in Zone 2, and not more than 50% of the FM approved spacing in zone 3.

NOTE:

- Install fasteners that engage lightweight insulating concrete (LWIC) no closer than 4 in. (100 mm) on center to avoid cracking the LWIC.
- When ribbed deck, such as steel deck is used, the fastener spacing within fastener rows must be in even multiples of the deck rib spacing (6 in. [150 mm] for 1-1/2 in. [38 mm] deep deck) to ensure the fastener engages the top deck flange.
- To adequately distribute the wind load to the roof deck and its securement and prevent deck buckling and deck securement failure, install fastener rows perpendicular to the deck ribs.

Mechanically Attached Membrane - Preliminary Insulation Securement

The table below provides the minimum preliminary insulation fastening rate required for systems using a mechanically attached membrane. Note the rates may differ based on the use or a vapor retarder, different building enclosure classification and building Zone 1 (Field) pressure rating.

Preliminary Insulation Securement					
Vapor Retarder	Building Enclosure Classification	Maximum Required Zone 1 Pressure Rating (P), psf (kPa)	Fastener Requirements for Insulation or Cover Boards up to 4 x 4 ft (1.2 x 1.2 m) board	Fastener Requirements for Insulation or Cover Boards up to 4 x 8 ft (1.2 x 2.4 m) board	
No	Enclosed or Partially Enclosed	No limit	Minimum 2 per board	Minimum 4 per board	
Yes	Enclosed	P = 60 (2.9)	Minimum 2 per board	Minimum 4 per board	
Yes	Partially Enclosed	P = 60 (2.9)	Minimum 4 per board	Minimum 5 per board	
Yes	Enclosed or Partially Enclosed	60 < P ≤ 90 (2.9 < P ≤ 4.3)	Minimum 4 per board	Minimum 5 per board	
Yes	Enclosed	90 < P ≤ 300 (4.3 < P ≤ 14.4)	Minimum 4 per board	Minimum 8 per board	
Yes	Partially Enclosed $90 < P \le 300$ $(4.3 < P \le 14.4)$ Minimum 6 per board		Minimum 6 per board	Minimum 12 per board	
Yes	Enclosed	P > 300 (14.4)	Minimum 6 per board	Minimum 12 per board	
Yes	Partially Enclosed	P > 300 (14.4)	Minimum 8 per board	Minimum 16 per board	
NOTE : Table 6 does not apply to roof assemblies with air barriers. Where air barriers are used, more stringent guidelines may be required in RoofNav and those must be followed.					

ASCE 7 - Basic Wind Speeds for Risk/Occupancy Category

The American Society of Civil Engineers (ASCE) provides basic wind speed maps based on Occupancy/Risk Category of buildings. Refer to the appropriate version of the ASCE for wind maps specific to the building's occupancy category. These maps can be found in the specific editions of the ASCE and can be found at www.atcouncil.org/windspeed. Locations that fall within a special wind region should be reviewed by an engineer to validate the full scope of the project's requirements.

ASCE - American Society of Civil Engineers - Roof Zones

ASCE 7-10 (IBC 2015/2012)

ASCE 7-10 offers basic wind speed maps for occupancy categories I, II, III and IV. In this edition of the ASCE Occupancy Category III and IV are combined on the same map, while categories I and II have their own maps. In this edition three maps are provided based on Occupancy/Risk Category. This version of the ASCE uses a more generalized approach to the areas of the county where most of the county falls within one wind speed and the coastal areas are more defined with contour lines and varying wind speeds.

ASCE 7-10 Perimeter and Corner Definition - Examples

The diagram below is an example only. Each building type and shape may require its own specific layout for perimeters and corners. ASCE 7-10 should be consulted for nonstandard building/roof types and shapes.



ASCE 7-16 (IBC 2018)

ASCE 7-16 offers basic wind speed maps for occupancy categories I, II, III and IV. In this edition of the ASCE all Occupancy/Risk Categories have been defined on their own maps. In this edition four maps are provided based on Occupancy/Risk Category. This version of the ASCE uses more detailed contour lines throughout the map showing more accurate wind speed estimates.

ASCE 7-16 Perimeter and Corner Definition - Examples

Data referenced from ASCE/SEI 7-16 Minimum Design Loads and Associated Criteria for Buildings and Other Structures. All referenced information should be validated against the current document and local relevant building codes. Roof zones may change based on actual building size/layout and roof type. See ASCE documents to validate zones based on building conditions.





Insulation Attachment

General

- 1. Insulation must provide a suitable substrate for the proposed roof system as well as insulation for the building.
- 2. Insulation thickness requirements may vary for code compliance. Contact the local code or insurance official before contacting a Holcim Regional Technical Coordinator at 1-800-428-4511.
- 3. Refer to Insulation Technical Information Sheet (TIS) for specific spanning capabilities.

Attachment

- 1. Insulation may be installed by various methods including fasteners, adhesives, and asphalt. It is acceptable to combine fastener and adhesive attachment methods in multi-layer applications.
- 2. Tapered insulation below the 1" (25.4 mm) minimum thickness must be fastened at a rate of one (1) fastener and plate per two (2) ft² (0.22 sq. m). If possible, install the tapered insulation first, covered by the flat stock.
- 3. Refer to specific Elevate Technical Information Sheets (TIS) for installation and fastening requirements.
- 4. When a composite of two insulation layers is installed, the fastening pattern required for the top board thickness must be used. A common fastener may be used to install multilayer applications. Some restrictions apply to fastener length depending on the standards used.

Multiple Layers of Insulation

- 1. Where overall insulation thickness is 2" (50.8 mm) or greater, Holcim recommends installing the insulation in two (2) or more layers.
- 2. Insulation may be installed in one or multiple layer applications for the Red Shield Warranty. If installed in multiple layers, the joints of each succeeding and adjoining layer should be staggered from the joints of previous layers by a minimum of 6" (152.4 mm) in each direction. When a composite of two insulation layers is installed, the fastening pattern required is dependent on the top board type and thickness. A common fastener may be used to simultaneously fasten all layers to the structural deck.

Attachment of Insulation to Substrate - Adhered Membrane

		Insulation/Se		bstrate Attachment ²		
Red Shield Warranty Thickness Insulation		Insulation	Min. # of Fasteners per 4' x 8' boards	Adhesive Ribbon Spacing 4' x 4' boards		
	1⁄4″		12			
	1/2"	DensDeck [®] Prime	8			
	5⁄8"		8			
	1⁄4″		10			
55 mph (20 Year Max.) ³	1/2"	Securock®	8			
	5⁄8"		8			
	1/2"	ISOGARD HD	12			
	¹ /2" – 1.4"	ISOGARD GL/ ISO 95+ GL/	16	F12 – P6 – C6		
	1.5" – 1.9"		12			
	≥ 2″	Resista/ISOGARD CG	8			
	1.5"		12			
	2″	ISOGARD ID Composite	8			
	1.5"		12			
	2″	HailGard/ISUGARD HG	8			
	5⁄8"	DensDeck [®] StormX™ Prime ¹	8			

Note:

- 1. Uplift requirements for the project may require increased fastening rates than those listed above. The rates listed in these tables are for warranty purposes only. Contact an Elevate representative for rates related to special warranty terms or conditions.
- 2. Applications where adhesives are used to adhere insulations directly to the steel deck require that the deck be clean, smooth, dry, and free of all processing oils or other contaminants. Bead spacing in this type of application may be increased from those listed above. Contact an Elevate representative for further information.
- 3. Adhesion direct to steel decking will limit increased wind speed coverage to a maximum of 80 mph.

Mechanical Attachment of Insulation to Substrate - Mechanically Attached Membrane

- 1. Insulation must be fastened with appropriate Elevate fasteners and insulation plates. See Allowable Fastener tables below for information on use and warranty terms of fasteners for insulation attachment in mechanically attached membrane systems.
- 2. See Allowable Fastener tables below for information on use and warranty terms of fasteners for insulation attachment in mechanically attached membrane systems.
- 3. Fastening rates and patterns may vary for code or regulatory compliance. Contact the local code or insurance official before contacting a Holcim Regional Technical Coordinator at 800-428-4511.

Fastening Rates for Insulation in Mechanically Attached Single-Ply Systems¹

Maximum	Top Layer of Insulation	Number of Fasteners per Insulation Board ³					
Warranty	Inculation	Thickness	No Air F	Retarder	With an Air Retarder ²		
Term	insulation	Thickness	4' x 4' Board	4' x 8' Board	4' x 4' Board	4' x 8' Board	
		1.0" - 1.4"	4	5	8	16	
	ISOGARD GL / ISO 95+ GL or Resista /ISOGARD CG	1.5" - 1.9"	4	5	6	12	
		2.0" - 4"	4	5	4	8	
	Dens Deck/ Dens Deck Prime Securock	1⁄4"	4	5	8	16	
		1/2"	4	5	6	12	
Up to 25-Year		5⁄8"	4	5	4	8	
	DensDeck StormX Prime ⁴	5⁄8"	4	5	4	8	
	HailGard / ISOGARD HG	1.5" min.	4	5	8	16	
	ISOGARD HD	1⁄2"	4	5	6	12	
	ISOGARD HD Comp.	1" min.	4	5	8	16	
	APA Rated OSB	7/16" min.	4	5	8	16	
Up to 15-Year	Structodek	1⁄2" - 1"	4	5	8	16	

Note:

1. Rates in this table may differ from tested assemblies. In such a case the more stringent rate should be used. Rates in this table refer to minimum warranty requirements for a standard Red Shield 20 Year Warranty unless noted.

- 2. The use of an Air Retarder requires that the cover board/insulation pre-securement be increased to accommodate the added uplift the system may experience due to the retarder. Proper application details for the air retarder should be followed.
- 3. Uplift requirements for the project may require increased fastening rates than those listed above. The rates listed in these tables are for warranty purposes only. Contact an Elevate representative for rates related to special warranty terms or conditions.
- 4. All-Purpose Fasteners are not approved for in seam or InvisiWeld applications into steel decks.
- 5. Elevate #12 Fasteners are not approved for in seam or InvisiWeld applications into steel or wood decks.

Attachment of Vacuum Insulated Panels (VIP) - Adhered Membrane Only

VIP Assembly Information

Layer	Material	Attachment	Rate
Top Layer	1/2" ISOGARD HD	Adhered: Twin Jet, I.S.O. Twin Pack, or I.S.O. Stick	Maximum 12" o.c. beads
Middle Layer	VIP Panel	Adhered: Twin Jet, I.S.O. Twin Pack, or I.S.O. Stick	Maximum 12" o.c. beads
Dattam Lavar	r ¹ /2" ISOGARD HD	Attached: Mechanical Attachment (4'x8' board)	Minimum 12 fasteners/plates
Bottom Layer		Adhered: Twin Jet, I.S.O. Twin Pack, or I.S.O. Stick	Maximum 12" o.c. beads

Note:

1. VIP panels are not to be cut or punctured in any way.

- 2. Damaged panels or panels thought to be damaged should not be installed.
- 3. Refer to the VIP Panel Application Instruction and Technical Information Sheet.
- 4. Increased wind speed coverage is not allowed with the use of this panel.
- 5. 20-year maximum Red Shield Warranty when this product is used.

Insulation Mechanical Attachment Patterns

See Technical Information Sheet (TIS) 950 Insulation Attachment Patterns for example pattern layouts for proper placement of approved fasteners and plates based on board size. These fastening patterns apply to standard 4' x 8' boards. The most common fastener density and patterns are shown. Certain specifications may call for increased densities of fasteners in the perimeter or corner areas. For these patterns and other non-standard fastener densities, contact a Holcim Regional Technical Coordinator at 800-428-4511.





EPS Fanfold Attachment

- Fanfold insulation is approved for use when recover applications call for mechanically attached membrane applications. See appropriate design guide for more information.
- InvisiWeld applications are not allowed when Fanfold is the immediate substrate.
- Fanfold must have a suitable facer. "Bare" EPS must never come into contact with PVC or PVC KEE membranes, or with residual asphalt.
- Adjacent Fanfold sheets should be laid parallel and staggered ever 2' (0.61 m).
- The maximum Red Shield[™] Warranty term for systems including Fanfold is 20 years. Wind speeds up to 72 MPH may be approved based on project characteristics. Hail and Cut & Puncture Protection are not available when Fanfold is used in lieu of an Elevate insulation and/or cover board.
- Contact a Regional Technical Coordinator for more information.

Attachment Rates for EPS Fanfold Sheathing (Per 32 Square Feet)				
Annual Custome	Deck Type and minimum Fastening Rate			
Approved Systems	Steel	Plywood/OSB/Wood Plank		
Mechanically Attached Elevate UltraPly TPO Membrane (60 mil min.)	5	5		

Insulation Adhesive Attachment Patterns





The maximum size of any insulation board is 4' (1.2 m) x 4' (1.2 m) regardless of the thickness. The rate of application, with a Elevate Insulation Adhesive, is a minimum of four (4) ribbons per board to be installed in $\frac{1}{2}$ " (12.7 mm) to $\frac{3}{4}$ " (19.05 mm) beads spaced 12"/6"/6" (304.8 mm/152.4 mm) (Field/Perimeter/Corner) on center for a standard 55 mph Red Shield warranty. The adhesive application does not increase or decrease with the thickness of the board as in mechanically fastened insulation boards. Loose or unattached corners in insulation boards shall be repaired by the addition of fasteners and insulation plates as required.

Refer to the Technical Information Sheet for specific information on these products: <u>Foam Adhesives</u>. If enhancements are required or your project presents a unique situation, contact a Holcim Regional Technical Coordinator at 800-428-4511. The images below are for example purposes only for a 12" (304.8 mm) o.c. pattern only. Refer to the specific insulation adhesive below to review row spacing details and instructions for placement.

I.S.O. Twin Pack Insulation Adhesive

- Ensure the use of a 4' (1.2 m) x 4' (1.2 m) board.
- Application surfaces must be even to ensure continuous adhesion.
- Immediately place insulation board into wet adhesive.
- The first and last adhesive bead should be inset 6" from the board edge for a 12" o.c. (304.8 mm) application, inset 3" (76.2 mm) o.c. for 6" (152.4 mm) o.c. application and inset 2" (50.8 mm) o.c. for 4" (101.6 mm) o.c. application.
- Immediately place insulation board into wet adhesive and weight with pails of Bonding Adhesive or other viable weight.
- See ribbon pattern diagram above.

I.S.O. Stick / Winter Grade Insulation Adhesive

- Ensure the use of a 4' (1.2 m) x 4' (1.2 m) board.
- Requires the PaceCart 2 Dispenser
- Application surfaces must be even to ensure continuous adhesion.
- Place board while adhesive is still wet and tacky. Adhesive should not reach a tack-free state.
- The first and last adhesive bead should be inset 6" from the board edge for a 12" (304.8 mm) o.c. application, inset 3" (76.2 mm) o.c. for 6" (152.4 mm) o.c. application and inset 2" (50.8 mm) o.c. for 4" (101.6 mm) o.c. application.

10/5/2023 Elevate Attachment Guide and Supplemental Increased Wind Speed Warranty Attachment Guide

- Wait for the adhesive to develop a stringy body before placing the insulation board into the adhesive. Immediately walk the board in and weigh it down with pails of Bonding Adhesive or other available weights.
- See serpentine style pattern above.

Twin Jet Insulation Adhesive

- Ensure the use of a 4' (1.2 m) x 4' (1.2 m) board.
- Apply Twin Jet on the deck substrate in 1¹/₄" (31.75 mm) beads spaced 12" (304.8 mm) on center, or as specified to meet wind uplift requirements. Allow adhesive to reach the open/mate time and set the suitable insulation into position.
- Place maximum 4' x 4' (1.2 m x 1.2 m) insulation boards into Twin Jet Insulation Adhesive within the identified mate time.
- Immediately after setting the insulation board, provide continuous pressure using weighty objects such as adhesive pails on the insulation until the adhesive sets (typically 4-8 minutes) to ensure adequate contact between the insulation, substrate, and adhesive during the critical set-up period.

I.S.O. Spray R Insulation Adhesive

- Ensure the use of a 4' (1.2 m) x 4' (1.2 m) board.
- Performance of I.S.O. SPRAY R Adhesive should be periodically monitored during the workday to verify that sufficient rise, adhesion, and full mating is occurring.
- Requires spray rig equipment to apply.
- Application surfaces must be even to ensure continuous adhesion.
- Immediately place insulation board into wet adhesive.
- The first and last adhesive bead should be inset 6" (152.4 mm) from the board edge for a 12" (304.8 mm) o.c. application, inset 3" (76.2 mm) o.c. for 6" (152.4 mm) o.c. application and inset 2" (50.8 mm) o.c. for 4" (101.6 mm) o.c. application.
- Wait for the adhesive to develop a stringy body before placing the insulation board into the adhesive. Immediately walk the board in and weight it down with pails of Bonding Adhesive or other available weight.
- See serpentine style pattern above.

Criteria for Field Testing Insulation Adhesives for Adhesion to Deck Substrates

When Specified Uplifts Are Required

Adhesive pull tests should be performed in accordance with the requirements listed within ANSI/SPRI IA-1, Standard Field Test Procedure for Determining the Uplift Resistance of Insulation, and Insulation Adhesive Combinations over Various Substrates.

- All adhesive pull tests should be documented via Insulation Adhesive Test Report and provided to Holcim.
- Official pullout/adhesion results may impact the required fastening rates for the project.

Warranty Purposes with No Specified Uplift

- 1. Prepare an area large enough to allow a 4' (1.2 m) x 4' (1.2 m) insulation board to be laid in place. Follow the appropriate Elevate Technical Information Sheet guidelines for surface preparation and list of acceptable substrates. Contact a Holcim Regional Technical Coordinator at 800-428-4511 if the substrate information is not listed.
- 2. Apply the adhesive to the deck per recommended application rates and methods (12" o.c. (304.8 mm), 1/2" (12.7 mm) to 3/4" (19.05 mm) bead).
- 3. Allow the adhesive a minimum of 60 minutes to cure.
- 4. After the adhesive has been allowed to cure, pull up on the adhered board by placing a hand under the corner or end of the board in the same direction as the ribbons. Make sure that the board is lifted by hand. Using tools to scrape the board may cause disbonding between the adhesive and the substrate. This will not show whether the adhesive is performing under uplift considerations. (If a tool is used, it should be used to pry or pop the board up).
- 5. Observe the insulation and deck. The desired result is a delamination of the surface or board facer with adhesive and facer residue remaining on the deck or the board breaks apart remaining adhered to the deck at the ribbons. If the board is lifted and the adhesive pulls/peels off the deck or decking is pulled up with the board, contact a Holcim Regional Technical Coordinator. This will be considered an unacceptable substrate.
- 6. Results should be documented via photos, location on roof and number of tests performed and provided to a Holcim Regional Technical Coordinator for approval. Results from the testing may impact the required fastening/adhesive rates required for the project.

Retarders – Air and Vapor Definition

Vapor/air retarders provide protection to the above deck components from air infiltration and condensation due to high internal moisture loads. Moisture sealed into the roof system during construction may expand during hot weather, causing blisters to form in the roof covering and eventually leading to failure of the roof system. Vapor retarders prevent moisture from infiltrating to the above deck components. Air retarders prevent air from infiltrating to the above deck components. Air retarders prevent air from infiltrating to the above deck components. A vapor/air retarder for steel, wood or concrete deck may be provided in

the form of a membrane sheet applied over the deck surface. The membrane sheet or film type of vapor/air retarder may be supplied as asphalt-saturated felt, vinyl plastic, Kraft paper, etc., or a laminated combination.

FM Approved vapor/air retarder sheets shall be placed directly on the deck or over a minimum FM Approved thickness of insulation or separator board. They shall be installed in accordance with the Approval requirements. Then, FM Approved insulation is placed, and fasteners driven through the components into the deck.

When an air retarder or vapor retarder is listed as a component with a mechanically fastened roof cover, it is imperative that the air/vapor retarders restrict air infiltration to the roof assembly between the top of the air retarder and the underside or the roof covering. To accomplish this, the air/vapor retarder must encapsulate these roof components. An accepted means of encapsulating these components is to fold the air/vapor retarder up along the edges of the components and seal the air/vapor retarder to the underside or the roof covering using a compatible adhesive. The encapsulating must be done at the entire roof perimeter and at all roof penetrations. Additionally, if the integrity of the air/vapor retarder is breached; e.g., equipment is added on the roof, the air/vapor retarder must be sealed to the underside of the roof cover using a compatible adhesive.

FM Approved vapor/air retarders have been evaluated for fire hazard and/or wind resistance only, not for permeability. See additional information below as it relates specifically to Vapor or Air retarders.

Vapor Retarder (Barrier)

For adhered above-roof covers, when insulation is adhered to the top surface of a vapor retarder, the vapor retarder is part of the wind load path and, as such, its strength and securement are critical. When roof covers are adhered to insulation or cover boards that are fastened through the vapor retarder into the deck, the wind load applied to the roof cover by-passes the vapor retarder. Vapor Retarders are materials designed to restrict passage of water vapor located on the "warm side" of the roof or sandwiched between insulation layers. The vapor retarder is sealed to the exterior walls of the building, but not necessarily to the underside of the roof cover. While some Elevate roofing systems may require a vapor retarder to receive a Red Shield Warranty, the need for a vapor retarder, as well as a professional architect or engineer must determine the type, placement, and location of the vapor retarder.

The following recommendations cover vapor retarder applications that maintain Class 1 and appropriate wind uplift ratings. This information has been referenced from FM LPDS 1-29, Section 2.2.10.5.

- Do not use a vapor retarder directly on steel deck unless specifically included in RoofNav assemblies for steel decks. Some vapor retarders are FM Approved only for use directly over concrete deck; use directly over steel deck will cause the roof assembly to be Class 2.
- Seal side and end laps where vapor retarders are used. Some systems are FM Approved with the retarder installed above a base layer of insulation.
- Fastener penetration of the vapor retarder can be avoided by using an FM Approved assembly that has the vapor retarder and all components above it adhered to a mechanically fastened thermal barrier.

Air Barrier (Retarder)

Used with a mechanically fastened roof cover and located directly above the roof deck. The air barrier is sealed to the underside of the roof cover, but not necessarily to the exterior walls of the building. In theory, an air barrier improves wind uplift resistance of the roof assembly by preventing air flow into the space below the roof cover and transferring a portion of the uplift load to the insulation. It should be noted that even for properly installed air barrier systems, roof penetrations made after the installation of an air barrier system can hamper the wind performance of an air barrier system if the air barrier is not sealed to the underside of the roof cover after the penetration cut is made. Consequently, there are special FM Approval restrictions on air barrier systems.

- While some Elevate roof systems may require an air retarder to receive a Red Shield warranty, the need for an air retarder, as well as the type, placement and location of the air retarder must be determined by a professional architect or engineer.
- Air retarder systems are a component of building envelope systems that control the movement of air into and out of buildings.
- An air retarder may consist of a single material or of two or more materials which, when installed as a system, make up an air impermeable, structurally adequate retarder.
- Air retarder systems are generally comprised of building components and materials that have an air permeability not exceeding 0.004 cfm/sf under a pressure differential of 0.3" water.
- No single component or material has the capability to provide a complete air retarder system for a building; therefore, air retarder systems include many components and materials that are interfaced with each other. Holcim recommends that

the individual manufacturers of these products provide written certification that their products, when used together, meet this requirement.

- If the air retarder is to perform its intended role, it must meet a number of requirements:
 - Continuity: The assembly must be linked together and sealed at all laps, seams, perimeters, and penetrations to ensure that there is no break in the air tightness of the envelope.
 - Structural Integrity: The air retarder must be capable of resisting the imposed load or must be supported by one that can. It must be capable of resisting the strongest wind load acting as either a pressure or suction without rupturing or breaking away from its support. The air retarder and its support must be sufficiently rigid to resist displacement.
 - Air Impermeability: A major requirement of an air retarder is that it offers a high resistance to airflow.
 - Durability: Durability depends largely on how a material reacts to a specific environment such as moisture, temperature, ultra-violet radiation, and to the presence of other materials (incompatibility).
- The use of an Air Retarder requires that the cover board/insulation pre-securement be increased to accommodate the added uplift the system may experience due to the retarder. Proper application details for the air retarder should be followed.

When specific uplift pressures are provided for systems using air barriers or vapor retarders the uplift pressures and/or attachment rates should be calculated by an engineer or validated by a tested assembly.

V-Force[™] Application

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Elevate V-Force Vapor Barrier Membrane may be applied directly to properly prepared substrate as outlined in the table below. The substrates must be clean, dry, and smooth. Some substrates may require special preparation including cleaning and/or priming. Review the Technical Information Sheet (TIS), Application Guide and details for application requirements and additional information. Reference the V-Force Requirements – Increased Wind Speed section in this guide for information related to extended wind speeds. V-Force adhered direct to steel will not be approved on projects with special wind regions or coastal areas. When uplift and fire requirements are specified, alternate applications may be required.

V-Force – Acceptable Substrates					
Acceptable Substrate	Notes				
Structural Concrete	Clean, dry, and properly cured. Free of any contaminants or sources of puncture.				
Steel Deck	Processing Oils must be removed. Clean, dry, and free of contaminants. NOTE: Factory Mutual (FM) does not recognize direct to steel deck adhesion of this product.				
Plywood or OSB	Clean, dry, and free of any contaminants or sources of puncture.				
DensDeck [®] Prime					
DensDeck StormX Prime					
Securock [®] Gypsum Fiber					
Structodek [®] HD					
ISOGARD™ HD	Clean, dry, and free of any contaminants or sources of puncture.				
ISOGARD HD Composite					
Resista™ / ISOGARD CG					
HailGard / ISOGARD HG					
Existing Smooth Surface BUR, SBS or APP Modified Bitumen	Clean, dry, and free of any contaminants or sources of puncture.				
NOTE:					
1. All substrates except metal d	1. All substrates except metal decks must be primed with either Elevate SA-Water Based (WB) Primer, SA-LVOC Primer or				
SA-Solvent Based (SB) Primer					

2. Hot asphalt cannot be used to adhered roofing material to V-Force Vapor Barrier membrane.

V-Force – Acceptable Adhesives for Insulation Attachment Bead Spacing (o.c.) (55 mph) TIS Number Adhesive Field Perimeter Corner 812 I.S.O. Twin Pack 819 I.S.O. Stick 12" (304.8 mm) 4" (101.6 mm) 6" (152.4 mm) 831 I.S.O. Spray R 836 Twin Jet NOTE:

1. All substrates except metal decks must be primed with either Elevate SA-Water Based (WB) Primer, SA-LVOC Primer or SA-Solvent Based (SB) Primer.

2. Hot asphalt cannot be used to adhered roofing material to V-Force Vapor Barrier membrane.

3. On steel deck assemblies, beads should be spaced to be located over the top flute of the steel deck.

Attachment Rate Requirements for Plate Bonded Systems with an Air Barrier

When Invisiweld and Invisiweld-S systems are to be used and an Air Barrier is installed the attachment rates may require to be increased. The table below is for standard warranties without increased wind speeds or specified uplift requirements.

Fastening Patterns for Insulation in Plate Bonded Single-Ply Systems with an Air Retarder (Barrier)* **Top Layer of Insulation** Maximum Number of Fasteners per 4' x 8' Insulation Board with an Air Barrier* Warranty Insulation Thickness 1/2" - 1.4" ISOGARD GL / ISO 95+ GL 16 1.5" - 1.9" 12 or Resista / ISOGARD CG 2.0" - 4" 8 1/4" 16 DensDeck 1/2" 12 5⁄8" 8 1/4" 12 Up to 20-Year** **DensDeck Prime** 1/2" UltraPly TPO or 8 Elevate PVC/PVC 5⁄8" 8 KEE membrane. DensDeck StormX Prime 5/8" 8 *NOTE: 1⁄4" 10 1. Rates listed in this table are Red Shield 1/2" Securock 8 Warranty minimum attachment rates 5⁄8" 8 unless otherwise noted. HailGard / ISOGARD HG 1.5" min. 16 2. Rates listed in this table may differ from **ISOGARD HD** 1/2" 12 those in tested assemblies. In such ISOGARD HD Comp. 1" min. 16 cases more stringent rates should be 1/2" - 1.4" ISOGARD GL / ISO 95+ GL used. 1.5" - 1.9" or 3. When specific uplift performance or Resista / ISOGARD CG 2.0" - 4" wind speed coverage is required, these 1⁄4" rates may not apply. Contact a Holcim 1/2" Dens Deck Representative for confirmation. 16 per board 5/8" 25-Year* minimum 1/4" *Limited to 80 mil **Dens Deck Prime** 1/2" UltraPly TPO 30 Year Platinum 5⁄8" Details membrane. 1/4" Required 1/2" Securock 5⁄8" HailGard / ISOGARD HG 1.5" min. ISOGARD HD 1/2" ISOGARD HD Comp. 1" min. Up to 15-Year ¹/2" - 1" Structodek 16 per board **AP Fasteners and Elevate #12 Fasteners are not approved for use on Invisiweld Systems.

Allowable Fasteners – Insulation Attachment										
		Deck Type								
TIS	Fastener		Structural Concrete	Plywood/OSB/ Wood Plank	Cementitious Wood Fiber	Gypsum	LWC/Steel Pan	LWC/Concrete		
1001	All-Purpose Fastener	\checkmark	-	\checkmark	-	-	-	-		
1002	Heavy-Duty Fastener	\checkmark	\checkmark	\checkmark	-	-	√1	√1		
1003	Pre-Assembled #12 Fastener and Plate	\checkmark	-	\checkmark	-	-	-	-		
1005	Concrete Drive Fastener	-	\checkmark	-	-	-	-	√1		
1006	Polymer Fastener	-	-	-	\checkmark	\checkmark	-	-		
1007	AP AccuTrac™ Kits (#12 Fasteners and insulation Plate)	\checkmark	-	\checkmark	-	-	-	-		
1013	IsoFast™ #12 Belted Fasteners and Insulation Plates	\checkmark	-	\checkmark	-	-	-	-		
1016	HD AccuTrac Kits™	\checkmark	-	\checkmark	-	-	-	-		
1017	All-Purpose Stainless-Steel Fastener	\checkmark	-	\checkmark	-	-	-	-		
1019	Heavy Duty (HD) ISOGARD™ HG / HailGard™ Fastener	\checkmark	~	\checkmark	-	-	-	-		
1026	Elevate #12 Fastener	\checkmark	-	\checkmark	-	-	-	-		
NOTE:										
1 Mu	st penetrate steel pan or structural concrete									

Insulation Attachment Fastener – Warranty Coverage

			Warra	nty Cov	/erage	by Decl	к Туре	
TIS	Fastener		Structural Concrete	Plywood/OSB/ Wood Plank	Cementitious Wood Fiber	Gypsum	LWC/Steel Pan	LWC/Concrete
1001	All-Purpose Fastener	20	-	20	-	-	-	-
1002	Heavy-Duty Fastener	30	30	30	-	-	30	30
1003	Pre-Assembled #12 Fastener and Plate ¹	20	-	20	-	-	-	-
1005	Concrete Drive Fastener	-	30	-	-	-	-	30
1006	Polymer Fastener	-	-	-	30	30	-	-
1007	AP AccuTrac™ Kits (#12 Fasteners and insulation Plate)	20	-	20	-	-	-	-
1013	IsoFast [™] #12 Belted Fasteners and Insulation Plates	20	-	20	-	-	-	-
1016	HD AccuTrac Kits™	20	-	20	-	-	-	-
1017	All-Purpose Stainless-Steel Fastener	20	-	20	-	-	-	-
1019	Heavy Duty (HD) ISOGARD™ HG / HailGard™ Fastener	30	30	30	-	-	-	-
1026	Elevate #12 Fastener	20	-	20	-	-	-	-

Modified Bitumen Base Sheet Attachment

General

The following information is intended to describe the base sheet attachment within a roofing system for Red Shield Warranty purposes. This is only one component of the overall roofing system. For more information on the system warranty requirements, please visit the Technical Database at www.HolcimElevate.com or contact a Holcim Regional Technical Coordinator at 800-428-4511.

Allowable Fasteners – Base Sheet Attachment											
			Deck Type								
TIS	Fastener	Steel	Structural Concrete	Plywood/OSB/ Wood Plank	Cementitious Wood Fiber	Gypsum	LWC/Steel Pan	LWC/Concrete			
1001	All-Purpose Fastener	✓	-	\checkmark	-	-	-	-			
1002	Heavy Duty Fastener	\checkmark	\checkmark	\checkmark	-	-	√1	√1			
1003	Pre-Assembled #12 Fastener and Plate	\checkmark	-	\checkmark	-	-	-	-			
1005	Concrete Drive Fastener	-	\checkmark	-	-	-	-	√1			
1006	Polymer Fastener	-	-	-	\checkmark	~	-	-			
1012	LWC Base-Ply Fasteners	-	-	-	-	\checkmark	\checkmark	\checkmark			
1014	IsoFast™ #15 Belted Fasteners and Membrane Plates	✓	-	~	-	-	√1	-			
1017	All-Purpose Stainless-Steel Fastener	✓	-	\checkmark	-	-	-	-			
1020	Two Piece Impact Nail	-	-	-	\checkmark	\checkmark	\checkmark	~			
NOTE:											
1. Mu	st penetrate steel pan or structural concrete.										

Base Sheet Attachment with any Modified Bitumen Base Sheet

Zone	Elevate Faster	ners and Plates	Cap Nails or LWC	Base Ply Fasteners						
	Warranties Up to and Including 20 Years									
Laps	12" (304.8 mr	n) o.c. Spacing	9" (228.6 mm) o.c. Spacing						
Zone	Rows	Spacing	Rows	Spacing						
Field Prime	2 Rows, Staggered 12"	18" o.c. Spacing	2 Rows, Staggered 12"	14" o.c. Spacing						
Field	2 Rows, Staggered 12"	18" o.c. Spacing	2 Rows, Staggered 12"	14" o.c. Spacing						
Perimeter	2 Rows, Staggered 12"	18" o.c. Spacing	2 Rows, Staggered 12"	14" o.c. Spacing						
Corner	3 Rows, Evenly Spaced	16" o.c. Spacing	3 Rows, Evenly Spaced	12" o.c. Spacing						
		Warranties Up to and Inclu	ding 30 Years							
Laps	12" (304.8 mr	n) o.c. Spacing	9" (228.6 mm) o.c. Spacing						
Zone	Rows	Spacing	Rows	Spacing						
Field Prime	2 Rows, Staggered 12"	14" o.c. Spacing	2 Rows, Staggered 12"	12" o.c. Spacing						
Field	2 Rows, Staggered 12"	14" o.c. Spacing	2 Rows, Staggered 12"	12" o.c. Spacing						
Perimeter	2 Rows, Staggered 12"	2 Rows, Staggered 12" 14" o.c. Spacing		12" o.c. Spacing						
Corner	r 3 Rows, Evenly Spaced 12" o.c. Spaci		3 Rows, Evenly Spaced	9" o.c. Spacing						

NOTE:

1. Install fastener rows and/or batten bars perpendicular to the roof deck ribs.

2. Pull out tests shall be conducted, documented, and provided to Holcim prior to job installation. Pullout values may require additional fastening, alternate fastening, or result in the project being disqualified from warranty coverage.

3. Uplift pressures should be calculated by the design professional and in accordance with all relevant building codes.

4. FM Insured or specified projects may require different attachment rates, methods, or enhancements. See FM Approval listing.

5. See Detail BASE-L60 and BASE-G60 for attachment pattern example based on roof zone.

6. Warranted wind speed coverage over 55 mph, please reference the Base Sheets – Mechanical Attachment Requirements, LWC – Base Sheet Attachment Rates table in this document.

7. Not all projects may qualify for extended warranties or increased wind speeds. Review project requirements with an Elevate Sales Representative for more information.

8. See details MB-LS-4 and MB-LS-5 for lap requirements.

Base Sheet Attachment, Coiled Metal Batten, with a SBS Torch Cap

Base Sheet	SBS Poly Torch Base or SBS Glass Torch Base							
Attachment	Elevate Coiled Metal Batten and appropriate Elevate fasteners							
Deck Types	Steel							
Pattern	 See diagram below Install one row with a coiled batten strip at min. 24" (609.6 mm) o.c. using appropriate fastener. Seams are lapped 4" (101.6 mm) and heat welded. Roll with a 20-pound roller. Fasteners can be placed at 6" (152.4 mm), 12" (304.8 mm), 18" (457.2 mm) or 24" (609.6 mm) o.c. based on desired warranty. Contact a Holcim Regional Technical Coordinator for warranty options. See details MB-LS-4 and MB-LS-5 for lap requirements. 							
	- Fastener - Batten 4" 6" - 24"							

Base Sheet Attachment, MB 2" Barbed Plates, with a SBS Torch Cap

Base Sheet	SBS Poly Torch Base or SBS Glass Torch Base							
Attachment	/IB 2" Barbed Metal Lap Plate and Elevate Heavy-Duty Fasteners							
Deck Types	Steel							
Pattern	 See diagram below Install one row with MB 2" Barbed Metal Lap Plate and Heavy-Duty Fastener min. 24" (609.6 mm) o.c. Align plate edge with laying line Seams are lapped 4" (101.6 mm) and heat welded Roll with a 20-pound roller Fasteners can be placed at 6" (152.4 mm), 12" (304.8 mm), 18" (457.2 mm) or 24" (609.6 mm) o.c. based on desired warranty. See details MB-LS-4 and MB-LS-5 for lap requirements. 							
	- Plate/Fastener							

Single-Ply Membrane Attachment

Acceptable Fastener and Plate Guidelines

Allowable Fasteners – Membrane Attachment										
		Deck Type								
Fastener	Steel	Structural Concrete	Plywood/OSB/ Wood Plank	Cementitious Wood Fiber	Gypsum	LWC/Steel Pan	LWC/Concrete			
All-Purpose Fastener	√2	-	~	-	-	-	-			
Heavy Duty Fastener	\checkmark	\checkmark	\checkmark	-	-	√1	√1			
Concrete Drive Fastener	-	\checkmark	-	-	-	-	√1			
Heavy Duty Plus Fastener	\checkmark	-	-	-	-	-	-			
Purlin Fasteners Black E-Coated	16-gau	uge Stri	uctural	Steel P	urlins					
IsoFast™ #15 Belted Fasteners and Membrane Plates	\checkmark	-	\checkmark	-	-	√1	-			
All-Purpose Stainless-Steel Fastener	-	-	\checkmark	-	-	-	-			
	able Fasteners – Membrane Attachment Fastener All-Purpose Fastener Heavy Duty Fastener Concrete Drive Fastener Heavy Duty Plus Fastener Purlin Fasteners Black E-Coated IsoFast™ #15 Belted Fasteners and Membrane Plates All-Purpose Stainless-Steel Fastener	able Fasteners – Membrane Attachment Fastener Image: State Pastener All-Purpose Fastener Heavy Duty Fastener V Concrete Drive Fastener Heavy Duty Plus Fastener V Purlin Fasteners Black E-Coated IsoFast™ #15 Belted Fasteners and Membrane Plates V All-Purpose Stainless-Steel Fastener	able Fasteners – Membrane Attachment Fastener Image: state sta	able Fasteners – Membrane AttachmentFastenerDFastenerImage: Section of the secti	able Fasteners – Membrane AttachmentFastenerDeck TypeFastenerImage: Image: Ima	able Fasteners – Membrane AttachmentFastenerDeck TypeFastenerison and ison a	able Fasteners – Membrane AttachmentFastenerDeck TypeFastenerImage: State			

NOTE:

1. Must penetrate steel pan or structural concrete.

2. Elevate All-Purpose fasteners are approved for in seam attachment of Elevate RubberGard MAX Membrane in combination with Elevate V-Plate (TIS 1103) into steel and wood deck assemblies. Warranty restrictions apply.

Membrane Attachment Fastener - Warranty Coverage

			Deck Type							
TIS	Fastener	Steel	Structural Concrete	Plywood/OSB/ Wood Plank	Cementitious Wood Fiber	Gypsum	LWC/Steel Pan	LWC/Concrete		
1001	All-Purpose Fastener	20	-	20	-	-	-	-		
1002	Heavy Duty Fastener	30	30	30	-	-	30	30		
1005	Concrete Drive Fastener	-	30	-	-	-	-	30		
1009	Heavy Duty Plus Fastener	30	-	-	-	-	-	-		
1011	Purlin Fasteners Black E-Coated	20 (16	-gauge	Structu	ural Ste	el Purlii	ns)			
1017	All-Purpose Stainless-Steel Fastener	-	-	20	-	-	-	-		

Elevate Plates - For the attachment of:

		Rubber (Standar)	rGard EPDM d, LSFR, or FR)	Rubber Ga	ard EPDM MAX	UltraPly TPO	Elevate PVC and PVC KEE				
TIS	Plate	Batten in the Seam (BITS)	Mechanically Attached System (MAS)	Batten in the Seam (BITS)	Mechanically Attached System (MAS)	Mechanically Attached System (MAS)	Mechanically Attached System (MAS)				
1101	2" Metal	√	√	√	√	✓ RPF ONLY (No Seams)					
	Plate	For attaching Ele Specifications ar	evate Reinforced Perime nd Details.	eter Fastening	Strips (RPF Strip) t	o approved substrates	as required by Elevate				
1102	Polymer Fastener	√	V	√	√	✓ RPF ONLY (No Seams)					
	Plate	For attaching Ele Specifications ar	For attaching Elevate Reinforced Perimeter Fastening Strips (RPF Strip) to approved substrates as required by Elevate Specifications and Details								

Eleva	Elevate Plates – For the attachment of: (Continued)								
		Rubber((Standard	Gard EPDM , LSFR, or FR)	Rubber Ga	ard EPDM MAX	UltraPly TPO	Elevate PVC and PVC KEE		
TIS	Plate	Batten in the Seam (BITS)	Mechanically Attached System (MAS)	Batten in the Seam (BITS)	Mechanically Attached System (MAS)	Mechanically Attached System (MAS)	Mechanically Attached System (MAS)		
		√	√	\checkmark	\checkmark				
1103	V-Plate	For attaching QuickSeam R	g Elevate Rubber R.M.A. Strip to appr	Gard MAX me oved substrate	mbrane, Elevate R es as required by El	PF and QuickSeam RI evate Specifications ar	PF Strips, and Elevate nd Details.		
1100	Insulation	√	√	√	✓	✓	✓		
1106	Fastening Plate	For attaching	, insulation to appi	oved substrat	es as required by El	evate Specifications ar	nd Details.		
1107	Polymer Fastener	✓	\checkmark	√	√	\checkmark	√		
1107	Insulation Plate	For attaching	; insulation to appi	oved substrat	es as required by El	evate Specifications ar	nd Details.		
			\checkmark	\checkmark	\checkmark	\checkmark	\checkmark		
1108	HD Seam Plate	For attaching Elevate Spec	g Elevate UltraPly ifications and Det	y TPO and Ele ails.	evate PVC membra	anes to approved subs	strates as required by		
						✓	√		
1109	Plate	For attaching and Details.	g Elevate UltraPly	TPO membrar	ies to approved sub	ostrates as required by	Elevate Specifications		
	Liltra Div TDO					\checkmark			
1111	InvisiWeld Plate	For attaching and Details.	g Elevate UltraPly	TPO membrar	ies to approved sub	ostrates as required by	Elevate Specifications		
	Elovato DVC						\checkmark		
2112 InvisiWeld Plate For attaching Elevate PVC membranes to approved substrates as required by Elevate Specifications and Details.						ate Specifications and			
			J =	Accentable f	oruse				
		See	the specific pla	te TIS for sp	ecific application	data			

Eleva	Elevate Battens and Bars – For the attachment of:										
		Rubber (Standard	RubberGard EPDM (Standard, LSFR, or FR) Rubber Gard EPDM MA)		ard EPDM MAX	UltraPly TPO	Elevate PVC and PVC KEE				
TIS Plate		Batten in the Seam (BITS)	Mechanically Attached System (MAS)	Batten in the Seam (BITS)	Mechanically Attached System (MAS)	Mechanically Attached System (MAS)	Mechanically Attached System (MAS)				
1001	Coiled metal	√		√		(Perimeter Enhancement Only)	(Perimeter Enhancement Only)				
1201	Batten Strip	For anchorin and Details.	g membrane and	flashing detail	s to approved sub	strates as required by	Elevate Specifications				
1000	Metal Batten	√		✓		(Perimeter Enhancement Only)	(Perimeter Enhancement Only)				
Strip For anchoring membrane and flashing details to approved su and Details.					s to approved sub	strates as required by	Elevate Specifications				
	Polymer Fastener	*	*	*							
1204	Metal Batten Strip	For anchorin Details. *Bas	g RubberGard me e Tie-ins only.	embrane to a	oproved substrates	as required by Eleva	ate Specifications and				
		√	\checkmark	✓	\checkmark	√	√				
1205	Termination bar	For anchoring and Details.	g and sealing flas	hing terminatio	ons to approved sub	ostrates as required by	Elevate Specifications				
	Aluminum Drain	√	√	✓	√	✓	√				
1206	Bar	Used with El substrates as	evate Adhered ar s required by Eleva	nd Ballasted synthesis and Ballasted synthesis and the specification of the second sec	ystems for termina ons and Details.	ting the RubberGard r	nembrane to approved				
	Polymer Batten	*	*	*							
1207	1207 Strip Used for anchoring membrane and flashing details to the approved substrates as required by Elevate Specifications and Details. *Base Tie-ins only.										
	\checkmark = Acceptable for use See the specific batten or bar TIS for specific application data										
			See the specific batter of bar ins for specific application data								

Elevate Fastener – For the attachment of accessories:								
TIS	Fastener	Batten Strips	Seam Plates	Termination Bars				
1001	All-Purpose Fastener	✓	√	✓				
1002	Heavy-Duty Fastener	✓	\checkmark	\checkmark				
1005	Concrete Drive Eastener	✓	\checkmark	\checkmark				
1005	Concrete Drive Fastener	Do not use with polymer batten strips.						
1006	Polymor Factoror	✓	√*	√*				
(Special battens and plates required) *Only approved for base tie-ins, membrane must be adhered								
		√	\checkmark					
1009	HD Plus Fastener	Elevate Metal Batten Strips in Batten in the Seam (B.I.T.S.), Nattached systems.	I.A.S. and Reinford	ced MAX, mechanically				
		✓	\checkmark					
1011	1011Purlin FastenerMembrane and QuickSeam R.M.A. Strip to 12 – 18 gauge structural steel purlins. The Elevate Purlin Fastener can be used in conjunction with Elevate 2" Metal Plates, Elevate V-Plates, or batten strips.							
1012	1012 LWC Base Ply Fastener For the attachment of base sheets. Insulation may not be attached with LWC Base Ply Fastener							
	\checkmark = Acceptable for use See the specific fastener TIS for specific application data							

Perimeter Enhancements

NOTE: It is necessary for the overall strength of the system to reinforce the perimeter and corners areas on a roof due to these areas receiving an increased uplift pressure. These increased pressures cause additional stress on the roofing system. The following enhancements assist in alleviating this change n pressure.

TPO Details			
Detail Number	Detail Name	Membrane Type	Max. Warranty Period
UT-PE-1	Batten or HD Plates with 8" Welded Cover Stirp at Perimeter Enhancement	UltraPly TPO	20 Years
UT-PE-2	Batten or HD Plates with 9.5" UltraPly TPO QuickSeam Flashing at Perimeter Enhancement	UltraPly TPO	20 Years
UT-PE-3	Batten with 5.5" UltraPly TPO QuickSeam Flashing at Perimeter Enhancement	UltraPly TPO	20 Years
UT-PE-4	Batten or HD Plates with UltraPly QuickSeam R.M.A. at Perimeter Enhancement	UltraPly TPO	20 Years
UT-PE-5	UltraPly TPO Invisiweld at Perimeter Enhancement	UltraPly TPO	20 Years
UT-PE-6	Batten or HD Plate and UltraPly TPO 8" Cover Strip	UltraPly TPO	20 Years
UT-PE-7	Batten or HD Plate and UltraPly TPO 9.5" QuickSeam Flashing	UltraPly TPO	20 Years

EPDM Details								
Detail Number	Detail Name	Membrane Type	Max. Warranty Period					
B-1	QuickSeam Batten Cover at "T" Perimeter	RubberGard EPDM	20 Years					
B-7	QuickSeam R.M.A. Strip at T-Perimeter	RubberGard EPDM	20 Years					

PVC and PVC KEE Details								
Detail Number	Detail Name	Membrane Type	Max. Warranty Period					
PVC-PE-1	Batten or HD Plates with 8" Welded PVC Cover Strip at Perimeter Enhancement	Elevate PVC	20 Years					
PVC-PE-2	Elevate PVC Invisiweld at Perimeter Enhancement	Elevate PVC	20 Years					
PVC-PE-3	Batten or HD Seam Plate with Elevate PVC 8" Cover Strip at Perimeter Enhancement	Elevate PVC	20 Years					

Peel Stops

Peel stops are required in the following situations:

- Projects located in HVHZ, coastal or other high wind zones.
- Buildings with roof heights greater than 60' (18.29 m) tall with parapets less than 3' (0.91 m) in height and wind speed coverage at or greater than 90 mph.
- Projects over wood, lightweight concrete (LWC/LWIC), tectum, gypsum, and unidentifiable decking.
- Projects where decking pullout values do not meet FSBP requirements.
- Projects with large wall openings.
- If atypical project conditions exist and are not represented this document, please contact a Holcim Regional Technical Coordinator for review and approval of warranty requirements prior to installation.



Factory Mutual (FM) Attachment Layout Examples

Factory Mutual (FM) does not recognize the "picture framing" method of membrane attachment. FM requires the use of the "Finger" or "T" method of attachment. The current FM Maximum Deck Span Charts and some typical layout patterns are located on the Elevate website (<u>www.HolcimElevate.com</u>) under the Technical Information Codes section. These layouts are examples only and may not fit the needs of the specific job. All perimeter and corner areas should be calculated based on specific building information and standards set by FM within Loss Prevention Data Sheet (LPDS) 1-28. Details below represent prescriptive enhancements. Not all projects will qualify for prescriptive enhancements. Every project should be evaluated against FM's LPDS's and other related standards to validate this method of attachment.

RubberGard EPDM MAX Factory Mutual Mechanically Attached Layout Examples								
Deteil Nome		Row Spacing	g (Maximum)					
	Field Prime	Field	Perimeter	Corner				
FM - EPDM Membrane Layout Example –		70"	19"	26"				
72 Inch Rows		72 O.C.	40 O.C.	30 0.C.				
FM - EPDM Membrane Layout Example –		72"	19"	26"				
72 Inch Rows - Building Greater Than 60 Feet Tall		72 0.0.	40 0.0.	30 0.C.				
FM - EPDM Membrane Layout Example –		94"	56"	12"				
84 Inch Rows		04 U.C.	50 0.C.	42 0.0.				
FM - EPDM Membrane Layout Example –	Somo oo Fiold	94" 0 0	56"	42"				
84 Inch Rows - Building Greater Than 60 Feet Tall	or por tostod	04 U.C.	50 0.C.	42 0.0.				
FM - EPDM Membrane Layout Example –		11/1" 0.0	76" 0.0	57" 0.0				
114 Inch Rows	assembly	114 0.0.	70 0.0.	57 0.0.				
FM - EPDM Membrane Layout Example –		11/1" 0.0	76" 0.0	57" 0.0				
114 Inch Rows - Building Greater Than 60 Feet Tall		114 0.0.	70 0.0.	57 0.0.				
FM - EPDM Membrane Layout Example –		114"	76"	57" 0.0				
RMA 114 Inch Rows - Building 60 Feet Tall or Less		114 O.C.	70 0.0.	57 0.0.				
FM - EPDM Membrane Layout Example –		114" 0 0	76"	57" 0.0				
RMA 114 Inch Rows - Building Greater Than 60 Feet Tall		114 O.C.	70 0.0.	57 0.0.				
NOTE: The layouts listed above are for example use only. The above listings do not validate full assembly applications. Individual project								

NOTE: The layouts listed above are for example use only. The above listings do not validate full assembly applications. Individual project validation should be completed prior to using the information listed above.

UltraPly TPO Factory Mutual Mechanically Attached Layout Examples

Datail Nama	Row Spacing (Maximum)				
	Field Prime	Field	Perimeter	Corner	
FM - TPO Membrane Layout Example – 6 Foot Sheets		72" o.c.	48" o.c.	36" o.c.	
FM - TPO Membrane Layout Example – 6 Foot Sheets - Building Greater Than 60 Feet Tall		72" o.c.	48" o.c.	36" o.c.	
FM - TPO Membrane Layout Example – 8 Foot Sheets		90" o.c.	60" o.c.	45" o.c.	
FM - TPO Membrane Layout Example – 8 Foot Sheets - Building Greater Than 60 Feet Tall	Same as Field or per tested assembly	90" o.c.	60" o.c.	45" o.c.	
FM - TPO Membrane Layout Example – 10 Foot Sheets		114" o.c.	76" o.c.	57" o.c.	
FM - TPO Membrane Layout Example – 10 Foot Sheets - Building Greater Than 60 Feet Tall		114" o.c.	76" o.c.	57" o.c.	
FM - TPO Membrane Layout Example – 12 Foot 4 Inch Sheets		142" o.c.	95" o.c.	71" o.c.	
FM - TPO Membrane Layout Example – 12 Foot 4 Inch Sheets - Building Greater Than 60 Feet Tall		142" o.c.	95" o.c.	71" o.c.	
NOTE: The layouts listed above are for example use only. The above	e listings do not v	alidate full assem	bly applications.	Individual project	

NOTE: The layouts listed above are for example use only. The above listings do not validate full assembly applications. Individual project validation should be completed prior to using the information listed above.

Elevate PVC and PVC KEE Factory Mutual Mechanically Attached Layout Examples

Datail Nama	Row Spacing (Maximum)					
	Row Spacing (Maximum) Field Prime Field Perimeter Same as Field or per tested assembly 114" o.c. 76" o.c. 114" o.c. 76" o.c. 76" o.c.	Corner				
FM - PVC Membrane Layout Example – 10 Foot Sheets	Same as Field	114" o.c.	76" o.c.	57" o.c.		
FM - PVC Membrane Layout Example – 10 Foot Sheets - Building Greater Than 60 Feet Tall	assembly	114" o.c.	76" o.c.	57" o.c.		
NOTE: The layouts listed above are for example use only. The above listings do not validate full assembly applications. Individual project validation should be completed prior to using the information listed above.						

Elevate InvisiWeld Factory Mutual Mechanically Attached Layout Examples

Detail Name	Per Board Fastening (EXAMPLE) NOTE: See actual listing for attachment rate details					
	Field Prime	Field	Perimeter	Corner		
FM TPO/PVC Membrane Layout Example Invisiweld Layout	Same as Field	6	9	12		
FM TPO/PVC Membrane Layout Example Invisiweld Layout – Building Greater Than 60 Feet Tall	or per tested assembly	6	9	12		

NOTE: The layouts listed above are for example use only. The above listings do not validate full assembly applications. Individual project validation should be completed prior to using the information listed above.

Layouts in Chart Form - Elevate Standard Warranty Requirements

Single-Ply Mechanically Attached System layouts are in the Elevate Technical Information section on the Elevate website (<u>www.HolcimElevate.com</u>). These layouts are suitable for typical 55 mph warranty requirements. If uplift pressures, increased wind speed warranty requirements or other specific codes must be met, then alternate layout or attachment rates may be required. Reference either the tested assembly requirements and/or the Increased Wind Speed supplemental section of this guide for appropriate membrane layouts. Contact a Regional Technical Coordinator for additional information.

To determine the correct Fastening Rate and Perimeter Layout:

- 1. Determine the System Type
 - EXAMPLE: The membrane being installed is
 - RubberGard EPDM (Standard, LSFR, or FR)
 - 7.5' panels
 - Batten in the Seam system (B.I.T.S.)
- 2. Based on the Roof Height, from the table below, determine the:
 - Layout Design Number
 - Field Fastening Rate
 - Perimeter Fastening Rate
 - EXAMPLE: Roof Height of up to 60'
 - Layout Design Number: B-7-2
 - Field Fastening Rate: 12" o.c.
 - Perimeter Fastening Rate: 12" o.c.

RubberGard EPDM (Standard, LSFR, or FR), 45 or 60 mil, Batten in the Seam (BITS)								
Maximum Warranty Term	Seam Att	tachment	Deeflisisht	Layout	Fastening Rate			
	System Type	Panel Width	KOOI Height	Number	Field	Perimeter		
	7' BITS	7 1⁄2'	Up to 60'	B-7-2	12" o.c.	12" o.c.		
	7' BITS	7 1⁄2'	61' to 120'	B-7-4	12" o.c.	12" o.c.		
15 Voor	8 1⁄2' BITS	9'	Up to 40'	B-9-2	12" o.c.	12" o.c.		
15-Year	8 1⁄2' BITS	9'	41' to 80'	B-9-4	12" o.c.	12" o.c.		
	9 1⁄2' BITS	10'	Up to 20'	B-10-2	12" o.c.	12" o.c.		
	9 1⁄2' BITS	10'	21' to 40'	B-10-4	12" o.c.	12" o.c.		
	7' BITS	7 1⁄2'	Up to 60'	B-7-2	12" o.c.	12" o.c.		
	7' BITS	7 1/2'	61' to 120'	B-7-4	12" o.c.	12" o.c.		
20-Year	8 1⁄2' BITS	9'	Up to 40'	B-9-2	12" o.c.	12" o.c.		
(60 mil min)	8 1⁄2' BITS	9'	41' to 80'	B-9-4	12" o.c.	12" o.c.		
	9 1⁄2' BITS	10'	Up to 20'	B-10-2	12" o.c.	12" o.c.		
	9 1⁄2' BITS	10'	21' to 40'	B-10-4	12" o.c.	12" o.c.		

RubberGard EPDM MAX, 45 or 60 mil, Mechanically Attached System (MAS)								
Maximum Warranty Term	Seam Attachment		Deeflisisht	Layout	Fastening Rate			
	System Type	Panel Width	ROOT Height	Number	Field	Perimeter		
15.7	10' M.A.S.	Any	Up to 20'	M -10-2	12" o.c.	12" o.c.		
IS-fear	10' M.A.S.	Any	21' to 40'	M -10-4	12" o.c.	12" o.c.		
20-Year (60 mil min)	10' M.A.S.	Any	Up to 20'	M -10-2	12" o.c.	12" o.c.		
	10' M.A.S.	Any	21' to 40'	M -10-4	12" o.c.	12" o.c.		

RubberGard EPDM MAX, 45 or 60 mil, Mechanically Attached System (MAS)

Maximum Warranty Term	Seam Attachment		Deeflictet	Layout	Fastening Rate	
	System Type	Panel Width	Root neight	Number	Field	Perimeter
15 Voor	10' R.M.A.S.	10'	Up to 40'	R-10-2	12" o.c.	12" o.c.
15-168	10' R.M.A.S.	10'	41' to 80'	R-10-4	12" o.c.	12" o.c.
20-Year (60 mil min)	10' R.M.A.S.	10'	Up to 40'	R-10-2	12" o.c.	12" o.c.
	10' R.M.A.S.	10'	41' to 80'	R-10-4	12" o.c.	12" o.c.

UltraPly TPO 96, 45 mil, Mechanically Attached System (MAS)

Maximum Warranty Term	Seam Attachment		Doof Hoight	Layout	Fastening Rate	
	System Type	Panel Width	Root Height	Number	Field	Perimeter
15-Year	Single Weld	96"	Up to 60'	UT-96-112	12" o.c.	12" o.c.
	Single Weld	96"	61' to 120'	UT-96-212	12" o.c.	12" o.c.

UltraPly TPO 96, 60/80 mil, Mechanically Attached System (MAS)								
Maximum Warranty Term	Seam Attachment		Deeflisisht	Layout	Fastening Rate			
	System Type	Panel Width	Root Height	Number	Field	Perimeter		
00. Y	Single Weld	96"	Up to 60'	UT-96-112	12" o.c.	12" o.c.		
20-168	Single Weld	96"	61' to 120'	UT-96-212	12" o.c.	12" o.c.		
25-Year	Single Weld	96"	Up to 60'	UT-96-106	6" o.c.	6" o.c.		
	Single Weld	96"	61' to 120'	UT-96-206	6" o.c.	6" o.c.		

UltraPly TPO 120, 45 mil, Mechanically Attached System (MAS)								
Maximum Warranty Term	Seam Attachment		Deef Usight	Layout	Fastening Rate			
	System Type	Panel Width	Root Height	Number	Field	Perimeter		
	Single Weld	120"	Up to 30'	UT-120-112	12" o.c.	12" o.c.		
15-Year	Single Weld	120"	Up to 60'	UT-120-212	12" o.c.	12" o.c.		
	Single Weld	120"	61' to 120'	UT-120-412	12" o.c.	12" o.c.		

UltraPly TPO 120, 60/80 mil, Mechanically Attached System (MAS)

Maximum Warranty Term	Seam Att	tachment	Description	Layout	Fastening Rate		
	System Type	Panel Width	Root Height	Number	Field	Perimeter	
20-Year	Single Weld	120"	Up to 30'	UT-120-106	6" o.c.	6" o.c.	
	Single Weld	120"	Up to 30'	UT-120-112	12" o.c.	12" o.c.	
	Single Weld	120"	Up to 60'	UT-120-212	12" o.c.	12" o.c.	
	Single Weld	120"	61' to 120'	UT-120-412	12" o.c.	12" o.c.	
25-Year	Single Weld	120"	Up to 60'	UT-120-206	6" o.c.	6" o.c.	
	Single Weld	120"	61' to 120'	UT-120-406	6" o.c.	6" o.c.	

UltraPly TPO 148, 45 mil, Mechanically Attached System (MAS)							
Maximum Warranty Term	Seam Attachment		Deeflictet	Layout	Fastening Rate		
	System Type	Panel Width	Root neight	Number	Field	Perimeter	
15-Year	Single Weld	148"	Up to 60'	UT-148-212	12" o.c.	12" o.c.	
	Single Weld	148"	61' to 120'	UT-148-412	12" o.c.	12" o.c.	

UltraPly TPO 148, 60/80 mil, Mechanically Attached System (MAS)							
Maximum Warranty Term	Seam Attachment		Deeflisht	Layout	Fastening Rate		
	System Type	Panel Width	Root neight	Number	Field	Perimeter	
20-Year	Single Weld	148"	Up to 60'	UT-148-212	12" o.c.	12" o.c.	
	Single Weld	148"	61' to 120'	UT-148-412	12" o.c.	12" o.c.	
25-Year	Single Weld	148"	Up to 60'	UT-148-206	6" o.c.	6" o.c.	
	Single Weld	148"	61' to 120'	UT-148-406	6" o.c.	6" o.c.	

Elevate PVC and PVC KEE 120, 50 mil, Mechanically Attached System (MAS)							
Maximum Warranty Term	Seam Attachment		Deef Height	Layout	Fastening Rate		
	System Type	Panel Width	Root neight	Number	Field	Perimeter	
15-Year	Single Weld	120"	Up to 60'	PVC-120-2-12	12" o.c.	12" o.c.	
	Single Weld	120"	61' to 120'	PVC-120-4-12	12" o.c.	12" o.c.	

Elevate PVC and PVC KEE 120, 60/80 mil, Mechanically Attached System (MAS)							
Maximum Warranty Term	Seam Attachment		Deeflicht	Layout	Fastening Rate		
	System Type	Panel Width	Root Height	Number	Field	Perimeter	
20-Year	Single Weld	120"	Up to 60'	PVC-120-2-12	12" o.c.	12" o.c.	
	Single Weld	120"	61' to 120'	PVC-120-4-12	12" o.c.	12" o.c.	

Elevate PVC XR and PVC KEE XR 120, 60/80 mil, Mechanically Attached System (MAS)							
Maximum Warranty Term	Seam Attachment		Deef Height	Layout	Fastening Rate		
	System Type	Panel Width	Root Height	Number	Field	Perimeter	
20-Year	Single Weld	120"	Up to 60'	PVC-120-2-12	12" o.c.	12" o.c.	
	Single Weld	120"	61' to 120'	PVC-120-4-12	12" o.c.	12" o.c.	

LWC - Base Sheet Attachment Rates

Peak Gust		Regional Wind Speed							
Wind Speed	Up to 120 mph			121 mph or greater					
Coverage	Lap	Field/Perimeter	Corner	Lap	Field/Perimeter	Corner			
55 mph	35″ Rows, 9″ o.c.	2 Rows, 12″ o.c. Stagered 18″ o.c. Spacing	3 Rows, Equally Spaced, 16″ o.c. spacing	35″ Rows, 9″ o.c.	2 Rows, 12″ o.c. Staggered, 16″ o.c. spacing	3 Rows, Equally Spaced, 14″ o.c. spacing			

InvisiWeld Attachment

General

Invisiweld is an induction welded system that requires the use of an induction welder to weld the InvisiWeld Plate to the UltraPly TPO or Elevate PVC membrane. It also requires the membrane horizontal seams to be heat welded with a standard automatic welder. Please consult the full Elevate UltraPly TPO Invisiweld and/or Elevate PVC and PVC KEE Invisiweld Application Guides for full instructions.

Induction Welded Membrane

Activate the weld between the roof membrane and InvisiWeld plate using the electromagnetic induction device as supplied by others. The induction coil, demarked by a red circle on the device, must be positioned over the center of the InvisiWeld plate, ± 1" (25 mm). When the induction welding cycle is complete, immediately place a magnetic

10/5/2023 Elevate Attachment Guide and Supplemental Increased Wind Speed Warranty Attachment Guide

cooling clamp over the welded roof membrane and plate assembly. This will ensure that there is adequate clamping of the membrane to the plate during cooling, ensuring a good weld. The magnetic cooling clamp device must be left in place for at least 60 seconds while the weld cools and sets.

The magnetic cooling clamp will increase in temperature during continued use. This will cause damage to the membrane. Holcim recommends keeping a pail of cool, clean water near the installation area to dip the magnetic cooling clamp into to reduce its temperature.

Holcim recommends the use of a bathroom plunger to inspect the individual InvisiWeld plate welds. By applying the rubber end of a plunger to the membrane adjacent to the welded InvisiWeld plate and pulling upwards, the condition of the weld can be assessed. This is a good tool to ensure that no InvisiWeld plate welds were missed during roofing.

Heat Welded Membrane Seams

Horizontal field splices, these areas are to be welded first. Wherever possible, all field splices on the horizontal surface (including flashing) should be completed using an automatic heat welder that has been designed for hot air welding of thermoplastic membranes. Seams made with the automatic welder shall be a minimum of 11/2" (38 mm) wide. Seams made with hand welders shall be a minimum of 2" (50 mm) wide. Use silicone hand rollers to assure proper mating of surfaces as hand welding proceeds. On vertical surface welds, or where an automatic welder is not practical, hand welders shall be used. Avoid overlapping membrane seams with plate locations. The plates may cause the robotic welder to jump when it hits the plates affecting the quality of the seam completed by the robotic welder.

InvisiWeld Fastener Patterns

On standard InvisiWeld projects, fastening rates may be listed as per board, contributory area, or linear rows. Fastening rates and/or patterns should be followed when outlined in a tested assembly. Refer to details TPO-IW-7 or PVC-IW-7 for InvisiWeld plate patterns approved for warranted applications. Please contact a Holcim Regional Technical Coordinator if specific patterns are not represented within the referenced details.



10/5/2023 Elevate Attachment Guide and Supplemental Increased Wind Speed Warranty Attachment Guide



Thirty (30)



InvisiWeld Warranty Requirements

The attachment rates below are for standard Red Shield Warranty requirements. Increased Wind Speeds, specific uplift requirements or other codes or specifications may alter the attachment rates listed below. The more stringent attachment rates should be used in this case. Contact your Building System Advisor for specific questions.

Red Shield Warranty	Field	Perimeter	Corner	Assembly	Fasteners
5, 10 or 15 Year ²	6	0	10	Rates based on Elevate ISO 95+/ISOGARD GL as the top	
20 Year ³	0	9	12	layer installed. Cover board choice may alter these rates.	HD Fasteners
25 and 30 Year⁵	6	10	16	Rates for specific assemblies should be validated.	1 dotenero
NOTE					

NOTE:

1. Rates above are based on contributory area rates.

2. 0.045" (1.14 mm) thick TPO and 0.050" (1.27 mm) thick Elevate PVC or PVC KEE approved for 15-year warranties.

- 3. 0.060" (1.52 mm) thick TPO or greater required for 20-year warranties.
- 4. 0.060" (1.52 mm) thick or greater TPO, PVC or PVC KEE required for any increased wind speed warranties.
- 5. 0.080" (2.03 mm) thick UltraPly TPO required for 25 and 30-year warranties.
- 6. 0.060" and 0.080" (1.52 mm and 2.03 mm) Elevate PVC or PVC KEE approved for 20-year warranties.
- 7. If the RoofNav listing has linear rows listed instead of contributory area, decrease the spacing between rows by a minimum 67% for the perimeters and 50% for the corners.
- 8. Elevate All-Purpose (AP) Fasteners are not approved for use on Invisiweld Applications into Steel Decks.
- 9. Elevate #12 Fasteners are not approved for use on InvisiWeld Applications.

InvisiWeld Enhancement Requirements

On standard InvisiWeld projects, Elevate fasteners and InvisiWeld Plates are to used. It is important to be aware that the standard enhancements must carry over to the next board as shown by the example below. The required perimeter enhancement will be defaulted to in the field area if the perimeter board extends into that area. The same is true for the corner enhancements. All-Purpose Fasteners are not approved for use on Invisiweld Applications into Steel Decks. The zone layouts shown below are for example purposes only. Actual layout requirements may vary based on project conditions.



Metal Building Re-Cover (MBR) - InvisiWeld Attachment Rates - Standard Warranty

Membrane must be attached to InvisiWeld Plates that are installed directly into purlins with Elevate Purlin Fasteners at a minimum of 10' o.c. in the field (every other purlin) and 5' o.c. for perimeter and corner (every purlin) areas. Fastening rates may vary based on conditions. Specific uplifts, code conditions or wind speed requirements may alter the requirements, in this case the more stringent requirements should be followed. The zone layouts shown below are for example purposes only. Actual layout requirements may vary based on project conditions.

Metal Building Re-Cover

Worrenty Longth	Matarial	Attachment Method	Roof Zone			
warranty Length	material	Attachment Method	Field	Perimeter	Corner	
Up to 20 Years	Membrane	Purlin Fastener	12" o.c.	6" o.c.	6" o.c.	
	Cover Board/Insulation	Heavy Duty (HD)	5	5	5	
Added Air Retarder*	N/A	Heavy Duty (HD)	8	12	16	

* The use of an Air Retarder requires that the cover board/insulation pre-securement be increased to accommodate the added uplift the system may experience due to the retarder. Proper application details for the air retarder should be followed.



Metal Building Re-Cover – Mechanically Attached FM Enhancement Options

Factory Mutual Loss Prevention Data Sheet 1-31 - 3.1.4.1

It is not practical to provide additional rows of fasteners for re-cover systems in which the mechanically attached, single-ply roof cover is secured directly to the purlins because the existing purlins are at a fixed distance, typically 4' to 6' (1.2 m to 1.8 m) on center. For these cases it is acceptable to increase the fastening density of the new single-ply roof cover by decreasing the spacing between fasteners along each fastener row or batten bar in the specific zones. The fastener spacing should be a minimum of 60% (perimeter) and 40% (corner) of the FM Approved spacing but no closer than 3" oc. Pre-secure the insulation per DS 1-29. **NOTE:** Not intended to be used with Invisiweld Systems.

Example:

- Reduce the perimeter fastener spacing to a maximum of 60% of the field spacing.
- Field = 12" o.c. Perimeter = 12" x .6 = 7.2" (round down if necessary)
- Reduce the corner fastener spacing to a maximum of 50% of the field spacing.

Field = 12" o.c. – Corner = 12" x .5 = 6" (round down if necessary) **NOTE:** Refer to tested assembly to validate FM Approved fastening rates for insulation installed over an existing metal building.

Standing Seam Roof (SSR) Factory Mutual (FM) Inseam Enhancement Options

- 1. Find a tested assembly that meets each or all three zones of the roof.
- 2. For SSR in regions not prone to tropical cyclones, secure the system as required for the field of the roof in accordance with RoofNav. In the perimeter and corner areas, use a purlin and internal clip spacing that is a maximum of one-half and one-third that required for the field of the roof, respectively.
- 3. For SSR in regions prone to tropical cyclones, see Factory Mutual LPDS 1-31 Section 2.2.2.2 B and 2.2.2.3.

Ballast Warranty Requirements

The ballast rates below are for standard Red Shield Warranty requirements. See product specific Design and Application Guides along with details and related technical documents for additional information. Project conditions, increased wind speed warranties, specific uplift requirements or other codes or specifications may alter the attachment rates listed below. The more stringent attachment rates should be used in this case. Contact a Holcim Regional Technical Coordinator for specific questions. Regarding size and roughness of stone ballast refer to local building codes, the ANIS/SPRI Wind Design Standard for Ballasted Single-ply Roofing Systems RP-4 or Factory Mutual Loss Prevention Data Sheet 1-29 for information regarding stone ballast requirements on loose laid sing-ply roofing systems. Building height, parapet height and exposure category may impact allowance of ballast systems.

Chart of Minimum Coverage Requirements for Various Ballast Gradations							
ASTM Size No. Stone	Nominal Size	Minimum Acceptable Coverage					
4 (Elevate Minimum)	³ ⁄4 " (19 mm) to 1 ½" (38 mm)	10 lb/ft ² (49 kg/m ²)					
3	1" (25 mm) to 2" (51 mm)	10 lb/ft² (49 kg/m²)					
2	1 1⁄2" (38 mm) to 2 1⁄2" (63 mm)	13 lb/ft² (63.5 kg/m²)					
1	1 1⁄2" (38 mm) to 3 1⁄2" (89 mm)	16 lb/ft ² (78 kg/m ²)					
ASTM Size No. Stone	Nominal Size	Minimum Acceptable Coverage					
Δ	Standard Concrete Pavers	18 lb/ft² (88 kg/m²)					
4	Interlocking, Beveled, Doweled or Contoured Fit LWC Pavers	10 lb/ft² (49 kg/m²)					
2	Concrete Pavers	22 lb/ft ² (107 kg/m ²)					
2	Interlocking, Beveled, Doweled or Contoured Fit LWC Pavers	10 lb/ft ² (49 kg/m ²)					

Ballast Roof Zones:

Zone 1' (Field Prime) and Zone 1 (Field): Remainder

Zone 2 (Perimeter) and Zone 3 (Corner): Width equal to at least 60% of the roof height, but not less than 8.5 ft (2.6 m) or 4% lesser plan dimension



Increased Wind Speed Warranty Attachment Guide

October 2023

NOTE: The contents of this guide are considered accurate at the 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 Holcim Regional Technical Coordinator prior to its use.

Elevate Increased Wind Speed Warranty Minimum Attachment Rate Guide

The following document outlines the required attachment rates and conditions that Holcim Solutions and Products US, LLC looks for to issue a warranty that contains increased wind speed coverage. When the project requires specific codes and/or uplifts to be met the attachment rates below may not be appropriate. Review of the specific project conditions and specifications should be completed, and all pertinent information must be provided to Holcim prior to the project being bid on or installed. Failure to do so may result in required changes to the bids, products used, installation and/or possible denial of warranty coverage. Not all conditions are covered in this document. Please contact an Elevate Sales Representative or a Holcim Regional Technical Coordinator for conditions or information not found in this document.

Due to unknown variables associated with each building structure, Holcim suggests a licensed engineer to verify all attachment rates are appropriate for the specific project requirements. It is the responsibility of the Architect, Design Professional, Engineer and/or Building Owner to verify that the installed roofing system and related components are installed to meet the specified requirements of the International Building Code, State and Local codes and other related requirements. It is the responsibility of the specifier to review local, state, and regional codes to determine their impact on the specified system. Drainage must be evaluated by the specifier in accordance with all applicable codes. For code compliance, increased fastening density may be required depending upon project wind speed and wind uplift requirement. Subject to code requirement, it is recommended that a minimum roof slope of 1/8" per horizontal foot be provided to serve long-term aesthetics.

Metal-Edge Systems and Copings should be designed in compliance with Section 1504.5 of the International Building Code and shall be tested in accordance with ANSI/SPRI ES-1. Shop fabricated or factory formed metal is required for increased wind speed warranties over 90 mph. Contact a Holcim Regional Technical Coordinator when this condition is in question.

Projects that require specific codes or uplift pressures may require additional enhancements. Attachment rates may vary from those listed in these documents. In such cases the more stringent fastening rates apply.

Wind Speed and Uplift are not interchangeable. Please be sure to present a Holcim Regional Technical Coordinator with the projects calculated uplift requirements along with the desired wind speed request.

Please note that Regional Wind Speeds are mentioned in the tables below. These values can be found using several sources. ASCE, IBC and FM are a few examples. The ASCE 7-10 Basic Wind Speeds per risk category have been provided at the end of this document. Holcim references the Basic Wind Maps found in Factory Mutual Loss Prevention Data Sheet 1-28 which can be found within the Factory Mutual RoofNav application (www.roofnav.com).

Re-Cover and Re-Roof projects may not qualify for increased wind speed warranties. These applications will require at least one layer of new insulation/cover board to be mechanically attached to the structural deck. Documented Pull Tests are required on all projects where the deck type cannot be validated or on projects that are re-cover/re-roof applications.

Alaska, Hawaii, and International Projects

Contact a Holcim Regional Technical Coordinator or your Elevate Sales Representative for further information.

Metal Roofing

Contact a Holcim Regional Technical Coordinator or your Elevate Sales Representative for further information.

Asphalt or Mod-Bit Roofing

- Attachment rates for the insulation and cover boards will be the same as those listed in the insulation and cover board attachment rate table located at the end of this document.
- Warranty requests with wind speeds greater than 90 MPH will require hot asphalt or torched membrane applications.
- ISO 95+ GL[™] / ISOGARD[™] GL or ISOGARD HD is not an acceptable substrate for torched membranes.
- All systems that utilize hot asphalt or torched attachment of cap/base sheets require a suitable cover board to be used.

• If hot asphalt or torch applied base sheet are to be installed then a suitable cover board must be placed over ISO 95+GL / ISOGARD GL in the assembly.

General Notes

- Warranty requests of 25-30 years may require additional requirements. Review project requirements with a Holcim Regional Technical Coordinator.
- All assemblies that require an increased wind speed greater than 90mph require the addition of a cover board. Cover board thickness ¹/₂" or minimum. 90-99 mph request will require a minimum of 2" ISO 95+ GL / ISOGARD GL to be used if no cover board is present.
- Projects located in HVHZ, coastal or other high wind zones may require additional enhancements.
- Peel stop details may be required. Please review the Peel Stop section of this document or contact a Holcim Regional Technical Coordinator for more information.
- Projects that require specific uplift pressures may require additional enhancements. Attachment rates may vary from those listed in these documents. In such cases the more stringent fastening rates apply.
- The use of an air barrier is highly recommended on systems with 100 mph or greater wind speed coverage added. Six (6) mil poly is acceptable. The use of air barriers requires mechanical attachment of at least the base layer of insulation.
- The use of air barriers may result in increased fastening rates. Consult a Holcim Regional Technical Coordinator for more information.
- Some assemblies may not be acceptable over improperly designed decks. Contact Holcim Regional Technical Coordinator for specific requirements.
- Elevate Water Based Bonding Adhesive P and Elevate PVC Water Based Bonding adhesive is only approved for use on warranties up to 15 years and with a maximum wind speed coverage of 55 mph.
- Required fastener pullout values: Adhered Membrane ≥ 300 lb -or- Mechanically Attached ≥ 400 lb.
- Pulls for mechanically attached membrane must be minimum 400 lb (documented). Pull values under listed requirement require attachment into the truss/structure.
- Platinum warranties require a minimum of 1" of ISO 95+ GL / ISOGARD GL be installed over the deck.
- HailGard[™] Fasteners are to be used with HailGard/ISOGARD HG insulation, OSB or Plywood insulation/cover boards only.
- FM Insured projects do not allow perimeter half sheets to be used around the entire perimeter. The "Finger" method of attachment at the appropriate locations is acceptable. Alternate attachment rates and methods may be required.
- Holcim recommends the use of the "Finger" method of attachment on mechanically attached membranes when increased wind speeds are to be warranted.
- When oriented strand board (OSB) is to be used the smooth side of the board should be placed up.
- Ballasted systems (stone ballast paver or heavy-weight pavers (90 lb minimum)) may qualify for up to 72 mph increased wind speed coverage on buildings with 30 ft. height or less when installed per the Holcim approved guidelines.
- Systems using decorative ballast, decorative pavers or garden roofing do not qualify for increased wind speed warranties.
- Jet Bond Spray Adhesive is approved for increased wind speed coverage up to 120 MPH within an approved assembly.
- Jet Bond PVC Spray Adhesive is approved for use with Elevate PVC (non-fleece) Membrane only. Jet Bond PVC Spray Adhesive is approved for increased wind speed coverage up to 90 MPH within an approved assembly.
- RubberGard EPDM SA and UltraPly TPO SA may qualify for Increased Wind Speed Warranties up to 120 MPH when used in an approved assembly.
- Base tie-in attachment spacing to match membrane attachment spacing on increased wind speed warranties.

Edge Metal Requirements

Elevate metal must be used and installed per Elevate details and standards for warranty inclusion. ES-1 certified metal and details are required for increased wind speed warranties over 80 mph. Contractors participating in the Holcim ES-1 Metal Cleat Program may receive up to 90 mph coverage for qualifying products. To meet Holcim's technical specifications, all edge metal, metal copings and edge systems whether field fabricated, shop fabricated, or factory formed should be designed in compliance with the International Building Code (IBC) and be tested/installed in accordance with ANSI/SPRI/FM4435/ES-1 standard and requirements. Reference the tables below for more available warranty terms and wind speed coverage options.

Flevate Edge Metal and Flash	ing Warranty	/ Breakdown*
		Dioditaomi

Material	Included in Red Shield	Warranty and Terms
Elevate Metal – Field Fabricated	Yes	Max. 20-Years, 80 mph Installed per current Elevate details/guidelines. (No increased wind speeds when installed per non-Elevate guidelines.)
Elevate Metal – Shop Fabricated (ES-1 Metal Cleat Program)	Yes	Max. 20-Years, up to 90 mph Installed per current Elevate details/guidelines. Factory Cleat required (ANSI/SPRI ES-1).
Factory Formed – Other Suppliers (Using Elevate Metal)	Yes	Max. 20-Years, 90 mph Elevate metal purchased direct from approved factory fabricator.
Elevate Branded Metal – Factory Formed	Yes	Max. 30-Years, up to 120 mph Factory formed Elevate Metal and accessories, installed per current details/guidelines. Elevate branded and purchased from Elevate.
*Saa warranty aampla far apaaifia aa		

*See warranty sample for specific coverage.

Elevate Warranted Pre-Engineered Edge Metal Systems							
Red Shield Platinum (30 Year)	Red Shield (25 Year)	Red Shield (5 – 20 Year)					
	Fascia						
Elevate AnchorGard® SP Fascia	Elevate SP Rail Fascia	Elevate Gravel Stop					
Elevate AnchorGard® SP Extended Fascia	Elevate MB Rail Fascia	Elevate Drip Edge					
Elevate AnchorGard® SP HG Fascia	Elevate Extended SP Rail Fascia	Elevate TPO Coated Drip Edge					
Elevate AnchorGard® Canted WD Fascia	Elevate Extended MB Rail Fascia	Elevate PVC Coated Drip Edge					
Elevate AnchorGard® Canted Nailer Fascia	Elevate Snap-On Fascia	Elevate TPO Skirted Drip Edge					
Elevate AnchorGard® Extended Canted WD Fascia	Elevate System 300 Fascia	Elevate PVC Skirted Drip Edge					
Elevate AnchorGard® Extended Canted Nailer Fascia	Elevate EdgeGard+ Fascia	Elevate Flash-Thru Drip Edge					
Elevate AnchorGard® SP Butyl Strip Fascia	Elevate EdgeGard+ Crimp Fascia	Elevate Extender					
Elevate AnchorGard® HG Butyl Strip Fascia		Elevate Extender with Offset					
Elevate AnchorGard® Drip Edge							
Elevate AnchorGard® MB Fascia							
Elevate AnchorGard® MB Extended Fascia							
Elevate AnchorGard® MB HG Fascia							
Elevate AnchorGard® Platinum Fascia							
Elevate AnchorGard® Platinum Extended Fascia							
Elevate AnchorGard® Platinum HG Fascia							
	Coping						
Elevate Coping	Elevate Snap-On Coping	Elevate Continuous Cleat Coping					
Elevate Gold Coping	Elevate Snap-On Gold Coping	Elevate Flush Face Coping					
	Elevate One Coping	Elevate Single Cantilever Coping					
		Elevate Dual Cantilever Coping					
		Elevate Double Tapered Coping					

Elevate Warranted Pre-Engineered Edge Metal Systems (Continued)										
Red Shield Platinum (30 Year)		Red Shield (25 Year)	Red Shield (5 – 20 Year)							
Wood Nailer Alternatives										
Elevate AnchorGard® Nailer-T										
Elevate Edgebox RI										
ES-1 Cleat Program										
			Elevate ES-1 Drip Edge							
			Elevate ES-1 Gravel Stop							
			Elevate ES-1 Flat Coping							
			Elevate ES-1 Snap-On Fascia							
			Elevate ES-1 Tapered Coping							
	Stan	dard Warranty - Other								
Elevate Termination Bar*			Elevate Metal Field Fab (NIP)							
Elevate Drain Bar*										
Elevate Clad Metal Field Fab (NIP)*										
*Per Elevate Platinum Details										
Increased Wind Speed Coverage - Edge Metal to be included in Red Shield Warranty Coverage										
Up to 55 mph	Up t	o and including 90 mph	Up to and including 120 mph							
NOTE:	<u></u>									

1. Non-Elevate metal is **NOT** included in the Red Shield Warranty.

Hurricane-Prone Regions and Special Wind Regions

Engineer review of project conditions and attachment rates required for projects located in Special Wind and Hurricane-Prone Regions



Increased Wind Speed Warranty Attachment Requirements

UUVEI DUA	ru/ Insulation Attachment nates - Aunereu om	igie-riy menibrai	ie noornig oysteilis		
Peak Gust		Insulation/Su	bstrate Attachment		
Wind Speed Coverage	Minimum Insulation/Substrate	Min. # of Fasteners per 4' x 8' board ¹	Adhesive Ribbon Spacing 4' x 4' boards		
	1/4" DensDeck [®] Prime	12			
	5/8" DensDeck StormX Prime	12]		
	1/4" Securock®	12			
72 – 80 mph	1/2" ISOGARD HD	12	F12 – P6 – C6		
	≥ 2″ ISOGARD GL/ISO 95+ GL or ISOGARD CG/RESISTA	8			
	2" ISOGARD HD Composite	8			
	HailGard/ISOGARD HG or OSB	16	-		
	1/2" DensDeck Prime	12			
	5/8" DensDeck StormX Prime	12			
	1/2" Securock	12			
90 mph	≥ 2" ISOGARD GL/ISO 95+ GL or ISOGARD CG/RESISTA	12	F12 – P6 – C4		
	1/2" ISOGARD HD	16			
	2" ISOGARD HD Composite	2" ISOGARD HD Composite 12			
	HailGard/ISOGARD HG or OSB	16	-		
	5%" DensDeck Prime	16			
	5%" DensDeck StormX Prime	16			
	5%" Securock	16			
100 mph	≥ 2" ISOGARD GL/ISO 95+ GL (25 psi) or ISOGARD CG/RESISTA (25 psi)	16	Full Spray or		
	1/2" ISOGARD HD	16	Ribbons 4" o.c.		
	11/2" HailGard/ISOGARD HG	18			
	7/16″ OSB	18			
	2" ISOGARD HD Composite	16			
	5/8" DensDeck Prime	16			
	5%" DensDeck StormX Prime	16			
110	5⁄8″ Securock	16	Full Spray		
110 mpn	1/2" ISOGARD HD	24	Or Dibbono 4" o o		
	Min. 11/2" HailGard/ISOGARD HG	18	Ribbolis 4 o.c.		
	7/16" OSB	18	-		
	5% " DensDeck Prime	24			
	5/8" DensDeck StormX Prime	24	Full Spray		
120 mph	5⁄8" Securock	24	or		
	Min. 11/2" HailGard/ISOGARD HG	24	Ribbons 4" o.c.		
	7/16″ OSB	20]		

NOTE:

- Due to unknown variables associated with each building structure, Holcim Solutions and Products US, LLC suggests a
 licensed engineer to verify all attachment rates are appropriate for the specific project requirements. It is the
 responsibility of the Architect, Design Professional, Engineer and / or Building Owner to verify that the installed roofing
 system and related components are installed to meet the specified requirements of the International Building Code, State
 and Local codes and other related requirements. For code compliance, increased fastening density may be required
 depending upon project wind speed and wind uplift requirement.
- 2. All pertinent information regarding code requirements, uplift requirements and special conditions should be disclosed at the time of project review, bid and system approval. Lack of the appropriate information may result in increased costs associated with changes required to meet the code or warranty requirements.
- 3. This chart is only to be used for buildings with heights at 60' height or less. Buildings over 60' require design data and project specifications be provided.
- Projects located in Hurricane-Prone and / or Special Wind Regions (See Map Below), may require additional project enhancements. Projects in these locations must be reviewed by a Holcim Regional Technical Coordinator for approval*.

SEE ADDITIONAL NOTES ON THE NEXT PAGE

Additional Notes

- See Elevate Edge Metal and Flashing Warranty Breakdown table and the Elevate Warranted Pre-Engineered Edge Metal Offering warranty coverage table for warranty term and increased wind speed coverage options.
- Buildings with heights between 51'-100' increase perimeter/corner zones to a minimum 12' wide* and increased board fastening rates by no less than 50% more fasteners/plates, maximum 32 fasteners per board*.
- The base layer of insulation, when mechanically attached, must be a min. of 2" to use listed fastening above if the additional insulation or cover board is to be adhered. 1/2" 3/4" diameter bead required on all adhesives unless otherwise noted*.
- Assemblies with insulation adhered directly to the steel deck may qualify for a maximum of 80 mph at an attached rate of 12/6/4 inches on center. Deck must be clean, with oils or residue removed. Ensure adhesives is applied to top of ribs in this minimum bead spacing.
- FM does not recognize adhesion of insulation materials direct to steel decks. Alternate attachment methods may be required*.
- Building heights over 60' may require increased fastening rates over what is listed above*.
- Attachment rates may change based on uplift requirements for the specific project.
- The attachment rates listed in this table are for warranty purposes only.
- The attachment rates listed in this table are for new construction only.
- Re-Roof or Recover attachment rates may vary based on project conditions, pull test values and other related information*.
- Peel Stops may be required on any increased wind speed warranty at or over 90 mph*.
- Warranty requests of 25 30 years may include additional requirements*
- RubberGard EPDM SA and UltraPly TPO SA may qualify for Increased Wind Speed Warranties up to 120 MPH when used in an approved assembly.
- Deck Requirements
 - o Steel Decks Minimum 22 ga, 33 ksi
 - o Concrete Decks Smooth/Dry concrete deck is required.
 - $\,\circ\,$ Wood Decks New or Like New Deck required and pull tests validated.
 - $_{\odot}\,$ LWC over Steel/Concrete Maximum increased wind speed of 90 mph.
- Wood, Gypsum, Tectum and LWC/LWIC Deck type may require additional fasteners than what is listed above*.
- Gypsum and Cementitious Wood Fiber deck Min. bead spacing F6-P4-C4 inches on center for increased wind speeds, 90mph max.
- Re-Cover over existing insulated systems that contain a base sheet and/or insulation materials (adhered/attached) require mechanical attachment of an approved base sheet or at least one layer of insulation/cover board into an approved deck.
- Re-Cover over a gravel surface BUR (direct to deck) may be approved, subject to the following:
 - Adhesion tests must be performed. Document the successful results and provide them to your Holcim Regional Technical Coordinator for approval.
 - o If adhesion tests are not favorable, an approved primer or mechanical attachment may be required.
 - If approved:
 - o Power Wash, Power Broom, Spud/Scrape existing gravel to make the surface as smooth as possible.
 - Any damaged, wet, loose, or otherwise compromised components of the existing system must be replaced with like materials.
 - Adhesive rates increase to full coverage (FS).
 - o Limited to max. 90 mph with approval.
- A Re-Cover over a Granule Surface BUR (Direct to Deck) may be approved, subject to the following:
 - Adhesion tests must be performed. Document the successful results and provide them to your Holcim Regional Technical Coordinator for approval.

 $_{\odot}\,$ If adhesion tests are not favorable, an approved primer or mechanical attachment may be required.

- If approved:
- o Broom existing surface to ensure it is as clean as possible and all loose granules are removed.
- Any damaged, wet, loose, or otherwise compromised components of the existing system must be replaced with like materials.
- Adhesive rates increase to full coverage (FS).
- o Limited to max. 90 mph with approval.
- Contact a Holcim Regional Technical Coordinator when building conditions are not outlined by the information listed in this document.
- Use of Elevate #12 Fasteners are not approved for use in re-cover systems when asphalt is present without a validated moisture scan showing dry installation conditions.

*Please validate with a Holcim Regional Technical Coordinator

Ballasted Roofing Systems

Stone, Elevate Ballast Pavers, and Heavy-Weight (90 lb) Paver Ballast

Holcim increased wind speed coverage for ballasted roofing systems is limited to 72 mph on buildings with a height of 30 feet or less and following the outlined information below. Ballast weight must be increased to accommodate the increased risk associated with higher winds. All increased wind speed warranty requests are subject to review by the Holcim Regional Technical Coordinator. It is the responsibility of the building owner to validate that the structure can support the added weight of the ballast material. Holcim is not responsible for any movement or scouring of ballast materials. Holcim is not responsible for any ballast materials falling/flying off the roof. Elevate PVC and PVC KEE membranes are not approved for ballast applications.

Stone Ballast

- A minimum continuous parapet height from the finished roof of 36 inches is required.
 - If minimum height cannot be met, then heavy-weight (90 lb min.) concrete pavers are required in all perimeter/corner areas.
- The weight of stone ballast must be a minimum of 12/15/18 lb/ft in corresponding Field/Perimeter/Corner zones.

Paver Ballast

- A minimum continuous parapet height from the finished roof of 36 inches is required.
- Elevate Ballast Pavers are acceptable when installed per Elevate installation instructions, details, and other guidelines.
- Elevate SkyPaver composite roof paver products are not considered a valid ballast option.

Please contact a Holcim Regional Technical Coordinator for further information.

Half Sheet Information

Warranty

The information listed in the tables below is approved for Red Shield Warranty purposes only. The half sheet totals used below do not indicate compliance to building codes or other specific compliance. The designer, architect and building owner should validate the system installed to be appropriate per all local, state, and national building code requirements.

See the ASCE 7 Roof Zones section to determine code compliant roof zones and perimeter width requirements.

Increased Wind Speed System Options – UltraPly TPO

UltraPly TPO Mechanically Attached or Adhered Membrane Options

	Warranty Wind Speed Coverage – Membrane Attachment									
Warranty Length	55, 72 & 80 mph		90 mph		100 mph		110 to 120 mph		Thickness	
	Adhered	Mech. Attached	Adhered	Mech. Attached	Adhered	Mech. Attached	Adhered	Mech. Attached	(Minimum)	
5, 10	1	√	N/A	N/A	N/A	N/A	N/A	N/A	45 mil	
or 15 years	\checkmark	√	\checkmark	√	\checkmark	√	\checkmark	N/A	60 mil	
20 years	√	√	\checkmark	√	\checkmark	√	\checkmark	N/A	60 mil	
25 years	√	✓	\checkmark	1	\checkmark	√	\checkmark	N/A	60 mil	
30 years	\checkmark	\checkmark	\checkmark	1	\checkmark	1	\checkmark	N/A	80 mil	

NOTE:

- 1. Wind speeds over 80 mph require the use of 60-80 mil membranes.
- 2. At wind speeds of 100 MPH maximum sheet size of 8' allowed, attached at a maximum of 6" o.c.
- 3. At wind speeds of 110-120 MPH, Elevate InvisiWeld Attachment only for mechanically attached systems.
- 4. 45 mil UltraPly TPO is only acceptable on 5, 10 and 15-year warranties up to 80 mph.
- 5. UltraPly TPO XR adhered with Twin Jet in spatter application is not approved for Increased Wind Speeds over 90MPH.
- 6. Warranty requests of 25 30 years may require additional requirements. Review project requirements with a Holcim Regional Technical Coordinator.
- 7. Refer to the appropriate version of the ASCE for wind maps not found within this document.
- 8. Location-specific basic wind speeds shall be permitted to be determined using www.atcouncil.org/windspeed.
- 9. See adhered membrane table for coverboard requirements for mechanically attached and Invisiweld attached systems.

TPO - Steel/Concrete - 22 ga Steel Deck or 2,500 psi Structural Concrete Decks											
Peak Gust Wind Maximur Speed Coverage Roof Heig	Maximum	Min. # Perime Regional W	eter Sheets by /ind Speeds	Field Sheet	Perimeter Sheet	Fastening					
	Root Height	Up to 120 mph	121 mph or Greater	Size (width)	Size (width)	Rate					
				12'-4″	6'	6" o.c.					
	< 60'	2	2	10'	5'	12" o.c.					
	< 00	2	5	8'	5'	12" o.c.					
72 90 mph				5'	-	12" o.c.					
72 - 60 mpn				12'-4″	6'	6" o.c.					
	≥ 60'	4	5	10'	5'	12" o.c.					
				8'	5'	12" o.c.					
				5'	-	12" o.c.					
				10'	5'	6" o.c.					
	< 60'	3	4	8'	5'	12" o.c.					
00 mph				5'	-	12" o.c.					
90 mpn				10'	5'	6" o.c.					
	≥ 60'	4	5	8'	5'	12" o.c.					
				5'	-	12" o.c.					
	< 60'	1	5	8'	5'	6" o.c.					
100 mph		4	5	5'	-	6" o.c.					
	> 60'	5	6	8'	5'	6" o.c.					
	- 00	5	0	5'	-	6" o.c.					
110 – 120 mph	< 60'		Invisiweld	Only - 12-20-30							

NOTE:

- 1. Wind speeds over 80 mph require the use of 60-80 mil membranes.
- 2. FM Insured projects do not allow perimeter half sheets to be used around the entire perimeter. The "finger" method of attachment at the appropriate locations is acceptable. Alternate attachment rates and methods may be required.
- 3. FM insured projects may not allow the attachment rates listed above. Validation using FM RoofNav should be used.
- 4. Ensure deck type/span allow for attachment rate shown above. When specific uplift pressures must be met, not all options above will be valid.
- 5. Building heights over 100' may require additional enhancements.
- 6. Heavy Duty or Heavy Duty Plus Fasteners are required on steel decks: minimum 33 ksi, 22 ga, 72" maximum deck span.
- 7. Concrete Drive Fasteners or Heavy-Duty Fasteners are required on concrete decks.
- 8. Warranty requests of 25 30 years may require additional requirements. Review project requirements with a Holcim Regional Technical Coordinator. Maximum 6" o.c. spacing for mechanically attached systems.
- 9. Refer to the appropriate version of the ASCE for wind maps not found within this document.
- 10. Location-specific basic wind speeds shall be permitted to be determined using <u>www.atcouncil.org/windspeed</u>.
- 11. See adhered membrane table for coverboard requirements for mechanically attached and Invisiweld attached systems.

TPO – Woo	d Decks						
Peak Gust Wind Speed	Deck Type	Max. Roof	Min. # Peri Regional	Min. # Perimeter Sheets by Regional Wind Speeds		Perimeter Sheet Size (Width)	Fastening
Coverage		Height	Up to 120 mph	121 mph or Greater	OIZO (Width)	0120 (Whath)	Hato
	5∕8″ OSB	< 60'	2	3	12'-4" 10'	6' 5'	6" o.c. 6" o.c.
		≥ 60'	4	5	8' 5'	5'	12" o.c. 12" o.c.
	15/32″	< 60'	2	3	12'-4" 10'	6' 5'	6" o.c. 6" o.c.
72-80 mph	Plywood (3-Ply)	≥ 60'	4	5	8' 5'	5'	12" o.c. 12" o.c.
	15/32" Plywood (5-Ply)	< 60'	2	3	12'-4" 10'	6' 5'	6" o.c.
		≥ 60'	4	5	8' 5'	5'	12" o.c.
	5/ # 000	< 60'	3	4	10'	5'	6" o.c.
	%8″ USB	≥ 60'	4	5	8' 5'	-	12" o.c. 12" o.c.
90 mph	15/32" Plywood	< 60'	3	4	10' 8'	5'	6" o.c.
50 mpn	(3-Ply)	≥ 60'	4	5	5'	-	12" o.c.
	15/32" Plywood	< 60'	3	4	10' 8'	5'	6" o.c.
	(5-Ply)	≥ 60'	4	5	5'	-	12" o.c.
100 mph	Wood Plank ³ ⁄4" min. (T&G)	< 60'	3	4	5'	5'	6" o.c.
	h Wood Plank 3/4" min. (T&G) 2 x 6 Plank 2 4 15/32" 4 15/						

NOTE:

1. Fire Treated Plywood may be used provided it has not been treated with Ammonium Phosphates.

2. Wood deck condition must be new or like new. No wet, damaged, dry rot or severely punctured decking allowed.

3. Wind speeds over 80 mph require the use of 60-80 mil membranes.

4. FM Insured projects do not allow perimeter half sheets to be used. Alternate attachment rates and methods may be required.

5. 20 Year maximum warranty term (new construction) on OSB decks.

6. Minimum 1" deck penetration with all fasteners.

7. Warranty requests of 25 - 30 years may require additional requirements. Review project requirements with a Holcim Regional Technical Coordinator. Maximum 6" o.c. spacing for mechanically attached systems.

8. Refer to the appropriate version of the ASCE for wind maps not found within this document.

9. Location-specific basic wind speeds shall be permitted to be determined using www.atcouncil.org/windspeed.

10. See adhered membrane table for coverboard requirements for mechanically attached and Invisiweld attached systems.

TPO - LWC over Steel/Structural Concrete - UltraPly TPO Membrane Mechanically Attached into Min. 22 ga Steel Pan/Deck or 2,500 psi Structural Concrete

Peak Gust Wind Speed	Deck Type	Max. Roof	Min. # Peri Regional	neter Sheets by Wind Speeds	Field Sheet Size	Perimeter Sheet Size	Fastening
Coverage		Height	Up to 120 mph	121 mph or Greater	(Width)	(Width)	Rate
72.90 mph	Steel Pan/Deck	60'	2	2	10'	5' 5'	6" o.c.
72-80 mph	Structural Concrete	60'	2	2	o 5'	-	12 0.c. 12" o.c.
90 mph	Steel Pan/Deck	60'	3		10'	5'	6" o.c.
	Structural Concrete			4	5'	-	12" o.c. 12" o.c.

NOTE:

- 1. Wind speeds over 80 mph require the use of 60-80 mil membranes.
- 2. FM Insured projects do not allow perimeter half sheets to be used around the entire perimeter. The "finger" method of attachment at the appropriate locations is acceptable. Alternate attachment rates and methods may be required.
- 3. Validate deck types/spans allow for attachment rate shown above. When specific uplift pressures are to be met not all options above will be valid.
- 4. Minimum 2" thick LWC
- 5. For Cellular Light Weight Concrete decks that are properly prepared and dry, Holcim does not require a vapor retarder, however one is recommended, if insulation is installed with the system.
- 6. Warranty requests of 25 30 years may require additional requirements. Review project requirements with a Holcim Regional Technical Coordinator. Maximum 6" o.c. spacing for mechanically attached systems.
- 7. Refer to the appropriate version of the ASCE for wind maps not found within this document.
- 8. Location-specific basic wind speeds shall be permitted to be determined using www.atcouncil.org/windspeed.
- 9. See adhered membrane table for coverboard requirements for mechanically attached and Invisiweld attached systems.

UltraPly TPO - Invisiweld Attachment Requirements

Deals Quet Wind Sheed Coverage	Attachment Rate Per Board				
Peak Gust wind Speed Coverage	Field	Perimeter	Corner		
72 mph	6	10	15		
80 mph	8	12	16		
90 – 100 mph	8	14	20		
110 – 120 mph	12	20	30		

NOTE:

- 1. Minimum 60 mil membrane required for warranties of 81 mph or greater.
- 2. Cover board required on wind speeds of 110 mph or greater. See adhered membrane table for type and thickness.
- 3. 45 mil UltraPly TPO is only acceptable on 5, 10 and 15-year warranties up to 80 mph.
- 4. FM Insured projects may require alternate attachment rates or patterns than those listed above.
- 5. Attachment rates listed above may change due to specific uplift requirements.
- 6. Attachment rates above may change due to specific substrate used.
- 7. Attachment rates above may change due to warranty length requested.
- 8. Attachment rates above may change due to the addition of a vapor/air barrier (retarder).
- 9. Warranty requests of 25 30 years may require additional requirements. Review project requirements with a Holcim Regional Technical Coordinator.
- 10. Refer to the appropriate version of the ASCE for wind maps not found within this document.
- 11. Location-specific basic wind speeds shall be permitted to be determined using www.atcouncil.org/windspeed.
- 12. See adhered membrane table for coverboard requirements for mechanically attached and Invisiweld attached systems.

Metal Building Re-Cover – Increased Wind Speed Min. Requirements (20 Year max.)²

Wind Creed	Motorial	Attachment Method	Roof Zone			
wind Speed	Material	Attachment Method	Field	Perimeter	Corner	
72 – 80 mph	Mombrono Every Durlin	Durlin Footonor	10"	6"	6"	
90 mph	Membrane – Every Purtin	Purlin Fastener	12 O.C.	6 0.C.	0 0.C.	
72 – 90 mph	Cover Reard/Inculation		8	8	8	
Added Air Retarder ¹	Cover Board/Insulation	neavy Duty (nD)	8	12	16	

NOTE:

1. The use of an Air Retarder requires that the cover board/insulation pre-securement be increased to accommodate the added uplift the system may experience due to the retarder. Proper application details for the air retarder should be followed.

2. Rates listed in this table are for warranty purposes only and may change based on project conditions, relevant building codes, or when performance requirements must be validated.

Increased Wind Speed System Options – Elevate PVC and PVC KEE

Increased Wind Speed System Options

Elevate PVC and PVC XR Adhered Membrane

Mannantu	Warranty Wind Speed Coverage – Membrane Attachment							
Length	55, 72 & 80 mph	90 mph	100 mph	110 to 120 mph	Thickness			
Longtin	Adhered	Adhered	Adhered	Adhered	(Minimum)			
5, 10 or 15	√	N/A	N/A	N/A	50 mil			
years	√	√	√	√	60 mil			
20 years	√	√	√	✓	60 mil			

NOTE:

1. Wind speeds over 80 mph require the use of 60-80 mil membranes.

2. Elevate 50 mil. PVC and PVC KEE membranes are limited to 15-year warranty coverage.

3. Elevate PVC Water Based Bonding Adhesive is only approved for use on warranties up to 15 years and with a maximum wind speed coverage of 55 mph.

Elevate PVC KEE, PVC KEE XR and PVC KEE XRT Adhered Membrane

Warranty Length	Warranty Wind Speed Coverage – Membrane Attachment							
	55, 72 & 80 mph Adhered	90 mph Adhered	100 mph Adhered	110 to 120 mph Adhered	Thickness (Minimum)			
5, 10 or 15	√	N/A	N/A	N/A	50 mil			
years	√	\checkmark	\checkmark	√	60 mil			
20 years	√	√	√	√	60 mil			
25 years	\checkmark	\checkmark	\checkmark	√	60 mil			
30 years	\checkmark	\checkmark	\checkmark	✓	80 mil			

NOTE:

1. Wind speeds over 80 mph require the use of 60-80 mil membranes.

2. Elevate 50 mil. PVC and PVC KEE membranes are limited to 15-year warranty coverage.

3. Elevate PVC Water Based Bonding Adhesive is only approved for use on warranties up to 15 years and with a maximum wind speed coverage of 55 mph.

Elevate PVC and PVC KEE Mechanically Attached

Morronty	Warranty Wind Speed Coverage – Membrane Attachment							
Length	55, 72 & 80 mph	90 mph	100 mph	110 to 120 mph	Thickness			
Longth	Mech. Attached	Mech. Attached	ed Mech. Attached Mech. Attached		(Minimum)			
5, 10 or 15	\checkmark	N/A	N/A	N/A	50 mil			
years	\checkmark	√	N/A	N/A	60 mil			
20 years	\checkmark	✓	N/A	N/A	60 mil			

NOTE:

1. Wind speeds over 80 mph require the use of 60-80 mil membranes.

2. Elevate 50 mil. PVC and PVC KEE membranes are limited to 15-year warranty coverage.

3. See adhered membrane table for coverboard requirements for mechanically attached systems.

PVC or PVC KEE – Min. 22 ga Steel Deck or 2,500 psi Structural Concrete Decks

Peak Gust Wind	Max Building	Min. # Perime Regional W	ter Sheets by 'ind Speeds	Field Sheet	Perimeter Sheet	Fastening
Speed Coverage	Height	Up to 120 mph	o 120 mph 121 mph or Greater		Size (width)	Rate
70.00 mm	< 60'	2	3	10' 5'	5' -	12" o.c.
72-80 mpn	≥ 60'	4	5	10' 5'	5' -	12" o.c.
00 mph	< 60'	3	4	10' 5'	5' -	6" o.c. 12" o.c.
ווקוו ספ	≥ 60'	4	Indects by ional Wind SpeedsFiel Sizenph121 mph or GreaterSize354455	10' 5'	5' -	6" o.c. 12" o.c.

NOTE:

1. Wind speeds over 80 mph require the use of 60-80 mil membranes.

2. FM Insured projects do not allow perimeter half sheets to be used around the entire perimeter. The "finger" method of attachment at the appropriate locations is acceptable. Alternate attachment rates and methods may be required.

3. FM insured projects may not allow the attachment rates listed above. Validation using FM RoofNav should be used.

4. Ensure deck type/span allow for attachment rate shown above. When specific uplift pressures must be met, not all options above will be valid.

5. Building heights over 100' may require additional enhancements.

- 6. Heavy Duty or Heavy Duty Plus Fasteners are required on steel decks: minimum 33 ksi, 22 ga, 72" maximum deck span.
- 7. Concrete Drive Fasteners or Heavy-Duty Fasteners are required on concrete decks.
- 8. Refer to the appropriate version of the ASCE for wind maps not found within this document.
- 9. Location-specific basic wind speeds shall be permitted to be determined using <u>www.atcouncil.org/windspeed</u>.
- 10. Elevate 50 mil. PVC and PVC KEE membranes are limited to 15-year warranty coverage.
- 11. See adhered membrane table for coverboard requirements for mechanically attached and Invisiweld attached systems.

PVC and PVC KEE – Wood Decks											
Peak Gust Wind Speed	Deck Type	Max. Roof	Min. # Perime Regional W	ter Sheets by /ind Speeds	Field Sheet	Perimeter Sheet Size	Fastening				
Coverage		Height	Up to 120 mph	121 mph or Greater	Size (Width)	(Width)	Rate				
	56 11 OSP	< 60'	2	3	10'	5'	6" o.c.				
	98° 03B	≥ 60'	4	5	5'	-	12" o.c.				
	15/32″	< 60'	2	3	10'	5'	6" o.c.				
72-80 mph	Plywood (3-Ply)	≥ 60'	4	5	5'	-	12" o.c.				
	15/32″	< 60'	2	3	10'	5'	6" o.c.				
	Plywood (5-Ply)	≥ 60'	4	5	5'	-	12" o.c.				
	56 11 OSP	< 60'	3	4	10'	5'	6" o.c.				
	98° 03B	≥ 60'	4	5	5'	-	12" o.c.				
90 mph	15/32″	< 60'	3	4	10'	5'	6" o.c.				
	Plywood (3-Ply)	≥ 60'	4	5	5'	-	12" o.c.				
	15/32″	< 60'	3	4	10'	5'	6" ი.с.				
	Plywood (5-Ply)	≥ 60'	4	5	5'	-	12" o.c.				

NOTE:

1. Fire Treated Plywood may be used provided it has not been treated with Ammonium Phosphates.

2. Wood deck condition must be new or like new. No wet, damaged, dry rot or severely punctured decking allowed.

3. Wind speeds over 80 mph require the use of 60-80 mil membranes.

4. When specific uplift pressures are to be met not all options above will be valid.

- 5. Validate deck types/spans allow for attachment rate shown above.
- 6. FM Insured projects do not allow perimeter half sheets to be used. Alternate attachment rates and methods may be required.

7. 20-Year maximum warranty term (new construction) on OSB decks.

8. Minimum 1" deck penetration with all fasteners.

9. Refer to the appropriate version of the ASCE for wind maps not found within this document.

10. Location-specific basic wind speeds shall be permitted to be determined using <u>www.atcouncil.org/windspeed</u>.

11. Elevate 50 mil PVC and PVC KEE membranes are limited to 15-year warranty coverage.

12. See adhered membrane table for coverboard requirements for mechanically attached and Invisiweld attached systems.

Elevate <mark>PVC</mark> and <mark>PVC KEE</mark> - LWC over Steel/Structural Concrete – Mechanically Attached into Min. 22 ga Steel Pan/Deck or 2,500 psi Structural Concrete

Peak Gust Wind Speed	Deck Type	Max. Min. # Perin Roof Regional		neter Sheets by Wind Speeds	Field Sheet Size	Perimeter Sheet Size	Fastening
Coverage		Height	Up to 120 mph	121 mph or Greater	(Width)	(Width)	Rate
72.80 mph	Steel Pan/Deck	60'	2	2	10'	5'	6" o.c.
72-80 mph	Structural Concrete	00	2	2	5'	-	12" o.c.
90 mph	Steel Pan/Deck	601	3	4	10'	5'	6" o.c.
	Structural Concrete	60		4	5'	-	12" o.c.

NOTE:

1. Wind speeds over 80 mph require the use of 60-80 mil membranes.

2. FM Insured projects do not allow perimeter half sheets to be used around the entire perimeter. The "finger" method of attachment at the appropriate locations is acceptable. Alternate attachment rates and methods may be required.

- 3. Validate deck types/spans allow for attachment rate shown above.
- 4. When specific uplift pressures are to be met not all options above will be valid.
- 5. Minimum 2" thick LWC
- 6. For <u>Cellular Light Weight Concrete</u> decks that are properly prepared and dry, Holcim does not require a vapor retarder, however one is recommended, if insulation is installed with the system.
- 7. Refer to the appropriate version of the ASCE for wind maps not found within this document.
- 8. Location-specific basic wind speeds shall be permitted to be determined using www.atcouncil.org/windspeed.
- 9. Elevate 50 mil PVC and PVC KEE membranes are limited to 15-year warranty coverage.
- 10. See adhered membrane table for coverboard requirements for mechanically attached and Invisiweld attached systems.

Elevate PVC and PVC KEE - Invisiweld Attachment Requirements

Paak Cust Wind Speed Coverage	Attachment Rate Per Board				
Peak Gust wind Speed Coverage	Field	Perimeter	Corner		
72 mph	6	10	15		
80 mph	8	12	16		
90 – 100 mph	8	14	20		

NOTE:

- 1. Minimum 60 mil membrane required.
- 2. FM Insured projects may require alternate attachment rates or patterns than those listed above.
- 3. Attachment rates listed above may change due to specific uplift requirements.
- 4. Attachment rates above may change due to specific substrate used.
- 5. Attachment rates above may change due to warranty length requested.
- 6. Attachment rates above may change due to the addition of a vapor/air barrier (retarder).
- 7. Refer to the appropriate version of the ASCE for wind maps not found within this document.
- 8. Location-specific basic wind speeds shall be permitted to be determined using www.atcouncil.org/windspeed.
- 9. Elevate 50 mil PVC and PVC KEE membranes are limited to 15-year warranty coverage.
- 10. See adhered membrane table for coverboard requirements for mechanically attached and Invisiweld attached systems.

Increased Wind Speed System Options – RubberGard™ MAX EPDM

RubberGard MAX EPDM Mechanically Attached or Adhered Membrane Options

	Warranty Wind Speed Coverage – Membrane Attachment										
Warranty	55, 72 & 80 mph		90 mph		100 mph		110 to 120 mph		Thickness		
Length	Adhered	Mech. Attached	Adhered	Mech. Attached	Adhered	Mech. Attached	Adhered	Mech. Attached	(Minimum)		
5, 10 or 15 years	\checkmark	\checkmark	\checkmark	\checkmark	√	N/A	\checkmark	N/A	60 mil		
20 years	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	N/A	\checkmark	N/A	60 mil		
25 years	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	N/A	\checkmark	N/A	60 mil		
30 years	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	N/A	\checkmark	N/A	80 mil		

NOTE:

- 1. Elevate Water Based Bonding Adhesive P is only approved for use on warranties up to 15 years and with a maximum wind speed coverage of 55 mph.
- 2. Warranty requests of 25-30 years may require additional requirements. Review project requirements with a Holcim Regional Technical Coordinator. Maximum 6" o.c. spacing for mechanically attached systems.

3. Refer to the appropriate version of the ASCE for wind maps not found within this document.

4. Location-specific basic wind speeds shall be permitted to be determined using www.atcouncil.org/windspeed.

5. See adhered membrane table for coverboard requirements for mechanically attached and Invisiweld attached systems.

RubberGard MAX EPDM - Steel/Concrete – 22 ga Steel or 2,500 psi Structural Concrete Decks											
Peak Gust Wind	Max Building	Min. # Perime Regional W	ter Sheets by /ind Speeds	Field Sheet	Perimeter Sheet	Fastening					
Speed Coverage	Height	Up to 120 mph	121 mph or Greater	Size (Width)	Size (Width)	Rate					
				10'	5'	6" o.c.					
	< 60'	2	3	8	4'	12" o.c.					
72 ¹⁰ -80 mph				5' 4' 10' 5'	12" o.c.						
72 ¹⁰ -80 mpn	≥ 60'	4	5	10'	5'	6" o.c.					
				8'	4'	12" o.c.					
				5'	4'	12" o.c.					
				10'	5'	6" o.c.					
	< 60'	3	4	8'	4'	12" o.c.					
90 mph				5'	4'	12" o.c.					
				10'	5'	6" o.c.					
	≥ 60'	4	5	8'	4'	12" o.c.					
				5'	4'	12" o.c.					

NOTE:

1. Ensure deck type/span allow for attachment rate shown above. When specific uplift pressures must be met, not all options above will be valid.

2. FM Insured projects do not allow perimeter half sheets to be used around the entire perimeter. The "finger" method of attachment at the appropriate locations is acceptable. Alternate attachment rates and methods may be required.

3. Building heights over 100' may require additional enhancements.

4. Heavy Duty or Heavy Duty Plus Fasteners are required on steel decks: minimum 33 ksi, 22 ga, 72" maximum deck span.

5. Concrete Drive Fasteners or Heavy-Duty Fasteners are required on concrete decks.

6. Warranty requests of 25 - 30 years may require additional requirements. Review project requirements with a Holcim Regional Technical Coordinator. Maximum 6" o.c. spacing for mechanically attached systems.

7. Refer to the appropriate version of the ASCE for wind maps not found within this document.

8. Location-specific basic wind speeds shall be permitted to be determined using <u>www.atcouncil.org/windspeed</u>.

9. See adhered membrane table for coverboard requirements for mechanically attached and Invisiweld attached systems.

10. Elevate All-Purpose Fasteners (TIS 1001) may be used in combination with Elevate V-Plate (TIS 1103) for in-seam securement of Elevate RubberGard MAX Membrane up to 72 mph in approved applications into appropriate wood decks.

RubberGard MAX EPDM – Wood Decks											
Peak Gust Wind Speed	Deck Type	Max. Roof	Min. # Peri Regional	meter Sheets by Wind Speeds	Field Sheet	Perimeter Sheet	Fastening				
Coverage		Height	Up to 120 mph	121 mph or Greater	Size (Width)	Size (Width)	Rate				
	5/ 000	< 60'	2	3	10'	5'	6" o.c.				
	%8″ USB	≥ 60'	4	5	5'	4 ⁻	12" o.c. 12" o.c.				
7010 00 1	15/32″	< 60'	2	3	10'	5'	6" o.c.				
72 [™] -80 mph	Plywood (3-Ply)	≥ 60'	4	5	5'	4	12" o.c. 12" o.c.				
	15/32" Plywood (5-Ply)	< 60'	2	3	10'	5'	6" o.c.				
		≥ 60'	4	5	5'	4	12" o.c. 12" o.c.				
	5/ # 000	< 60'	3	4	10'	5'	6" o.c.				
	%8″ USB	≥ 60'	4	5	5'	-	12" o.c. 12" o.c.				
00 I	15/32″	< 60'	3	4	10'	5'	6" o.c.				
90 mph	Plywood (3-Ply)	≥ 60'	4	5	5'	- -	12" o.c. 12" o.c.				
	15/32″	< 60'	3	4	10'	5'	6" o.c.				
	Plywood (5-Ply)	≥ 60'	4	5	8 5'	-	12 o.c. 12" o.c.				

NOTE:

1. 20 Year maximum warranty term (new construction) on OSB decks.

2. Fire Treated Plywood may be used provided it has not been treated with Ammonium Phosphates.

3. Wood deck condition must be new or like new. No wet, damaged, dry rot or severely punctured decking allowed.

4. FM Insured projects do not allow perimeter half sheets to be used around the entire perimeter. The "finger" method of attachment at the appropriate locations is acceptable. Alternate attachment rates and methods may be required.

5. Minimum 1" deck penetration with all fasteners.

6. Warranty requests of 25 - 30 years may require additional requirements. Review project requirements with a Holcim Regional Technical Coordinator. Maximum 6" o.c. spacing for mechanically attached systems.

7. Refer to the appropriate version of the ASCE for wind maps not found within this document.

8. Location-specific basic wind speeds shall be permitted to be determined using www.atcouncil.org/windspeed.

9. See adhered membrane table for coverboard requirements for mechanically attached and Invisiweld attached systems.

10. Elevate All-Purpose Fasteners (TIS 1001) may be used in combination with Elevate V-Plate (TIS 1103) for in-seam securement of Elevate RubberGard MAX Membrane up to 72 mph in approved applications into appropriate wood decks.

RubberGard MAX EPDM - LWC over Steel/Structural Concrete - Mechanically Attached into min. 22 ga Steel Pan/Deck or 2,500 psi Structural Concrete

Peak Gust Wind Speed Deck Type		Max. Roof	Min. # Peri Regional	meter Sheets by Wind Speeds	Field Sheet Size	Perimeter Sheet Size	Fastening
Coverage		Height	Up to 120 mph	121 mph or Greater	(Width)	(Width)	Rate
72-80 mph	Steel Pan/Deck		2	2	10'	5'	6" o.c.
	Structural Concrete	60'			8' 5'	4'	12" o.c. 12" o.c.
	Steel Pan/Deck		3		10'	5'	6" o.c.
90 mph	Structural Concrete	60'		4	8' 5'	4'	12" o.c. 12" o.c.

NOTE:

- 1. Validate deck types/spans allow for attachment rate shown above. When specific uplift pressures are to be met not all options above will be valid.
- 2. FM Insured projects do not allow perimeter half sheets to be used around the entire perimeter. The "finger" method of attachment at the appropriate locations is acceptable. Alternate attachment rates and methods may be required.
- 3. Minimum 2" thick LWC
- 4. Warranty requests of 25 30 years may require additional requirements. Review project requirements with your Holcim Regional Technical Coordinator. Maximum 6" o.c. spacing for mechanically attached systems.
- 5. Refer to the appropriate version of the ASCE for wind maps not found within this document.
- 6. Location-specific basic wind speeds shall be permitted to be determined using <u>www.atcouncil.org/windspeed</u>.
- 7. See adhered membrane table for coverboard requirements for mechanically attached and Invisiweld attached systems.

Increased Wind Speed System Options – Base Sheets

LWC - Base Sheet Attachment Rates

Peak Gust Wind Speed Coverage	Regional Wind Speed									
		Up to 120 mph		121 mph or greater						
	Lap	Field/Perimeter	Corner	Lap	Field/Perimeter	Corner				
72-80 mph	35" Rows, 8" o.c.	2 Rows, 12″ o.c. Staggered 17″ o.c. spacing	3 Rows, Equally Spaced, 15″ o.c. spacing	35″ Rows, 8″ o.c.	2 Rows, 12″ o.c. Staggered, 14″ o.c. spacing	3 Rows, Equally Spaced, 12″ o.c. spacing				
90 mph	35″ Rows, 7″ o.c.	2 Rows, 12" o.c. Staggered 16" o.c. spacing	3 Rows, Equally Spaced, 14″ o.c. spacing	35″ Rows, 7″ o.c.	2 Rows, 12″ o.c. Staggered, 12″ o.c. spacing	3 Rows, Equally Spaced, 10″ o.c. spacing				

NOTE:

- 1. Wind speeds over 80 mph require the use of 60-80 mil membranes.
- 2. FM Insured or other code/testing agencies may require different/additional attachment methods/rate.
- 3. Elevate 1.7" LWC Base Ply Fasteners Pull out value minimum 40 lb/fastener.
- 4. Minimum 2" thick LWC required.
- 5. For Cellular Light Weight Concrete decks that are properly prepared and dry, Holcim does not require a vapor retarder, however one is recommended, if insulation is installed with the system.
- 6. Warranty requests of 25 30 years may require additional requirements. Review project requirements with a Holcim Regional Technical Coordinator. Maximum 6" o.c. spacing for mechanically attached systems.
- 7. Refer to the appropriate version of the ASCE for wind maps not found within this document.
- 8. Location-specific basic wind speeds shall be permitted to be determined using www.atcouncil.org/windspeed.
- 9. See details MB-LS-4 and MB-LS-5 for lap requirements.

V-Force[™] Application – Increased Wind Speed

Increased wind speed approvals with Elevate V-Force Vapor Barrier Membrane applied directly to properly prepared substrate is outlined in the table below. Review the Technical Information Sheet (TIS), Application Guide and details for application requirements and additional information. Reference the V-Force Requirements – Attachment section in this guide for information related to extended wind speeds. V-Force adhered direct to steel will not be approved on projects with special wind regions or coastal areas. When uplift and fire requirements are specified, alternate applications may be required.

V-Force – Acceptable Adhesives for Insulation Attachment – Increased Wind Speed

TIS Number	Adhaaliya	Bead Spacing (o.c.) (72 - 80 mph)				
	Adhesive	Field	Perimeter	Corner		
812	I.S.O. Twin Pack			4" (101.6 mm)		
819	I.S.O. Stick	6" (1E2.4 mm)	6" (152.4 mm)			
831	I.S.O. Spray R	0 (152.4 mm)				
836	Twin Jet					

NOTE:

1. All substrates except metal decks must be primed with either Elevate SA-Water Based (WB) Primer, SA-LVOC Primer or SA-Solvent Based (SB) Primer.

2. Hot asphalt cannot be used to adhered roofing material to V-Force Vapor Barrier membrane.

3. On steel deck assemblies beads should be spaced to be located over the top flute of the steel deck.

This guide is meant to highlight Elevate products and specifications provided by Holcim Solutions and Products US, LLC 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 a Products US, LLC 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.