THE GARLAND COMPANY, INC.

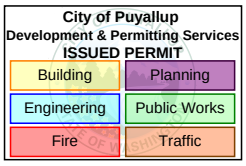
HIGH PERFORMANCE BUILDING ENVELOPE SYSTEMS

PRRF20250950

October 9th 2024

REVISED FIRE RATING DESCRIPTION

Puyallup School District
Meeker Elementary
Address: 409 5th St SW, Puyallup, WA 98371
Meeker Elementary Roof Replacement SOW



New Class A fire rated assembly with attachment per NRCA wind uplift Req.

Low Slope:
-Mobilize all material and equipment needed to complete the project
-Set up contractor safety per LNI approved requirements
-Assume 1000 sq/ft of insulation replacement (Additional will be billed on a T&M rate)
-Relief cut the existing single ply roof
-Demo all existing flashing metal
-Provide additional cricketing on the West wall of the Office roof to improve drainage
-Mechanically attach ½" primed densdeck per wind uplift calculations
-Install Stressbase 80 Plus in Green Lock Plus at 2Gal per 100 sq/ft
-Install KEE Stone FB 60 in KEE Spatter Spray
-Install new 24ga edge metal to all areas of existing flashing
-Install new Trafguard walk pads in existing locations
-Chimney located on the East side of the South wing is to be re tuck pointed at roof level and a new counter flashing cut into the brick
-Demobilize from the project site removing all contractor related debris/items
-Installer to provide a three year workmanship warranty
-Garland to provide a 30 year NDL warranty

Calculations and additional documents are required to be provided by the Permittee on site for all Inspections

• *Direct Line: Matt 206-681-8151*
Email: mshaxton@garlandind.com

intertek
Total Quality. Assured.

LISTING INFORMATION OF

Garland Combustible Deck (AC-49)

SPEC ID: 42967

Garland Company, Inc. (The)
3800 East 91st Street
Cleveland, OH 44105
United States

LISTING INFORMATION

Garland Combustible Deck (AC-49)
Slope: 1/4:12
1.) Optional insulation: ½"Wood fiber, ½"glass fiber, polyisocyanurate, ½"perlite.
2.) ½" Dens-Deck. **Note:** when EPS insulation is applied over a metal or combustible deck, a thermal barrier complying with section 2603.4.1.5 of the IBC is required.
Note: When insulation is not used, 1-ply ASTM D4601 Type II Base Sheet or 1-ply VersiPly 40, mechanically fastened, is required. Insul Lock HR insulation adhesive can be used for insulation and cover board.
3.) Minimum 1 ply of Stress Base 80, Flex Base Plus 80, Flex base E 80, Stress Base 120, Flex Base Plus 120, Stress Base E 120, Flex Base 80, Flex Base 120, VersiPly 80, StressPly IV Smooth 120. Adhered with Weatherking, Green-Lock, Green-Lock Plus or ASTM-D312 Type IV roofing asphalt OR Minimum 1 ply HPR Torchbase.
4.) Minimum 1 ply of KEE Stone Fleece Back Membrane with KEE Lock Foam Adhesive.
Note: The component materials of each system must be applied in the order in which they are listed above.

Evaluated to the following:
The roof covering systems in this section have been evaluated for external fire resistance Classifications A, B, C as outlined by the following test methods:

- ASTM-E108 - American Society for Testing & Materials 'Standard Methods of Fire Test of Roof Covering'
- FM-4470, Section 5.1.A - Factory Mutual 'Standard Method of Test for Fire Resistance of Roof Covering Materials'
- ULC-S107 - Underwriters' Laboratories of Canada 'Standard Method of Tests for Fire Resistance of Roof Covering Materials'
- UL-790 - Underwriters' Laboratories Inc. 'Tests for Fire Resistance of Roof Covering Materials'

Each system listing identifies the deck substrate as either non-combustible or combustible. Systems evaluated for combustible decks will provide the same ratings when applied over non-combustible decks. Unless otherwise noted in individual listings, combustible decks shall be sheathed with a minimum 15/32" veneer plywood or minimum 7/16" non-veneer APA rated sheathing panel (oriented strand board panels, structural particleboard panels, composite panels or wafer-board panels) or 3/4" thick solid wood sheathing boards. The component materials of each system must be applied in the order in which they are listed. All components of the system must be listed for external fire exposure by an agency acceptable to the AHJ.

Some Roof Covering Systems have been evaluated for other performance characteristics, in addition to external fire exposure. Where applicable, such additional performance characteristics are noted within the specific listing.

In all cases, manufacturer's instructions should be consulted for installation procedures and details not covered by these listings.

Listed Materials are identified by a label or marking bearing the wording, "Listed Roofing Component", a reference number or code and the WHI Certification Mark.

Attribute	Value
Criteria	FM 4470 Section 5.1.A
Criteria	ASTM E108 (2017)

Criteria	UL 790 (2014)
CSI Code	07 50 00 Membrane Roofing
Intertek Services	Certification
Listed or Inspected	LISTED
Listing Section	ROOF COVERING SYSTEMS
Roofing: Deck Type	Combustible
Roofing: Fire Rating	Class A
Roofing: Maximum Slope	1/4:12
Spec ID	42967

THE GARLAND COMPANY, INC.

HIGH PERFORMANCE BUILDING ENVELOPE SYSTEMS

since 1895

Class A Fire rated/ 110 MPH wind Uplift rated Laminate Shingles

Steep Slope:

-Mobilize all material and equipment needed to complete the project
-Set up contractor safety per LNI approved requirements
-Demo the existing shingles down to the deck
-Inspect the existing substrate and replace any damaged decking on a T&M rate
-Prime the existing substrate with SA primer at 0.5Gal per 100 sq/ft
-Install R Mer Seal as the ice and water shield underlayment
-Install Malarkeys Legacy Shingle per manufacturer guidelines to obtain warranty
-All new edge 24ga edge metal to be installed
-Replace all external gutters with 032 new continuous K style 6” gutter in a continuous manner.
-Replace all downspouts with new 22ga 3x4 color to match gutter. All new downspouts are to have a clean out and ground level with a debris screen
-Installer to provide a three year workmanship warranty

Steep Slope assembly shall consist of a Class A Roof Covering as reflected in the attached documentation. A Class A Roof Assembly is not required for a VB construction.

• *Direct Line: Matt 206-681-8151*
Email: mshaxton@garlandind.com

NEX® Laminated Architectural Shingles (cont.)

See page 1 for color availabilities and distribution locations.

PRODUCT DESCRIPTION	TESTING & APPROVALS	SPECIFICATIONS
251 Vista® • NEX® Polymer Modified Asphalt • Limited Lifetime Shingle Warranty • 110 mph (177 kph) Limited Wind Warranty • 130 mph (209 kph) Enhanced Wind Warranty available • Class 4 Impact Resistant CRRC RATED PRODUCT · THE ZONE Featuring The Zone,® Malarkey's Patented Nailing Area	ASTM D7158 Class H ASTM D3462 ASTM D3161 Class F ASTM D3018 Type I UL 2218 Class 4 ICC Approval - ESR-3150 CSA A123.5; ICC-ES AC438 FBC Approval - #14809 Listed in various fire assemblies Vista® colors *Sienna Blend* and *Silverwood* have measured radiative property values listed with CRRC[1] and can be used to comply with California Energy Code Title 24, Part 6 Cool Roof Requirements. SRI: 16[†] (Sienna Blend); 20 (Silverwood)	Shingles/Sq.: 66 Bundles/Sq.: 3 Exposure: 5⅝" (143 mm) Squares/Pallet: 16
252 Vista® AR • NEX® Polymer Modified Asphalt • Limited Lifetime Shingle Warranty • 110 mph (177 kph) Limited Wind Warranty • 130 mph (209 kph) Enhanced Wind Warranty available • 15-Year Algae Resistant System Warranty* • Class 4 Impact Resistant THE ZONE Featuring The Zone,® Malarkey's Patented Nailing Area	ASTM D7158 Class H ASTM D3462 ASTM D3161 Class F ASTM D3018 Type I UL 2218 Class 4 ICC Approval - ESR-3150 CSA A123.5; ICC-ES AC438 FBC Approval - #14809 Listed in various fire assemblies	Shingles/Sq.: 66 Bundles/Sq.: 3 Exposure: 5⅝" (143 mm) Squares/Pallet: 16
273 Legacy® Scotchgard • NEX® Polymer Modified Asphalt • Limited Lifetime Shingle Warranty • 110 mph (177 kph) Limited Wind Warranty • 130 mph (209 kph) Enhanced Wind Warranty available • Limited Lifetime Scotchgard™ Protector Warranty* • Class 4 Impact Resistant THE ZONE Featuring The Zone,® Malarkey's Patented Nailing Area	ASTM D7158 Class H ASTM D3462 ASTM D3161 Class F ASTM D3018 Type I UL 2218 Class 4 CSA A123.5 ICC Approval - ESR-3150 ICC-ES AC438 FBC Approval - #14809 Listed in various fire assemblies	Shingles/Sq.: 64 Bundles/Sq.: 4 Exposure: 5⅝" (143 mm) Squares/Pallet: 12

[1] Results are CRRC listings unless marked otherwise.
[†] Solar reflectance data calculated using CRRC Rapid Ratings.
* Malarkey hip and ridge shingles (10", 12" RidgeFlex® or 8", 10" EZ-Ridge® with Scotchgard™ Protector from 3M) are recommended for all Malarkey field shingles but required with shingles having Scotchgard™ Protector to receive Malarkey's Limited Lifetime Scotchgard™ Protector Warranty.

Prepared Roof-covering Materials

See General Information for Roof-covering Materials

GENERAL

This category covers materials intended to provide Classes A, B and C coverings on combustible (wood, 3/4-in. thick sheathing boards or 3/4-in. thick plywood unless otherwise indicated) decks when applied in accordance with detailed instructions included with the packages.

The use of 15/32-in. thick (minimum) plywood is a suitable alternate to 1/2-in. thick (minimum) plywood specified in the certifications for individual manufacturers.

The use of 3/8-in.-thick (minimum) nonveneer PS-2-rated sheathing (oriented strandboard panels, structural particleboard panels, composite panels or waferboard panels) is a suitable alternate to 1/2-in. thick (minimum) plywood specified in the certifications for individual manufacturers when a certified underlayment is utilized between the sheathing and the prepared roof covering.

Certifications are applicable either for new work or for recovering purposes.

Flashings and trimmings are intended to be the same as or not less than the equivalent of the roof coverings in each class, or of 16 oz. or heavier copper, No. 26 USS gauge or heavier galvanized steel, or 0.019-in. thick or heavier aluminum.

This category also covers shingles with factory-applied adhesives or integral locking features. The certification markings for such shingles may, in addition to fire-resistance information, include wind-resistance information.

PREPARED ROOF COVERINGS

Asphalt Organic-Felt Shingle Coverings are composed of asphalt organic-felt (previously identified as rag-felt) grit-surfaced shingles, one or more thickness, laid in accordance with the instruction sheets accompanying the packages. These coverings are limited to roof decks capable of receiving and retaining nails and to inclines sufficient to permit drainage.

Asphalt Glass-Fiber Mat Shingle or Sheet Roofing Coverings are composed of asphalt glass-fiber mat, grit-surfaced shingles or sheet roofing, laid in accordance with the instruction sheets accompanying the packages. These coverings are limited to roof decks capable of receiving and retaining nails and to inclines sufficient to permit drainage.

Modified Asphalt Glass-Fiber Mat, Asphalt Organic-Felt or Glass-Fiber/Polyester Composite Shingle Coverings are composed of modified asphalt-coated glass-fiber mat or glass-fiber/polyester composite, grit-surfaced shingles, laid in accordance with the instruction sheets accompanying the packages. These coverings are limited to roof decks capable of receiving and retaining nails and to inclines sufficient to permit drainage.

Wind-resistant Asphalt Glass-Fiber Mat Shingles are provided with field-applied or factory-applied adhesive or integral locking tabs. Some shingles with factory-applied adhesive utilize bands or spots of a heat-sensitive adhesive located either on the surface of the shingles or on the back side of each tab. Adhesives of this type must be activated by solar heat of intensity generally attained on warm, sunny days. Other shingles with factory-applied adhesive utilize a combination pressure-sensitive and heat-sensitive adhesive. Due to the nature of adhesives of this type, sealing is induced by application of pressure and/or heat.

Wind-resistant Asphalt Organic-Felt Shingles are provided with factory-applied adhesive or integral locking tabs. Some shingles with factory-applied adhesive utilize bands or spots of a heat-sensitive adhesive located either on the surface of the shingles or on the back side of each tab. Adhesives of this type must be activated by solar heat of intensity generally attained on warm, sunny days. Other shingles with factory-applied adhesive utilize a combination pressure-sensitive and heat-sensitive adhesive. Due to the nature of adhesives of this type, sealing is induced by application of pressure and/or heat.

Wind-resistant Modified Asphalt Glass-Fiber Mat Shingles are provided with factory-applied adhesive. Some shingles with factory-applied adhesive utilize bands or spots of a heat-sensitive adhesive located either on the surface of the shingles or on the back of each tab. Adhesives of this type must be activated by solar heat of intensity generally attained on warm, sunny days. Other shingles with factory-applied adhesive utilize a combination pressure-sensitive and heat-sensitive adhesive. Due to the nature of adhesives of this type, sealing is induced by application of pressure and/or heat.

Hip and Ridge Shingles are composed of asphalt or modified asphalt-coated glass-fiber mat surfaced with granules and are intended to be installed as specified on packaging supplied with the product for hip and ridge installations only. They are investigated for fire resistance in accordance with the fire test portion of UL 2375, "Outline of Investigation for Hip and Ridge Shingles." Where indicated, they have also been

investigated for wind resistance in accordance with the test procedures of UL 2375. The class of shingles and performance criteria are in accordance with ASTM D3161. Wind-resistant hip and ridge shingles may utilize locking mechanisms, field-applied adhesives or factory-applied heat-sensitive adhesive which must be activated by solar heat of intensity generally attained on warm, sunny days.

PRODUCT IDENTITY

The following product identity appears on the product:

Prepared Roof-covering Material

RELATED PRODUCTS

Prepared roof-covering materials investigated for impact resistance are covered under Roof-covering Materials, Impact Resistance (TGAM).

Asphalt shingles investigated for wind resistance are covered under Prepared Roof-covering Materials, Asphalt Shingle Wind Resistance (TGAH).

Accessory components utilized in the prepared roof-covering system are covered under Prepared Roofing Accessories (TGDY). Ridge vents utilized in the prepared roof-covering system are covered under Ridge Vents (TGEW). Type 15 and Type 30 asphalt felts, used as underlayments, are covered under Roofing Systems (TGFU). Underlayments, ridge vents and accessory components, when utilized, are intended to be certified materials.

ADDITIONAL INFORMATION

For additional information, see Roof-covering Materials (TEVT) and Roofing Materials and Systems (AARM).

REQUIREMENTS

The basic standard used to investigate products in this category is UL 790, "Tests for Fire Resistance of Roof Covering Materials" (ASTM E108 and ANSI/NFPA 256).

Some products covered under this category have also been investigated to the following standards:

1. Where indicated in the individual certifications, specific products have also been investigated to ASTM D3161, "Standard Test Method for Wind-Resistance of Asphalt Shingles (Fan-Induced Method)." Where Classes A, D and F are referenced, tests were conducted at 60, 90 mph and 110 mph, respectively.

2. Also, where indicated in the individual certifications, specific shingle products have also been investigated to ASTM D3462, "Standard Specifications for Asphalt Shingles Made from Glass Felt and Surfaced with Mineral Granules," or CSA-A123.5, "Asphalt Shingles Made from Organic Felt and Surfaced with Mineral Granules/Asphalt Shingles Made from Glass Felt and Surfaced with Mineral Granules."

3. Also, where indicated in the individual certifications, specific sheet roofing products have also been investigated to ASTM D3909, "Standard Specification for Asphalt Roll Roofing (Glass Felt) Surfaced with Mineral Granules."

4. Also, where indicated in the individual certifications, specific shingle products have also been investigated to ICC Evaluation Services Acceptance Criteria AC438, "Acceptance Criteria for Alternative Asphalt Roofing Shingles."

UL MARK

The Certification Mark of UL Solutions on the product is the only method provided by UL to identify products manufactured under its Certification and Follow-Up Service. The Certification Mark for these products includes the UL symbol, the words "CERTIFIED" and "SAFETY," the geographic identifier(s), and a file number.

Additional Certification Markings

Products covered under this category are additionally marked with the following information:

AS TO DEGREE OF RESISTANCE TO EXTERNAL FIRE - CLASS +

\+ **A**, **B** or **C**

For those products which are also certified by UL to the standards noted under **REQUIREMENTS** above, one or more of the following statements is included on the product:

ALSO CERTIFIED TO ASTM D3161, CLASS ++

ALSO CERTIFIED TO ASTM D3462

ALSO CERTIFIED TO CSA-A123.5

ALSO CERTIFIED TO ASTM D3909

ALSO CERTIFIED TO ICC-ES ACCEPTANCE CRITERIA AC438

++ **A**, **D** or **F**

Alternate UL Mark

The Listing Mark of UL Solutions on the product is the only method provided by UL to identify products manufactured under its Listing and Follow-Up Service. The Listing Mark for these products includes the UL symbol together with the word "LISTED," and the following additional information:

PREPARED ROOF COVERING MATERIALS
DEGREE OF RESISTANCE TO EXTERNAL FIRE - CLASS +
Issue No.

Combination Listing/Classification Mark — A Listing Mark combined with a Classification Mark is provided on products that have additionally been investigated in accordance with the standards detailed below. The combined Listing/Classification Mark consists of the Listing Mark elements detailed above and the following marking: **ALSO CLASSIFIED IN ACCORDANCE WITH ***, where "*" is one or more of the texts detailed below:

ASTM D3161, CLASS ++
ASTM D3462
CSA-A123.5
ASTM D3909
ICC-ES ACCEPTANCE CRITERIA AC438

+ **A**, **B** or **C**

++ **A**, **D** or **F**

****

Last Updated on 2013-05-16

Confirmation Letter

UL Solutions Customer	MALARKEY ROOFING PRODUCTS 3131 N COLUMBIA BLVD PORTLAND, OR 97217-0217 United States
File Number	R4299
Category	Prepared Roof-covering Materials | TFWZ

July 21, 2025

As of the above date, UL Solutions confirms that MALARKEY ROOFING PRODUCTS is the party associated with UL Solutions file number R4299 that appears in the UL Product iQ platform. Public information contained in UL Solutions file number R4299 can be viewed using the following link:

https://iq.ulprospector.com/en/profile?e=148559

Additional information regarding the intended use, limitations and further guidance on the use of the certified products in UL File # [File Number] can be viewed using the following link:

https://iq.ulprospector.com/en/profile?e=211208

The appearance of a company's name or a specific product/component designation in the UL Product iQ platform does not in itself mean that the product or component so specified or identified is subject to the UL Solutions' Surveillance Program.

The manufacturer's products are not covered under UL Solutions' Surveillance Program unless they bear the authorized UL Mark. Therefore, only those products bearing the appropriate authorized UL Mark or UL Recognized Component Mark, the authorized company name, tradename, trademark and product designation shall be considered as being covered by the UL Solutions' Listing, Classification, or Recognition Service.

If you have questions regarding this letter, please contact the UL Solutions customer care team at https://www.ul.com/contact-us.

Note: In the process of enhancing our systems, we are transitioning data to a new PiQ data view. This data is being verified with the "Historical" view for accuracy. Once the data is confirmed, the "Historical" view will be discontinued. During this transition, you may encounter duplicate entries or missing/outdated data. For queries during this interim period, please visit our Historical View FAQs or contact our Customer Service.

Prepared Roof-covering Materials

COMPANY

MALARKEY ROOFING PRODUCTS

3131 N COLUMBIA BLVD
KENTON STATION
PO BOX 17217
PORTLAND, OR 97217-0217 United States

R4299

Asphalt glass fiber mat shingles, designated "Northwest-XL", "Northwest-XL Scotchgard", "Highlander", "Highlander AR", "Highlander Scotchgard", "Ecoasis Sol" and "Ecoasis Costa", for installation as Class A prepared roof coverings. Suitable for installation on minimum 3/8 in. thick plywood decks. Also Classified in accordance with ASTM D3161, Class A or Class F. Also Classified in accordance with ASTM D3462. Also Classified in accordance with ICC ES AC438.

Modified asphalt glass fiber mat shingles, designated "Dura-Seal", "Dura-Seal AR", "Legacy", "Legacy Scotchgard" and "Windsor" for installation as Class A prepared roof coverings. Suitable for installation on minimum 3/8 in. thick plywood decks. Also Classified in accordance with ASTM D3161, Class F. Also Classified in accordance with ASTM D3462.

Asphalt glass fiber mat sheet roofing, for installation as Class C prepared roof coverings.

Hip and ridge shingles, designated "EZ Ridge" and "EZ Ridge XT", for installation as Class A prepared roof coverings. Suitable for installation on minimum 3/8 in. thick plywood decks and on minimum 15/32 in. thick plywood decks without underlayment. Also Classified in accordance with ASTM D3161, Class A or Class F.

Last Updated on 2024-06-03

ICC-ES Evaluation Report

ESR-3150

Reissued February 2025

This report also contains:

- CA Supplement

Subject to renewal January 2027

DIVISION: 07 00 00—THERMAL AND MOISTURE PROTECTION Section: 07 31 13—Asphalt Shingles	REPORT HOLDER: MALARKEY ROOFING PRODUCTS	EVALUATION SUBJECT: MALARKEY POLYMER-MODIFIED ASPHALT SHINGLES	

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2021, 2018, 2015, 2012, and 2009 *International Building Code*® (IBC)
- 2021, 2018, 2015, 2012, and 2009 *International Residential Code*® (IRC)
- 2013 *Abu Dhabi International Building Code* (ADIBC)†

†The ADIBC is based on the 2009 IBC. 2009 IBC code sections referenced in this report are the same sections in the ADIBC.

Properties evaluated:

- Weather resistance
- Fire classification
- Wind resistance

2.0 USES

The Malarkey asphalt shingles described in this report meet the requirements for Class A roof coverings when installed in accordance with this report.

3.0 DESCRIPTION

3.1 General:

Malarkey asphalt shingles are polymer-modified self-sealing shingles complying with ASTM D3462. See Table 1 and Figure 1 for shingle type (three-tab or laminated), product names, dimensions, and manufacturing locations.

3.2 Polymer Modified Asphalt Shingles:

3.2.1 Highlander NEX: Highlander NEX shingles are self-sealing laminated shingles that consist of bitumen and fillers applied onto a fiberglass mat and surfaced with mineral roofing granules.

3.2.2 Highlander NEX AR: Highlander NEX AR shingles are identical to the Highlander except for the addition of copper roofing granules, for algae resistance, on the top surfacing.

3.2.3 Dura-Seal: Dura-Seal are self-sealing, single layer, 3-tab shingles that consist of bitumen and fillers applied on a fiberglass mat and surfaced with roofing granules.

3.2.4 Dura-Seal AR: Dura-Seal AR are self-sealing, single layer, 3-tab shingles that consist of bitumen and fillers applied on a fiberglass mat and surfaced with algae resistant roofing granules.

3.2.5 Vista: Vista shingles are self-sealing laminated shingles that consist of polymer modified bitumen and fillers applied onto a fiberglass mat and surfaced with mineral roofing granules.

3.2.6 Vista AR: Vista AR shingles are self-sealing laminated shingles that consist of bitumen and fillers applied onto a fiberglass mat and surfaced with mineral roofing granules.

3.2.7 Alaskan: Alaskan shingles are self-sealing, single-layer three-tab shingles that consist of polymer-modified bitumen and fillers applied onto a fiberglass mat and surfaced with mineral roofing granules.

3.2.8 Alaskan Scotchgard™: Alaskan Scotchgard™ shingles are identical to the Alaskan except for the addition of copper roofing granules, for algae resistance, on the top surfacing.

3.2.9 Legacy: Legacy shingles are self-sealing laminated shingles that consist of polymer-modified bitumen and fillers applied onto a fiberglass mat and surfaced with mineral roofing granules.

3.2.10 Legacy Scotchgard™: Legacy Scotchgard™ shingles are identical to the Legacy except for the addition of copper roofing granules, for algae resistance, on the top surfacing.

3.2.11 Ecoasis NEX: Ecoasis shingles are self-sealing laminated shingles that consist of bitumen and fillers applied onto a fiberglass mat and surfaced with reflective roofing granules

3.2.12 Ecoasis Premium: Ecoasis Premium shingles are self-sealing laminated shingles that consist of polymer-modified bitumen and fillers applied onto a fiberglass mat and surfaced with reflective roofing granules, as well as copper roofing granules on the top surfacing for algae resistance.

3.2.13 Windsor Scotchgard™: Windsor Scotchgard™ shingles are heavy weight self-sealing laminated shingles that consist of polymer-modified bitumen and fillers applied onto a fiberglass mat and surfaced with mineral roofing granules.

3.2.14 EZ-Ridge: EZ-Ridge high profile decorative ridge shingles with sealant consist of an SBS blend asphalt coating applied onto a fiberglass mat and surfaced with colored ceramic granules. EZ-Ridge has an exposure of $8^1/_4$ inches (210 mm).

3.2.15 EZ-Ridge XT: EZ-Ridge XT high profile decorative shingles with sealant consist of an SBS blend asphalt coating applied onto a fiberglass mat and surfaced with colored granules. The EZ-Ridge XT has an exposure area of $8^1/_4$ inches (210 mm).

3.2.16 10" RidgeFlex: 10**"** RidgeFlex are SBS-modified fiberglass hip & ridge caps intended for use with wide ridge vents. 10” RidgeFlex consists of a fiberglass mat impregnated and coated on both sides with a modified-bitumen asphalt surfaced with embedded ceramic granules.

3.2.17 12" RidgeFlex: 12**"** RidgeFlex are SBS-modified fiberglass hip and ridge caps intended for use with wide ridge vents. 12**"** RidgeFlex consists of a fiberglass mat impregnated and coated on both sides with a modified-bitumen asphalt surfaced with embedded ceramic granules.

3.3 Fasteners:

Fasteners must comply with ASTM F1667 and must be minimum No. 12 gage [0.105-inch-diameter (2.67 mm] shank], $^3/_8$-inch-diameter-head (9.5 mm), galvanized steel, stainless steel, aluminum or copper roofing nails. Fasteners must be of sufficient length to penetrate into the sheathing $^3/_4$ inch (19.1 mm), or through the sheathing, whichever is less.

3.4 Underlayment:

Under the 2021 and 2018 IBC, the roof underlayment must be in accordance with Section 1507.1.1 and Table 1507.1.1(1). Under the 2015, 2012 and 2009 IBC, the roof underlayment must be in accordance with Section 1507.2.3. Under the 2021, 2018 and 2015 IRC, the roof underlayment must be in accordance with Section R905.1.1 and Table R905.1.1(1) [2012 and 2009 IRC Section R905.2.3].

3.5 Asphalt Cement:

Asphalt roofing cement used for hand-sealing the shingles must comply with ASTM D4586, Type I, Class I, or Type II, Class I.

4.0 DESIGN AND INSTALLATION

4.1 New Construction:

4.1.1 General: Installation of Malarkey polymer-modified asphalt shingles must comply with the applicable code, this report and the manufacturer’s published installation instructions. The manufacturer’s published installation instructions must be available at the jobsite at all times during installation. When installed on new construction in accordance with this section, the shingles are a Class A roof covering.

Roof deck must be code-complying, minimum 3/8-inch-thick (9.5 mm), exterior-grade plywood; 7/16-inch-thick (11.1 mm) oriented strand board (OSB); or nominally 1-inch-by-6-inch (25-by-152 mm) lumber installed as solid sheathing conforming to 2021, 2018, and 2015 IBC Section 2304.8.2 or 2308.7.10 [2012 and 2009 IBC Section 2304.7.2 or 2308.10.8]. The shingles must be installed in accordance with IBC Section 1507.2 or IRC Section R905.2, except as noted in this report. See Figure 5 for typical installation details.

4.1.2 Underlayment: Under the 2021 and 2018 IBC, the roof underlayment must be installed in accordance with Section 1507.1.1 and Tables 1507.1.1(2) and 1507.1.1(3). Under the 2015, 2012 and 2009 IBC, the roof underlayment must be installed in accordance with Section 1507.2.8. Under the 2021, 2018 and 2015 IRC, the roof underlayment must be installed in accordance with Section R905.1.1 and Tables R905.1.1(2) and R905.1.1(3). Under the 2012 and 2009 IRC, the roof underlayment must be installed in accordance with Section R905.2.7. Minimum roof slope must be 2:12. For roof slopes greater than 4:12, the roof deck must be covered with a minimum of one layer of underlayment as described in Section 3.4 of this report. For slopes between 2:12 and 4:12, two layers of the underlayment described in Section 3.4 of this report are required. In areas where there has been a history of ice forming along the eaves, causing a backup of water, an ice barrier must be provided in accordance with 2021 and 2018 IBC Section 1507.1.2 [2015, 2012 and 2009 IBC Section 1507.2.8.2] or 2021, 2018, and 2015 IRC Section R905.2.7 [2012 and 2009 IRC Section R905.2.7.1], as applicable.

4.1.3 Shingle Application: The three-tab and laminated shingles are installed with vertical joints of each course of shingles offset a minimum of 4 inches (102 mm) from the preceding course and with a maximum exposure to the weather of 5 5/8 inches (143 mm). Windsor shingles are offset a minimum of 5 1/2 inches (140 mm) from the preceding course and have a maximum exposure to the weather of 5 3/4 inches (146 mm). In colder climates or wind regions where it is questionable whether the sealant strip will activate and seal the shingles, the shingles must be hand-sealed. For three-tab shingles, hand-sealing consists of applying two spots of tab adhesive, approximately 1/2 inch (12.7 mm) in diameter, under each tab near the corners. Hand-sealing of laminated shingles consists of applying four 15/16-inch (23.8 mm) spots of tab adhesive to the back of the shingles, 1 inch and 13 inches (25 mm and 330 mm) in from each side and 1 inch (25 mm) up from the bottom of the shingle. For Windsor shingles, hand-sealing consists of applying a dab of tab adhesive, approximately 1 inch (25 mm) in diameter, under each shingle tab. See Figures 3 and 4.

4.1.4 Shingle Fastening: For roof slopes of 2:12 to 21:12, three-tab and laminated shingles are fastened to the roof deck using four fasteners, located as shown in Figure 2. Windsor shingles require five or six fasteners, depending on region, as shown in Figure 3. In high wind areas and for roof slopes exceeding 21:12, three tab and laminated shingles must be hand-sealed in accordance with Section 4.1.3 and fastened to the roof deck using six fasteners, located as shown in Figure 2. In high wind areas and for roof slopes exceeding 21:12, Windsor shingles require nine fasteners and hand-sealing, located as shown in Figure 3. See Figure 5 for nailing depth illustration.

4.1.5 Valley Construction, Other Flashings and Drip Edges: Roof valleys must be flashed in accordance with 2021 and 2018 IBC Section 1507.2.8.2 [2015, 2012 and 2009 IBC Section 1507.2.9.2] or IRC Section R905.2.8.2. See Figure 7 for typical installation details. Other flashings must be installed in accordance with IBC Sections 1503.2 and 2021 and 2018 IBC Section 1507.2.8 [2015, 2012 and 2009 1507.2.9] or IRC Sections R903.2 and R905.2.8. Drip edges must be installed in accordance with 2021 and 2018 IBC Section 1507.2.8.3 [2015, 2012 and 2009 IBC Section 1507.2.9.3] or IRC Section R905.2.8.5.

4.1.6 Hip & Ridge: The hip & ridge shingles must be centered over hips and ridges, and must be fastened to the roof deck using two fasteners, one located on each side of the hip or ridge, 6 1/2 inches (165 mm) from the exposed end for RidgeFlex products, 8¾ inches (222.3 mm) for EZ-Ridge products, and 1 inch (25.4 mm) up from the shingle edge for both RidgeFlex and EZ-Ridge products. RidgeFlex hip and ridge shingles must be installed with a maximum 5 5/8-inch (143 mm) exposure to the weather. See Figure 8. EZ-Ridge and EZ-Ridge XT hip and ridge shingles must be installed with a maximum exposure of 8 1/4-inch (2010 mm) exposure to the weather. See Figure 9 for details.

4.2 Reroofing:

When the asphalt shingles described in this report are installed over existing Class A or Class C asphalt shingles in accordance with this section, the roofing assemblies are recognized as Class A roof coverings. The existing asphalt roof shingle covering must be inspected in accordance with the provisions and limitations of 2021 IBC section 1512 and 2018 and 2015 IBC Section 1511 [2012 and 2009 IBC Section 1510] or 2021, 2018, and 2015 IRC Section R908 [2012 and 2009 IRC Section R907]. Prior to reroofing, hip and ridge shingles must be removed. Except as noted in this section, the shingles must be installed in accordance with Section 4.1 of this report. Fasteners must be of sufficient length to penetrate 3/4 inch (19 mm) into the sheathing or through the sheathing, whichever is less. Valley flashing and other flashings must comply with Section 4.1.5 and the following, as applicable:

- **IBC:** 2021 Sections 1512.4 and 1512.5 and 2018 and 2015 Sections 1511.5 and 1511.6 [2012 and 2009 Sections 1510.5 and 1510.6].
- **IRC:** 2021, 2018 and 2015 Sections R908.5 and R908.6 [2012 and 2009 IRC Sections R907.5 and R907.6].

4.3 Wind Resistance:

Malarkey asphalt shingles have been tested for wind resistance in accordance with ASTM D3161 or ASTM D7158. Shingles tested in accordance with ASTM D3161 are classified as Class A or Class F and qualify for use under 2021 IBC Section 1504.2 and 2018 and 2015 IBC Section 1504.1.1 [2012 and 2009 IBC Section 1507.2.7.1] or IRC Section R905.2.4.1, as applicable. Shingles tested in accordance with ASTM D7158 are classified as Class H and qualify for use in locations where the maximum basic wind speed is 190 mph (306 kph) or less with an exposure category of B or C (ASCE 7) and a maximum building height of 60 feet (18.3 m). Installation must be in accordance with 2021 and 2018 IBC Section 1507.2.6 [2015, 2012 and 2009 Section 1507.2.7] or IRC Section R905.2.6, as applicable.

5.0 CONDITIONS OF USE:

The Malarkey asphalt shingles described in this report comply with, or are suitable alternatives to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

5.1 Installation complies with this report, the manufacturer's published installation instructions and applicable code. If there is a conflict between the installation instructions and this report, this report governs.

5.2 The products are manufactured at the plant locations listed in Table 1 of this report, under a quality control program with inspections by ICC-ES.

6.0 EVIDENCE SUBMITTED

6.1 Manufacturer's published installation instructions.

6.2 Reports of testing in accordance with ASTM D3462, ASTM D3161, ASTM D7158, and ASTM E108.

6.3 Quality control documentation.

7.0 IDENTIFICATION

7.1 Each bundle of shingles bears a label with the name and address of the manufacturer (Malarkey Roofing Products), the product name, installation instructions, and the ICC-ES evaluation report number (ESR-3150). Additionally, in accordance with ASTM D3462, each bundle of shingles is marked with the area of the roof surface covered, ASTM designation, style, and color of the product.

7.2 The report holder's contact information is the following:

MALARKEY ROOFING PRODUCTS
POST OFFICE BOX 17217
3131 NORTH COLUMBIA BOULEVARD
PORTLAND, OREGON 97212
(503) 240-1191
www.malarkeyroofing.com

DIVISION: 07 00 00—THERMAL AND MOISTURE PROTECTION
Section: 07 31 13—Asphalt Shingles

REPORT HOLDER:

MALARKEY ROOFING PRODUCTS

EVALUATION SUBJECT:

MALARKEY POLYMER-MODIFIED ASPHALT SHINGLES

1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that the Malarkey Engineered and Polymer-modified asphalt shingles, described in ICC-ES evaluation report ESR-3150, have also been evaluated for compliance with the codes noted below.

Applicable code editions:

- 2019 *California Building Code* (CBC)

For evaluation of applicable chapters adopted by the California Office of Statewide Health Planning and Development (OSHPD) AKA: California Department of Health Care Access and Information (HCAI) and the Division of State Architect (DSA), see Sections 2.1.1 and 2.1.2 below.

- 2019 *California Residential Code* (CRC)

2.0 CONCLUSIONS

2.1 CBC:

The Malarkey Engineered and Polymer-modified asphalt shingles, described in Sections 2.0 through 7.0 of the evaluation report ESR-3150, comply with CBC Sections 1505.1 and 1507.2, and may be used where the CBC requires a Class A roof covering complying with CBC Section 1505.1.1, a Class B roof covering complying with CBC Section 1505.1.2, or a Class C roof covering complying with CBC Section 1505.1.3, provided the design and installation are in accordance with the 2018 *International Building Code*® (IBC) provisions noted in the evaluation report and the additional requirements of CBC Section 1511, as applicable.

2.1.1 OSHPD:

The applicable OSHPD Sections of the CBC are beyond the scope of this supplement.

2.1.2 DSA:

The applicable DSA Sections of the CBC are beyond the scope of this supplement.

2.2 CRC:

The Malarkey Engineered and Polymer-modified asphalt shingles, described in Sections 2.0 through 7.0 of the evaluation report ESR-3150, complies with CRC Sections R902.1 and R905.2, and may be used where the CRC requires a Class A roof covering complying with CRC Section R902.1.1, a Class B roof covering complying with CRC Section R902.1.2, or a Class C roof covering complying with CRC Section R902.1.3, provided the design and installation are in accordance with the 2018 *International Residential Code*® (IRC) provisions noted in the evaluation report and the additional requirements of CRC Section R908, as applicable.

This supplement expires concurrently with the evaluation report, reissued February 2025.

ROOF MEASUREMENT REPORT

409 5th St SW, Puyallup, WA 98371

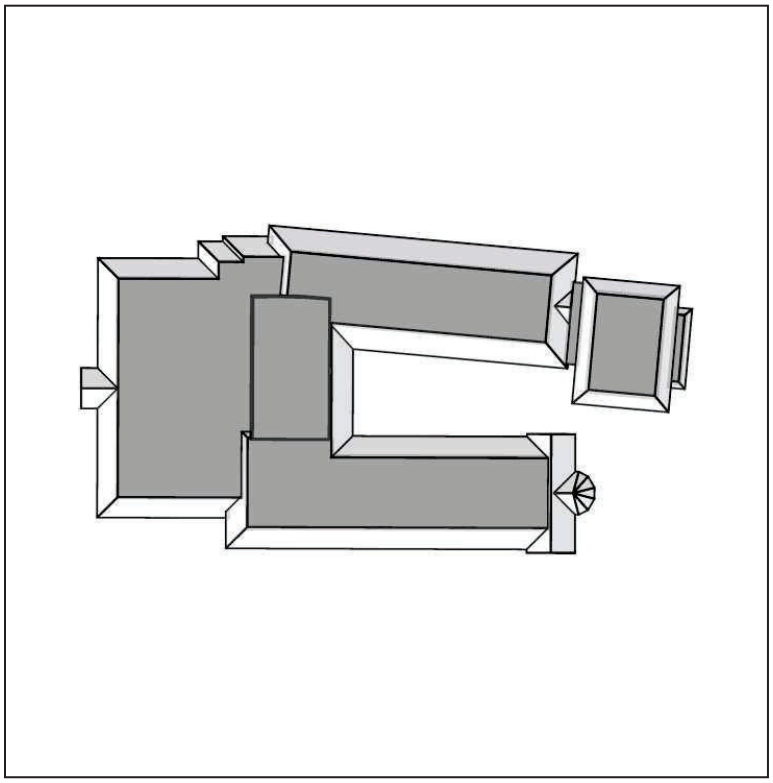
Report Contents

Report Details

Date:	09/29/2024
Report:	61723982
Building:	1

Roof Details

Total Area:	45,458 sq ft
Total Roof Facets:	43
Predominant Pitch:	0/12
Number of Stories:	>1
Total Ridges/Hips:	404 ft
Total Valleys:	229 ft
Total Rakes:	115 ft
Total Eaves:	2,631 ft
Total Penetrations:	158
Total Penetrations Perimeter:	1,130 ft
Total Penetrations Area:	788 sq ft



In this 3D model, facets appear as semi-transparent to reveal overhangs.

Contact Us

Contact: Matt Shaxton

Company: The Garland Company Inc.

Address: 3800 East 91st St
Cleveland OH 44105

Phone: 216-641-7500

Measurements provided by www.eagleview.com

Certified Accurate
www.eagleview.com/Guarantee.aspx

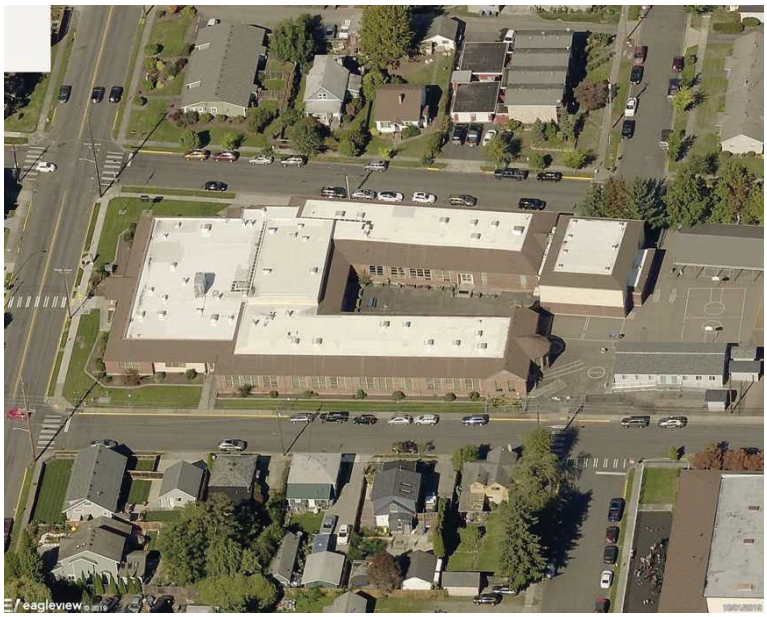
eagleview

REPORT IMAGES

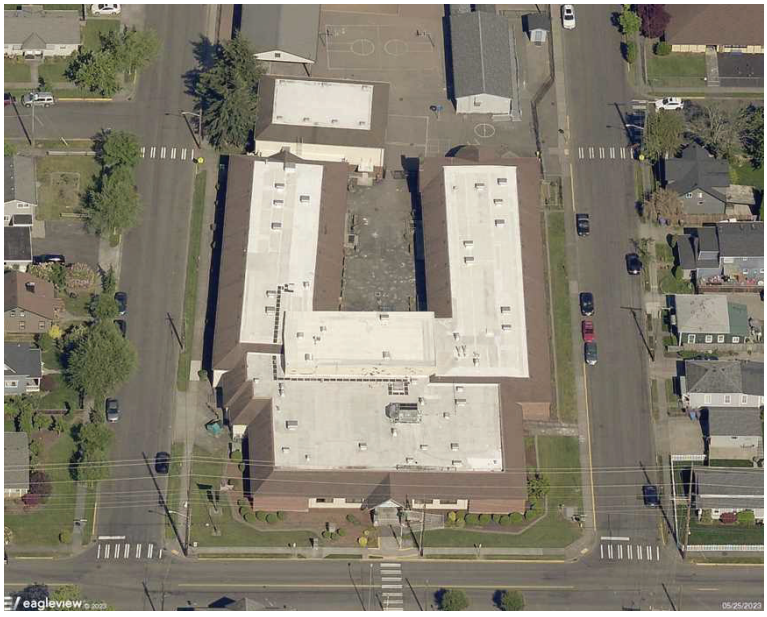
The following aerial images show different angles of this structure for your reference.

Top View

REPORT IMAGES

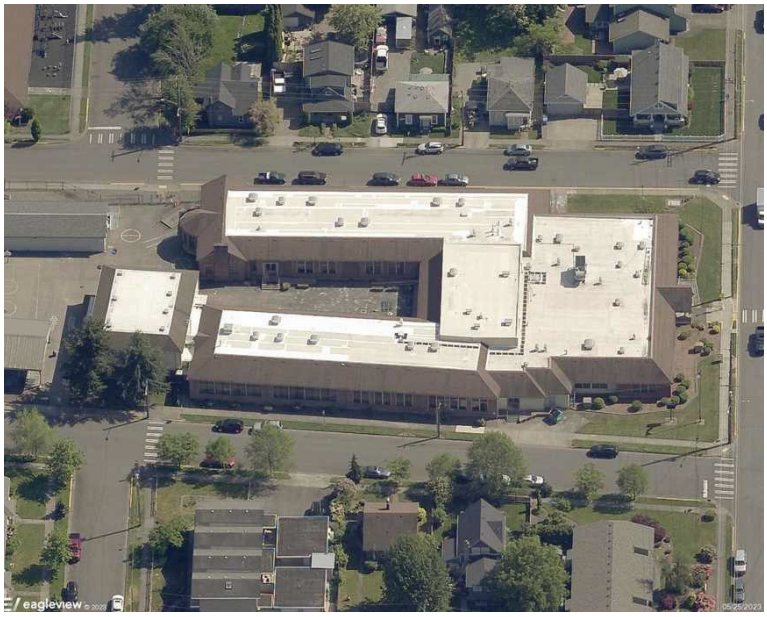


North View

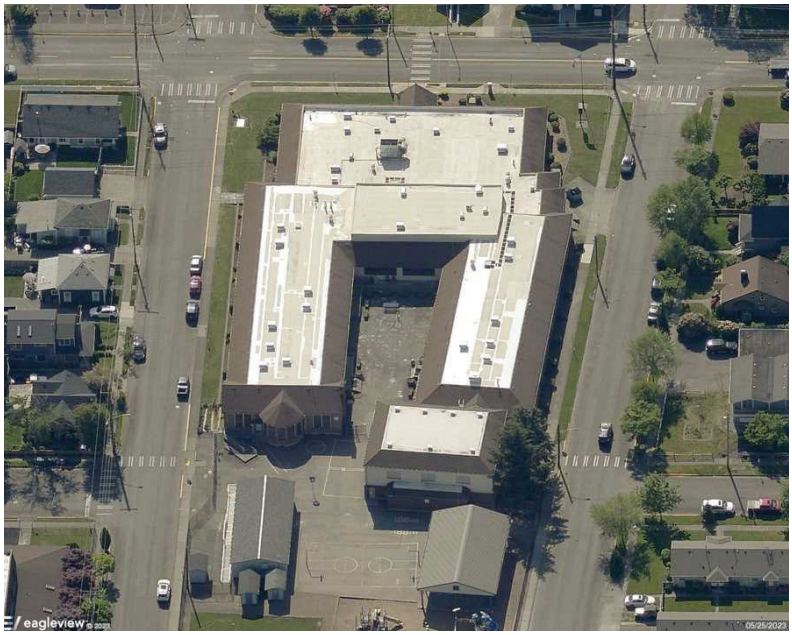


East View

REPORT IMAGES



South View



West View

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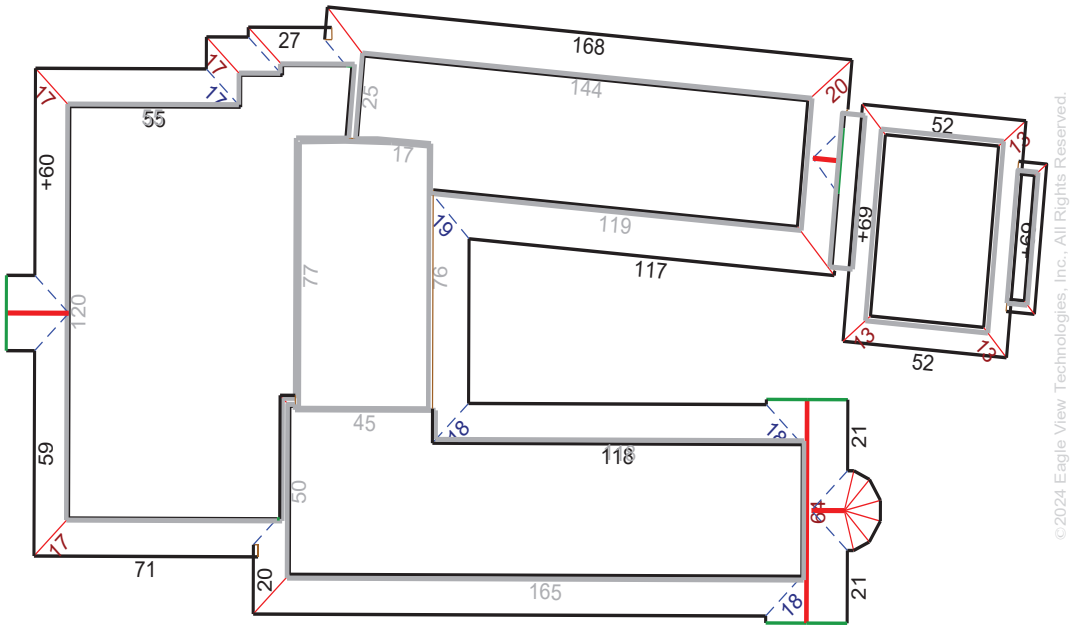
ROOF MEASUREMENT REPORT

LENGTH DIAGRAM

Total Line Lengths:	Ridges = 104 ft	Valleys = 229 ft	Flashing = 66 ft	Eaves = 2,631 ft
	Hips = 300 ft	Rakes = 115 ft	Step flashing = 31 ft	Parapets = 1,859 ft



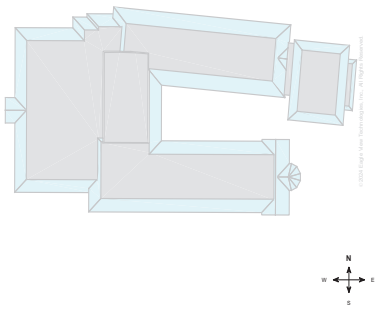
Note: This diagram contains segment lengths (rounded to the nearest whole number) over 5 feet. In some cases, segment labels have been removed for readability. Plus signs preface some numbers to avoid confusion when rotated (e.g. +6 and +9).

REPORT SUMMARY

Below is a measurement summary using the values presented in this report.

Lengths, Areas and Pitches

Ridge	104 ft (4 Ridges)
Hips	300 ft (21 Hips)
Valleys	229 ft (14 Valleys)
Rakes*	115 ft (10 Rakes)
Eaves/Starter**	2,631 ft (66 Eaves)
Drip Edge (Eaves + Rakes)	2,746 ft (76 Lengths)
Parapet Walls	1,859 ft (45 Lengths)
Flashing	66 ft (3 Lengths)
Step Flashing	31 ft (9 Lengths)
Total Area	45,458 sq ft
Total Penetrations Area	788 sq ft
Total Roof Area Less Penetrations	44,670 sq ft
Total Penetrations Perimeter	1,130 ft
Predominant Pitch	0/12



Total Roof Facets = 43

*Rakes are defined as roof edges that are sloped (not level).
** Eaves are defined as roof edges that are not sloped and level.

Areas per Pitch

Roof Pitches	0/12	8/12
Area (sq ft)	27286.2	18171.2
% of Squares	60%	40%

The table above lists each pitch on this roof and the total area and percent (both rounded) of the roof with that pitch.

Waste Calculation Table

Waste %	0%	10%	12%	15%	17%	20%	22%
Area (sq ft)	45,458	50003.8	50913.0	52276.7	53185.9	54549.6	55458.8
Squares	454.6	500.0	509.1	522.8	531.9	545.5	554.6

This table shows the total roof area and squares (rounded up to the nearest decimal) based upon different waste percentages. The waste factor is subject to the complexity of the roof, individual roofing techniques and your experience. Please consider this when calculating appropriate waste percentages. Note that only roof area is included in these waste calculations. Additional materials needed for ridge, hip, valley, and starter lengths are not included.

Parapet Calculation Table

Wall Height (ft)	1	2	3	4	5	6	7
Vertical Wall Area (sq ft)	1859	3718	5577	7436	9295	11154	13013

This table provides common parapet wall heights to aid you in calculating the total vertical area of these walls. Note that these values assume a 90 degree angle at the base of the wall. Allow for extra materials to cover cant strips and tapered edges.

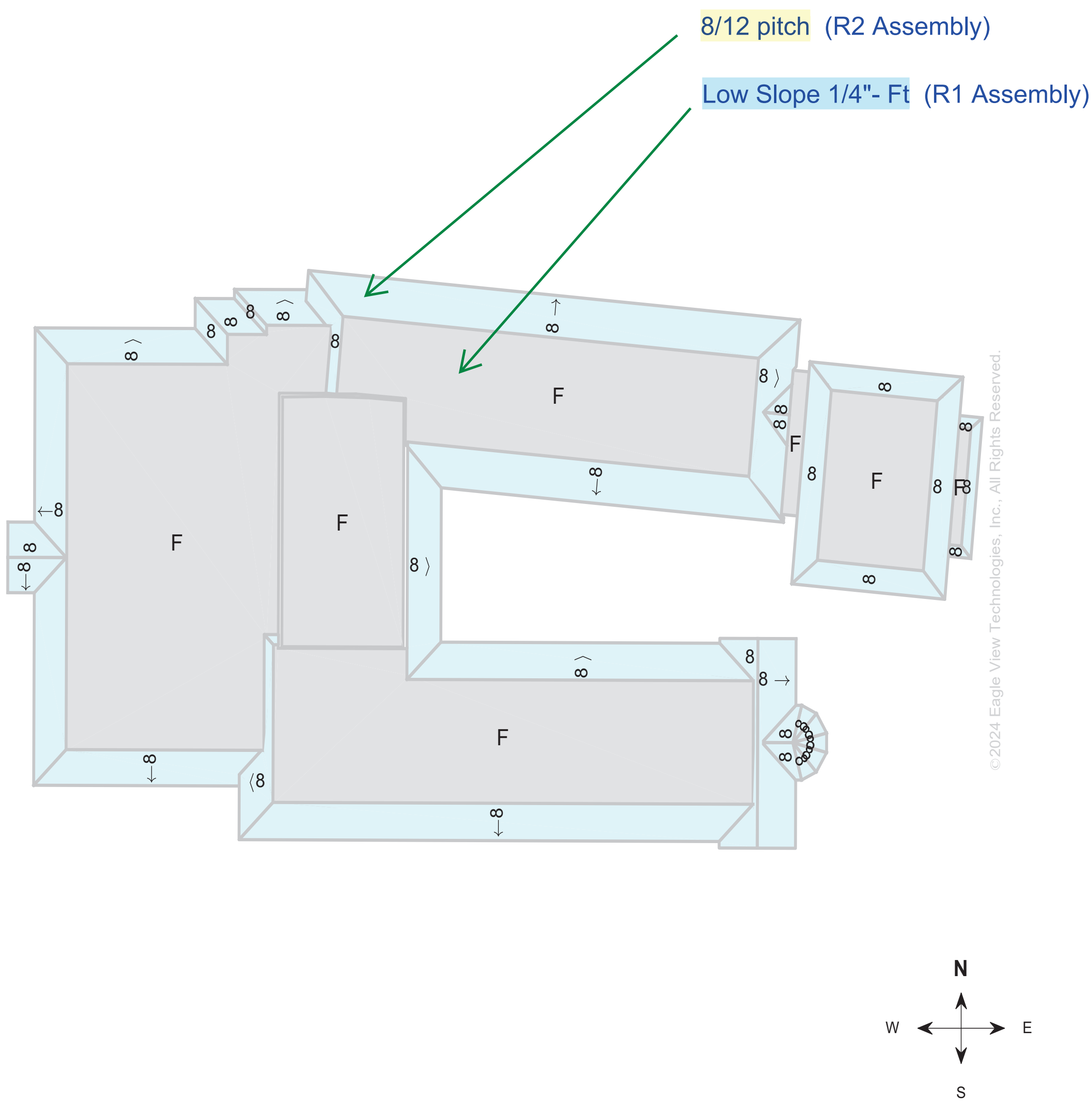
Penetration Table	1-16	17-97	98	99-103	104-105	106	107-114	115-117	118	119
Area (sq ft)	0.2	1	1.6	2.2	3	3.7	4	5	5.4	6.2
Perimeter (ft)	2	4	5.2	6	7	8	8	9	9.4	10
	120-121	122	123	124	125	126	127-128	129	130	131
Area (sq ft)	6.2	6.7	6.4	7.8	8.4	8.9	9	9.3	10.5	10.9
Perimeter (ft)	10	10.4	10.4	11.2	11.6	11.8	12	12.4	13	13.2
	132	133	134	135	136	137	138	139	140	141
Area (sq ft)	10.5	11.5	11.7	12	13	11.9	13.3	13.6	13.7	14
Perimeter (ft)	13.4	13.8	13.8	14	14.6	14.6	14.6	14.8	15	15

Any measured penetration smaller than 3x3 feet may need field verification. Accuracy is not guaranteed. The total penetration area is not subtracted from the total roof area.

ROOF MEASUREMENT REPORT

PITCH DIAGRAM

Pitch values are shown in inches per foot, and arrows indicate slope direction. The predominant pitch on this roof is 0/12.



Note: This diagram contains labeled pitches for facet areas larger than 20 square feet. In some cases, pitch labels have been removed for readability. Gray shading indicates flat, 1/12 or 2/12 pitches. If present, a value of "F" indicates a flat facet (no pitch).

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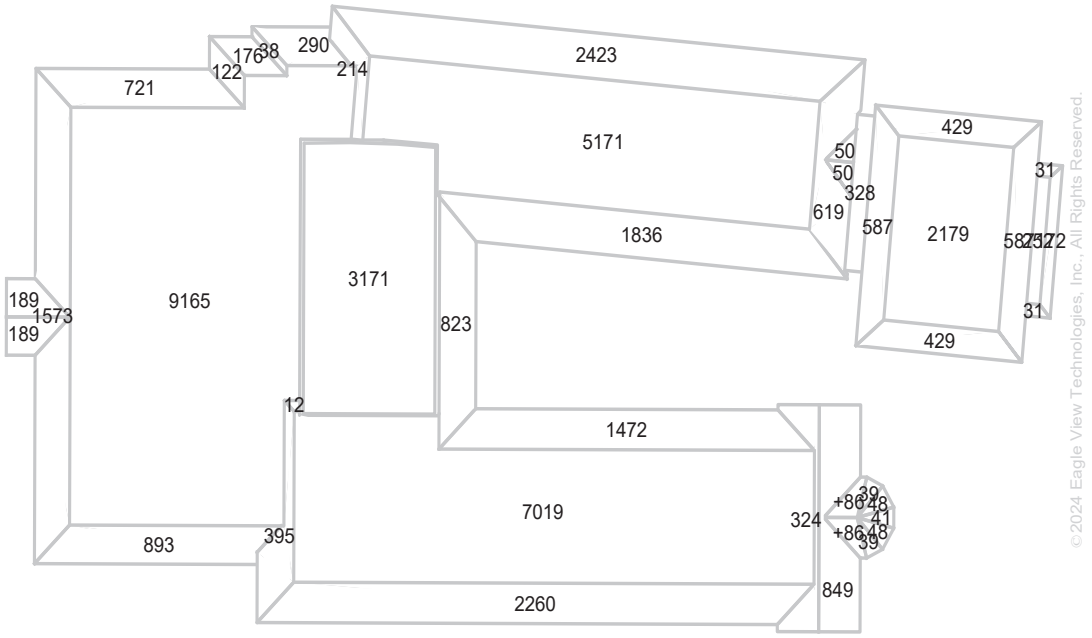
ROOF MEASUREMENT REPORT

AREA DIAGRAM

Total Area = 45,458 sq ft, with 43 facets.



Note: This diagram shows the square feet of each roof facet (rounded to the nearest foot). The total area in square feet, at the top of this page, is based on the non-rounded values of each roof facet (rounded to the nearest square foot after being totaled).

ROOF MEASUREMENT REPORT

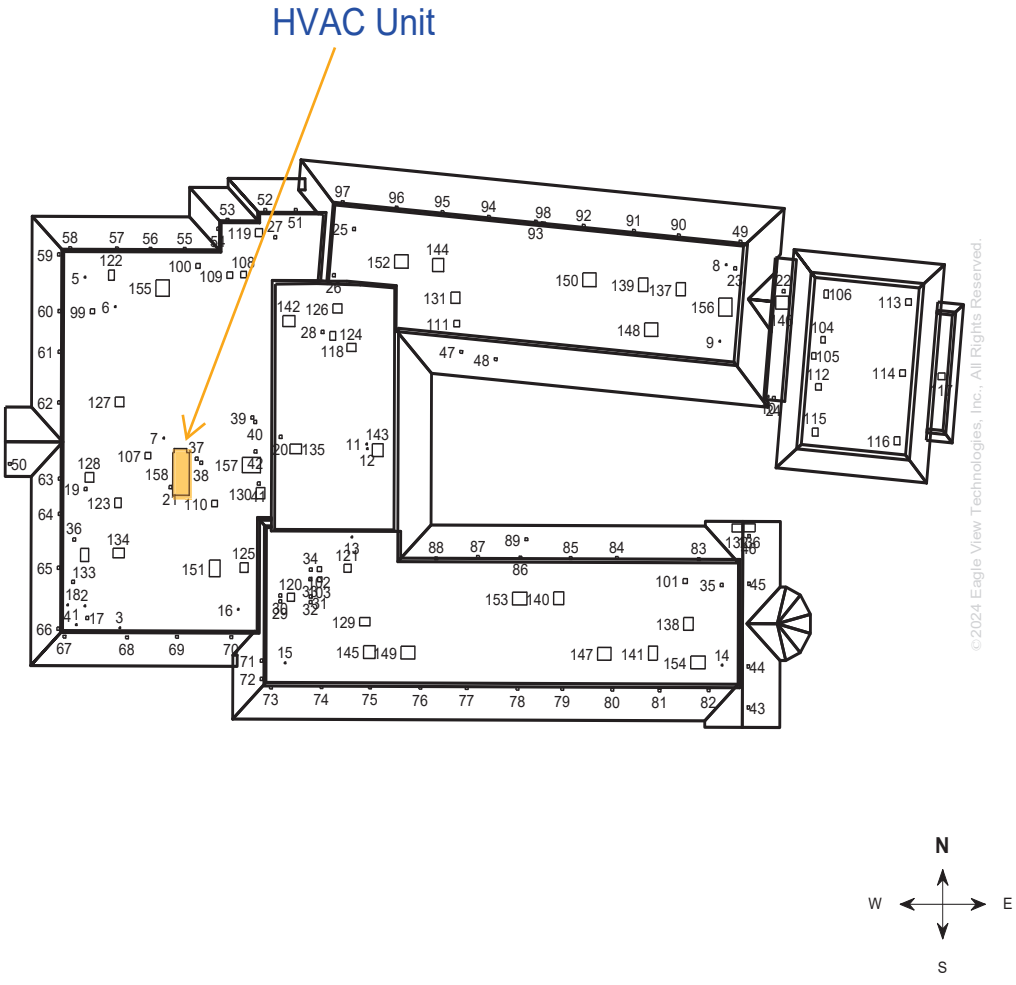
PENETRATIONS

Penetrations Notes Diagram

Penetrations are labeled from smallest to largest for easy reference.

Total Penetrations: 158
Total Penetrations Perimeter = 1,130 ft

Total Penetrations Area: 788 sq ft
Total Roof Area Less Penetrations = 44,670 sq ft



Note: Any measured penetration smaller than 3x3 feet may need field verification. Accuracy is not guaranteed. The total penetration area is not subtracted from the total roof area.

GARLAND since 1895

ROOF MEASUREMENT REPORT

Property Info

Building Use- Elementary School

Property Location

Longitude = -122.2982455 Latitude = 47.1884468

Online map of property:
http://maps.google.com/maps?f=g&source=s_q&hl=en&geocode=&q=409+5th+St+SW,Puyallup,WA,98371

Property Info

Year Built: Varies

Effective Year Built: *

1930's , 1980's, 2000's

*.

Notes

This was ordered as a commercial property. There were no changes to the structure in the past four years.

THE GARLAND COMPANY, INC.
HIGH PERFORMANCE BUILDING ENVELOPE SYSTEMS

October 9th 2024

Puyallup School District
Meeker Elementary
Address: 409 5th St SW, Puyallup, WA 98371

Meeker Elementary Roof Replacement SOW

Assembly R1

Low Slope:
-Mobilize all material and equipment needed to complete the project
-Set up contractor safety per LNI approved requirements
-Assume 1000 sq/ft of insulation replacement (Additional will be billed on a T&M rate)
-Relief cut the existing single ply roof
-Demo all existing flashing metal
-Provide additional cricketing on the West wall of the Office roof to improve drainage
-Mechanically attach ½" primed densdeck per wind uplift calculations
-Install Stressbase 80 Plus in Green Lock Plus at 2Gal per 100 sq/ft
-Install KEE Stone FB 60 in KEE Spatter Spray
-Install new 24ga edge metal to all areas of existing flashing
-Install new Trafguard walk pads in existing locations
-Chimney located on the East side of the South wing is to be re tuck pointed at roof level and a new counter flashing cut into the brick
-Demobilize from the project site removing all contractor related debris/items
-Installer to provide a three year workmanship warranty
-Garland to provide a 30 year NDL warranty

• *Direct Line: Matt 206-681-8151*
Email: mshaxton@garlandind.com


4th Ave SW
R2
R2
R1
Roof Type - R1
R2
Meeker Elementary School
Roof Type R2-
R1
R2
R2
Google Earth
5th Ave SW

KEE-STONE®

KEE-Stone® Hybrid System

2-Ply Cold Application Guidelines

GARLAND since 1895

Garland's 2-ply KEE-Stone hybrid cold system incorporates a Garland approved modified bitumen base sheet, designed to exceed the industry's highest standards by containing the latest SBS (Styrene-Butadiene-Styrene), fire retardant compounds, and fiberglass and polyester scrim reinforcements with Garland's KEE-Stone membrane as a cap sheet, featuring high-performance ELVALOY™ HP Ketone Ethylene Ester (KEE) technology that exceeds all requirements outlined in ASTM D 6754.

MATERIALS

The materials used in the system may include Green-Lock® Plus Membrane Adhesive, Green-Lock Plus Flashing Adhesive, KEE-Lock Foam and KEE-Lock Spatter Spray to adhere the membranes, an approved modified bitumen base sheet, the KEE-Stone membrane for the cap sheet, and KEE-Stone 6" Utility Roll for all end laps and vertical flashing seams. Approved base sheets are listed below.

SYSTEM/PRODUCT OPTIONS

Nailable Base Sheet (Optional): ASTM D4601 Type II base sheet

Interply: StressBase® 80/120, StressBase Plus 80, FlexBase® 80, FlexBase Plus 80, FlexBase E 80, HPR® Torchbase, Ultra-Shield Torch Base

Membrane: KEE-Stone FB 60, KEE-Stone HP, KEE-Stone NF 60 Flashing, KEE-Stone HP NF Flashing, KEE-Stone Utility Roll (6")

APPLICATION EQUIPMENT

Here are some specific tools you'll need to install Garland's 2-ply cold KEE-Stone hybrid system:

- Suitable trowel for applying adhesive to flashing details if necessary
- Roofer's knife with hooked blade
- Long-handled (standing) squeegee that has a 12"-16" (304 - 406 mm) flat blade for applying cold adhesive
- Long-handled squeegee with ¼" (6 mm) notch
- Silicone seam rollers
- Leister Uniroof AT/ST hot air welder for field seams
- Hand-held hot air welder for seam details and flashings
- Seam probing tool to check for small voids
- Heavy-weighted (minimum 75 lb) roller to press membrane into adhesive
- Weights for edges or corners that potentially curl up when the sheets have not had enough time to relax

BASE SHEET APPLICATION OVER NAILABLE SUBSTRATE (OPTIONAL)

1. Beginning at the low point of the roof, fasten one ply of VersiPly 40 or StressBase 80 to the nailable substrate.
2. Start with an appropriate roll width (⅓ or ½ roll width) to accommodate off-setting of side laps of subsequent layers of base sheet. Install so that no side laps are against the flow of water.
3. Fasten nailable base sheet with a minimum fastening pattern of every 9" (230 mm) o.c. on side laps and every 18" (457 mm) o.c. in two staggered rows in the field of the sheet. **Note: Check specification for exact fastening pattern as it may change based on wind uplift requirements.**
4. Overlap nailable base sheet side laps 4" (100 mm) and end laps 8" (200 mm). Offset end laps of side by side sheets a minimum of 3' (0.90 m).
5. Additional plies of base sheet are to be installed as specified in the next section. **Note: Do not leave fastened base exposed; cover in the same day with the base sheet and cap sheet that is specified.**
6. Start base sheet application at the low point of the roof with appropriate roll width to offset side laps 18" (457mm) from side laps of the nailable base sheet. Install flush to roof edge if over base sheet, otherwise turn the base sheet over the fascia minimum 2" (50 mm) and nail 9" (230 mm) o.c. For perimeter flashing details, you must extend the base sheet up to a minimum of 8" (203 mm). Design layout so that no side laps are against the flow of water. **Note: On smaller roofs, cut rolls into manageable lengths.**

BASE SHEET APPLICATION OVER APPROVED ROOF BOARD

Approved Roof Boards: ½" (8 mm) min.

- G-P Gypsum
- DensDeck Prime®
- DensDeck DuraGuard®
- DensDeck StormX™
- Securock®
- High density asphalt coated wood fiberboard

1. Sweep or blow away any dust, dirt or sand particles that could interfere with adhesion.
2. Tape all insulation joints prior to applying Green-Lock Plus Membrane Adhesive to keep material from seeping in between the boards. (Duct tape can be used for taping insulation joints).
3. Relax base sheet prior to application (until sheet lies flat) and work with no more than 18' (5.5 m) lengths. This will allow the sheet to sit down into the adhesive.
4. Snap chalk lines for area of application to prevent material from skinning over in areas that material will not be applied immediately.
5. Pour a liberal amount of Green-Lock Membrane Adhesive onto the cover board at a rate 1.5 to 2.0 gallons per square (.61 to .82 l/m²). **Note: Work outwards to eliminate voids. Coverage based on a smooth surface; uneven surfaces or more porous roof boards will increase the coverage rate.**
6. Start base sheet application at the low point of the roof with appropriate roll width. Install flush to roof edge if over base sheet, otherwise turn the base sheet over the fascia minimum 2" (50 mm) and nail 9" (230 mm) o.c. For perimeter flashing details, you must extend the base sheet up to a minimum of 8" (203 mm). Design layout so that no side laps are against the flow of water. **Note: On smaller roofs, cut rolls into manageable lengths.**

KEE-STONE SHEET APPLICATION

1. Before installing the KEE-Stone cap sheet, you must sweep or blow away any dust, dirt or debris off the base sheet, as this will interfere with adhesion.
2. Relax the KEE-Stone cap sheet prior to application. This will allow the sheet to sit down into the adhesive.
3. Apply KEE-Lock Foam or KEE-Lock Spatter Spray to the approved base sheet. For KEE-Lock Foam, apply adhesive in a ribbon pattern. ½" to ¾" wide beads (1.27- 1.90 cm), 12" o.c. (30.5 cm).. For KEE-Lock Spatter Spray, spray the adhesive covering 75-85% of the base sheet. Wait approximately 2-3 minutes to ensure the adhesive is tacky before applying.
4. Position the KEE-Stone where it is ready to be installed and then roll the membrane into the KEE-Lock Foam or Spatter Spray adhesive. **Note: Ensure that foam adhesive is not applied to any side laps or areas where the membrane is to be welded.**
5. Broom in the KEE-Stone membrane immediately after installation to ensure even, continuous contact between the fleece backing and the adhesive. After brooming, immediately use a minimum 75 lb. weighted roller to roll the membrane to ensure proper contact and adhesion with the adhesive and push out any air pockets. Once the KEE-Stone HP is adhered, heat-weld and seal the side and head laps using hot air welding equipment and a clean, 2" silicone roller.

6. To install KEE-Stone, start at the low point of the roof with an appropriate roll width to offset side laps from the underlying base sheet a minimum of 18" (457 mm). Work with manageable lengths for proper handling. Position the KEE-Stone cap sheet with salvage edge at low side of roof. Install in shingle fashion, with no laps against the flow of water. **Note: Once the membrane has had a chance to bond, utilize a seam probe to check all laps and joints for full adhesion. Check for small voids at laps. If the membrane can be lifted at any area, it is not properly adhered. Any areas not properly bonded require welding or, if necessary, the application of a utility patch to seal an unbonded areas that exist.**
7. Once the KEE-Stone is adhered, heat-weld side lap seams to seal the membranes together.
8. All end laps shall be butted up to one another. Once end laps are adjoined, heat weld KEE-Stone 6" Utility Roll over joint to seal.
9. Refer to Leister equipment manual for proper heat welding instructions.
10. Foot traffic must be restricted on applied membrane. Stained or contaminated membrane will not be accepted.
11. All hot air welded seams should be no less than 1.5" indicating a proper welded seam.
12. To ensure proper equipment settings throughout the project, a preliminary test weld is required prior to installation and at the re-start of welding throughout the day.

FLASHING APPLICATION

At all vertical and other flashing details, install one of the approved base sheets followed by the KEE-Stone Flashing membrane extending over the already installed field plies.

Base Flashing Installation

1. Position the base flashing ply where it is ready to be installed.
2. Use preferred method to align sheet with install path.
3. Apply Green-Lock Plus Flashing Adhesive to the substrate and a min. 6" (152.4 mm) onto the field at a rate of 2-3 gallons per 100 sq. ft. (0.82-1.2 l/ m^2).
4. Install a 3' (0.9 m) wide approved base flashing ply extending min. 6" (152.4 mm) onto the field of the roof.
5. Overlap base flashing ply side laps 4" (100 mm).
6. Utilize a clean trowel to apply pressure to all T-laps to seal immediately following base ply application.

KEE-Stone Flashing Installation

1. Before installing the KEE-Stone Flashing, all dust, dirt or debris must be removed from the base sheet.
2. Position KEE-Stone Flashing membrane where the membrane is ready to be installed.
3. Use preferred method to align sheet with install path.
4. Apply KEE-Lock WB Flashing adhesive in a smooth, even coat to the exposed side of the installed base flashing ply and to the backside of the KEE-Stone NF Flashing at a total combined rate of 1.0-1.5 gallons per sq. ft. (0.5-0.75 per sq. ft on each sheet)
5. Install 10' (3.3 m) wide KEE-Stone cap flashing ply extending min. 9" (228.6 mm) onto the field of the roof.
6. Broom in or roll with a weighted roller the KEE-Stone Flashing membrane immediately after install to ensure even continuous contact between the flashing membrane and the adhesive.
7. All vertical seams are to be butted together and then fully heat weld 6" KEE-Stone Utility Roll covering the seam.
8. Complete all inside and outside corner flashing details by fully heat welding KEE-Stone Utility Roll centered on the seam or the appropriate KEE pre-fabricated accessories. **Note: Once the membrane has had a chance to bond, utilize a seam probe to check all laps and joints for full adhesion. Check for small voids at laps. If the membrane can be lifted at any area, it is not properly adhered. Any areas not properly bonded require welding or, if necessary, the application of a utility patch to seal any unbonded areas that exist.**
9. All vertical flashings shall be terminated a min. 8" (203 mm) above the top layer of insulation with approved termination bar and counter-flashing system.
10. For any applications involving PVC or KEE-coated sheet metal, refer to its specific installation details.

LIMITATIONS

1. Do not install in inappropriate weather. Green-Lock Plus Membrane Adhesive is a moisture-cured product and rain or high humidity can accelerate the curing process.
2. Store the adhesives properly to protect them before use. Keep dry and above 70˚F (21˚C) for 24 hours prior to application.
3. Leave the lids on the product until you are ready to use. Open containers will skin and start to cure.
4. Flip over all sealed buckets of Green-Lock Plus Membrane Adhesive onto their lids to allow the product to mix before beginning the job. This will give you a more consistent product.
5. When applying KEE-Lock Foam, allow product to rise but do not let it skin over.
6. Do not apply Green-Lock Plus Membrane Adhesive or Flashing Adhesive that has been improperly stored or exposed to moisture. IF THE MATERIAL ISN'T BONDING, STOP THE APPLICATION!
7. Refer to the KEE-Stone cold process specification for complete requirements.
8. Substrates must be free of dust, dirt, oil, debris and moisture.
9. Work with manageable lengths of base and cap sheets for the particular job. Where appropriate, cut rolls into ⅓ or ½ roll lengths and allow material to relax prior to installation.
10. KEE-Stone end laps do not have a selvedge edge. Therefore, make sure all end laps are sealed by heat welding KEE-Stone 6" Utility Roll over joints.

WEATHER CONDITIONS

Do not attempt application if ice, snow, moisture or dew is present. Bonding substrates must be clean, dry and free of dust or other inhibitors of proper adhesion. Ambient temperature must be 50˚F (10˚C) or rising through the day. Cooler temperatures will negatively impact the properties of the system. Contact your Garland Sales Representative for proper cold weather applications.

STORAGE

Store pails and roll goods in their original packaging, indoors on pallets protected from the elements. Green-Lock Plus Membrane and Flashing Adhesives need to be kept at 70˚F (21°C) for at least 24 hours prior to application. If stored on the roof, all product needs to be under a breathable tarp at all times. Rolls and containers that are improperly stored or have been warehoused for prolonged periods of time could potentially be damaged or go beyond their shelf life.

GREEN-LOCK® PLUS

High-Performance Membrane Adhesive
Technical Data Sheet

OVERVIEW & FEATURES

Green-Lock Plus Membrane Adhesive is a high-performance, asphalt free, moisture-cured polymer adhesive used to construct cold process roofing systems for Garland approved membranes. The result is a high performance, solvent free, cold applied multi-ply modified bitumen roof system with an outstanding life span that functions equally well on flat surfaces and slopes up to 3:12. Green-Lock Plus Membrane Adhesive is easy to apply by squeegee.

Versatile - Green-Lock Plus Membrane Adhesive is approved for use with Garland's approved base and cap sheets. Green-Lock Plus Membrane Adhesive can be directly applied to DensDeck Prime®, SecuRock®, or high density asphalt coated wood fiberboard. Green-Lock Plus Membrane Adhesive can also be used as a surfacing adhesive to adhere roofing aggregate. Compatible with asphalt-based roofing mastics, adhesives and sealers.

Environmentally-Friendly - Green-Lock Plus Membrane Adhesive contains ultra low VOCs and is 100% solids and solvent free. This non-asphaltic formulation is very low odor and it lowers the carbon footprint of roofing assemblies.

APPLICATION

In cool weather, store all adhesive containers at 70˚F (21˚C) for 24 hours before use. Applying cold adhesive to a cold substrate will increase the application rate of the adhesive due to the increase in the viscosity of the adhesive. The adhesive is to be applied at a minimum application temperature of 50˚F (10˚C) and rising.

Interply - Starting at the low point on the roof, the salvage edge of the sheet shall be "up slope." Unroll cap sheet and base sheet and allow to relax; this will aid a flat uniform application - re-roll prior to application. Snap chalk lines in areas where application of the adhesive to the sheet will occur. Pour the adhesive on the roof substrate and use a notched squeegee to spread the adhesive covering the entire substrate at an application rate of 2-2.5 gal./100 sq. ft. (0.82-1.02 l/m²) for base and cap sheet.

Unroll the sheet into the wet adhesive and repeat the adhesive application procedure for the next roll/sheet covering any head or side laps as required. If desired, the adhesive can be applied to the side laps and head laps with a 4" (101 mm) wide medium nap roller. If curling occurs on the head laps, adhesive can be applied to both bonding surfaces. This will hold the head laps in place. Apply a temporary weight if necessary. Use a push broom to press membrane into adhesive. Apply roofing granules into the adhesive bleed out at 30 lbs./100 sq. ft.

Flood Coat - To apply Green-Lock Plus Membrane Adhesive as a flood coat, sweep or blow away any dust, dirt or debris off the cap sheet. Then pour Green-Lock Plus Membrane Adhesive onto the cap sheet at a rate 4-5 gal./100 sq. ft. (1.63-2.0 l/m²) and spread with a 1/2" squeegee. Finally, broadcast 400 lbs./100 sq. ft. (181 kg/9.29m²) of gravel immediately into the adhesive.

PRECAUTIONS

- Not a sprayable product; dispense only by Garland-approved methods
- High levels of humidity decreases work time of product
- May not be used as a restoration coating
- Coverage rate increases over more porous cover board
- Roofing granules **must** be installed in adhesive bleed out prior to applying reflective coatings
- Must allow adhesive to cure for 30 days before applying any roof coatings due to staining
- Do not mix water into the pails of adhesive
- Do not use in freezing conditions and do not apply the adhesive over ice or moisture
- Do not apply the adhesive in the rain
- Do not heat-weld seams
- Do not apply interply adhesive beyond 5 ft. of the roll
- Ensure ambient temperature is at least six degrees Fahrenheit or three degrees Celsius and rising above the dew point

Assembly R1- Wind Uplift Attachment Info

Report of Roof System Design Wind-load Analysis

Report Date: 7/11/2025
ASCE 7 Version: ASCE 7-10

This report is applicable to:	This report has been prepared by:
Meeker Elementary Low Slope Meeeker Elementarey Low Slope 409 5th St SW Puyallup, WA, 98371	Ryan Lawson Wright Roofing PO Box 9339 TACOMA, WA 98490

Preparer's comments:

None

Roof Wind Designer provides users an easy-to-use means for accurately determining design wind loads and design uplift resistance capacities for roof systems on many commonly encountered building types that are subject to building code compliance.

Design wind loads are derived using American Society of Civil Engineers (ASCE) standard ASCE 7-10, "Minimum Design Loads for Buildings and Other Structures," Chapter 30—Wind Loads—Components and Cladding (C&C), Envelope Procedure, Part 2: Low-rise Buildings (Simplified). ASCE 7-10 is a widely-recognized consensus standard and is referenced in and serves as the technical basis for wind load determination in the 2012 and 2015 editions of the International Building Code.

The fundamental concept of wind design for roof systems is the tested uplift-resistance capacity for a building's roof system needs to be equal to or greater than the roof systems' design wind loads. Roof Wind Designer determines roof systems' minimum recommended design wind loads. From these values, Roof Wind Designer determines the necessary design uplift capacities for the roof system incorporating an appropriate safety factor. Users can select wind-resistance roof systems using these design uplift capacity values.

Roof Wind Designer also will provide design wind load calculations related to edge-metal flashing systems for buildings with roof slopes of 1½:12 or less. These calculations are applicable to roof systems using metal fascia, embedded edge-metal or metal copings to secure membrane roof systems' perimeter edges.

Roof Wind Designer relies solely upon the preparer who generates this report to accurately input appropriate information that is applicable to the specific building to which this report applies. This report applies to only the specific roof area and building that is indicated above. Any misinformation, miscalculations, mistakes or changes that have been input into this application may affect the results, accuracy, reliability and results of this report.

Use of Roof Wind Designer is subject to a license agreement and important legal notices and disclaimers. By inputting project information and generating this report, the preparer who generates this report accepts this license agreement and important legal notices and disclaimers. A copy of this license agreement and important legal notices and disclaimers is included at the end of this report and is considered to be a part of this report.

Summary of the building and roof area information input by the preparer:

Roof Area Dimensions (feet):	165 x 40
Mean Roof Height (feet):	25.0
Roof Slope:	Flat: 1½:12 or less
Parapet(s) (minimum 36 inches high):	No
Building Configuration	Enclosed
Exposure:	B
Occupancy Category:	II
Basic Wind Speed (three-second peak gust, mph):	110 from ASCE 7-10, Figure 26.5-1A Basic Wind Speed
Roof Deck Type:	Wood
Roof Covering Type:	KEE

In ASCE 7-10, the Envelope Procedure, Part 2: Low-rise Buildings (Simplified), roof area dimensions, mean roof height, roof slope, the building's configuration and exposure, risk category, and basic wind speed are used in the determination of the design wind loads.

The building's configuration (open, partially enclosed, enclosed) affects design wind loads of the roof system. ASCE 7-10, the Envelope Procedure, Part 2: Low-rise Buildings (Simplified), is limited to buildings of an enclosed configuration. An enclosed configuration is defined by ASCE 7-10 as a building that does not comply with the requirements for open or partially enclosed buildings. An open building is one having each wall at least 80 percent open. A partially enclosed building is one where the total area of openings in a wall that receives positive external pressure exceeds the sum of the area openings in the balance of the building envelope (walls and roof) by more than 10 percent and where the total area of openings in a wall that receives positive external pressure exceeds 4 ft2 or 1 percent 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 percent.

A building's exposure has an effect on the magnitude of design wind loads that act on a building and the building's roof system. ASCE 7-10 provides for three Exposure Categories: B, C and D. Exposure Category C shall apply for all cases where Exposure Categories B or D do not apply. Exposure B shall apply where the ground surface roughness condition, as defined by Surface Roughness B, prevails in the windward direction for a distance of at least 2,600 feet. For buildings whose mean roof height is less than or equal to 30 feet, the upwind distance may be reduced to 1,500 feet. Exposure D shall apply where the ground surface roughness, as defined by Surface Roughness D, prevails in the upwind direction for a distance greater than 5,000 feet. Exposure D shall also apply where the ground surface roughness immediately upward of the site is B or C, and the site is within a distance of 600 feet or 20 times the building height, whichever is greater from an Exposure D condition.

A building's occupancy has an effect on the magnitude of design wind loads that act on a building and the building's roof system. In ASCE 7-10, a building's occupancy determines a risk category. ASCE 7-10 provides for four Risk Categories: I, II, III and IV. Part 2: Low-rise Buildings (Simplified) uses risk category to determine the applicable basic wind speed map.

Risk Category II applies to all buildings except those listed in Risk Categories I, III or IV. Risk Category I applies to buildings that represent a low hazard to human life in the event of failure. Risk Category III applies to buildings that represent a substantial hazard to human life in the event of failure. Risk Category IV applies to buildings designated as essential facilities or buildings where the failure of which could pose a substantial hazard to the community. Essential facilities are defined as buildings that are intended to remain operational in the event of extreme environmental loading from wind, snow or earthquakes.

The basic wind speed is representative of a 3-second peak gust wind speed at 33 feet above the ground in Exposure C and is determined from Figure 26.5-1A—Basic Wind Speeds for Occupancy Category II Buildings and Other Structures, Figure 26.5-1B—Basic Wind Speeds for Occupancy Category III and VI Buildings and Other Structures and Figure 26.5-1C—Basic Wind Speeds for Occupancy Category I Buildings and Other Structures.

Roof edge parapets may assist in reducing design wind loads acting in the corner regions of the roof area. ASCE 7-10, Part 3: Buildings with h > 60 ft., allows for this reduction only when a minimum 36-inch-high parapet occurs at the two outside edges of the specific corner area where the design wind load is being reduced.

Wind Design for Roof Systems

ASCE 7-10 specifies wind design procedures for buildings and organizes them into two categories: main wind force-resisting systems, and component and cladding elements. Main wind force-resisting systems are the structural elements assigned to provide the support and stability for the overall building. Components and cladding are elements of the building envelope that do not qualify as part of the main wind force-resisting system. Roof systems and edge-metal flashing systems are considered components and cladding.

ASCE 7-10 provides two methods to determine minimum design load requirements for buildings: strength design method and allowable stress design (ASD) method. Design wind load calculations determined by the Envelope Procedure, Part 2: Low-rise Buildings (Simplified) method result in strength design values.

Roof systems and roof system components generally are designed using the ASD method. Because the ASD method's results often are used, a designer can adjust the strength design method's values to ASD method's values. A load-reduction factor is applied as a multiplier to the strength design values to determine the ASD values. ASCE 7-10 provides a load-reduction factor of 0.6 for this purpose, and the calculation is expressed as follows:

ASD value = Strength design value x 0.6

Roof Wind Designer determines design wind loads based upon the strength design method and then adjusts those values to the ASD method's values.

Design Wind Loads

To determine design wind loads on roof areas, ASCE 7-10 identifies three primary areas of differing wind loads on a roof area: roof area field, roof area perimeter and roof area corners. Within ASCE 7-10 these areas are designated as Zones 1, 2 and 3, respectively. Also, ASCE 7-10 identifies a dimension determined by calculation, referred to as "a," that defines the depth of the perimeter and corner zones from the roof area's edges.

Strength Design Method:

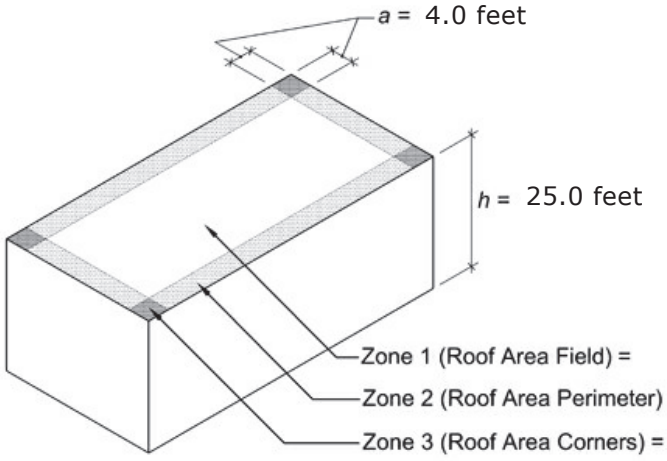
ASCE 7-10 uses three basic wind speed maps for different categories of building occupancies. These maps provide basic wind speeds that are applicable for calculating pressures and they are based on strength design. The strength design values determined for the roof area described by this report are as follows:

Zone 1 (roof area field):	21.8 pounds per square foot
Zone 2 (roof area perimeter):	36.5 pounds per square foot
Zone 3 (roof area corners):	55.0 pounds per square foot

Also, the calculated "a" dimension is as follows:

***a*:**	4.0 feet

Graphically, the strength design values are depicted as follows:

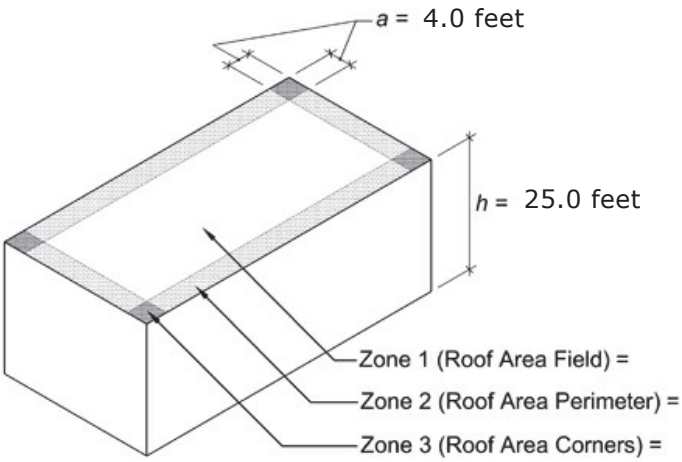


21.8 pounds per square foot
36.5 pounds per square foot
55.0 pounds per square foot

To adjust the strength design values to ASD values, the load-reduction factor of 0.6 is applied. The ASD values determined for the roof area described by this report are as follows:

Zone 1 (roof area field):	13.1 pounds per square foot
Zone 2 (roof area perimeter):	21.9 pounds per square foot
Zone 3 (roof area corners):	33.0 pounds per square foot

Graphically, the ASD values are depicted as follows:



13.1 pounds per square foot
21.9 pounds per square foot
33.0 pounds per square foot

Minimum Recommended Design Uplift-resistance Capacities

Accepted engineering principles practice provides for applying a reasonable "safety factor" to design wind-uplift loads when using the ASD method to determine the minimum recommended design uplift-resistance capacities. This safety factor is intended to address possible variances in design wind load determination, normally anticipated variances in the materials and construction of the building, including the roof system, and any normally anticipated deterioration of the materials' physical properties because of aging. This safety factor is applied to the ASD values.
The equation to determine required design uplift-resistance capacity is:

Design uplift-resistance capacity = ASD Design wind load x Safety factor

For membrane roof systems, Roof Wind Designer determines roof systems' minimum recommended design uplift-resistance capacities, using a safety factor defined in ASTM D6630, "Standard Guide for Low Slope insulated Roof Membrane Assembly Performance." This recognized consensus standard indicates design uplift-resistance loads shall have a minimum 2.0 safety factor from the design wind uplift loads determined using ASCE 7.

For roof assemblies with steel deck and a steel or aluminum metal panel roof system, Roof Wind Designer applies a safety factor of 1.67. This safety factor is recommended in AISI S100, "North American Specification for the Design of Cold-formed Steel Structural Members" and "Aluminum Design Manual: Part 1—Specification for Aluminum Structures" for bending.

On this basis, taking into consideration the ASD design wind-uplift loads and the safety factor, the minimum recommended design uplift-resistance capacities for the specific roof area and building identified in this report are as follows:

Zone 1 (roof area field):	26.2 pounds per square foot
Zone 2 (roof area perimeter):	43.8 pounds per square foot
Zone 3 (roof area corners):	66.0 pounds per square foot

Using these minimum recommended design uplift-resistance capacity values, a user can select an appropriate wind-resistant roof system. The tested uplift-resistance capacity of the roof system should be greater than the minimum recommended design wind-resistance loads for the roof system to be considered appropriately wind resistant. This is expressed as:

Tested uplift-resistance capacity ≥ Design uplift-resistance capacity

Important note: To determine minimum recommended design uplift-resistance capacity values using the strength design method, designers will have to determine an appropriate safety factor on their own. Because the strength design method already includes a more conservative determination of design uplift loads, it is generally recognized any safety factor applied to design loads derived from using the strength design method can be less

Roof systems' tested uplift-resistance load capacities typically are determined by laboratory testing or engineering analysis. In the International Building Code's 2009 and previous editions, four recognized test methods are referenced as acceptable methods for determining roof systems uplift-resistance capacities: FM 4450, FM 4470, UL 580 and UL 1898. The International Building Code's 2012 and 2015 editions reference FM 4474 instead of FM 4450 and FM 4470.

FM 4450, "Approval Standard for Class 1 Insulated Steel Roof Decks," and FM 4470, "Approval Standard for Single Ply, Polymer-Modified Bitumen Sheet, Built-Up Roof and Liquid Applied Roof Assemblies for use in Class I and Noncombustible Roof Deck Construction," are the laboratory test methods and serve as the technical basis of the FM Approvals' approval classifications (FM 1-60, FM 1-75, FM 1-90 etc.), with which most roofing professional are familiar. FM Approvals' applies a safety factor of 2 within these classifications. For example, a roof system that has an FM 1-60 approval classification is recommended for use where the ASD design wind load is 30 pounds per square foot (psf) or less, a FM 1-75 approval designation is recommended for use where the design wind load is 37.5 psf or less, and an FM 1-90 approval classification is recommended for use where the design wind load is 45 psf or less, and so forth.

FM 4474, "American National Standard for Evaluating the Simulated Wind Uplift Resistance of Roof Assemblies Using Static Positive And/or Negative Differential Pressures," is similar to the uplift-resistance test methods contained in FM 4450 and FM 4470 and results in uplift classifications Class 60, Class 75, Class 90, etc., which are similar to the FM 1-60, FM 1-75, FM 1-90, etc., respectively derived using FM 4450 and FM 4470. For example, a roof system that has an FM Class 60 approval classification is recommended for use where the ASD design wind load is 30 pounds per square foot (psf) or less, an FM Class 75 approval designation is recommended for use where the design wind load is 37.5 psf or less, and an FM Class 90 approval classification is recommended for use where the design wind load is 45 psf or less, and so forth.

FM Global's Loss Prevention Data Sheet 1-29, "Roof Deck Securement and Above-deck Roof Components," addresses FM Global's recommended guidelines for addressing wind-uplift capacity in Zone 2 (roof area perimeter) and Zone 3 (roof area corners).

FM Approvals online approval directory containing a listing of FM Approval's-approved roof systems and a copy of FM Global's Loss Prevention Data Sheet 1-29 can be viewed in the reference documents section of FM Approval's RoofNav application accessible at www.roofnav.com.

UL 580, "Standard for Tests for Uplift Resistance of Roof Assemblies" and UL 1897, "Standard for Uplift Tests for Roof Covering Systems" are the laboratory test methods and serve as the technical basis for Underwriters Laboratories (UL's) Inc.'s classifications (Class 30, Class 60, Class 90, etc.) for uplift resistance. UL's classifications do not apply a safety factor. A UL classification indicating a roof system that has a Class 30 designation has been tested and found resistant to uplift loads of 30 psf, a Class 60 designation has been tested and found resistant to uplift loads of 60 psf, a Class 90 designation has been tested and found resistant to uplift loads of 90 psf, and so forth. UL does not provide specific guidance regarding addressing wind-uplift capacity in Zone 2 (roof area perimeter) and Zone 3 (roof area corners).

Additional information regarding UL's wind-uplift classifications is available in UL's Roofing Materials & Systems Directory and in the certifications section of UL's website by accessing www.ul.com and typing "TGIK" into the UL category code field.

Additional information regarding roof systems' wind-uplift capacities may also be available by contacting individual roof system manufacturers.

Wind Load Design for Perimeter Edge Metal

The International Building Code references standard ANSI/SPRI ES-1, "Wind Design Standard for Edge Systems Used with Low Slope Roofing Systems." This code requirement is applicable to roof slopes less than 2:12. Because a roof slope of 1½:12 or less was selected for this project, this report also contains design load calculations related to edge-metal system design.

ANSI/SPRI ES-1 includes two primary elements: determination of design wind loads at roof edges (perimeter edge metal) and testing for resistance loads of perimeter edge metal. However, IBC does not adopt ANSI/SPRI ES-1 in its entirety. It requires low-slope metal edge securement be designed and installed using IBC's Chapter 16—Structural Design and tested for resistance in accordance with ANSI/SPRI ES-1's Test RE-1, "Test Method for Dependently Terminated Roof Membrane Systems," RE-2, "Test Method for Dependently or Independently Terminated Edge Systems," and Test RE-3, "Test for Copings," as applicable.

The fundamental concept of wind design as it applies to perimeter edge-metal systems is that the tested wind-resistance (uplift-resistance) capacity of perimeter edge-metal system should be greater than or equal to the design resistance loads that will act upon the perimeter edge-metal system. Design wind-resistance loads are derived from a building's design wind loads, taking into consideration an appropriate safety factor. Roof Wind Designer determines roof systems' minimum recommended design wind-resistance loads. Using these minimum recommended design wind-resistance loads, users can select appropriate wind resistance perimeter edge-metal systems.

Wind-resistance capacities of perimeter edge-metal systems are determined by testing in accordance with the test methods in ANSI/SPRI ES-1. Once design wind loads and minimum recommended design wind-resistance loads (including a safety factor) are determined, designers can select appropriate perimeter edge-metal systems that have tested capacities equal to or greater than the minimum recommended design wind resistance loads.

Design Wind Loads Using ASCE 7

IBC Chapter 16—Structural Design of IBC uses ASCE 7 as the basis for determining design wind loads; therefore, NRCA recommends using ASCE 7 for design wind load calculations instead of ANSI/SPRI ES-1.

As previously discussed in the section on Wind Load Design for Roof Systems, ASCE 7-10 provides two design methods to determine minimum load requirements for buildings: strength design and allowable stress design (ASD). The wind load calculations determined by the Envelope Procedure, Part 2: Low-rise Buildings (Simplified) method result in strength design values. However, roof systems and roof system components generally are designed using ASD.

Because ASD results often are used, a designer may want to adjust the strength design values to ASD values. A load-reduction factor is applied as a multiplier to adjust the values. An appropriate load-reduction factor is 0.6 and the calculation is expressed as follows:

Strength design value x 0.6 = ASD value

Roof Wind Designer provides the calculations for strength design and then adjusts those values to ASD values.

Strength Design Method:

ASCE 7 identifies a vertical surface as a "roof zone" and a horizontal surface as a "wall zone." As previously mentioned, Zones 1 through 3 are associated with roof areas. For wall areas, ASCE 7-10 identifies two primary areas of differing horizontal wind loads: perimeter and corners. These areas are designated as Zones 4 and 5, respectively. The dimension that defines the distance of the perimeter and corner zones is the same distance "a" used with defining Zones 1 through 3 for roof areas.

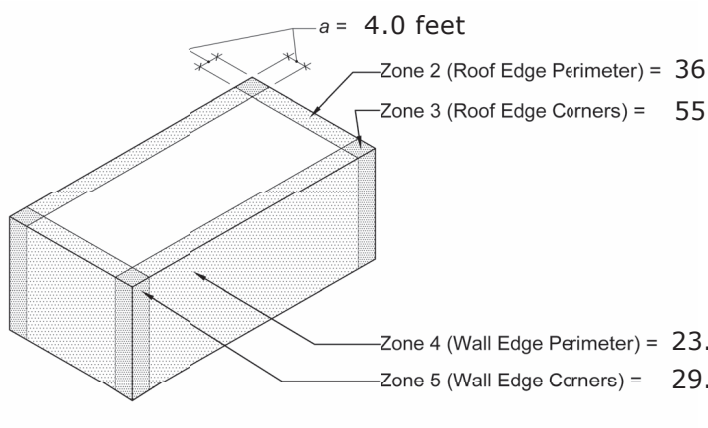
For the zones described by this report, the strength design wind loads determined using ASCE 7-10 are as follows:

Zone 2 (roof edge perimeter, vertical load direction):	36.5 pounds per square foot
Zone 3 (roof edge corners, vertical load direction):	55.0 pounds per square foot
Zone 4 (wall edge perimeter, horizontal load direction):	23.6 pounds per square foot
Zone 5 (wall edge corners, horizontal load direction):	29.1 pounds per square foot

Also, the calculated "a" dimension is as follows:

***a*:**	4.0 feet

Graphically, these values are depicted as follows:

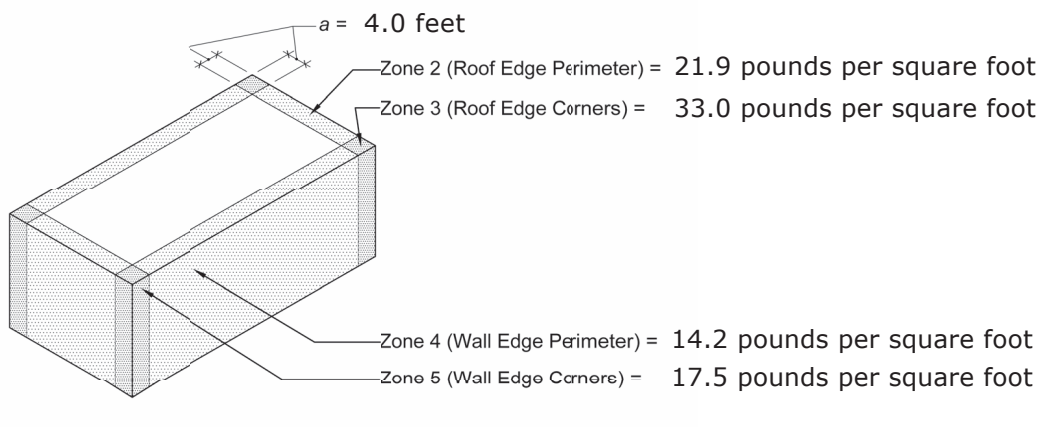


Adjustment of Strength Design to Allowable Stress Design (ASD):

To adjust the strength design values to ASD values, a load-reduction factor of 0.6 should be applied. The ASD values determined for the wall area described by this report are as follows:

Zone 2 (roof edge perimeter, vertical load direction):	21.9 pounds per square foot
Zone 3 (roof edge corners, vertical load direction):	33.0 pounds per square foot
Zone 4 (wall edge perimeter, horizontal load direction):	14.2 pounds per square foot
Zone 5 (wall edge corners, horizontal load direction):	17.5 pounds per square foot

Graphically, these values are depicted as follows:



Minimum Recommended Design Wind-resistance Loads

NRCA recommends designers include an appropriate safety factor in their design wind-resistance calculations for perimeter edge-metal flashings. NRCA suggests a minimum safety factor of 2.0 be applied to steel or aluminum edge-metal flashings. This is consistent with the minimum safety factor recommended in ANSI/SPRI ES-1's design wind load calculations section.

The safety factor is applied to the ASD values. The equation to determine required design wind-resistance load is:

Design wind-resistance capacity = [ASD Design wind load] x [Safety factor of 2.0]

Taking into consideration the design wind-uplift loads, the minimum recommended design wind-resistance loads for the specific roof and wall areas described in this report are as follows:

Zone 2 (roof edge perimeter, vertical load direction):	43.8 pounds per square foot
Zone 3 (roof edge corners, vertical load direction):	66.0 pounds per square foot
Zone 4 (wall edge perimeter, horizontal load direction):	28.3 pounds per square foot
Zone 5 (wall edge corners, horizontal load direction):	34.9 pounds per square foot

Please note: The safety factor used to determine minimum recommended design wind-resistance loads for perimeter edge metal may be a different value than the safety factor used in the roof system calculations.

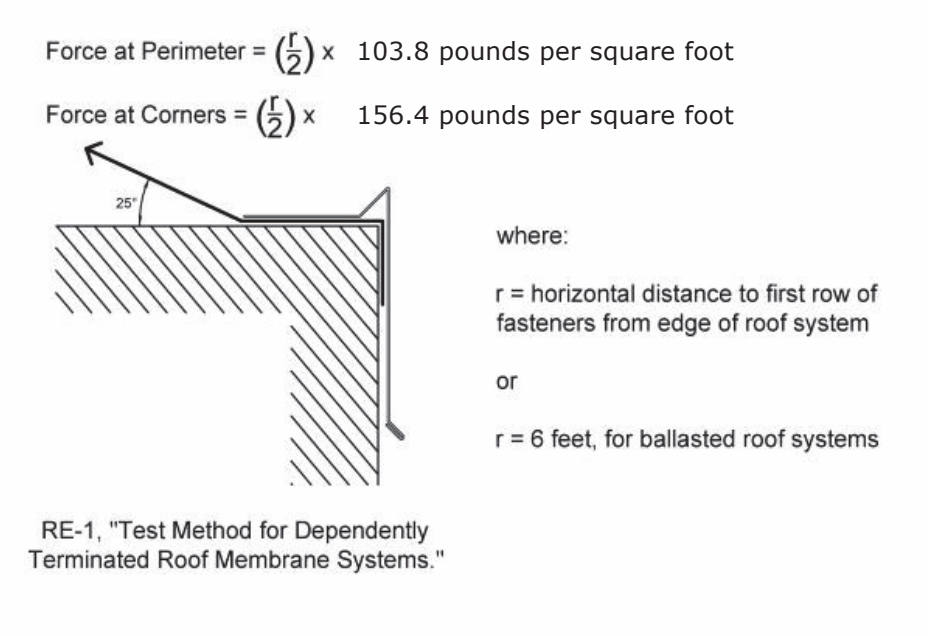
Tested Resistance Load Capacities of Perimeter Edge Metal

Using the minimum recommended design wind-resistance values, a user can select an appropriately wind-resistant perimeter edge metal. The tested wind-resistance load capacity—commonly referred to as "load capacity"—of the perimeter edge metal should be greater than the minimum recommended design wind-resistance capacities for the perimeter edge-metal system to be considered appropriately wind-resistant.

Tested wind-resistance capacities of edge-metal flashing systems are determined by testing. IBC requires the testing be done in accordance with the RE-1, RE-2 and RE-3 test methods contained in ANSI/SPRI ES-1 as applicable to the specific roof perimeter edge metal configuration. These three test methods are:

- Test RE-1, "Test Method for Dependently Terminated Roof Membrane Systems."
- Test RE-2, "Test Method for Dependently or Independently Terminated Edge Systems."
- Test RE-3, "Test for Copings."

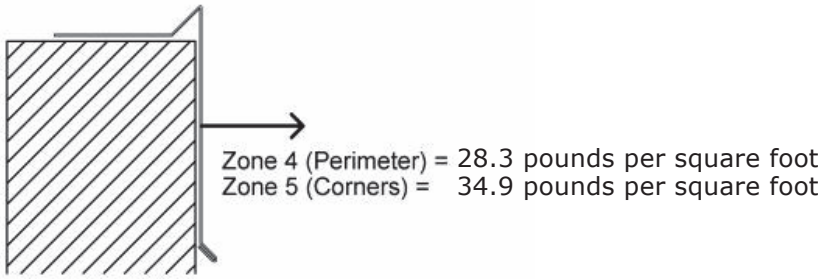
The following images illustrate how to apply the design wind-resistance capacities (including a safety factor) for fascia, embedded edge metal and copings based on RE-1, RE-2 and RE-3:



RE-1, "Test Method for Dependently Terminated Roof Membrane Systems."

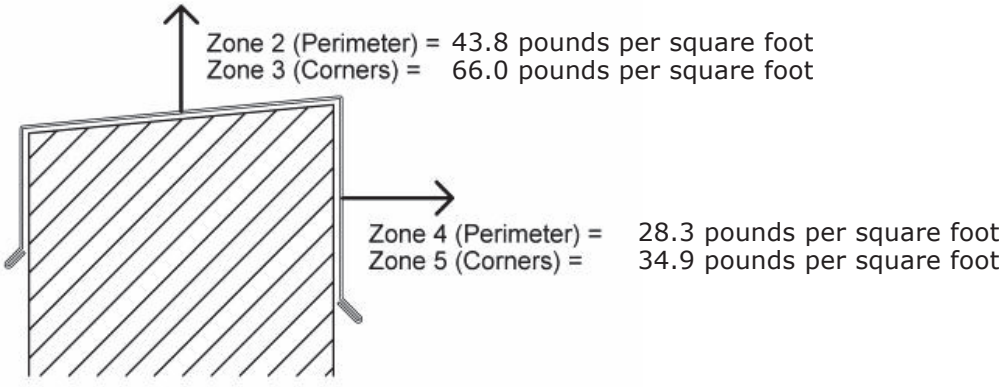
Note: The resultant forces indicated on the figure need to be further adjusted, depending on row spacing of the membrane fasteners or if the roof system is ballasted.

RE-1 tests an edge metal system's ability to restrain a membrane force from billowing. This test method is only



RE-2, "Test Method for Dependently or Independently Terminated Roof Membrane Systems."

RE-2 tests resistances to horizontal (outward from building face) loads for gravel stops or fascias.



RE-3, "Test for Copings."

RE-3 tests copings' resistances to outward (horizontal) and upward (vertical) pressures.

Using these minimum recommended design wind-resistance load values, a user can select an appropriately wind-resistant edge-metal flashing system. The tested wind-resistance capacity of the edge-metal flashing system should be greater than the minimum recommended design wind-resistance loads for the edge-metal flashing system to be considered appropriately wind-resistant. This is expressed as:

Tested wind-resistance capacity ≥ Design wind-resistance capacity

NRCA has conducted extensive testing using methods RE-2 and RE-3 of various edge-metal flashing profiles that are usually shop-fabricated. The edge-metal profiles tested are based upon the construction details contained in The NRCA Roofing Manual.

Visit www.nrca.net/roofing/Shop-fabricated-edge-metal-testing-242 to view drawings of the specific edge-metal flashings that have been tested. The drawings contain the tested wind-resistance capacity values for each edge-metal flashing profile. NRCA maintains certification programs with Underwriters Laboratories Inc. and Intertek Testing Services, N.A. Each program has its specific set of tested edge-metal flashing profiles.

License Agreement and Important Legal Notices & Disclaimers
National Roofing Contractors Association (NRCA) — *Roof Wind Designer*

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5. The calculations used in Roof Wind Designer are based on recognized engineering principles including recognized consensus standard ASCE 7-10 "Minimum Design Loads for Buildings and Other Structures," which is referenced in most current building codes as the method for determining design wind loads for buildings, and building components and claddings, including roof systems. Roof Wind Designer only may be used for determining design wind loads pursuant to the Envelope Procedure, Part 2: Low-rise Buildings (Simplified) under ASCE 7-10. When using ASCE 7-10, buildings requiring the use of the Envelope Procedure, Part 1: Low-rise Buildings, Directional Procedure or the Wind Tunnel Procedure are beyond the scope of Roof Wind Designer.

6. The safety factors used in calculating the minimum recommended design wind resistance loads for which your roof system should be designed is determined using ASTM D6630, "Standard Guide for Low Slope Insulated Roof Membrane Assembly," AISI S100, "North American Specification for the Design of Cold-formed Steel Structural Members" and AA ADM1, "Aluminum Design Manual: Part 1-A—Specification for Aluminum Structures, Allowable Stress Design; and Part 1-B—Aluminum Structures, Load and Resistance Factor Design."

7. Roof Wind Designer relies upon your input to generate a Report intended to serve as a guide in determining the appropriate design wind loads and minimum recommended design resistance loads for roof systems. The Report applies only to the specific building identified by you and relies solely on the input supplied by you.

8. Any misinformation, miscalculations, mistakes or changes in the information that you enter into the application may affect the results, accuracy, reliability and/or other aspects of the Report.

9. By agreeing to use Roof Wind Designer, you specifically acknowledge that neither NRCA or the Supporting Organizations is undertaking to render specific professional advice. You must rely solely on your own judgment or consult a technically competent roof professional to determine what application or design resistance loads, whether included in the Report or not, is appropriate for your purpose. Neither NRCA or the Supporting Organizations assume responsibility for any decision made by you relating to the suitability or use of Roof Wind Designer or the Report.

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GREEN-LOCK® PLUS

High-Performance Membrane Adhesive
Technical Data Sheet

since 1895

Technical Data	Green-Lock Plus Membrane Adhesive
Flash Point (ASTM D 93)	375˚F (190˚C)
Density @ 77˚F (25˚C) (ASTM D 1475)	11.4 lbs./gal. (1.36 g/m³)
Non-Volatile (ASTM D 4586)	100%
Slope Limitations	3:12
Viscosity @ 73.4 ± 2°F (23 ± 2°C) Brookfield Spindle T-E, 5 RPM	124,000 cPs
Skin Time @ 70˚F (21˚C) and 50% Humidity	40-120 minutes
Color	Slate
Shelf Life	12 months
Coverage	
Interply	2-2.5 gal./100 sq. ft. (0.82-1.02 l/m²)
New Flood Coat	4 - 5 gal./100 sq. ft. (1.63-2.04 l/m²)
Wet Mil Thickness	
Interply	32-40 mils
New Flood Coat	64 - 80 mils
Packaging	5 gallon pail (18.9 l)

Eco-Facts	Green-Lock Plus Membrane Adhesive
VOC	<50 g/L

For specific application recommendations, please contact your local Garland Representative or Garland Technical Service Department.

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MIAMI-DADE COUNTY APPROVED

USDA CERTIFIED BIOBASED PRODUCT

Garland Greenhouse

INTERTEK C US

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Phone: 416-747-7995
Toll Free: 800-387-5991
(Only in Canada)

StressBase® 80 Plus

since 1895

OVERVIEW & FEATURES

StressBase 80 Plus is a high-strength, puncture and fatigue resistant, modified roofing membranes that consists of fiberglass reinforcement sandwiched by Styrene-Butadiene-Styrene (SBS) rubber in a high penetration index asphalt mixture.

StressBase 80 Plus sheets can be used as a nailable base sheet over approved substrates, as a base flashing for hot- and cold-applied roof systems or as an interply in Garland's hot or cold applied systems. StressBase 80 Plus is typically used in two (2) or three (3) ply modified systems and also can be used in three (3) or four (4) ply BUR's.

Advanced Rubber Technology - The modifier utilized is SBS (Styrene-Butadiene-Styrene). When the SBS rubber is properly dispersed throughout the high penetration asphalt, the rubber provides increased thermal shock resistance, UV protection, heat resistance, elongation, and low temperature flexibility. To ensure proper dispersion, a special high shear mixer is used in manufacturing.

Security in Multi-Ply Construction - StressBase 80 Plus sheets are the base component of a multi-ply roof system. They combine the inherent advantages and proven performance of multi-ply protection with the strength, flexibility and elongation of elastomeric systems. This unique combination minimizes dependence on perfect workmanship, contact adhesive seaming, etc.

APPLICATION

Garland's StressBase 80 Plus sheets can be used in conjunction with Weatherking® and Green-Lock® to make up a cold-applied system. StressBase® 80 Plus sheets can also be used with hot asphalt or Garlastic® as a multi-ply BUR, as the underlayment for Garland's HPR® roof systems or as a base flashing ply for hot-and-cold applied roof systems. Specifications for nailing to various decks are also available.

NOTE: All rolls must be cut in 18 ft. (5.5 m) lengths and allowed to relax prior to application.

StressBase® 80 Plus

Technical Data	StressBase 80 Plus
Tensile Strength	MD 140 lbf./in. (24.5 kN/m) XD 100 lbf./in. (17.5 kN/m)
Tear Strength	MD 130 lbf. (578 N) XD 100 lbf. (444 N)
Elongation	MD 4% XD 4%
Low Temperature Flex	passes -40°F (-40°C)

Finished membrane meets and/or exceeds the performance criteria of ASTM D 6163, TYPE I.
Test Method ASTM D 5147 is tested at:
0.08 in/min @ 0 ± 3.6°F
(2.0 mm/min @ -18 ± -3°C)

Roll Dimensions	StressBase 80 Plus
Width	3 ft. 3 in. (1m)
Length	52 ft. (15.85 m)
Weight	100 lbs. (45.36 kg)
Nominal Thickness	80 mils (2,032 microns)
Net Coverage	150 sq. ft. (13.93 m^2)
Packaging	24 rolls/pallet

Eco-Facts	StressBase 80 Plus
Recycled Content	
Pre-Consumer	27%
Post-Consumer	–

For specific application recommendations, please contact your local Garland Representative or Garland Technical Service Department.

Installation of this product with hot oxidized asphalt may result in exposure to hazardous chemicals. Special care and attention for proper product installation must be followed in all cases. For specific details refer to the NIOSH safe handling practices in publication No. 2003-107, as well as OSHA standard 1910.134 for further exposure precautions.

For more information, visit us at: www.garlandco.com

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Toll Free: 0800 328 5560 (Only in UK)

KEE-Lock™ Spatter Spray

Membrane Adhesive

since 1895

DESCRIPTION

KEE-Lock Spatter Spray is a two component, low rise, solvent-free, polyurethane foamable adhesive that contains no high Global Warming Potential (GWP) propellants. The adhesive dispenses quickly and cures in minutes providing an immediate tight bond and labor savings. KEE-Lock Spatter Spray is packaged in dual pressurized canisters and dispensed utilizing a disposable adhesive applicator assembly and twenty-five-foot hoses. This product is approved for use in all US and Canadian markets that regulate ozone-depleting substances.

BASIC USE

KEE-Lock Spatter Spray is designed for use as an adhesive for adhering Garland's KEE-Stone FB 60 membrane to the underlying base sheet in a two ply hybrid roof assembly.

It is dispensed in a spatter application using our proprietary dual-purpose static mixer.

SAFETY

Prior to working with KEE-Lock Spatter Spray or any adhesive product consult product label and Safety Data Sheet (SDS) for necessary health and safety precautions.

SURFACE PREPARATION

All work surfaces should be clean, dry, and free of dirt, dust, debris, oils, loose and/or embedded gravel, un-adhered coatings, deteriorated membrane and other contaminants that may result in a surface that is not sound or is uneven.

STORAGE

Keep temperature of contents between 60°F to 90°F (16°C to 32°C). Bring temperature of material to approximately 70°F (21°C) for approximately 24 hours before use. Do not store in direct sunlight or above 95°F (35°C). Store canisters valve side up. KEEP FROM FREEZING! KEE-Lock Spatter Spray has a shelf life of 12 months when stored properly.

PACKAGING

KEE-Lock Spatter Spray is available in the following packages:

Package Size	Canisters/Pallet
Part 1, Canister	36
Part 2, Canister	36

Part 1 and Part 2 canister and packaged in individual labeled boxes. The Part 1 box will contain one applicator, hoses, four dual-purpose static mixers, a wrench, petroleum jelly and a set of gloves.

LIMITATIONS

- Do not apply to wet surface.
- Do not apply when temperatures are below 40°F (4°C).

Technical Data	KEE-Lock Spatter Spray
Skin Time*	5-8 Minutes
VOC Content	<50 g/L
Coverage Rate **Spatter Application**	Up to 24 squares per set
Shelf Life	12 months
Color (Foamed Adhesive will appear as a homogeneous light amber color with no streaking or marbling)	Part 1 - Amber Part 2 - Clear

*Note conditions - i.e. Standard Temperature/Humidity Conditions (70°F / 50% RH)

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For more information, visit us at: www.garlandco.com

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KEE-STONE® FB 60

Technical Data Sheet

OVERVIEW & FEATURES

KEE-Stone FB 60, a thermoplastic cap sheet modified with Ketone Ethylene Ester (KEE), is designed for use as the top component in a multi-ply hybrid system incorporating Garland-approved modified bitumen base sheets. This unique sheet incorporates a high quality KEE for superior flexibility and strength.

Under the attractive, bright white surface, this membrane is reinforced with a unique polymer-coated high tensile strength polyester scrim. This distinctive composition provides exceptional puncture, tensile and tear resistance while preserving the flexibility of the membrane. Polyester fleece (6.5 oz. per sq. yd.) is heat bonded to the backside for superior adhesion in hot or cold adhesives.

KEE-Stone meets and exceeds ASTM D 6754, the standard specification for KEE-based sheet roofing.

Long Lasting & Durable - KEE-Stone exceeds standard weathering tests, standing up against even the harshest weather and UV radiation. In accelerated weathering tests, KEE-Stone shows no signs of cracking or cratering even at 100X magnification, which is 10 times more than the ASTM standard requires. In heat aging tests, KEE-Stone retains more than 90% of its breaking strength, elongation and flexibility.

Superior Chemistry & Manufacturing – Garland's KEE-Stone thermoplastic chemistry uses a high-quality KEE compound, for the longest-lasting weatherability. This formula exhibits superior heat resistance while retaining its low-temperature flexibility. While some thermoplastic sheets only add quality KEE above the scrim, KEE-Stone is formulated with KEE throughout the entire sheet because the sheet is only as strong as its weakest point.

Strong & Flexible – KEE-Stone is formulated using Dupont™ Elvaloy® KEE and incorporates more of this premium polymer per square foot than any competitive product. Plus, the unique scrim design provides superior sheet strength for a longer lasting roof that is tough enough to resist damaging elements like hail as well as general wear and tear on the roof's surface.

UV Resistant & Energy Saving – KEE-Stone's white surface and advanced chemistry fight off damaging effects of the sun to protect your building and your wallet. KEE-Stone's bright finish reflects damaging UV rays away from the building, while the KEE formula locks the plasticizer within the membrane to prevent damaging migration that causes lesser materials to dry and crack under UV exposure. These resilient properties earned the seal from the Cool Roof Rating Council (CRRC).

APPLICATION

Hot Application

KEE-Stone FB 60 can be installed over Garland-approved modified base sheets; see the KEE-Stone Installation Guide for a list of approved base sheets. Adhere one ply of approved base sheet solidly to the approved substrate. Adhere KEE-Stone cap sheet using ASTM D 312, Type III or IV asphalt, Garland's HPR® All-Temp Asphalt or Garlastic® KM Plus modified asphalt at a rate of 25 lbs. per 100 sq. ft. Once the KEE-Stone FB 60 is adhered, heat-weld seams to seal the membranes together. All end laps shall be butted up to one another. Once end laps are adjoined, heat weld KEE-Stone 6" Utility Roll over joint to seal.

Cold Application

KEE-Stone FB 60 can be installed over Garland-approved modified base sheets; see the KEE-Stone Installation Guide for a list of approved base sheets. Adhere one ply of approved base sheet solidly to the approved substrate. Apply KEE-Stone cap sheet using Garland's KEE-Lock™ Spatter Spray adhesive at 75-80% coverage across the modified base sheet. Once the membrane is in place, roll the membrane with a weighted roller to ensure contact with the adhesive and remove air pockets from under the membrane. Once the KEE-Stone FB 60 is adhered, heat-weld laps to seal the membranes together. All end laps shall be butted up to one another. Once end laps are adjoined, heat weld KEE-Stone 6" Utility Roll over joint to seal.

STORAGE

Keep rolls in their original packaging and store in a cool dry area until they are ready to be installed. Store rolls on pallets and keep off the ground. Do not store anything on top of the rolls to prevent creasing or damaging the membrane.

PRECAUTIONS

- Wearing sunglasses is recommended when installing this membrane, as the white surface is highly reflective.
- The roof surface can be slippery when wet, take care especially around the roof edge.
- Do not cut open the bags to prevent cutting or piercing the membrane.

KEE-STONE® FB 60

Technical Data Sheet

since 1895

Technical Data	KEE-Stone FB 60
Thickness, min. (ASTM D 751)	0.060 in. (1.5 mm)
Thickness over fiber, min.	0.030 in. (0.762 mm)
Breaking Strength (ASTM D 751, proc. B - strip)	375 lbf (1668N)
***Breaking Strength, strip**	>90% of original
Elongation at Break (ASTM D 751, proc. B - strip)	40%
***Elongation at Break, strip**	>90% of original
Low Temperature Bend after heat aging (ASTM D 2136)	-40˚F (-40˚C)
Tearing Strength (ASTM D 751)	120 lbf. min. (534N)
Low Temperature Bend (ASTM D 2136)	-40˚F (-40 ˚C)
Static Puncture Resistance (ASTM D 5602)	pass
Puncture Resistance (ASTM D 751)	161 lbs
Factory Seam Strength (ASTM D 751, Grab Method)	620 lbf. min.

*Retention of properties after heat aging: ASTM D 3045 176°F (80˚C) for 56 days

Technical Data	KEE-Stone FB 60
Accelerated Weathering Test After 5000-h xenon arc light exposure: (ASTM G 155)	
Cracking (7x magnification)	none
Crazing (7x magnification)	none
Accelerated Weathering Test After 5000-h fluorescent/condensation exposure: (ASTM G 154)	
Cracking (7x magnification)	none
Crazing (7x magnification)	none

Product meets and exceeds ASTM D 6754

Roll Dimensions	KEE-Stone FB 60
Width	8 ft. (2.4 m)
Length	100 ft. (30.5 m)
Weight	0.49 lbs/ft² (2.39 kg/m²)
Nominal Thickness	60 mils (1,524 microns)
Overall Thickness	105 mils (2,667 microns)
Net Coverage	800 sq. ft. (74.32 m²) per roll
Packaging	9 rolls/pallet (individually bagged)

Eco-Facts	KEE-Stone FB 60
Reflective	0.87
Emittance	0.88
SRI	110

Garland GreenHouse

ENERGY STAR

CRRC COOL ROOF RATING COUNCIL RATED PRODUCT

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THE GARLAND COMPANY, INC.
HIGH PERFORMANCE BUILDING ENVELOPE SYSTEMS

Steep Slope:
-Mobilize all material and equipment needed to complete the project
-Set up contractor safety per LNI approved requirements
-Demo the existing shingles down to the deck
-Inspect the existing substrate and replace any damaged decking on a T&M rate
-Prime the existing substrate with SA primer at 0.5Gal per 100 sq/ft
-Install R Mer Seal as the ice and water shield underlayment
-Install Malarkeys Legacy Shingle per manufacturer guidelines to obtain warranty
-All new edge 24ga edge metal to be installed
-Replace all external gutters with 032 new continuous K style 6” gutter in a continuous manner.
-Replace all downspouts with new 22ga 3x4 color to match gutter. All new downspouts are to have a clean out and ground level with a debris screen
-Installer to provide a three year workmanship warranty

Garland Provided Materials (Quantities Needed)

Densdeck ½” (4x8)
Stressbase 80 Plus (1.5sq roll)
KEE Stone FB60 (8’x100’ roll)
KEE Stone NF Flashing (4’x50’ roll)
KEE Stone Utility (6”x50’ roll)
Green Lock Plus Membrane Adhesive (5Gal bucket)
KEE Spatter Spray (2000 sq/ft coverage box)
R Mer Seal (2sq roll)
Trafguard Walk Pad (1/2” 3x4)
24ga Flat stock (10x4)
22ga Flat Stock (10x4)
032 Coil (Dimensions needed)

• *Direct Line: Matt 206-681-8151*
Email: mshaxton@garlandind.com


4th Ave SW
R2
R2
R1
Roof Type - R1
R2
Meeker Elementary School
Roof Type R2
R1
R2
R2
Google Earth
5th Ave SW

END OF SECTION 075552

ASPHALT SHINGLE ROOFING SYSTEM

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Granule surfaced asphalt shingle roofing.

B. Moisture shedding underlayment, eave, valley and ridge protection.

C. Associated metal flashing.

1.2 RELATED SECTIONS

A. Section 07130 - Sheet Waterproofing.

1.3 REFERENCES

A. ASTM A 653/A 653M - Standard Specification for Steel Sheets, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

B. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

C. ASTM B 370 - Standard Specification for Copper Sheet and Strip for Building Construction.

D. ASTM D 224 - Standard Specification for Smooth-Surfaced Asphalt Roll Roofing (Organic Felt).

E. ASTM D 225 - Standard Specification for Asphalt Shingles (Organic Felt) Surfaced with Mineral Granules.

F. ASTM D 226 - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.

G. ASTM D 1970 - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection.

H. ASTM D 3018 - Standard Specification for Class A Shingles Surfaced with Mineral Granules.

I. ASTM D 3161 - Standard Test Method for Wind-Resistance of Asphalt Shingles (Fan-Induced Method).

J. ASTM D 3462 - Standard Specification for Asphalt Shingles Made from Glass Felt and Surfaced with Mineral Granules.

K. ASTM D 4586 - Standard Specification for Asphalt Roof Cement, Asbestos-Free.

L. ASTM D 4869 - Standard Specification for Asphalt-Saturated Organic Felt Shingle Underlayment Used in Roofing.

M. ASTM E 108 - Standard Test Methods for Fire Tests of Roof Coverings.

1.4 SUBMITTALS

A. Product Data: Provide manufacturer's printed product information indicating material characteristics, performance criteria, and product limitations.

B. Manufacturer's Installation Instructions: Provide published instructions that indicate preparation required and installation procedures.

1.5 QUALITY ASSURANCE

A. Maintain one copy of manufacturer's application instructions on project site.

B. Verify that manufacturer's label contains reference to specified ASTM standards.

1.6 ENVIRONMENTAL REQUIREMENTS

A. Take special care when applying underlayment and shingles when ambient or wind chill temperature is below 45 degrees F (7 degrees C). The underlayment will be self-adhered to the deck.

1.7 EXTRA MATERIALS

A. Provide 300 square feet of extra shingles of each color specified.

1.8 WARRANTY

A. Manufacturer's Warranty: Furnish shingle manufacturer's warranty as specified under product description and as follows:
   1. Basic Warranty: Repair or replace shingles found to be defective during the 40 year warranty period.
   2. Also cover labor and materials in the event of a material defect for the period indicated after completion of application of shingles.

B. Installer is to guarantee all work against defects in materials and workmanship for a period indicated following final acceptance of the Work.
   1. Warranty Period:
      a. 3 years from date of acceptance.

C. Warranty Transferability Clause: Make available to Owner shingle manufacturer's standard option for transferring warranty to a new owner.

PART 2 PRODUCTS

2.1 MANUFACTURER: **Malarkey - 272 Legacy or 273 Legacy** (mineral-surfaced, self-sealing, and coated with NEX polymer modified bitumen (asphalt) and fire retardant fillers on a non-woven fiberglass mat)

2.2 SHEET MATERIALS

A. Eaves Protection: HPR R-merseal; sheet barrier of self-adhering asphalt membrane shingle underlayment,

B. Waterproofing Underlayment:HPR R-merseal or equal; sheet barrier of self-adhering asphalt membrane shingle underlayment,

2.3 FLASHING MATERIALS

A. Sheet Flashing: ASTM A 653/A 653M; 26 gage (0.45 mm) steel with minimum G115/Z350 galvanized coating.

B. Sheet Flashing: ASTM B 209; 0.025 inch (0.63 mm) thick aluminum, mill finish.

C. Sheet Flashing: ASTM B 370; cold rolled copper; 16 ounces per square foot (0.55 mm); natural finish.

D. Bituminous Paint: Acid and alkali resistant type; black in color.

E. Tinner's Paint: Color as selected by building owner to coordinate with shingle color.

2.4 ACCESSORIES

A. Nails: Standard round wire type roofing nails, corrosion resistant; hot dipped zinc coated steel, aluminum, or chromated steel; minimum 3/8 inch (9.5 mm) head diameter; minimum 11 or 12 gage (2.5 mm) shank diameter; shank to be of sufficient length to penetrate through roof sheathing or 3/4 inch (19 mm) into solid wood, plywood, or non-veneer wood decking.

B. Asphalt Roofing Cement: ASTM D 4586, Type I or II.

C. Install new 7” continuous commercial box gutters - color to be approved by the District

D. Replace all downspouts with 4” square made from 22ga to match the flat stock

E. Install venting at the ridge and near the eave

2.5 FLASHING FABRICATION

A. Form flashing to profiles indicated on the drawings and to protect roofing materials from physical damage and shed water.

B. Form sections square and accurate to profile, in maximum possible lengths, free from distortion or defects detrimental to appearance or performance.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify existing site conditions under provisions of Section 01700.

B. Verify that roof penetrations and plumbing stacks are in place and flashed to deck surface.

C. Verify roof openings are correctly framed prior to installing work of this section.

D. Verify deck surfaces are dry and free of ridges, warps, or voids.

3.2 ROOF DECK PREPARATION

A. Follow shingle manufacturer's recommendations for acceptable roof deck materials.

B. Broom clean deck surfaces under eave protection and underlayment prior to their application.

3.3 INSTALLATION - EAVE ICE DAM PROTECTION

A. Place eave edge and gable edge metal flashing tight with fascia boards. Weather-lap joints 2 inches (50 mm). Secure flange with nails spaced 8 inches (200 mm) on center.

B. Apply underlayment as eave protection in accordance with manufacturer's instructions.

C. Extend eave protection membrane minimum 24 inches (610 mm) up slope beyond interior face of exterior wall.

3.4 INSTALLATION - PROTECTIVE UNDERLAYMENT

A. Roof Slope Between 2:12 and 6:12: Apply 2 layers of HPR Rmer-Seal over all areas with ends and edges weather-lapped in accordance with manufacturer's instructions. Stagger end-laps each consecutive layer. Nail in place as needed.

B. Weather-lap and seal watertight with asphalt roofing cement items projecting through or mounted on roof. Avoid contact of solvent-based cements.

3.5 INSTALLATION - VALLEY PROTECTION

A. For closed-cut, woven, and open valleys, first place one ply of Rmer-Seal, minimum 36 inches (910 mm) wide, centered over valleys. Lap joints minimum 6 inches (152 mm). Follow instructions of shingle and waterproofing membrane manufacturer.

3.6 INSTALLATION - METAL FLASHING

A. Weather-lap joints minimum 2 inches (50 mm).

B. Seal work projecting through or mounted on roofing with asphalt roofing cement and make weather-tight.

3.7 INSTALLATION - ASPHALT SHINGLES

A. Install shingles in accordance with manufacturer's instructions for product type and application specified.

3.8 FIELD QUALITY CONTROL

A. Field inspection will be performed under provisions of Section 01400.

B. Visual inspection of the Work will be provided by Owner. If conditions are unacceptable, Owner will notify the Architect.

3.9 PROTECTION OF FINISHED WORK

A. Protect finished work under provisions of Section 01700.

B. Do not permit traffic over finished roof surface.

END OF SECTION

Malarkey Roofing Products®

Designer Shingle Installation Instructions

WINDSOR® FEATURING Scotchgard™ PROTECTOR 3M

5 - Nail Nailing pattern per shingle see info below

Directions for Applying Malarkey Windsor® Designer Shingles

GENERAL INSTRUCTIONS

Install Malarkey *Windsor® designer shingles* in accordance with adopted building code and local amendments. To qualify for warranty protection and obtain stated coverage, the installation instructions detailed here must be followed. Contact Malarkey Technical Services or check our website at WWW.MALARKEYROOFING.COM for the most current version.

We assume no responsibility when there has been improper application, failure to properly prepare the surface or provide adequate ventilation according to FHA or HUD minimum property standard requirements and adopted building code.

For current warranty information, please visit: WWW.MALARKEYROOFING.COM/warranties.

Standard exposure is 5¾"(146 mm) to the weather. Offset between courses is 6⅜" (162 mm). Minimum offset for shingle installation is 5½" (140 mm).

These step-by-step application instructions apply to standard slopes/inclines not less than 4" (102 mm) per 12" (305 mm) or more than 21" (533 mm) per 12" (305 mm). For low slopes [2" (51 mm) to less than 4" (102 mm) per 12" (305 mm)] and steep slopes [more than 21" (533 mm) per 12" (305 mm)], modify the installation as described below. Do not apply shingles on roofs having a slope less than 2" (51 mm) per 12" (305 mm).

Note: The film strip on each shingle is to prevent the shingles from sticking together while in the bundle and is not designed to be removed.

IMPORTANT

- ALWAYS wear fall protection when working on a roof.
- Underlayments can be slippery, particularly when wet or covered with frost. Be careful when walking on them.

Ventilation: To prevent harmful condensation or heat buildup, air must circulate freely under the roof deck. Install roof vents at ridges and eaves. Ventilation provisions must meet or exceed current FHA or HUD requirements and adopted building codes.

Roof Deck: The surface to receive the new roofing should be in good condition and solidly sheathed, constructed of a minimum ⅜" (10 mm) thick, exterior-grade plywood, 7⁄16" (11 mm) oriented strand board (OSB), or seasoned lumber, nominally 1" (25 mm) thick. Boards should be positioned tight to each other and securely nailed to framing members. Replace deteriorated or rotted boards, and for excessively resinous areas and loose knots, cover with sheet metal patches.

Malarkey strongly recommends installing sheathing when wood board decking is the existing substrate. Problems with the performance of your roofing system, such as leaks and buckling, increase if installed directly over wood board decks. Failure to use properly conditioned deck materials can result in deck movement which can damage the roof covering and may void your warranty.

Drip Edge Flashing: In accordance with 2018 International Building Code, Section 1507.2.8.3, and 2018 International Residential (Building) Code, Section R905.2.8.5, *drip edge flashing* (drip edge, eave or rake metal) is required along the eave and rake edges of shingle roofs.

Install drip edge first along the eaves and later on the rakes once the field underlayment has been applied.

UNDERLAYMENT

Malarkey makes two types of underlayment, the first being water-resistant, *mechanically-attached* field underlayments Right Start™ UDL and our Secure Start® line of synthetic underlayments.

The second type are waterproof, *self-adhering* underlayments, Arctic Seal® and Secure Start® HT products which are intended for use in cold weather climates that produce ice dams.

Self-adhering underlayment can also be installed as a flashing membrane in areas susceptible to leaks such as roof valleys, roof-to-vertical transitions, and around vents, curbs, skylights and other roof penetrations.

Underlayment is required on roof decks prior to the installation of Malarkey shingles. Your geographical location, weather, degree of roof slope, and type of roof covering will help determine which Malarkey underlayment is right for your situation. Consult local building code for additional guidance.

Complete installation instructions are available on our website at WWW.MALARKEYROOFING.COM.

Other Instructions Common to the Installations that Follow:

- Underlayment is installed parallel to the eaves.
- End laps in the same course should be 6" (152 mm), and staggered 6' (1.8 m) apart in subsequent courses.
- Extend field underlayments 6" (152 mm) over hips, ridges and valleys. Where the roof meets a vertical surface, run the underlayment a minimum of 3" (76 mm) up the wall and secure.
- Once an expanse of roof is covered by underlayment up to the ridge, apply drip edge flashing to the rakes, over the ends of underlayment.

INSTALLATION IN NON-ICE DAM REGIONS

Roof Slopes 4:12 and Greater

Roof slopes 4:12 (4" [102 mm] per 12" [305 mm]) and greater require the installation of a single (1) layer of Malarkey's field underlayment (or code-compliant equivalent) over the entire roof deck.

Install the initial course flush to the eave and trim at the rake. Fasten sufficiently to hold the underlayment in place and work safely until shingles are applied or according to adopted building code. Secure Start® underlayments have bullseye imprints on the material to act as guides for fastening.

Continue working up the roof, subsequent courses overlapping the preceding by 2"- 4" (51-102 mm), depending on the type of underlayment being applied. ***(See Figure 1)***

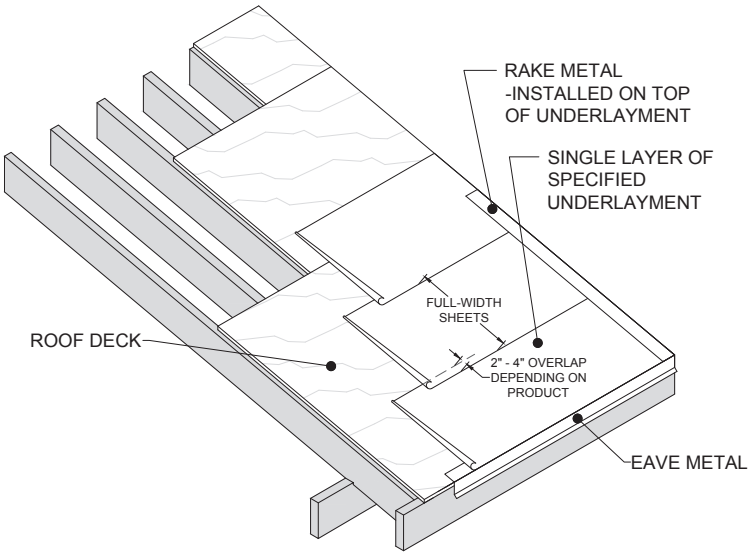

Figure 1 - Application of Field Underlayment on Roof Slopes 4:12 and Greater (Non-Ice Dam Regions)

Roof Slopes 2:12 Up to 4:12

Install a *double layer* of any Malarkey underlayments. If local building code has adopted 2015 or later IBC or IRC, a *single layer* of ASTM D1970 underlayment (Arctic Seal®, Secure Start® HT) is acceptable as an exception per the I-Codes.

For a double layer, start at a lower corner of roof and begin by applying a half-width *starter strip* of field underlayment (or code-compliant equivalent) along the eaves.

Succeeding courses are all full-width, the first course completely overlapping the starter, and followed by courses half-lapped over preceding courses.

Fasten sufficiently to hold in place and work safely until shingles are applied or according to adopted building code. ***(See Figure 2)***

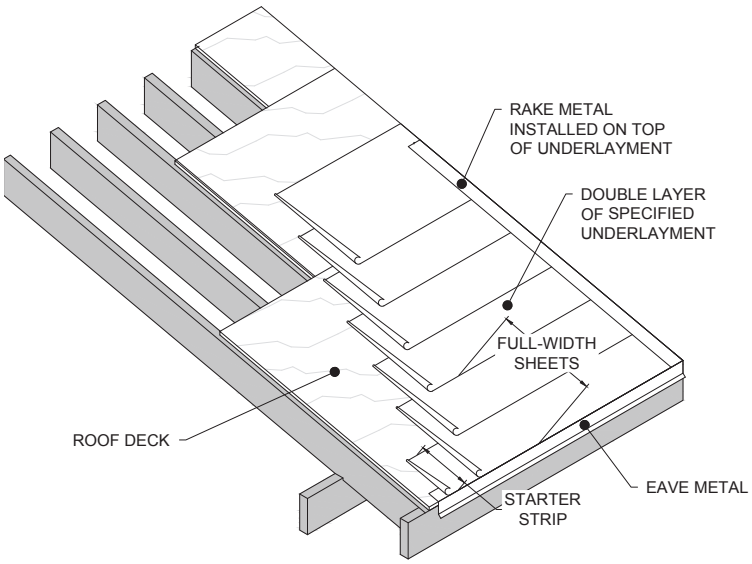

Figure 2 - Application of Field Underlayment on Roof Slopes 2:12 Up to 4:12 (Non-Ice Dam Regions)

Optional installation for low slope roofs: For superior protection in coastal regions, areas of wind-driven rain, or homes with double-slope construction, the roof deck can be covered with a double layer of Arctic Seal® self-adhering underlayment or equivalent conforming to ASTM D1970.

When choosing this option, make sure proper ventilation and moisture control issues are addressed.

INSTALLATION IN ICE DAM REGIONS

Roof Slopes 4:12 and Greater

In geographic regions that experience the possibility of ice dams along the eaves (or if required by building code), install a full-width sheet of *self-adhering* underlayment (or equivalent underlayment conforming to ASTM D1970) along the eaves.

Continue installing self-adhering underlayment up and out onto the roof no less than 24" (610 mm) past the inside, warm interior wall of the house or above the expected level of ice dams or according to building code requirements.

If additional courses of self-adhering underlayment are necessary to reach that point, *course lap guide lines* (lay lines) on the sheets show how far to lap the material. Firmly hand-roll these overlaps to ensure a complete, watertight bond.

Once past 24" (610 mm), follow with full-width courses of your specified field underlayment, the first course lapped 6" (152 mm) over the termination of self-adhering underlayment and the rest with 2"-4" (51-102 mm) side laps, depending on the type of underlayment being applied. Lay lines show how far to lap the material.

Fasten as described above.

For extra protection at the eaves and prior to the installation of drip edge, install a 6"-wide (152 mm) stripping ply of Arctic Seal®, and ensure it covers the junction of roof and fascia. ***(See Figure 3)***

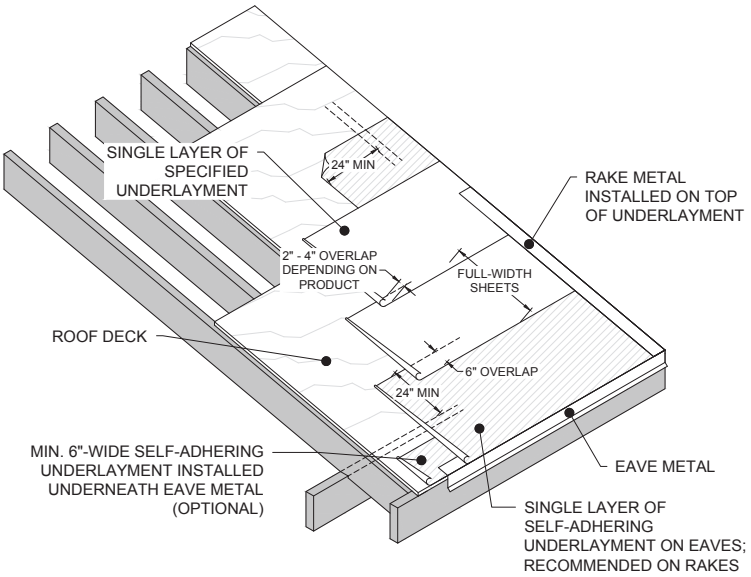

Figure 3 - Application of Self-Adhering and Field Underlayments on Roof Slopes 4:12 and Greater (Ice Dam Regions)

Roof Slopes 2:12 Up to 4:12

Like 4:12 and greater slopes, begin with a full-width sheet of self-adhering underlayment (or equivalent compliant with ASTM D1970) and apply along the eaves.

Continue application up and out onto the roof as necessary to a point not less than 24" (610 mm) past the inside, warm interior wall of the house or above the expected level of ice dams or according to building code requirements.

Once that point is reached, switch to *double layers* of your specified field underlayment, the first course a half-width *starter strip* lapped 6" (152 mm) over the termination of self-adhering underlayment.

Succeeding courses are full-width, the first course completely overlapping the starter, and followed by courses half-lapped over preceding courses, on up the roof.

Fasten as described above. ***(See Figure 4)***

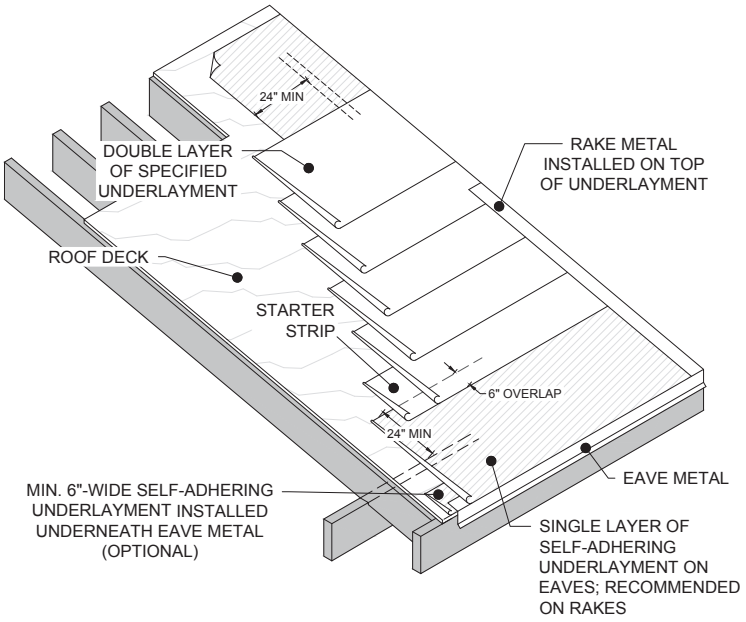

Figure 4 - Application of Self-Adhering and Field Underlayments on Roof Slopes 2:12 Up to 4:12 (Ice Dam Regions)

SHINGLE FASTENING

Type of Fasteners: Fasteners must be minimum 12-gauge (0.105 inch [3 mm]) shank, galvanized steel, stainless steel, aluminum or copper roofing nails, with a ⅜" (10 mm) head, compliant with ASTM F1667, and long enough to penetrate through all layers of roofing materials and at least ¾" (19 mm) into the roof sheathing. Where the roof sheathing is less than ¾" (19 mm) thick, the fasteners shall penetrate through the sheathing.

Malarkey approves the use of hand-nailing and/or pneumatic nailers for applying fasteners, but nails must be driven flush to the shingle surface and not overdriven, underdriven or driven at an angle, especially on low slope installations where water runs off less freely and leaks could result. When fastening adjacent shingles, butt them loosely together to prevent buckling.

The use of staples is not an approved fastening method. ***(See Figure 5)***

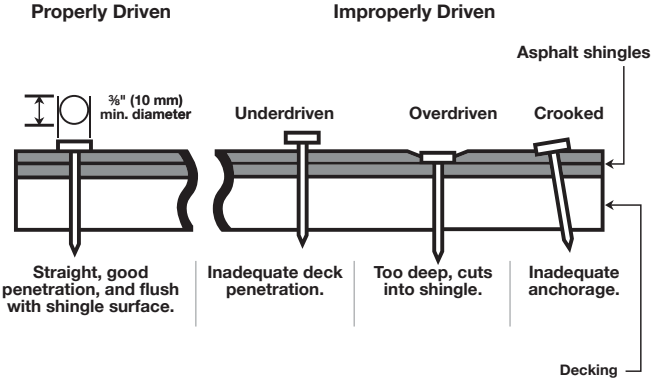

Figure 5 - Nailing Instructions

Nailing Pattern: Use five (5) fasteners for each shingle, evenly spaced across the shingle, and placed within the *high nailing area* designated by the parallel *nailing lines*. Ensure the outside fasteners are approximately 1" (25 mm) from each edge. ***(See Figure 6)***

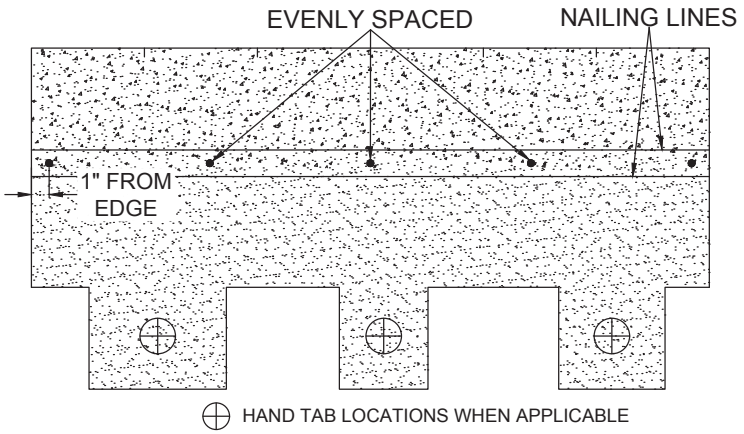

Figure 6 - 5-Nail Fastening Pattern and Hand-Tab Locations

In regions requiring six (6) nails per shingle, two methods can be used:

Method 1: Place four (4) fasteners in the high nailing area, evenly spaced across the shingle, with the outer fasteners 1" (25 mm) from each edge.

Place two (2) fasteners in the *low nailing area*, no more than 1" (25 mm) from each edge, and approximately ¾" (19 mm) above the tabs, making sure they will be covered by shingle tabs in the course above them. ***(See Figure 7)***

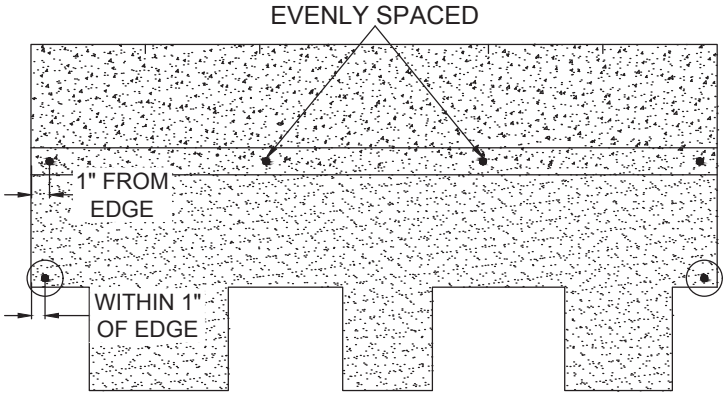

Figure 7 - 6-Nail Fastening Pattern

Method 2: Place two (2) fasteners in the high nailing area, each 1" (25 mm) from the outside edge.

Place four (4) fasteners in the low nailing area, approximately ¾" (19 mm) above the tabs, making sure they will be covered by shingle tabs in the course above them.

The two inner notches, or slits*, at the top of the shingle will aid in the alignment of the two middle fasteners while the two outer fasteners are placed 1" (25 mm) from each edge. ***(See Figure 8)***

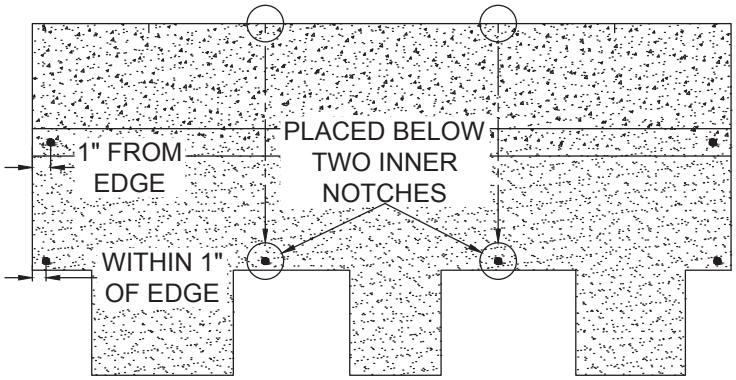

Figure 8 - Alternate 6-Nail Fastening Pattern

Wind Resistance and Hand-Sealing: Malarkey shingles are manufactured with strips of a factory-applied thermal sealant that is activated by the heat of the sun after the shingle is on the roof. Exposure to the sun and warm temperatures bonds each shingle to the one below for wind resistance.

A variety of conditions like cold weather, high winds or blowing dust, however, can affect the ability of the sealant strip to activate and prevent shingles from self-sealing during, or shortly after, installation.

If shingles have not sealed after a reasonable time period, *hand-sealing* (also called hand-tabbing) is strongly recommended.

Note: Malarkey's wind warranties apply only when shingles are sealed, whether by hand-sealing or activation of the self-sealing strips.

Failure to seal under adverse circumstances like those described above is not a manufacturing defect.

To hand-seal a Windsor® designer shingle, apply a quarter-size dab of asphalt roof cement conforming to ASTM D4586 under each shingle tab, and press them firmly into the cement (see Figure 6).

Excessive use may cause blistering; correct amounts should not bleed out from under the shingle.

Steep Slope Fastening of Shingles: Roof decks with slopes greater than 21" (533 mm) per 12" (305 mm) require installation with nine (9) fasteners per shingle (six [6] for starter shingles) and hand-sealing of tabs.

Place five (5) fasteners in the high nailing area, evenly spaced across the shingle, with the outer fasteners 1" (25 mm) from each edge.

Place four (4) fasteners in the low nailing area, approximately ¾" (19 mm) above the tabs, making sure they will be covered by shingle tabs in the course above them.

The two inner notches at the top of the shingle will aid in the alignment of the two inner low nailing area fasteners while the two outer fasteners are placed 1" (25 mm) from each edge of the shingle.

Note: See Malarkey's *Shingle and Accessory Warranty* online for any additional requirements related to specific coverages. ***(See Figure 9)***

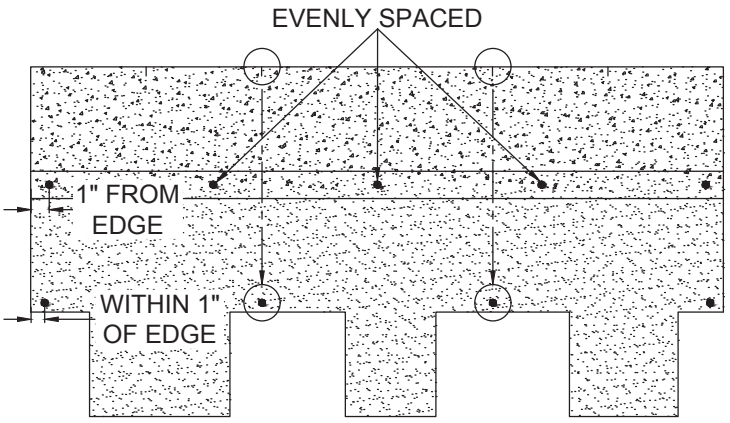

Figure 9 - 9-Nail Fastening Pattern

*Windsor® shingles have five (5) notches on the top of each shingle. The two outer notches are 6⅜" (162 mm) from each edge, the two inner notches are each 12¾" (324 mm) from the edge, and the center notch is at the middle of the shingle, 19⅛" (486 mm) from the edges.

When it comes to applying the shingles (see the *Shingle Pattern Layout* section below), the outer notches will play an important role for determining offsets and establishing a consistent diagonal pattern of shingles against the rake.

SHINGLE PATTERN LAYOUT AND APPLICATION

Important: The diagonal application procedures described below are necessary to prevent objectionable patterning. Malarkey is not responsible for such patterning on roofs where this diagonal application is not used. Exposures should be even along the courses as well, or an objectionable appearance may occur.

Malarkey Smart Start® Starter Shingles: Smart Start® starter shingles are designed to be separated lengthwise at a perforation so you get two, full-size starter shingles in one. The perforation is in the middle of the shingle, 8³⁄₁₆" (208 mm) from each edge, and both pieces have seal-down strips. Besides eaves, it is recommended Smart Start® starter shingles be installed on the rake edges of roof to provide a clean edge and increase wind resistance.

6⅜" (162 MM) OFFSET - FOUR COURSE DIAGONAL METHOD

Starter Course: Install Malarkey Smart Start® starter shingles or equivalent conforming to ASTM D3462. Ensure they are positioned with the factory-applied sealant strip face up and the strip adjacent to the eave edge of the roof.

Lay the initial, full-length starter shingle on a lower corner of the roof, overhanging the rake and eave edges by ¼" to ¾" (6 -19 mm).

Fasten with 4 nails, 1½"- 3" (38 -76 mm) up from the eave, with one fastener 1" (25 mm) from each side of the starter and the remaining two evenly spaced on the same line as the end fasteners. Do not place fasteners in the seal-down strip.

Continue across the roof, butting the starter shingles loosely together and fastening in place.

Windsor® Starter Course: Trim one end of the first Windsor® Starter shingle, 6⅜" (162 mm), and lay it over the Smart Start® starter at the rake, positioning the Windsor® Starter so the full

color blend overhangs the Smart Start® starter by approximately ⅛" (3 mm).

Fasten with four (4) nails in-between the paint lines, approximately 1" (25 mm) from each side of the starter and the remaining two evenly spaced. Continue across the roof, butting the shingles loosely together to prevent buckling, and fastening in place.

First Course of Shingles: Start with a full-length shingle and apply directly over and flush with the edges of the Windsor® Starter course on both eave and rake sides, maintaining the ⅛" (3 mm) overhang previously established. Secure with fasteners.

Second Course: Cut 6⅜" (162 mm) from one end of the first shingle and apply the remaining 31⅞" (810 mm) section over the underlying first course shingle and flush with the rake edge.

The bottom edge of the shingle tabs should line up with the top edge of the cutouts in the underlying shingle, leaving an exposure of 5¾"(146 mm). Secure with fasteners.

Another way to position it is to align the right side with the right outside *notch* in the underlying *first* course shingle.

Third Course: Cut 12¾" (324 mm) from the rake end of a full shingle and apply the remaining 25½" (648 mm) section over the underlying second course shingle and flush with the rake edge.

Position as before, lining up the bottom edge of the shingle tabs with the top edge of the cutouts in the underlying shingle, leaving an exposure of 5¾" (146 mm). Secure with fasteners.

Another way to position it is to align the right side with the right outside *notch* in the underlying *second* course shingle.

Fourth Course: Cut 19⅛" (486 mm) from the rake edge of a full shingle (in half), and apply the remaining 19⅛" (486 mm) over the underlying third course shingle and flush with the rake edge. Position it carefully, allowing an exposure of 5¾" (146 mm), and secure with fasteners.

Another way to position it is to align the right side with the right outside notch in the underlying *third* course shingle. ***(See Figure 10)***

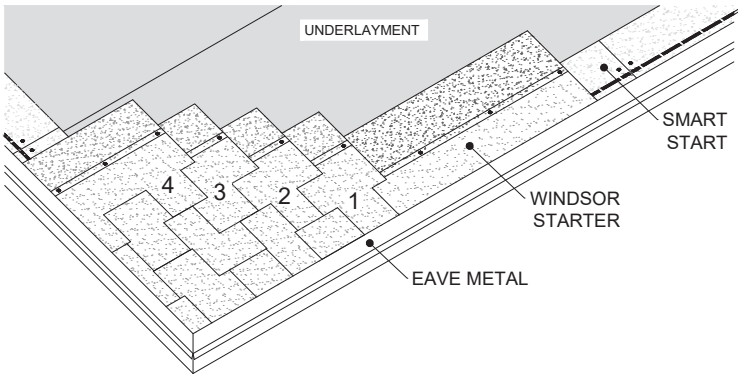

Figure 10 - Windsor® Shingle Layout Pattern with Smart Start® and Windsor® Starter Shingles

Prior to proceeding with the fifth course, fill in the preceding courses with full length shingles adjacent to the first pieces, and secure with fasteners. When fastening, butt ends loosely together to prevent buckling.

Courses Five and Above: To continue the installation on up the roof, repeat the diagonal pattern established in courses one to four. Snap a horizontal chalk line every six courses or so to ensure horizontal alignment.

Shingles may be laid from either lower corner of roof; follow layout and cutting instructions as required for proper application. If starting from the right rake, position the left side of cut shingles with the left outside notch in shingles of underlying courses.

Pieces cut from Windsor® shingles along the left rake can be used to finish off courses at the right rake. Because of our Windsor® shingles' unique tab patterning, they cannot be used to continue the diagonal installation pattern up the left rake.

Note: Straight up application of shingles, or *racking*, is not recommended.

CONSTRUCTING ROOF VALLEYS

Similar to a roof deck being prepared for shingles by first applying an underlayment, roof valleys must be likewise prepared before they can be "constructed" with shingles.

Open metal valley applications are recommended for Windsor® shingles, but *closed-cut valleys* are also acceptable. Contact Malarkey Technical Services for more information.

Valley Underlayment: Center a full-width strip of self-adhering underlayment (or equivalent conforming to ASTM D1970) in the valley, and apply it directly to the roof deck. Ensure this *valley liner* is tight to the deck without bridging in the center of the valley.

Field underlayment can be woven across the valley liner and up the opposite side at least 12" (305 mm) or lapped over each side a minimum of 6" (152 mm). When fastening, be aware no fasteners are allowed within 6" (152 mm) of the valley centerline.

Open Metal Valley Construction: Metal valley flashing (valley metal) used with Malarkey shingles must be minimum 24" (610 mm) wide and 26 gauge. Preformed, "W"-shaped flashing is recommended.

Center the valley metal over the valley liner, press it into the break of the valley, and secure with fasteners no more than 1" (25 mm) from the outside edges at a spacing of 10" (254 mm) to 12" (305 mm) O.C.

Set overlapping ends of the valley metal in a continuous bead of sealant, achieving a lap of 4" (102 mm). DO NOT FASTEN THE METAL LAP.

For additional sealing, a continuous 6"-wide (152 mm) strip of self-adhering Arctic Seal® may be applied over the fasteners on each side of the valley metal.

Never use a shingle trimmed to less than 12" (305 mm) in length to finish a course running into a valley. If necessary, trim a tab off the adjacent shingle in the course to allow a longer portion to be used. Make sure each shingle extends far enough into the valley so in a future step, a shingle's full width (or height) will be trimmed back.

Nail no closer than 6" (152 mm) to the valley centerline.

Now, trim shingles a minimum of 2" (51 mm) back from the centerline, cut the ends diagonally to match the centerline

angle, and crop the top of each shingle at a 1" (25 mm), 45 degree cut.

Embed the ends of the cut valley shingles in a continuous 3" (76 mm) wide bead of asphalt roof cement conforming to ASTM D4586, and press them into the adhesive. ***(See Figure 11)***

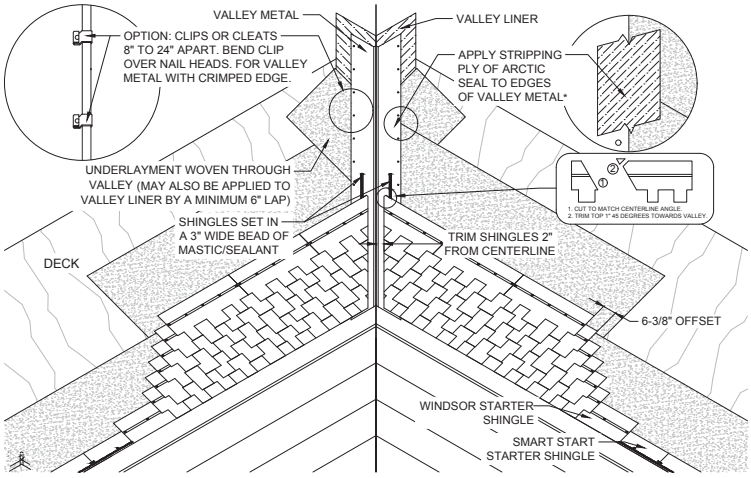

Figure 11 - Open Metal Valley Application

FLASHING APPLICATIONS

Intersections of Roof and Vertical Sidewall: Minimum 26-gauge, metal step flashing is used in the junction between a sloping roof and intersecting sidewall (on a dormer, for example) to protect this vulnerable area from moisture intrusion.

Step flashing can be square or rectangular, but 8-inch (203 mm) by 8-inch (203 mm) dimensions are common and satisfactory for our purposes.

Being 8" wide allows the flashing to be bent 90 degrees and pushed against the transition of roof to wall, the horizontal flange extending 4" (127 mm) out onto the roof deck and the vertical flange 4" (127 mm) up the wall assembly. Being 8" long allows individual step flashing pieces to overlap each other in water-shedding fashion as they are installed.

Individual step flashing pieces are integrated with each course of shingles as they are applied to intersect the sidewall. A ¼"-¾" (6-19 mm) gap between the shingles and vertical bend of the flashing is recommended.

To allow for possible differential movement, fasten each piece of step flashing to the roof deck and not the sidewall.

Installation is as follows: Atop the Smart Start® starter course at the eave, place the first piece of step flashing*****. The horizontal flange should be flush with the eave edge of the starter and the vertical flange against the sidewall, counter-flashed by the wall cladding.

Fasten the horizontal flange of the step flashing to the roof deck with two nails placed 1" (25 mm) from the upper edge and spaced an equal distance apart.

Apply the Windsor® Starter. The horizontal flange of the step flashing will no longer be visible, but you can still see the vertical flange along the sidewall.

Place the second step flashing atop the Windsor® Starter, and position it 5¾" (146 mm) up from the eave edge of the shingle, matching the shingle tab exposure, and fasten as before.

Position a first course Windsor® shingle over the Windsor® Starter and fasten.

Place the third step flashing atop that, overlapping the end of the previous step flashing by 2¼" (64 mm) - the point of shingle tab exposure.

Maintain the 5¾" (146 mm) exposure of each step flashing on up to the top of the sidewall intersection, alternating between the placement of step flashing and shingles.

***** The "first piece of step flashing" in this instance might well be kickout flashing, a piece of flashing cut and angled to direct water out and away from the side of a structure.

To accommodate the angled part, yet still serve as the initial piece of step flashing, the kickout will likely have a greater length than a regular piece of step flashing. Otherwise, the installation of starter shingles, Windsor® shingles, and step flashing to follow is the same. ***(See Figure 12)***

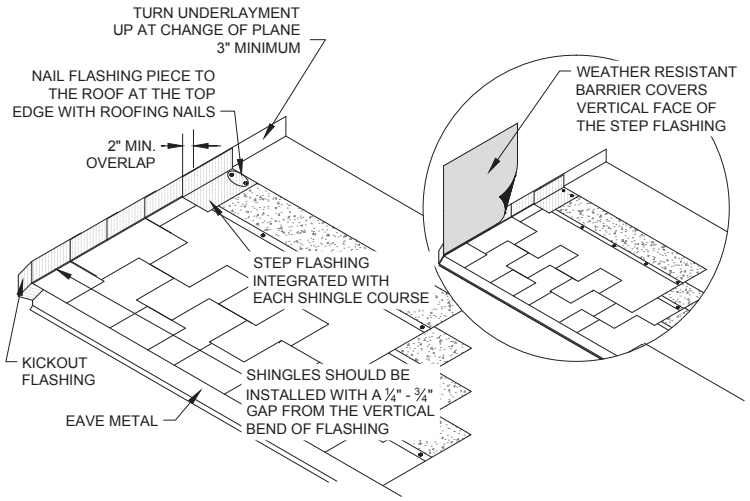

Figure 12 - Step Flashing Application at Roof-to-Sidewall Transitions

Vent Pipe (and Other Flanged Penetration) Flashing: Install shingle courses up to the vent pipe, and cut a hole in the shingle to be positioned over the pipe. Install the pipe jack or boot (top and side flanges may be set in sealant).

Additional, *optional* weatherproofing: Unexposed pipe jack flanges (top and both sides) may also be stripped-off with minimum 6" (152 mm) wide Arctic Seal®, covering all fasteners used to secure the flanges, and tying onto the field underlayment a minimum of 3" (76 mm).

Continue roofing around the pipe, cutting shingles to fit on the sides and top of the pipe jack flanges. Ensure shingles extend beyond the downslope side of the pipe itself. Shingles that overlap any part of the flanges should be sealed to the flange with asphalt roof cement conforming to ASTM D4586. Correct amounts should not bleed out from under the shingles; excessive use may cause blistering. Apply pressure to seal. ***(See Figure 13)***

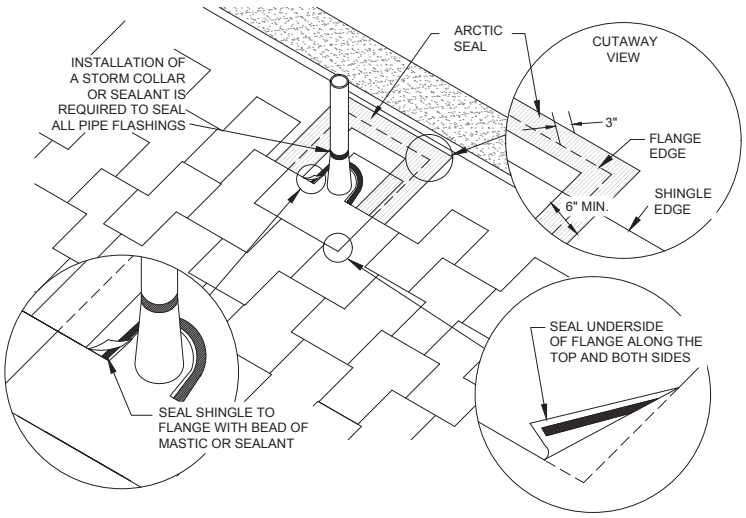

Figure 13 - Vent Pipe Flashing Application

Cap (Counter) and Chimney Flashings: The metal flashing apron for the front of the chimney shall be installed over the last course of shingles below the chimney and its vertical flange extending up the face of the chimney.

The metal flashings of chimneys, skylights, vents, and adjoining walls must be counter-flashed with sheet metal cap flashing.

Cap flashing (also called counter flashing) should originate in the masonry mortar joints of the chimney and be mortared-in or caulked with urethane sealant to ensure a watertight connection.

Cap flashing should then turn down the chimney and extend a minimum of 2" (51 mm) over the step flashings at all roof-to-sidewall intersections. ***(See Figure 14)***

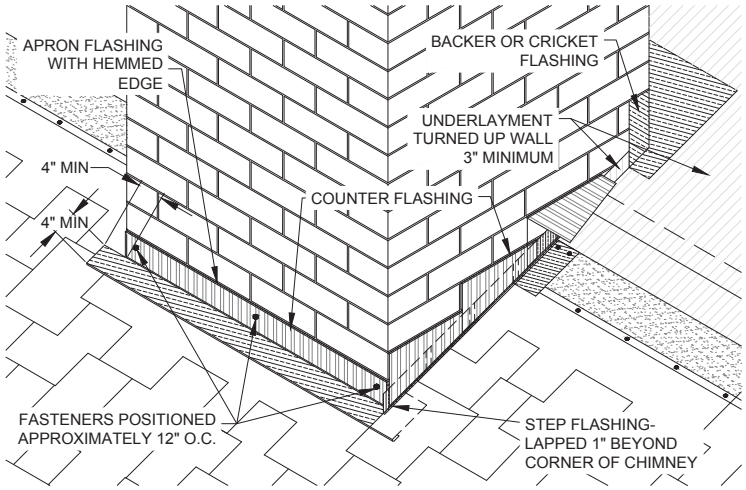

Figure 14 - Chimney Apron and Cap Flashing Applications

Chimney Saddles and Crickets: Apply Arctic Seal® self-adhering underlayment (or equivalent conforming to ASTM D1970) atop chimney saddles prior to the installation of flashing assemblies.

Flashing for chimney saddles and crickets shall be minimum 26-gauge galvanized or stainless steel, designed to cover the entire surface, and extend vertically 4" (102 mm) up the chimney.

Install a bead of mastic on the edges of chimney saddles and crickets. Press overlapping shingle courses into the mastic to seal. Seal all relief cuts and corners. ***(See Figure 15)***

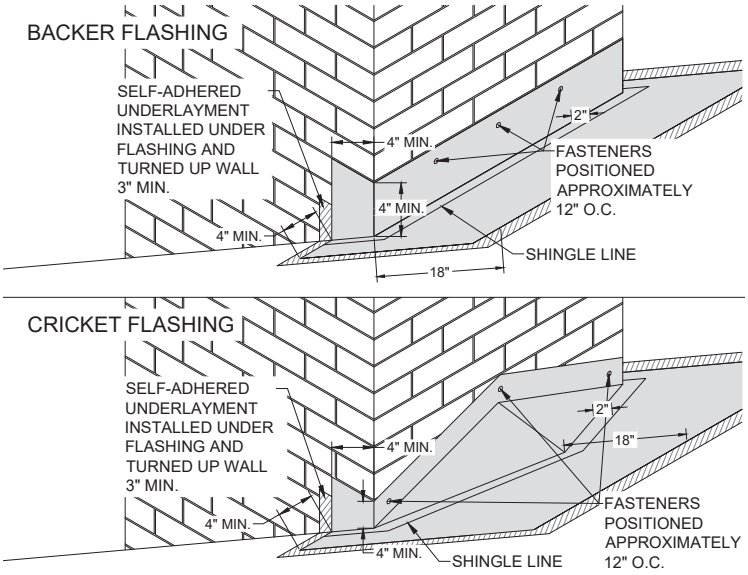

Figure 15 - Chimney Saddle and Cricket Flashing Applications

HIPS AND RIDGES

Malarkey EZ-Ridge® and EZ-Ridge XT® high-profile hip and ridge shingles are recommended for Windsor® shingles, but RidgeFlex® strip shingles may also be used. Some contractors adapt 3-tab roofing shingles to use as hip and ridge shingles, but Malarkey *only allows this when the field shingle is also a 3-tab shingle*.

Shingles featuring Scotchgard™ Protector from 3M (including Windsor® shingles) must be installed with hip and ridge shingles having Scotchgard™ Protector. All four of Malarkey's hip and ridge shingle types feature this algae-resistant protection.

Malarkey hip and ridge shingles also include a factory-applied, thermally activated seal-down adhesive that provides additional protection against blow-off. When applied in cold weather or a windy location, however, it is recommended each ridge shingle be hand-sealed under each lower corner with a quarter-size spot of asphalt roof cement conforming to ASTM D4586.

To avoid damage to hip and ridge shingles in cold weather, Malarkey recommends warming them sufficiently to prevent damage during installation.

LOW-PROFILE INSTALLATION (10" AND 12" RIDGEFLEX® HIP AND RIDGE SHINGLES)

Prepare for application by separating each hip and ridge shingle at the perforations: The 10" RidgeFlex® produces four (4) individual hip and ridge strips ***(see Figure 16)***, and the 12" RidgeFlex® produces three (3) ***(see Figure 17)***. Note the seal-down strips.

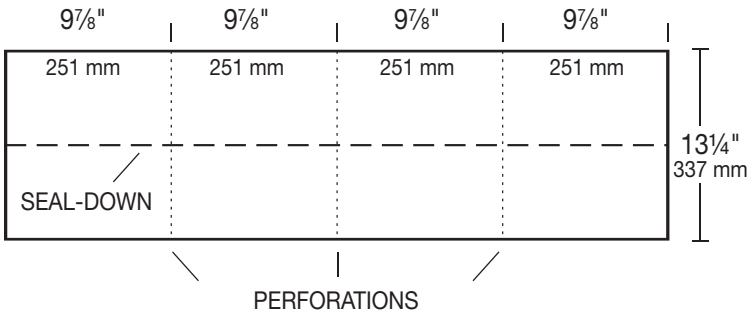

Figure 16 - 10" RidgeFlex® Hip and Ridge Shingle

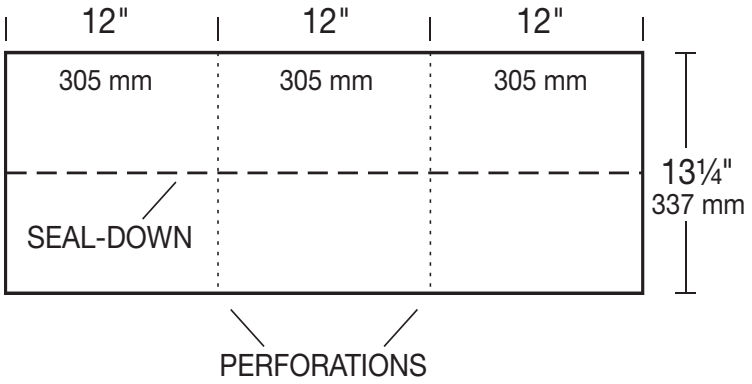

Figure 17 - 12" RidgeFlex® Hip and Ridge Shingle

Each scored strip is 13¼" (337 mm) tall and has an exposure of 5⅝" (143 mm). You will be installing these individual pieces, and all are installed sealant side up.

Detail drawings to follow in this section show the installation of hip and ridge shingles along a roof ridge, but hips are essentially the same. Application begins at the bottom of the hip or from the end of the ridge opposite the direction of prevailing winds with a hip and ridge *starter shingle*.

RidgeFlex® Starter Shingle: Create a starter shingle by cutting off the 5⅝" (143 mm) exposed portion of a RidgeFlex® shingle strip, and use the 7⅝" (194 mm) remainder as a starter. ***(See Figure 18)***

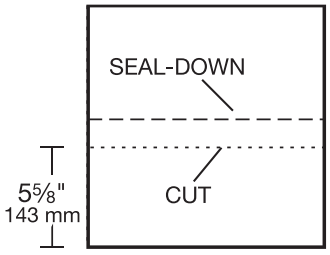

Figure 18 - RidgeFlex® Shingle Strip for Use as a Hip and Ridge Starter Shingle

Apply the starter shingle (with seal-down strip adjacent to the roof edge) over the bottom corner of the hip or on either end of the ridge, overhanging the corner or end by ¼"- ¾" (6-19 mm), and bending the starter shingle along its centerline to form into place (ensure shingles are sufficiently warm to avoid cracking).

Fasten with two nails, approximately 3" (76 mm) back from the leading edge and 1" (25 mm) up from each side. ***(See Figure 19)***

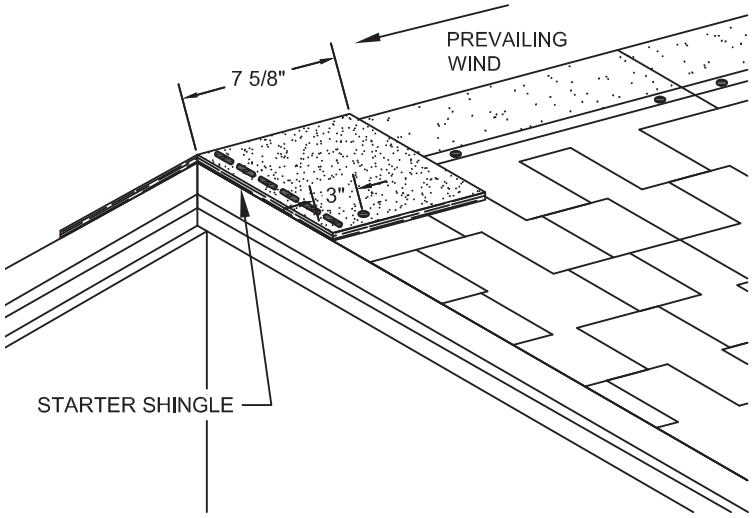

Figure 19 - Placement and Fastening of the RidgeFlex® Starter Shingle

RidgeFlex® Hip and Ridge Shingles: Lay the first RidgeFlex® shingle strip on top of the starter shingle (maintaining the overhang). Fasten with two nails, 1" (25 mm) more than the designed exposure and 1" (25 mm) up from each side so succeeding hip and ridge shingles conceal nailheads.

To aid installers for determining the *exposed* portion of a RidgeFlex® shingle, it's manufactured with a paint line in the headlap area, *opposite* the exposed portion. ***(See Figure 20)***

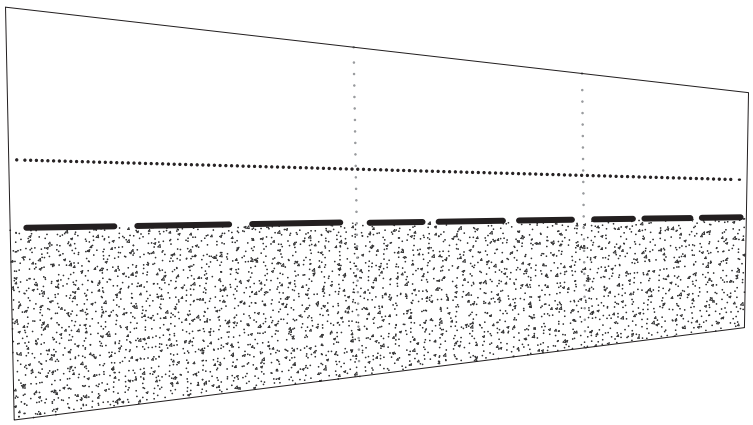

Figure 20 - Paint Line in Headlap Area of Shingle Is Opposite the Exposed Portion

Continue installing hip and ridge shingles, maintaining the exposure of 5⅝" (143 mm) and fastening with one nail on each side and 1" (25 mm) up from the edge so succeeding shingles conceal nailheads. ***(See Figure 21)***

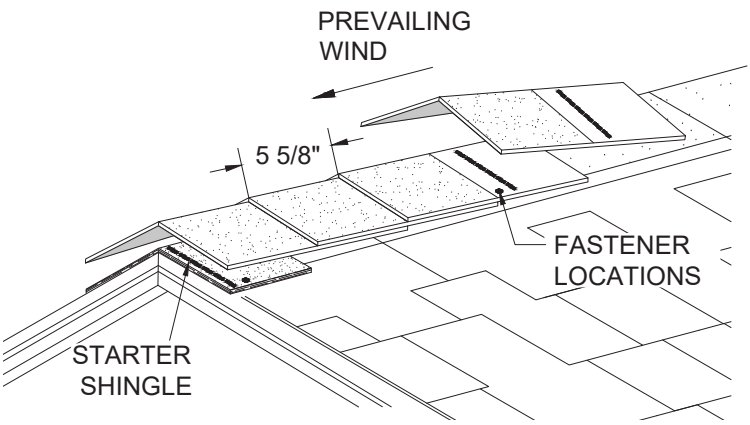

Figure 21 - Placement and Fastening of RidgeFlex® Shingles, Maintaining the 5⅝" Exposure

At the end of the ridge, cut a shingle strip, and use the 5⅝" (143 mm) exposed portion of a RidgeFlex® shingle to create an *end cap*. Position to maintain the exposure of 5⅝" (143 mm), trim to fit, and set the cap in asphalt roof cement conforming to ASTM D4586. Press down firmly to seal. ***(See Figure 22)***

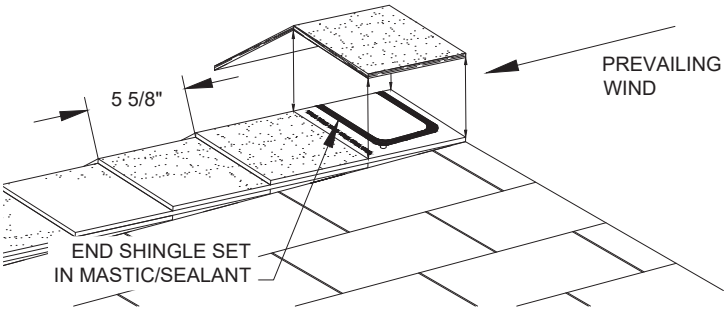

Figure 22 - Installation of RidgeFlex® Shingles; End Cap Set in Mastic

Should adverse conditions exist (like high winds), the end cap can also be face-nailed. Place two (2) nails on each side, 1" (25 mm) back from each end, and 1" (25 mm) up from the sides. Cover the nailheads with a dab of sealant.

HIGH-PROFILE INSTALLATION (EZ-RIDGE® AND EZ-RIDGE® XT HIP AND RIDGE SHINGLES)

Malarkey's EZ-Ridge® is a high-profile hip and ridge shingle specially designed to accompany laminate and Windsor® shingle applications.

Detail drawings to follow in this section show the installation of shingles along a roof ridge, but hips are essentially the same. Instructions for installing along rake edges are at the end of the section.

Given the added thickness of EZ-Ridge® shingles, ensure your fasteners are long enough to penetrate all layers and at least ¾" (19 mm) into the roof sheathing. Where the roof sheathing is less than ¾" (19 mm) thick, the fasteners shall penetrate through the sheathing.

Application begins at the bottom of the hip or from the end of the ridge opposite the direction of prevailing winds with a hip and ridge *starter shingle*.

EZ-Ridge® Starter Shingle: To create an EZ-Ridge® starter shingle, cut off the 8¼" (210 mm) *exposure* portion of the shingle, and use the remaining 3¼" (83 mm) *cutout* portion (with sealant strip) as the starter. ***(See Figure 23)***

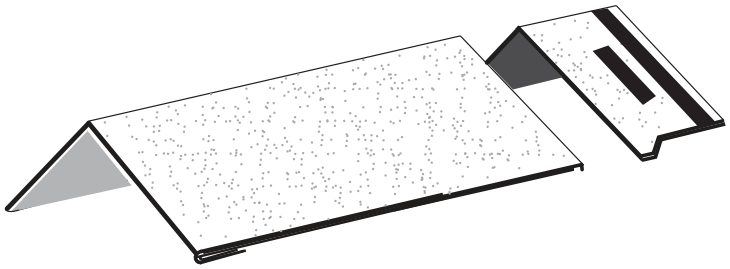

Figure 23 - Cutting an EZ-Ridge® Shingle to Make a Hip and Ridge Starter Shingle

Save the exposure portion because it can be used as the end cap on the opposite end of the ridge.

Note: The longer strip on the end of an EZ-Ridge® shingle is a film strip that prevents the shingles from sticking together while in the box they're packaged in. It is not designed to be removed.

Place the EZ-Ridge® starter shingle flush to the rake at the peak, and position it so the seal-down strip is adjacent to the roof edge. Push down on the center of the shingle and adjust to fit the pitch of roof.

Fasten with two (2) nails, one (1) on each side, ¾" (19 mm) behind the cutout and ½" (13 mm) up from the side. If installed correctly, fasteners should be covered by the overlying EZ-Ridge® shingles to come, leaving none exposed.

EZ-Ridge® Hip and Ridge Shingles: Apply a full-size EZ-Ridge® shingle over the starter and overhang the end of the ridge by ¼"- ¾" (6-19 mm). Push down on the center of the shingle and adjust it to fit the pitch of roof.

Fasten this shingle and those to follow with two (2) nails, one (1) on each side, ¾" (19 mm) behind the cutout (not on the exposed part of the shingle) and ½" (13 mm) up from the side.

Continue installing EZ-Ridge® shingles across the ridge, overlapping each with the side cutouts of the underlying shingle, and producing a consistent exposure of 8¼" (210 mm). Fasten in the same manner as the first. ***(See Figure 24)***

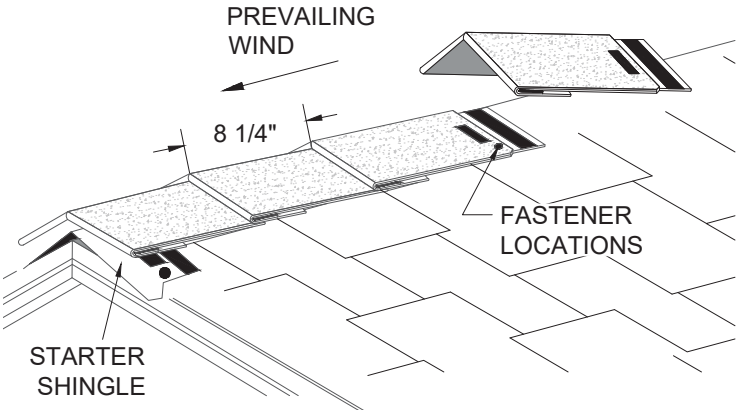

Figure 24 - Placement and Fastening of EZ-Ridge® Shingles, Maintaining the 8¼" Exposure

For the last hip and ridge shingle in the run, remove the cutout portion of an EZ-Ridge® shingle and trim the exposure portion to fit or use the exposure portion of the shingle you cut earlier when creating the starter.

Set this *end cap* in asphalt roof cement, maintaining the 8¼" (210 mm) exposure. ***(See Figure 25)***

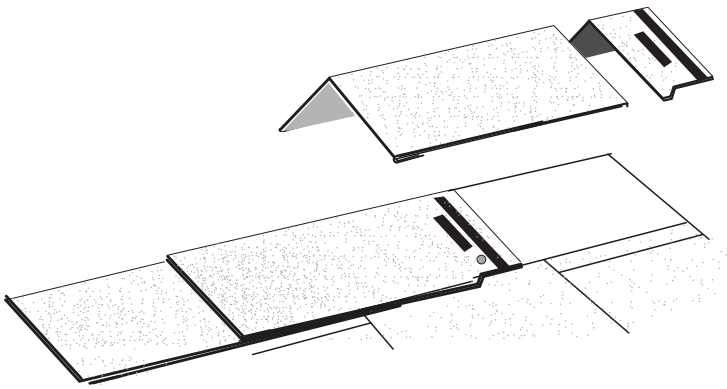

Figure 25 - EZ-Ridge® Shingle Cut to Create an End Cap

Should adverse conditions exist (like high winds), the end cap can also be face-nailed. Place two (2) nails on each side, 1" (25 mm) back from each end, and 1" (25 mm) up from the sides. Cover the nailheads with a dab of sealant.

Note: The end cap can also be flipped around to preserve the high-profile appearance and give a finished look to the ridge. Position it to overhang the end of the ridge by ¼"- ¾" (6-19 mm). ***(See Figure 26)***

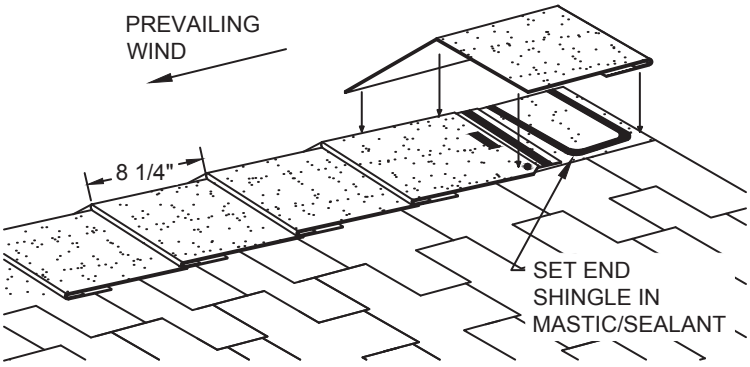

Figure 26 - Optional Positioning and Fastening of the EZ-Ridge® End Cap

EZ-RIDGE® RAKE EDGE INSTALLATION

Instructions are the same as those above with these exceptions:

1. Always start at the low end of the roof.
2. Have the high profile, finished end of EZ-Ridge® shingles in the lowest position.
3. Note: Installation with exposed nails may affect the aesthetic appeal of EZ-Ridge® shingles. ***(See Figure 27)***

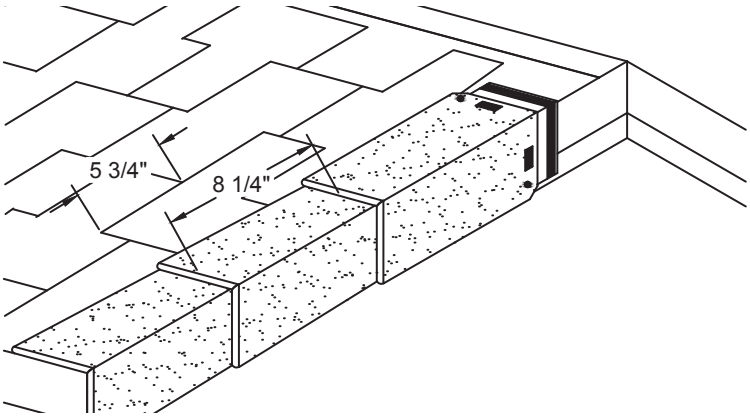

Figure 27 - Installation of EZ-Ridge® Shingles on Rake Edges of the Roof

RE-ROOFING OVER EXISTING ASPHALT SHINGLES

For best performance and appearance, it is recommended old roofing be completely removed from the deck.

When roofing over existing asphalt shingles, *it is recommended only 3-tab shingles be overlaid*. Roofing over laminates and designers like the Windsor® create an irregular surface across each course that may prevent the newly installed shingles from sealing down properly, leaving them more susceptible to wind damage.

In some areas, building codes do not require removal of old roofing if: 1) The existing shingles and framing will support the workers installing the roofing, the new roof itself, and required dead loads; and 2) The old wood deck is sound and able to provide good anchorage for nails.

Make the surface as smooth as possible by replacing missing shingles and securely nailing all buckles, raised tabs or curled shingles. Malarkey is not responsible for objectionable appearance of the new surface from any irregularity in the substrate caused by remaining roofing.

Additional ventilation should be provided, and longer nails will likely be necessary to penetrate a minimum of ¾" (19 mm) into the roof deck or completely through plywood or OSB sheathing.

Installing UL 2218 Class 3 or Class 4 impact resistant shingles over existing roofs negates their impact resistance and will not make them eligible for insurance discounts.

FINAL NOTE

These instructions are meant to act as a general guide. If you have questions about this installation or any Malarkey roofing product, please contact our Technical Services Department weekdays at (800) 545-1191 or (503) 283-1191, 7:00 am to 5:00 pm Pacific Time. You can also email us at malarkey.technicalinquiries@holcim.com. Thank you.

Malarkey Roofing Products®

P.O. Box 17217
Portland, OR 97217-0217

Rev. 01/24

R-MER® SEAL

Metal Roofing Underlayment
Technical Data Sheet

OVERVIEW & FEATURES

R-Mer Seal is a self-adhering high-temperature metal roofing underlayment. It is composed of a durable, non-slip, cross-laminated polymer film laminated to a high-temperature rubberized asphalt adhesive. A split release film protects the adhesive on the back side of the membrane and prevents the roll from sticking to itself during storage and handling.

R-Mer Seal is engineered for use as a continuous secondary waterproofing underlayment under Garland's metal roof systems. R-Mer Seal can also be used in valleys, ridges, penetrations and at eaves for protection against ice dams and wind driven rain. It can also serve as an underlayment for asphalt shingles, coping caps, and edge metal applications.

Aggressive Adhesion – R-Mer Seal is formulated with high temperature rubberized asphalt for reliable protection. R-Mer Seal exhibits superior adhesion to the roof deck and strong lap strength, ensuring long-term watertight protection. Quality-controlled manufacturing ensures uniform film thickness throughout each roll.

Flexible & Self-Healing – The rubberized adhesive compound yields a flexible membrane with excellent elongation capabilities and tensile strength to accommodate the expansion and contraction of the substrate. The rubberized adhesive layer also exhibits self-healing capabilities and accommodates the use of fasteners, staples, nails, and screws while maintaining a watertight seal.

Easy Installation – The peel and stick application and overlap guidelines make installation fast and easy. R-Mer Seal's cross-laminated polymer film provides an excellent slip-resistant surface for installers.

High-Temperature Rating – R-Mer Seal is able to withstand the elevated temperatures of a rooftop environment without degrading or losing its waterproofing capabilities.

APPLICATION

R-Mer Seal adheres to metal, plywood, OSB, rigid vinyl, polyisocyanurate insulation and masonry substrates. R-Mer Seal is intended for use on roof decks with slopes of 2:12 and higher.

All surfaces must be in sound condition and free of dirt, debris, or dust. Prime all substrates to be waterproofed with SA Primer™ at a rate of 0.5 gal./100 sq. ft. (0.21 l/m^2). Primer is not required when adhering to polyisocyanurate insulation.

Apply the membrane in lengths up to 18 feet. Overlap all seams a minimum 3" on the side laps and 6" on the head laps. Roll the seams and overlaps of the membrane with a hand roller to ensure complete adhesion with no voids, wrinkles, or fishmouths. The membrane should not be folded over the roof edge unless covered by a gutter, mechanically fastened every 6" or protected with other flashing materials.

PRECAUTIONS

- Do not expose to direct sunlight for more than 90 days.
- Store in original packaging and out of direct sunlight
- Must be installed in 50˚ F (10˚ C) and rising weather; contact your Garland representative or the Garland Technical Department for recommendations when temperatures are below 50˚ F (10˚ C
- R-Mer Seal should not be applied during inclement weather and the installation should not proceed in the event that precipitation is probable during the application
- All substrates, except polyisocyanurate insulation, must be primed with SA Primer
- Do not use over silicone caulking or flexible vinyl gaskets
- Do not install over solvent-based sealants unless fully cured and dry to the touch

R-MER® SEAL

Metal Roofing Underlayment
Technical Data Sheet

since 1895

Technical Data	R-Mer Seal
Thickness (ASTM D 5147)	45 mils (1.14mm)
Vapor Permeance (ASTM E 96)	<0.02
Flexibility @ -20°F (-28.88°C) (ASTM D 1970)	Pass
Tensile Strength (ASTM D 1970)	MD 32 lbs./in. (0.57 kg/mm) XD 35 lbs./in. (0.62 kg/mm)
Nail Sealability (ASTM D 1970)	Pass
Maximum Temp.	250ºF (121.11ºC)
Installation Temp.	50-100ºF (10-37.7ºC)
Color	White
Net Coverage	200 sq. ft. (18.5 m^2)
Packaging	30 rolls/pallet

Roll Dimensions	R-Mer Seal
Width	3 ft. (0.91m)
Length	73 ft. (22.25 m)
Weight	60 lbs. (27.2 kg)

For specific application recommendations, please contact your local Garland Representative or Garland Technical Department.

For more information, visit us at: www.garlandco.com

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Phone: 216-641-7500
Toll Free: 800-321-9336

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209 Carrier Drive
Toronto, Ontario
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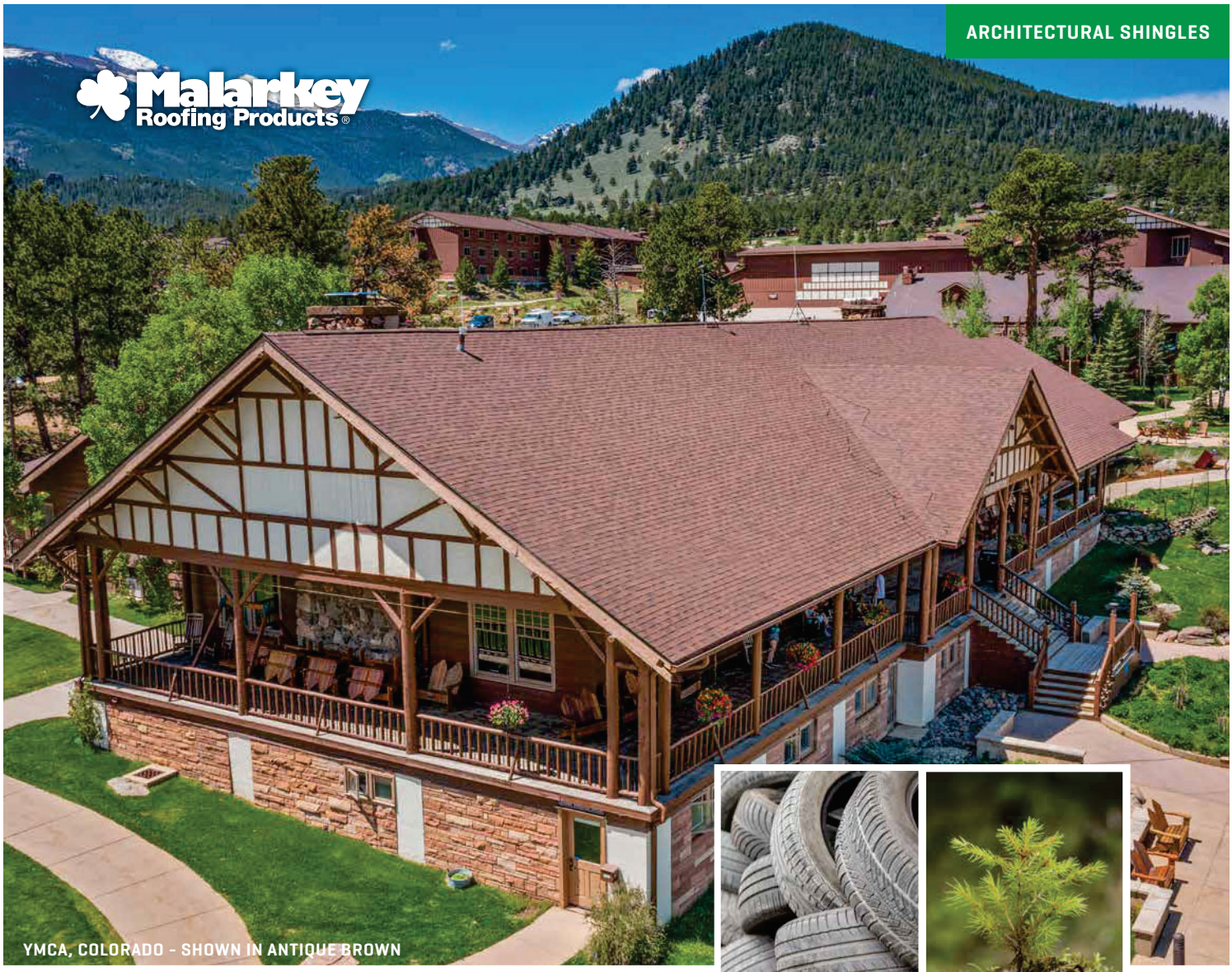
FAX: 416-747-1980
Phone: 416-747-7995
Toll Free: 800-387-5991
(Only in Canada)

ARCHITECTURAL SHINGLES

Malarkey Roofing Products®

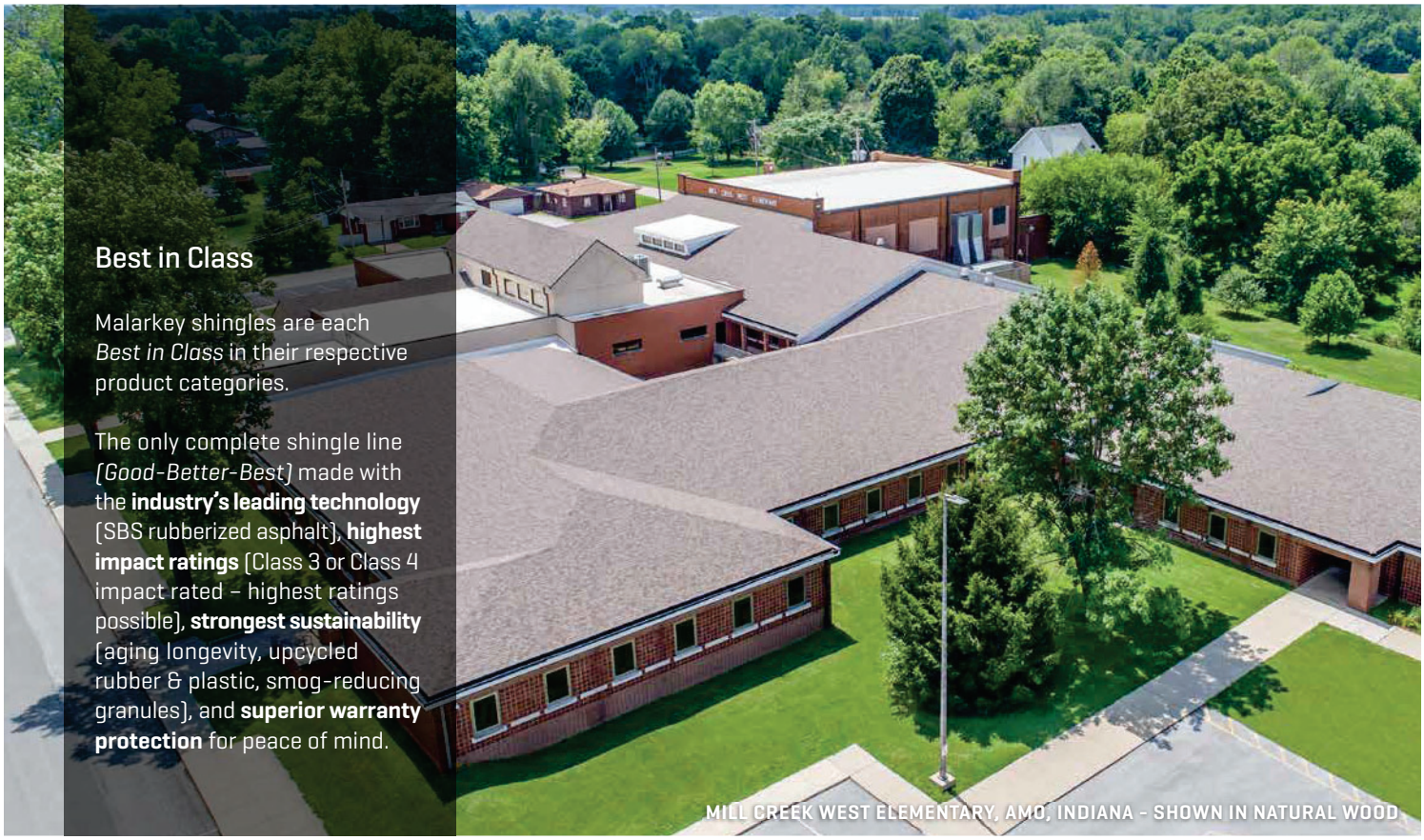


YMCA, COLORADO - SHOWN IN ANTIQUE BROWN

Commercial Shingles

Performance Engineered, Sustainably Designed

Aging, Algae, & Impact Resistant

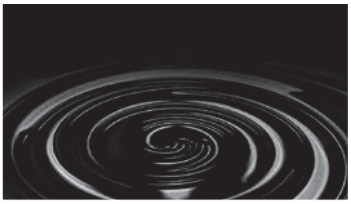


Made with NEX® Polymer Modified (Rubberized) Asphalt Technology

Asphalt Weathering, Rubber Tough, Environmentally Conscious

Patented NEX® Polymer Modified (SBS Rubberized) Asphalt Technology enhances asphalt's suppleness and stickiness to resist thermal dry-out and aging, and better adhere granules, while adding **rubberlike durability and flex for superior impact resistance, granule adhesion, all-weather resilience, and aging longevity**.

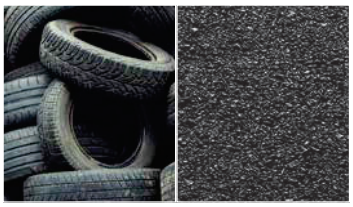
[THE NEX® FORMULA]



High-Grade Asphalt
Waterproofing & Granule Adhesion

+

Synthetic Rubber Polymers (SBS)
Strength, Aging, Flexibility



Upcycled Rubber Polymers
Durability, Aging, Sustainability

Upcycled Plastic Polymers
Strength & Sustainability

Sustainable Performance™

Superior Performance & Better for the Environment

CRAFTSMANSHIP

Up to 2X Larger Nailing Area
Up to 50% More Adhesive Bonds
2X Rain Seals

PERFORMANCE

Up to 35% Greater Tear Strength
Up to 65% Greater Granule Adhesion
Up to Class 4 Impact Rating

SUSTAINABILITY

(PER ROOF)[1]
Upcycles ~15 Rubber Tires
Upcycles ~9,600 Plastic Bags
Cleans Smog Pollution like ~6 Trees

Made Better to Last Longer, & More Sustainable

Malarkey shingles are made with our patented **NEX® Polymer Modified (SBS Rubberized) Asphalt**, an innovative technology that infuses rubber and plastic polymers to strengthen the asphalt core of the shingle for superior impact resistance, granule adhesion, all-weather resilience, and aging longevity.

Malarkey shingles are also sustainable. Upcycled polymers from used tires and plastic bags improve durability and aging resistance, while helping reduce landfill waste. And smog-reducing granules help clean the air of emission pollutants, like planting trees on your roof.

Sustainability without sacrificing performance.

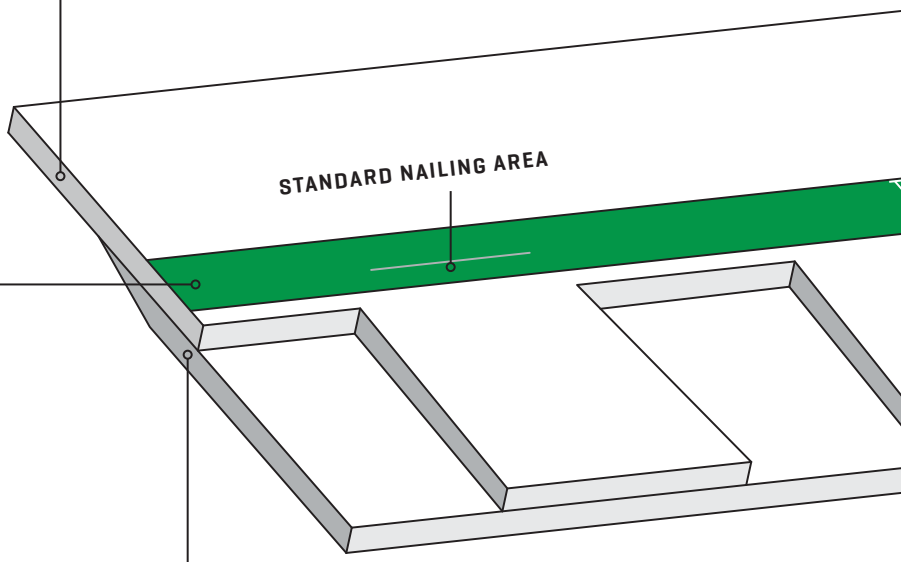
NEX® RUBBERIZED ASPHALT

Asphalt core of shingle is strengthened with SBS rubber polymers for superior all-weather resilience and aging resistance, then formed around a fiberglass mat, for **up to 35% greater tear strength than the industry standard (ASTM D3462), and up to Class 4 impact rating (highest rating possible)**. *Insurance discounts may apply.*

UPCYCLED RUBBER & PLASTIC

Polymers from recycled rubber and plastic improve shingle durability and aging resistance, while helping reduce landfill waste. **Each commercial roof of 90 squares upcycles the equivalent of ~15 rubber tires and ~9,600 plastic grocery bags.**[1]

It takes 18,000 nails to secure a commercial roof. Even one out of place can cause a leak.



THE ZONE® LARGER NAILING AREA

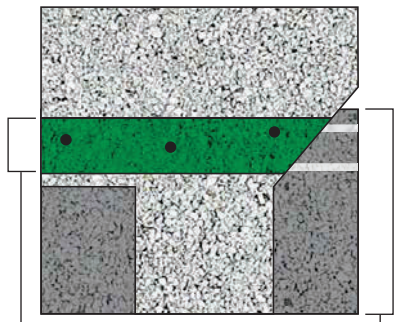
Up to 2X larger nailing area dramatically improves installation speed and accuracy, and helps ensure nails secure BOTH shingle layers – critical for preventing blow-offs.

LONGER & TAPERED BACKING SHIM

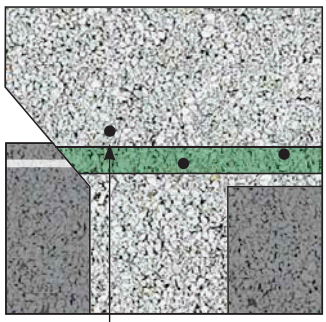
Longer, tapered shingle backing helps ensure nails penetrate BOTH shingle layers (critical for preventing blow-offs), promotes water flow, and helps prevent rain from blowing under the shingle and pooling (troughing), waiting to leak down a misplaced nail.

Top View:

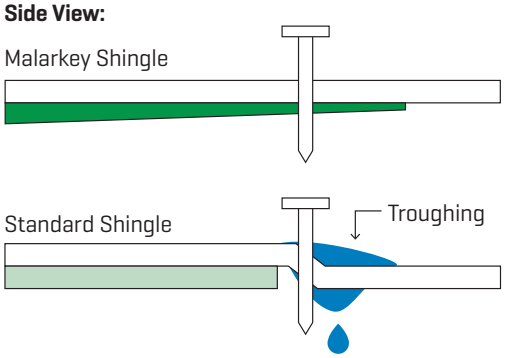
Malarkey Shingle



Standard Shingle



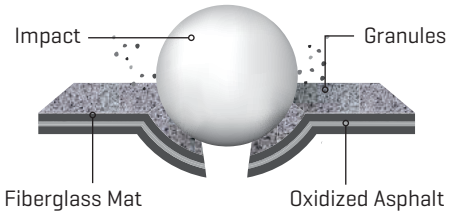
Side View:



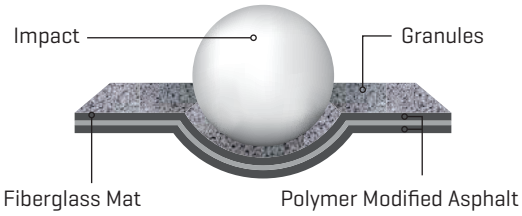
Architectural Shingle Lines Comparison Chart	VERY GOOD Highlander® AR	BETTER Vista® AR	BEST Legacy® Scotchgard™ Protector
Rubberized Asphalt Technology	NEX	NEX	NEX
Impact Rating (Class 4 Highest)	Class 3	Class 4	Class 4
Fire Rating (Class A Highest)	Class A	Class A	Class A
Tear Strength*	+10%	+25%	+35%
Thickness		+10%	+19%
Sustainability (assumes roof of 90 squares)			
~Upcycled Rubber Tires	12	15	18
~Upcycled Plastic Bags	8,700	9,600	12,000
~Trees 'Planted'[2]	6	6	6
Cost	$	$$	$$$
Warranties+:			
Shingle Warranty (years)	40	40	50
Non-Prorated Period (years)	10	15	20
Algae Warranty (years)	10	15	Limited Lifetime**
Standard Wind Warranty (mph / kph / years)	110 / 177 / 15	110 / 177 / 15	110 / 177 / 15
Enhanced Wind Warranty (mph / kph / years)	130 / 209 / 15	130 / 209 / 15	130 / 209 / 15

**Versus standard shingles, as measured per ASTM D3462.* ***Included on shingles with Scotchgard™ Protector from 3M.*

IMPACT RESISTANCE COMPARISON



Standard shingles are brittle, more likely to fracture and lose granules from hail impact.



Malarkey shingles are rubberized to better absorb and deflect hail impact.

[1] Assumes roof of 90 squares using Vista® shingles.
[2] Assumes roof of 90 squares. Source: Lawrence Berkeley National Laboratory and 3M.

TEST COMPLIANCE: All Shingles - ASTM D7158 Class H, ASTM D3462, ASTM D3161 Class F, ASTM D3018 Type I, ASTM E108 Class A Fire Rating, CSA A123.5, ICC Approval – ESR-3150, and ICC-ES AC438. UL 2218 Class 4 (Legacy® and Vista® lines) and UL 2218 Class 3 (Highlander® line).

DISCLAIMER: Photographs of shingles may not accurately represent their true color or the variations of color blends that will appear on the roof. **Before installation, five or six shingles should be laid out and reviewed for desired color.** Colors and specifications subject to change without notice. Shingle colors not available in all regions or product lines. Scotchgard and Scotchgard Protector, including the 3M logo, are all trademarks of 3M.

+ For complete warranty information, please reference Malarkey's **Shingle and Accessory Warranty available at www.malarkeyroofing.com/warranties**.

This version supersedes all previous versions. Rev. 04/24

www.malarkeyroofing.com

MEETS CSA A123.5 STANDARDS

MADE IN USA

Malarkey Roofing Products®