GAF

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# *A Guide to Perimeter Edge Metal Design*

*September 2023*

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# Introduction

## About GAF

Founded in 1886, GAF has grown to become North America's largest manufacturer of commercial and residential roofing. Professional roofing contractors have long preferred the rugged, dependable performance that a GAF roof can offer. We are the leading roofing manufacturer in North America, with plants strategically located across the U.S. A member of the Standard Industries family of companies, GAF is part of the largest roofing and waterproofing business in the world. We protect what matters most.

For more information, visit www.gaf.com.

## About ANSI/SPRI/FM 4435 ES-1

In 1997, research was conducted by the Institute for Disaster Research at Texas Tech University, Lubbock, to gain a better understanding of wind loading on edge metal. This was in response to failures of perimeter edge metal flashing as a result of Hurricanes Hugo and Andrew and other major storms.

In 1998, SPRI published its first edition of ANSI/SPRI ES-1, "Wind Design Guide for Edge Systems Used With Low Slope Roofing Systems." The standard was based on data obtained from the Texas Tech University research. The standard was updated in 2003, 2011, 2017 and the most recent edition was issued in 2022. It is now titled ANSI/SPRI/FM 4435 ES-1, "Test Standard for Edge Systems Used with Low Slope Roofing Systems" (ES-1).

ES-1 has been incorporated into the International Building Code (IBC) and provides an industry-recognized, consensus-based method for designing perimeter edge metal systems where the edge metal secures the roof membrane.

## About ANSI/SPRI GT-1

Failures of roof membranes due to gutters detachment after Hurricane Matthew prompted SPRI to develop ANSI/SPRI GT-1, "Structural Design Standard for Gutter Systems Used with Low-Slope Roofs" (GT-1).  The first edition was published in 2010 and subsequently updated and renamed "Test Standard for Gutter Systems" in 2016. The most recent edition was issued in 2022 and renamed to "Test Standard for External Gutter Systems."

The 2016 edition of GT-1 was incorporated into the 2021 edition of IBC. This code edition requires gutters that are used to secure the roof membrane be tested in accordance with GT-1.

## Important Considerations

The purpose of this Guide is to provide some fundamental information on wind design, code requirements, and how to select appropriate perimeter edge metal and gutters for a roofing system.

GAF manufactures and sells roofing materials and does not practice architecture or engineering. GAF is not responsible for the performance of its products when damage to its products is caused by such things as improper building design, construction flaws, or defects in workmanship.

The design responsibility remains with the architect, engineer, roofing contractor, or owner. These guidelines should not be construed as being all-inclusive. Please consult your design professional for more information.

The guidelines contained herein are for information purposes only, and are not intended as a substitute for independent evaluation by the building owner or its consultants to determine with certainty whether a particular roofing, edge metal and gutter system is suitable for a building. GAF makes no representation or warranty (express or implied) as to the suitability of its roofing systems for buildings.

Information contained in this Guide is presented in good faith and, to the best of GAF's knowledge, does not infringe upon any patents, foreign or domestic.

This information is provided for educational purposes only, and is not a substitute for independent review of applicable building code requirements. GAF makes no representation or warranty (express or implied) as to the accuracy of the information contained herein.

## Building Code Requirements

ANSI/SPRI/FM 4435 ES-1 and ANSI/SPRI GT-1 are referenced in Section 1504-Performance Requirements in the International Building Code (IBC). The code provisions have slightly changed with each edition of the IBC. For reference purposes, the following are excerpts from the 2009, 2012, 2015, 2018 and 2021 editions.

### IBC, 2009 Edition

*"**1504.5 Edge securement for low-slope roofs.** Low-slope membrane roof systems metal edge securement, except gutters, shall be designed and installed for wind loads in accordance with Chapter 16 and tested for resistance in accordance with ANSI/SPRI ES-1, except the basic wind speed shall be determined from Figure 1609."*

### IBC, 2012 and 2015 Editions

*"**1504.5 Edge securement for l6ow-slope roofs.** Low-slope built-up, modified bitumen and single-ply roof systems metal edge securement, except gutters, shall be designed and installed for wind loads in accordance with Chapter 16 and tested for resistance in accordance with Test Methods RE-1, RE-2 and RE-3 of ANSI/SPRI ES-1, except $V_{ult}$ wind speed shall be determined from Figures 1609A, 1609B, or 1609C as applicable."*

### IBC, 2018 Edition

*"**1504.5 Edge securement for low-slope roofs.** Low-slope built-up, modified bitumen and single-ply roof system metal edge securement, except gutters, shall be designed and installed for wind loads in accordance with Chapter 16 and tested for resistance in accordance with Test Methods RE-1, RE-2 and RE-3 of ANSI/SPRI ES-1, except basic design wind speed, V, shall be determined from Figures 1609.3(1) through 1609.3(8) as applicable."*

### IBC, 2021 Edition

*"**1504.6 Edge systems for low-slope roofs.** Metal edge systems, except gutters and counterflashing, installed on built-up, modified bitumen and single-ply roof systems having a slope less than 2 units vertical in 12 units horizontal (2:12) shall be designed and installed for wind loads in accordance with Chapter 16 and tested for resistance in accordance with Test Methods RE-1, RE-2 and RE-3 of ANSI/SPRI ES-1, except basic design wind speed, V, shall be determined from Figures 1609.3(1) through 1609.3(12) as applicable.*

***1504.6.1 Gutter securement for low-slope roofs.** Gutters that are used to secure the perimeter edge of the roof membrane on low-slope (less than 2:12 slope) built-up, modified bitumen, and single-ply roofs, shall be designed, constructed and installed to resist wind loads in accordance with Section 1609 and shall be tested in accordance with Test Methods G-1 and G-2 of SPRI GT-1."*

**Simply put, the IBC requires that perimeter edge metal and gutters be:**

- designed for wind uplift resistance in accordance with American Society of Civil Engineers' standard ASCE 7, "Minimum Design Loads and Associated Criteria for Buildings and Other Structures" (ASCE 7) as specified in Chapter 16.

  and

- tested for capacity in accordance with ES-1 or GT-1.

## Applicable Building Code Editions

ES-1, GT-1 and ASCE 7 are on different renewal cycles and as a result, the applicable editions will depend on which edition of IBC is being enforced. The chart below is a summary of the applicable standards for each International Building Code (IBC) edition.

| IBC Edition | Applicable ES-1 and GT-1 Edition for testing requirements | Applicable ASCE-7 Edition for determining design wind loads |
|---|---|---|
| 2009 | ANSI/SPRI ES-1-2003 | ASCE 7-05 |
| 2012 | ANSI/SPRI ES-1-2003 | ASCE 7-10 |
| 2015 | ANSI/SPRI ES-1-2011 | ASCE 7-10 |
| 2018 | ANSI/SPRI/FM 4435/ES-1-2017 | ASCE 7-16 |
| 2021 | ANSI/SPRI/FM 4435/ES-1-2017<br>ANSI/SPRI GT-1-2016 | ASCE 7-16 |

***Important note:** Verify with the building code official where the building is located to determine which code has been adopted. Also, keep in mind that state and local jurisdictions may add or delete portions of the model code or have local amendments, including which version of standards are applicable.*

## *Applicability*

It is important to note that the applicability of the code requirement for perimeter edge metal and gutters depends on the roof system type and the edition of the IBC.

### Roof system type

For every edition of the IBC, the code requirements are applicable to perimeter edge metal used with built-up, polymer-modified bitumen, and single-ply membrane roof systems. Therefore, it is not applicable with metal panel or spray polyurethane foam roof systems.

IBC edition

For the 2009, 2012, 2015 and 2018 editions of the IBC, perimeter edge metal that does not secure a roof membrane need not comply with the code requirements.

An example is where a roof membrane is not installed up a parapet wall and underneath a coping, i.e., the roof membrane is terminated with counterflashing. See Figure 1.

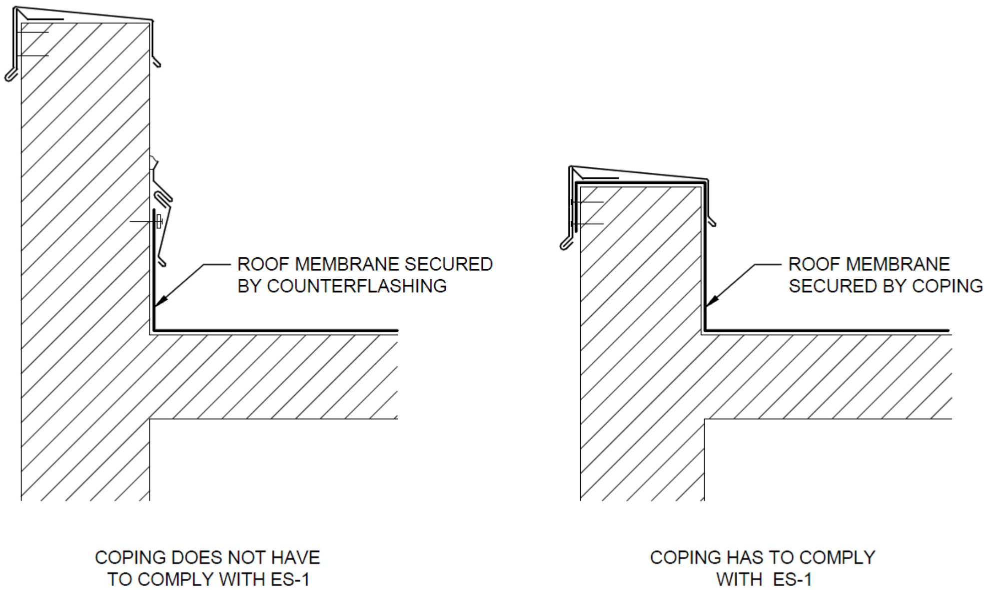



Figure 1: Examples illustrating ES-1 applicability for 2009, 2012, 2015 and 2018 editions of IBC

For the 2021 edition of the IBC, all perimeter edge metal must comply with the code requirements, even if it does not secure the roof membrane. The 2021 edition also introduced testing requirements for gutters that are used to secure the roof membrane.

## Design Considerations

The following are design considerations for designing and selecting perimeter edge metal and gutters used to secure roof membranes:

- Roof and wall zones
- Obtaining design wind uplift pressures
- Wind design methods
- Wind Uplift Resistance Capacity of Perimeter Edge Metal and Gutters
- Finding Wind Uplift Resistance Capacity Information for Perimeter Edge Metal and Gutters
- Wood Blocking

## Roof and Wall Zones

Perimeter edge metal and gutters are considered "Components and Cladding" and ASCE 7 design procedures reference roof and wall zones to determine wind uplift pressures. The relevant zones for perimeter edge metal and gutters are as follows:

- Roof zones
  - Zone 2
  - Zone 3

- Wall zones
  - Zone 4
  - Zone 5

See Figure 2 for a diagram illustrating roof and wall zones on a building per ASCE 7-05 and ASCE 7-10, and see Figure 3 for ASCE 7-16.

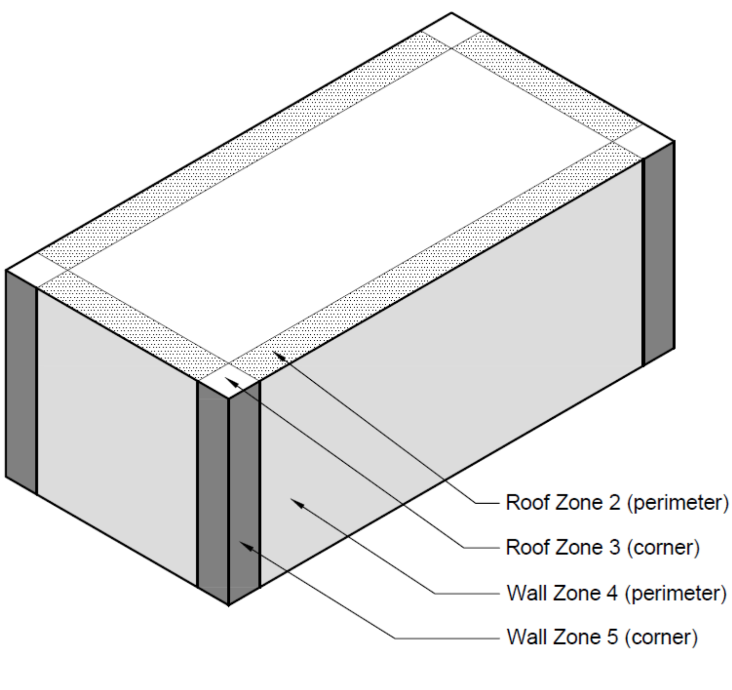



Figure 2: Roof and wall zones for ASCE 7-05 and ASCE 7-10

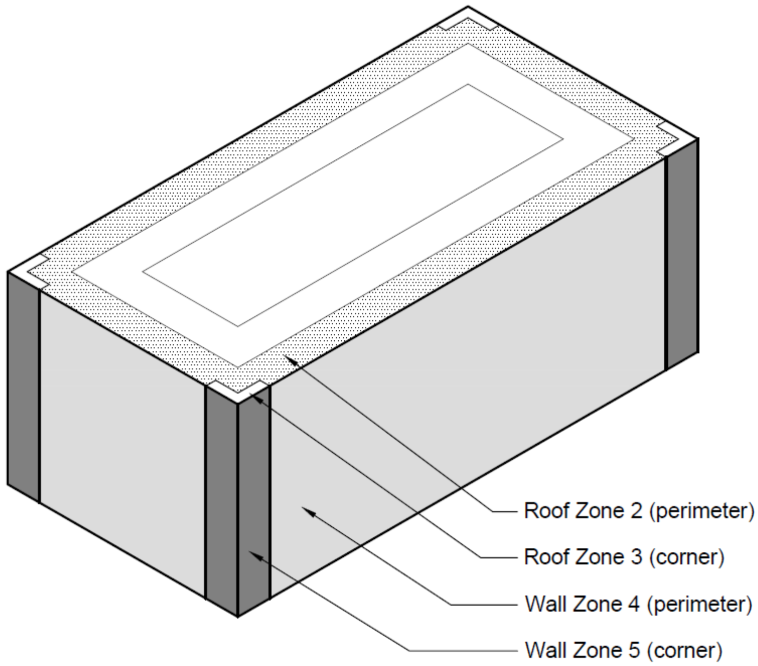



Figure 3: Roof and wall zones for ASCE 7-16

The type of perimeter edge metal determines which wind zones are applicable. For fascia and drip edge profiles, the horizontal loads, or Wall Zones 4 and 5, are applicable. This is illustrated in Figure 4.

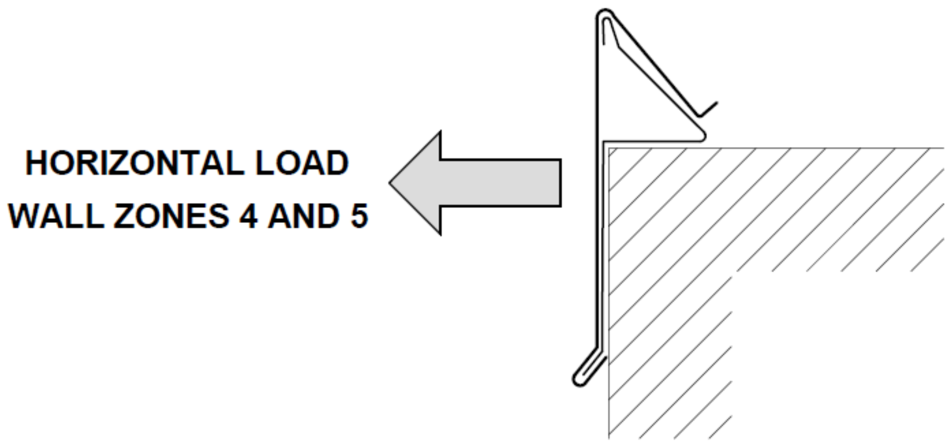



Figure 4: Applicable wind zones on a fascia

For metal cap/copings, both horizontal and vertical loads are considered. So, Wall Zones 4 and 5 and Roof Zones 2 and 3 are applicable. This is illustrated in Figure 5.

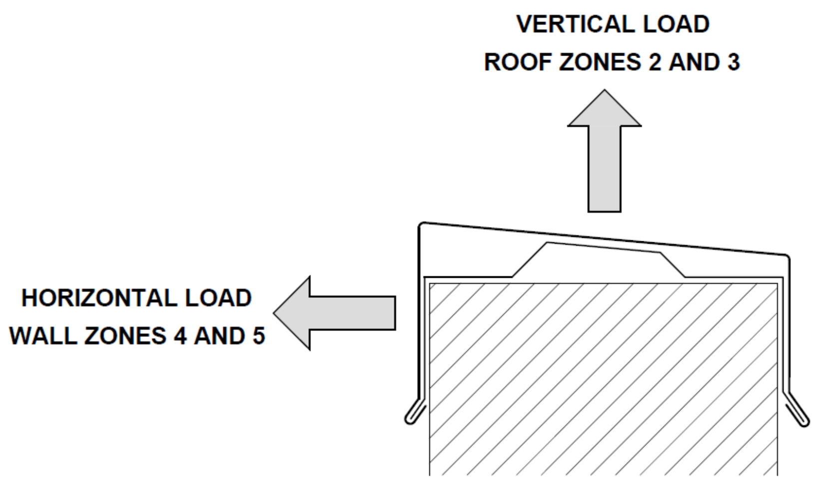



Figure 5: Applicable wind zones on a coping

For gutters used to secure roof membranes, both horizontal and vertical loads are considered. So, Wall Zones 4 and 5 and Roof Zones 2 and 3 are applicable. This is illustrated in Figure 6.

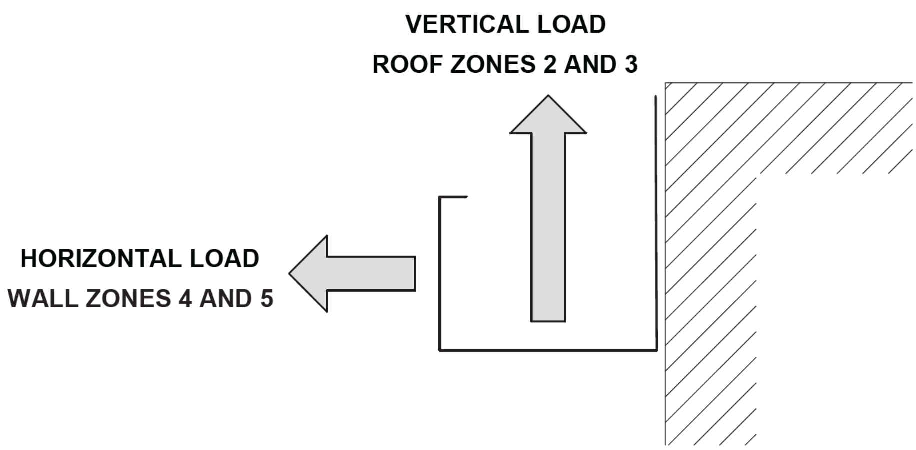



Figure 6: Applicable wind zones on a gutter used to secure a roof membrane

However, it is not very practical to install something different in the perimeter and corners.

**For that reason, GAF suggests just using the design wind uplift resistance loads for corner zones (i.e., Roof Zone 3 and Wall Zone 5), when selecting edge metal and gutters.**

## Obtaining Design Wind Uplift Pressures

There are several options to obtain design wind uplift pressures, which include:

- Hiring a licensed professional
- Performing calculations using ASCE 7
- Use an online wind calculator

If you choose to perform the wind design calculations on your own, there are several online calculators available that specifically address edge metal. They are offered by various organizations.

### *Online Wind Calculators*

Please keep in mind that there are certain limitations associated with each of these calculators. For example, all of these calculators are limited to "enclosed" buildings. Refer to each organization's website for further details to determine if they are appropriate for your specific project.

#### Trade Associations

**NRCA's Roof Wind Designer**

https://www.roofwinddesigner.com/

Features:
- ASCE 7 editions: ASCE 7-05, ASCE 7-10 and ASCE 7-16
- Provides Allowable Stress Design and Strength (Ultimate) Design pressures.
- Applies a safety factor of 2.
- Produces a PDF report.

**SPRI's Wind Design Calculator**

www.spri.org/standards/wind-calculator/

Features:
- ASCE 7 edition: ASCE 7-05, ASCE 7-10 and ASCE 7-16
- Applies a safety factor of 2.

#### Manufacturers

**Metal-Era**

www.metalera.com/resources/calculators

Features:
- ASCE 7 edition: ASCE 7-10
- Provides the manufacturer's metal edge profiles that meet the wind uplift resistance pressures.
- Applies a safety factor of 2.

**Hickman Edge Systems**

https://www.hickmanedgesystems.com/resources/wind-calculator

Features:

- ASCE 7 edition: ASCE 7-05, ASCE 7-10 and ASCE 7-16
- Applies a safety factor of 2.

## Wind Design Methods

There are two design methods in ASCE 7 used to determine design wind loads: Allowable Stress Design (ASD) and Strength Design (also referred to as Ultimate Design or Load and Resistance Factor Design, a.k.a., LRFD). Designers may use either method, but roof systems and their components are typically designed using ASD.

Ultimate Design values can be converted to ASD by using a reduction factor of 0.6.

This is expressed as follows:

**ASD value = [Ultimate Design value] x [Reduction Factor = 0.6]**

When using the ASD method, it is common engineering practice to apply a "safety factor" to design wind uplift pressures. A safety factor of 2 is typically recommended. This will determine design wind uplift resistance loads.

This is expressed as:

**Design wind uplift resistance loads = [ASD design wind uplift pressure] x [Safety Factor]**

For more information on wind design basics, refer to GAF's "A Guide to Using ASCE 7-16." Click here to access the guide.

## Wind Uplift Resistance Capacity of Perimeter Edge Metal and Gutters

The primary method for determining perimeter edge metal and gutters' wind uplift resistance—aka, capacity—is through physical testing. The tested wind uplift resistance capacity of perimeter edge metal and gutters should be equal to or greater than the calculated design wind uplift resistance loads.

This is expressed as:

**Tested wind uplift resistance capacity ≥ Design wind uplift resistance loads**

See Appendix A for information on the ES-1 test methods used to determine tested wind-resistance capacity for edge metal. See Appendix B for information on the GT-1 test methods used to determine tested wind-resistance capacity for gutters.

## Finding Wind Uplift Resistance Capacity Information for Perimeter Edge Metal and Gutters

Perimeter edge metal and gutters fall into two general types, pre-manufactured and shop-fabricated. Finding wind uplift resistance tested capacities depends on these two types.

### *Pre-manufactured*

Manufacturers of edge metal and gutter systems can provide wind uplift resistance tested capacities for specific profiles. Information may be found in manufacturers' literature, such as installation manuals, data sheets and construction details.

In addition, these listing services have the information for many manufacturers:

- UL Solutions: Product iQ (Product Category TGJZ)
- Miami-Dade County: Product Control Approvals Listings
- FM Approvals: RoofNav

Refer to Appendix C for GAF products and their specific tested wind-resistance capacity loads.

### *Shop-fabricated*

Many contractors fabricate their own edge metal and gutters. To provide for building code compliance of these shop-fabricated edge metal flashings, the National Roofing Contractors Association (NRCA) conducted testing using ES-1 of various edge metal flashing profiles. The edge metal profiles tested are based upon the construction details contained in The NRCA Roofing Manual.

*Important note: NRCA's listings currently do not include gutter profiles.*

NRCA maintains certification programs with UL Solutions (UL) and Intertek Testing Services, N.A. These certification programs provide third-party verification of compliance with ES-1 by code-approved testing agencies.

- Intertek Testing Services, N.A.: Click here for a copy of NRCA's drawings of the specific edge-metal flashings that have been tested and are included in NRCA's Intertek certification program.

  Click here to search for an NRCA authorized fabricator under the Intertek certification.

- UL Solutions: Click here for a copy of NRCA's drawings of the specific edge metal flashings that have been tested and are included in NRCA's UL certification program.

  Click here to search for an NRCA authorized fabricator under the UL certification.

## Wood Blocking

An important design consideration is the wood blocking used for attaching perimeter edge metal and gutter systems. Wood blocking attachment should be designed and installed to withstand the same wind load pressures as determined for the perimeter edge metal and gutters. A structural engineer may be needed to design the wood blocking system.

When designing perimeter edge roof details, designers should:

- include appropriate safety factors for fasteners when determining perimeter wood blocking wind resistance.
- incorporate wood blocking attachment information into construction details.
- specify the means of attachment and include a fastening schedule, taking into consideration increased wind load pressures at corners.

Following are some design references for the most commonly used materials.

**Concrete:** Wood blocking typically is secured to a concrete wall using steel anchors cast into concrete or proprietary anchors, such as expansion or adhesive anchors, installed into a cured concrete wall. Commonly used cast-in-place anchors include headed bolts, hooked bolts (such as J- or T-type) or headed studs.

Designers should refer to the American Concrete Institute's ACI 318, Building Code Requirements and Specification for Structural Concrete." Information about anchor bolts can be found in Chapter 17—Anchoring to Concrete. When proprietary anchors are used, the anchor manufacturer should be consulted for design considerations.

**Masonry:** Wood blocking typically is secured to a masonry wall using conventional anchor bolts or proprietary anchors, such as expansion or adhesive anchors. Conventional anchor bolts commonly used have L-type hook bolts or headed bolts and are placed in cells filled with grout.

Designers should refer to the Masonry Standards Joint Committee's document TMS 402/602, "Building Code Requirements and Specification for Masonry Structures." Information about anchor bolts can be found in Section 1.17—Anchor Bolts. When using proprietary anchors, the anchor manufacturer should be consulted for design considerations.

**Steel:** Wood blocking typically is secured to steel using steel bolts or sheet metal screws.

Designers should refer to the American Iron and Steel Institute's S100 "North American Specification for the Design of Cold-Formed Steel Structural Members." Information about connections can be found in Chapter E—Connections and Joints. Specifically, bolt information is in Section E3—Bolted Connections and screw information is in Section E4—Screw Connections.

General design information about steel decks used as roof decks can be found in the Steel Deck Institute's "SDI Roof Deck Design Manual" (RDDM2). If wood blocking is secured to structural steel members, designers should refer to the American Institute of Steel Construction's "Steel Construction Manual." Information about bolt design can be found in Part 7—Design Considerations for Bolts.

**Wood:** Wood blocking typically is secured to wood using bolts, lag screws, wood screws or nails.

Designers should refer to the American Wood Council's "The National Design Specification for Wood Construction." Information for fasteners can be found in Chapter 11—Mechanical Connections and Chapter 11—Dowel-type Fasteners.

## *Other design considerations*

**Stacked Wood Blocking:** Stacked wood blocking and cants should be fastened with corrosion-resistant fasteners that penetrate adequately to achieve design pullout resistance.

**FM Global:** A study of FM Global losses revealed a majority of roof covering failures were a result of improperly designed or constructed perimeter flashings. In response to those findings and to assist designers, FM Global provides design guidelines for perimeter flashings in Property Loss Prevention Sheet 1-49, "Perimeter Flashing." This document contains some guidance about wood blocking installation.

Designers should keep in mind that 1-49 offers minimum recommendations and wood blocking should be properly designed to withstand appropriate design wind load pressures.

## Appendix A: ANSI/SPRI/FM 4435 ES-1 Test Methods

The IBC does not adopt ES-1 in its entirety. The IBC requires edge metal systems be tested for resistance in accordance with ES-1. The following test methods for resistance testing for edge metal under simulated wind load conditions are addressed in ES-1:

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

Brief summaries of these test methods from the 2017 edition of ES-1 are provided for informational purposes.

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

This test is applicable to ballasted systems, ribbon/spot adhered systems, or systems in which the mechanically attached roof cover does not contain a mechanical termination (commonly referred to as a "peel stop") within 12 in. (300 mm) of the roof edge.

In this test, the roof membrane is pulled at a 25 degree angle to the roof deck to simulate a billowing membrane and uniform tension is applied along the length of the membrane, see Figure A-1. Failure is defined as any event that allows the membrane to come free of the metal edge system or the metal edge system to come free of its mount.

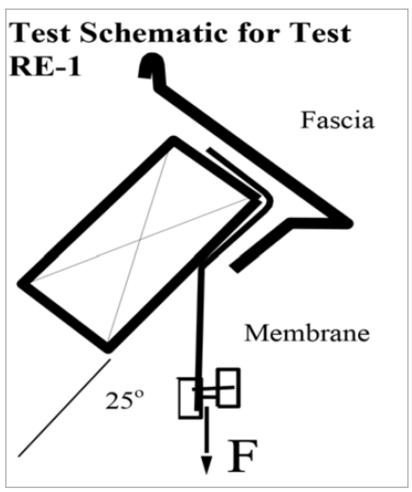



Figure A-1: Illustrating loading condition per RE-1 (Figure courtesy of SPRI)

*IMPORTANT: Many mechanically attached roofing systems have fasteners within 12 in. (305 mm) o.c. of the roof edge, so this test is seldom used.*

## RE-2, Test Method for Dependently or Independently Terminated Roof Edge Systems

This test is applicable to edge metal where the exposed horizontal component is 4 in. (102 mm) or less and for:

- Ballasted roofing systems, ribbon/spot adhered systems, or systems in which the mechanically attached roof cover is secured to the substrate at a distance greater than 12 in. (305 mm) from the roof edge. These systems are considered dependently terminated by the metal edge system.
- Roofing systems in which the roof cover is fully adhered to the substrate or a mechanically attached roof cover is secured to the substrate at a distance less than or equal to 12 in (305 mm) from the roof edge. These systems are considered independently terminated.

In this test, loading is applied uniformly on centers no greater than 12 in. (305 mm) to the centerline of the vertical face of the metal edge system, see Figure A-2. Loading is applied on the horizontal centerline of the face. Failure is defined as a loss of securement of a component of the metal edge system.

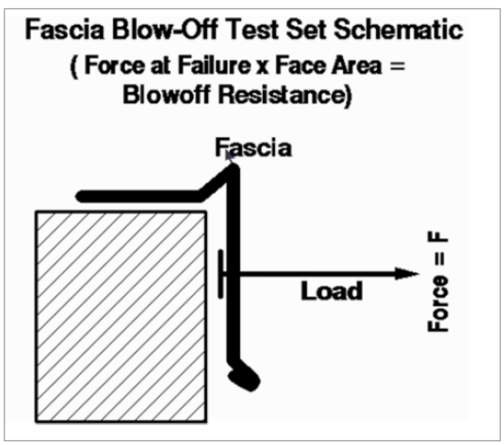



Figure A-2: Illustrating loading condition per RE-2 (Figure courtesy of SPRI)

## RE-3, Test for Copings

This test is applicable to edge metal systems where the exposed horizontal component exceeds 4 in. (102 mm).

In this test, loadings are applied simultaneously in the vertical and horizontal. Loading is applied uniformly on centers no greater than 12 in. (305 mm) to the top of the coping and to one of the faces of the coping at the same time. Loads are applied on parallel horizontal centerlines of the surfaces tested, see Figures A-3 and A-4. Failure is defined as loss of securement of a component of the metal edge system.

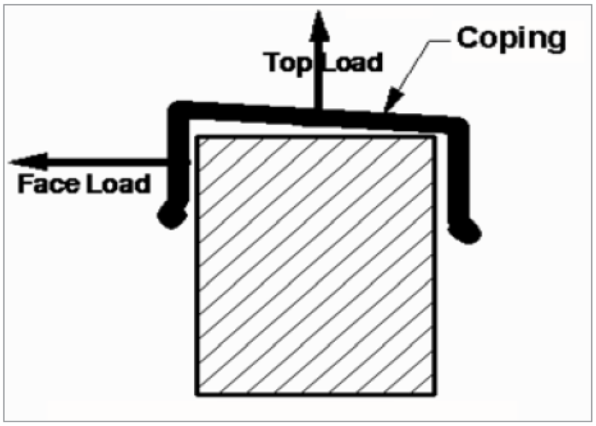



Figure A-3: Illustrating loading condition per RE-3 (Figure courtesy of SPRI)

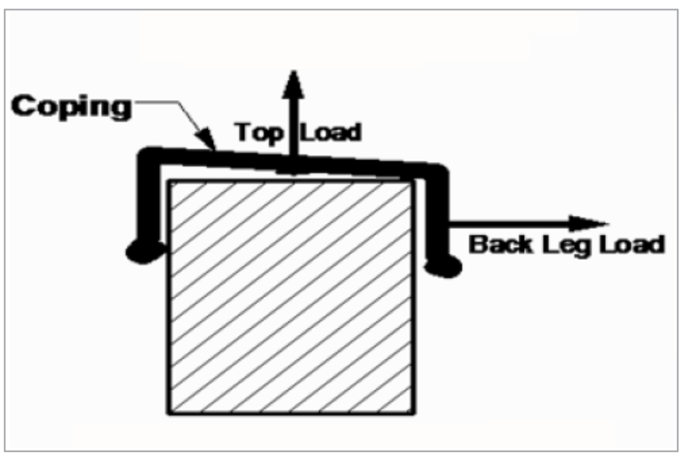



Figure A-4: Illustrating loading condition per RE-3 (Figure courtesy of SPRI)

## Appendix B: ANSI/SPRI GT-1 Test Methods

GT-1 specifies laboratory methods for static testing external gutters to withstand wind (G-1 and G-2) and environmental loads due to the weight of water, ice and snow (G-3). This appendix provides brief summaries of these test methods from the 2016 edition of GT-1 for informational purposes.

### G-1, Horizontal Test

Test G-1 measures the resistance of the gutter system to forces acting outwardly (away from the building). Loading is applied uniformly on centers no greater than 12 in. (305 mm) on the horizontal centerline of the gutter face, see Figure B-1.

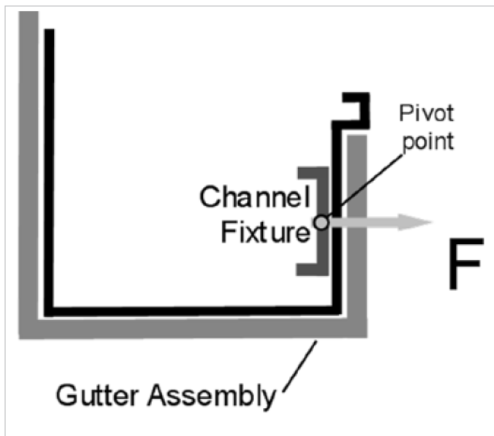



Figure B-1: Illustrating loading condition per SPRI Test G-1 (Figure courtesy of SPRI)

### G-2, Vertical Test

Test G-2 measures the resistance of the gutter system to forces acting upwardly (tending to lift the gutter off the building). Loading is applied uniformly on centers no greater than 12 in. (305 mm) on the gutter bottom, half-way between the back and the leading edge of the gutter, see Figure B-2.

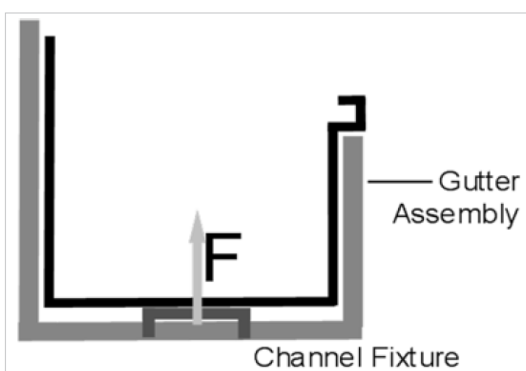



Figure B-2: Illustrating loading condition per SPRI Test G-2 (Figure courtesy of SPRI)

For G-1 and G-2, failure is either loss of securement of any component of the gutter system or permanent deformation of the gutter, in any direction, of the upper leading edge of the gutter by more than 25% of the distance between that edge and the back of the gutter.

## G-3, Water, Ice, and Snow Load Test

Test G-3 measures the resistance of the gutter system to test forces acting downwardly. Loading is applied uniformly on centers no greater than 12 in. (300 mm) on the centerline of the bottom of the gutter. see Figure B-3.

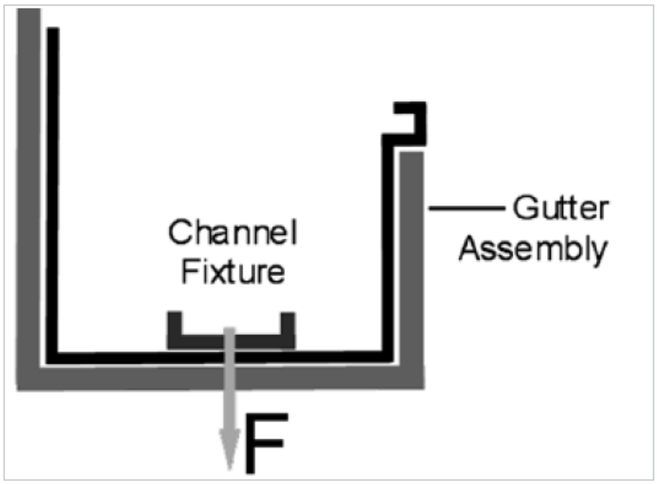



Figure B-3: Illustrating loading condition per SPRI Test G-3 (Figure courtesy of SPRI)

Failure shall be either loss of securement of any component of the gutter system or permanent deformation of the gutter measured as permanent stretching, in any direction, of the upper leading edge of the gutter by more than 10% of the distance between that edge and the back of the gutter.

*Important note: The G-3 test method is not a requirement in IBC.*

## Appendix C: GAF Products

Appendix C contains the tested wind uplift resistance capacity information for the following GAF edge metal and gutter products:

**Copings**

EverGuard® Coping
EverGuard® Continuous Cleat Coping
EverGuard® Gold Coping
EverGuard® Single Cantilever Coping
M-Weld™ Snap-On Coping
M-Weld™ Snap-On Coping Plus

**Drip Edge**

EverGuard® Drip Edge
EverGuard® Pro Drip Edge

**Fascia**

EverGuard® Fascia and M-Weld™ NP Fascia
EverGuard® EZ Fascia
EverGuard® One Edge Fascia
M-Weld™ One Edge Fascia
EverGuard® Pro Fascia and M-Weld™ Pro Standard Fascia
EverGuard® Pro Extended Fascia and M-Weld™ Pro Extended Fascia
EverGuard® Pro HG Fascia and M-Weld™ Pro HG Fascia

**Gravel Stop**

EverGuard® Gravel Stop

**Metal Blocking**

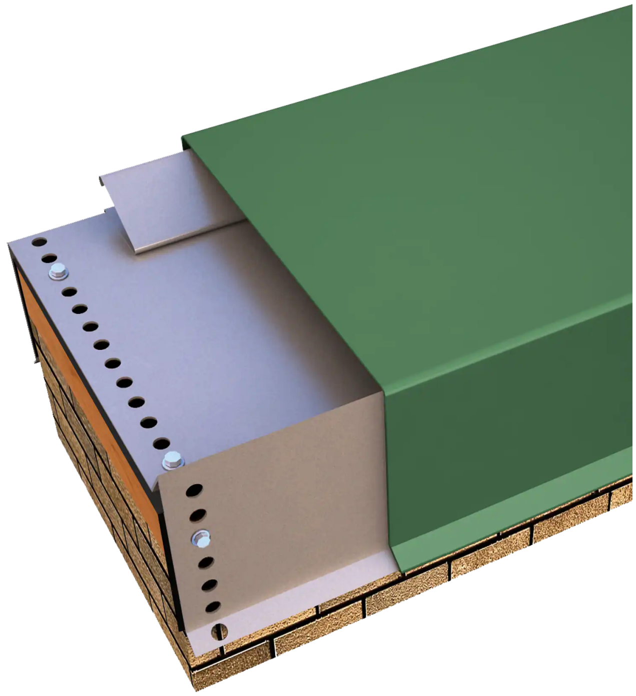
EverGuard® Edge Box RI

**Gutters**

EverGuard® WR Box Gutter
EverGuard® WR Offset Gutter
EverGuard® WR Chamfer Gutter

*Important note: This appendix is provided for reference only. Refer to the installation instructions and construction details for more information.*

## EverGuard® Coping
with 20 ga. Anchor Clips



| Material | Maximum Face Height (in.) | Maximum Wall Width (in.) | Maximum Back Height (in.) | Clip Spacing (ft.) | Tested Capacity (psf) | |
|---|---|---|---|---|---|---|
| | | | | | Horizontal | Vertical |
| 0.040 in. Aluminum<br>24 ga. Steel | 4 | 8 | 6 | 4 o.c. | 164 | 283 |
| | 4 | 12 | 6 | 4 o.c. | 97 | 167 |
| | 4 | 12 | 6 | 3 o.c. | 123 | 213 |
| | 4 | 14 | 6 | 3 o.c. | 129 | 223 |
| 0.050 in. Aluminum<br>0.063 in. Aluminum<br>22 ga. Steel | 4 | 8 | 6 | 4 o.c. | 226 | 391 |
| | 4 | 12 | 6 | 3 o.c. | 138 | 238 |
| | 4 | 14 | 6 | 3 o.c. | 127 | 219 |
| | 4 | 16 | 6 | 3 o.c. | 93 | 161 |

## EverGuard® Continuous Cleat Coping

| Material | Maximum Face Height (in.) | Maximum Wall Width (in.) | Maximum Back Height (in.) | Tested Capacity (psf) | |
|---|---|---|---|---|---|
| | | | | Horizontal | Vertical |
| 0.040 in. Aluminum<br>24 ga. Steel | 4 | 16 | 6 | 180 | 312 |
| | 4 | 16 | 12 | 157 | 272 |
| | 4 | 24 | 6 | 96 | 166 |
| | 4 | 24 | 12 | 99 | 171 |
| 0.050 in. Aluminum<br>0.063 Aluminum<br>22 ga. Steel | 4 | 16 | 6 | 244 | 422 |
| | 4 | 16 | 12 | 232 | 402 |
| | 4 | 24 | 6 | 131 | 226 |
| | 4 | 24 | 12 | 139 | 241 |

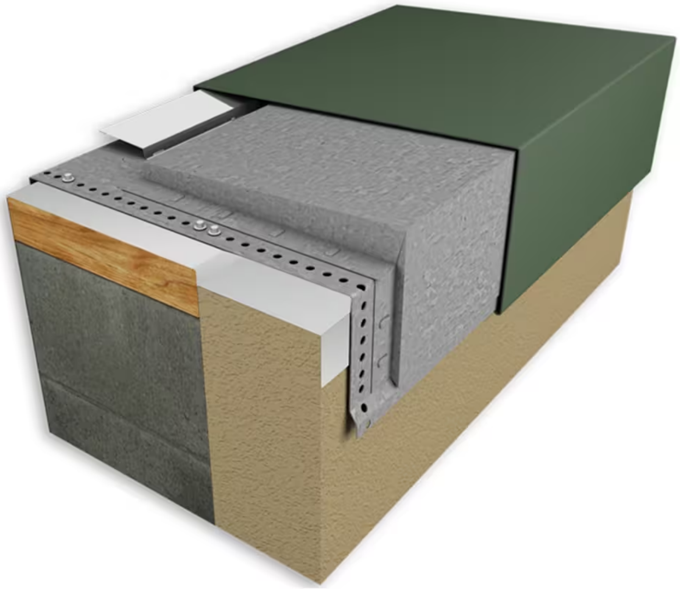
**EverGuard® Gold Coping**
**with 16 ga. Anchor Clips**

| Material | Maximum Face Height (in.) | Maximum Wall Width (in.) | Maximum Back Height (in.) | Clip Spacing (ft.) | Tested Capacity (psf) | |
|---|---|---|---|---|---|---|
| | | | | | Horizontal | Vertical |
| 0.040 in. Aluminum 24 ga. Steel | 4 | 10 | 6 | 4 o.c. | 221 | 383 |
| | 4 | 12 | 6 | 4 o.c. | 198 | 343 |
| | 4 | 16 | 6 | 4 o.c. | 134 | 232 |
| | 4 | 16 | 12 | 4 o.c. | 134 | 232 |
| | 4 | 24 | 6 | 3 o.c. | 122 | 211 |
| | 4 | 24 | 12 | 4 o.c. | 99 | 171 |

## EverGuard® Gold Coping
with 16 ga. Anchor Clips

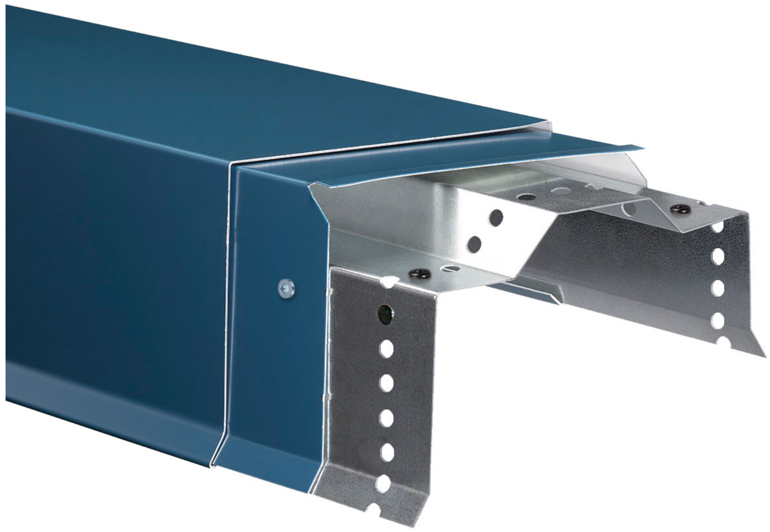
| Material | Maximum Face Height (in.) | Maximum Wall Width (in.) | Maximum Back Height (in.) | Clip Spacing (ft.) | Tested Capacity (psf) | |
|---|---|---|---|---|---|---|
| | | | | | Horizontal | Vertical |
| 0.050 in. Aluminum<br>0.063 in. Aluminum<br>22 ga. Steel | 4 | 10 | 6 | 4 o.c. | 297 | 513 |
| 0.050 in. Aluminum<br>0.063 in. Aluminum<br>22 ga. Steel | 4 | 12 | 6 | 4 o.c. | 233 | 403 |
| 0.050 in. Aluminum<br>0.063 in. Aluminum<br>22 ga. Steel | 4 | 16 | 6 | 4 o.c. | 151 | 261 |
| 0.050 in. Aluminum<br>0.063 in. Aluminum<br>22 ga. Steel | 4 | 16 | 12 | 4 o.c. | 151 | 261 |
| 0.050 in. Aluminum<br>0.063 in. Aluminum<br>22 ga. Steel | 4 | 24 | 6 | 3 o.c. | 136 | 236 |
| 0.050 in. Aluminum<br>0.063 in. Aluminum<br>22 ga. Steel | 4 | 24 | 12 | 3 o.c. | 110 | 191 |
| 0.050 in. Aluminum<br>0.063 in. Aluminum<br>22 ga. Steel | 4 | 32 | 6 | 2 o.c. | 99 | 171 |

## EverGuard® Single Cantilever Coping



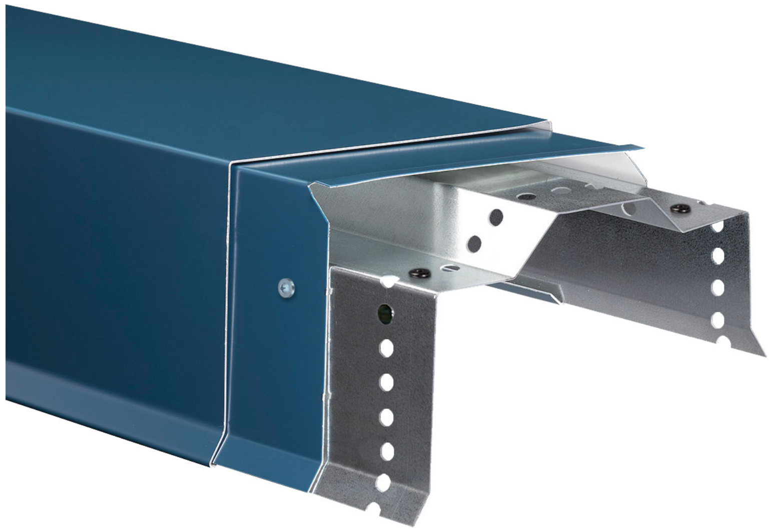
| Material | Maximum Face Height (in.) | Maximum Wall Width (in.) | Maximum Back Height (in.) | Clip Spacing (ft.) | Tested Capacity (psf) | |
|---|---|---|---|---|---|---|
| | | | | | Horizontal | Vertical |
| 0.040 in. Aluminum<br>24 ga. Steel | 4 | 16 | 6 | 3 o.c. | 128 | 221 |
| 0.040 in. Aluminum<br>24 ga. Steel | 4 | 24 | 10 | 3 o.c. | 87 | 151 |
| 0.050 in. Aluminum<br>0.063 Aluminum<br>22 ga. Steel | 4 | 16 | 6 | 3 o.c. | 128 | 221 |
| 0.050 in. Aluminum<br>0.063 Aluminum<br>22 ga. Steel | 4 | 24 | 10 | 3 o.c. | 93 | 161 |

## M-Weld™ Snap-On Coping
with 20 ga. Anchor Clips



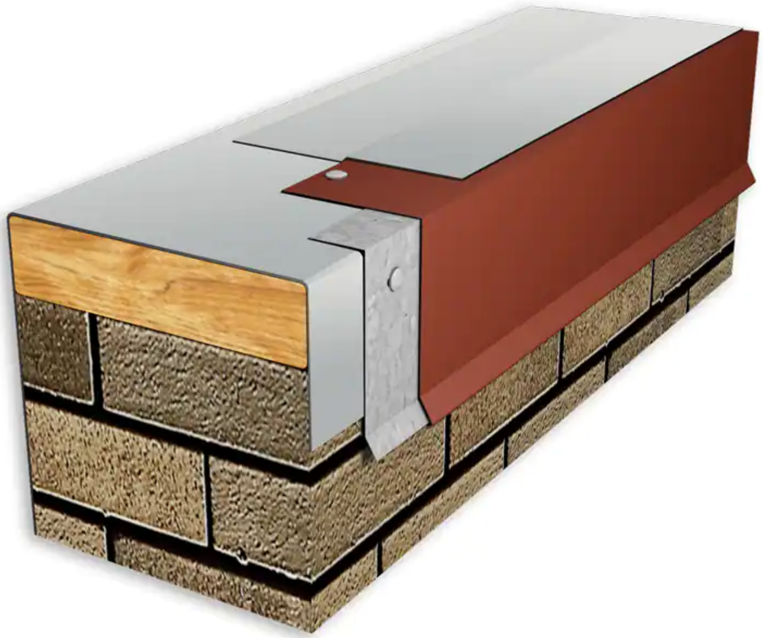
| Material | Maximum Face Height (in.) | Maximum Wall Width (in.) | Maximum Back Height (in.) | Clip Spacing (ft.) | Tested Capacity (psf) | |
|---|---|---|---|---|---|---|
| | | | | | Horizontal | Vertical |
| 24 ga. Steel | 4 | 16 | 6 | 3 o.c. | 64 | 111 |
| 0.040 in. Aluminum<br>0.050 in. Aluminum<br>0.063 Aluminum<br>22 ga. Steel | 4 | 16 | 6 | 3 o.c. | 69 | 121 |

## M-Weld™ Snap-On Plus Coping
### with 16 ga. Anchor Clips



| Material | Maximum Face Height (in.) | Maximum Wall Width (in.) | Maximum Back Height (in.) | Clip Spacing (ft.) | Tested Capacity (psf) | |
|---|---|---|---|---|---|---|
| | | | | | Horizontal | Vertical |
| 0.040 in. Aluminum<br>0.050 in. Aluminum<br>0.063 Aluminum<br>24 ga. Steel<br>22 ga. Steel | 4 | 16 | 6 | 3 o.c. | 81 | 141 |

## EverGuard® Drip Edge

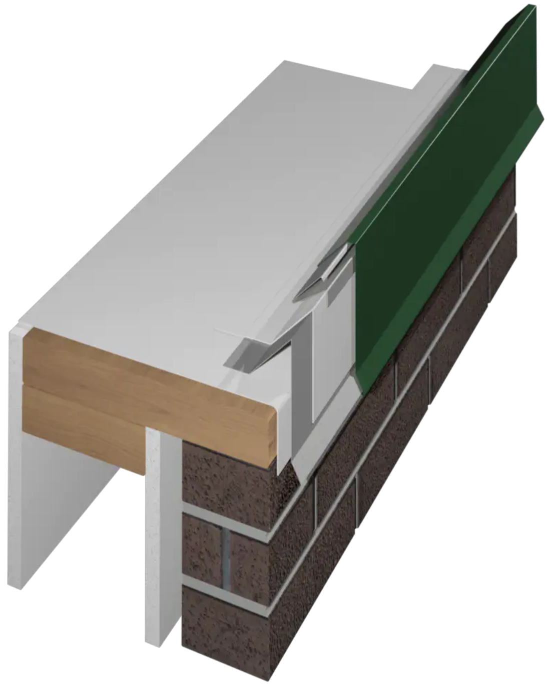


| Material | Maximum Face Height (in.) | Tested Capacity (psf) |
|---|---|---|
| 0.040 in. Aluminum<br>0.050 in. Aluminum<br>0.063 in. Aluminum<br>24 ga. Steel<br>22 ga. Steel | 6 | 282 |
| 0.040 in. Aluminum<br>0.050 in. Aluminum<br>0.063 in. Aluminum<br>22 ga. Steel<br>24 ga. Steel | 10 | 177 |

**EverGuard® Pro Drip Edge**

| Material | Maximum Face Height (in.) | Tested Capacity (psf) |
|---|---|---|
| 0.040 in. Aluminum<br>24 ga. Steel<br>22 ga. Steel | 7.5 | 98 |

## EverGuard® Fascia
## M-Weld™ NP Fascia

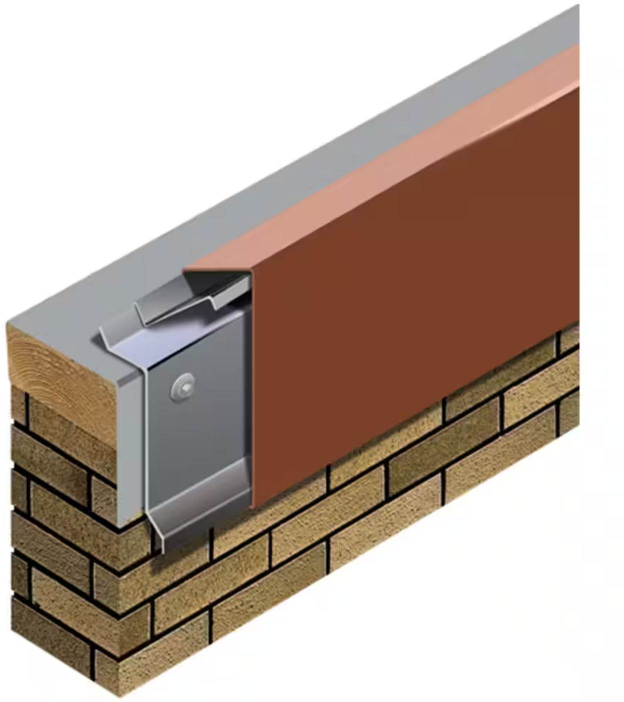


| Material | Maximum Face Height (in.) | Tested Capacity (psf) |
|---|---|---|
| 0.040 in. Aluminum<br>24 ga. Steel | 8.25 | 196 |
| 0.050 in. Aluminum<br>0.063 in. Aluminum<br>22 ga. Steel | 8.25 | 216 |
| 0.050 in. Aluminum<br>0.063 in. Aluminum<br>22 ga. Steel | 12.75 | 116 |

## EverGuard® EZ Fascia

| Material | Maximum Face Height (in.) | Tested Capacity (psf) |
|---|---|---|
| 0.040 in. Aluminum<br>0.050 in. Aluminum<br>0.063 in. Aluminum<br>24 ga. Steel<br>22 ga. Steel | 4.75 | 326 |
| 0.040 in. Aluminum<br>0.050 in. Aluminum<br>0.063 in. Aluminum<br>24 ga. Steel<br>22 ga. Steel | 7.75 | 111 |

## EverGuard® One Edge Fascia

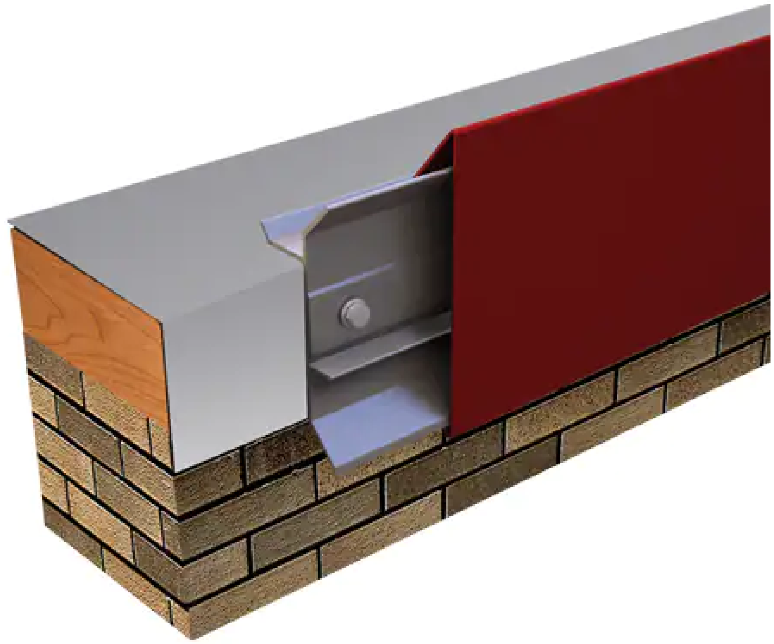


| Material | Maximum Face Height (in.) | Tested Capacity (psf) |
|---|---|---|
| 0.040 in. Aluminum<br>24 ga. Steel<br>22 ga. Steel | 5 | 396 |
| 0.040 in. Aluminum<br>24 ga. Steel<br>22 ga. Steel | 8 | 155 |

## M-Weld™ One Edge Fascia

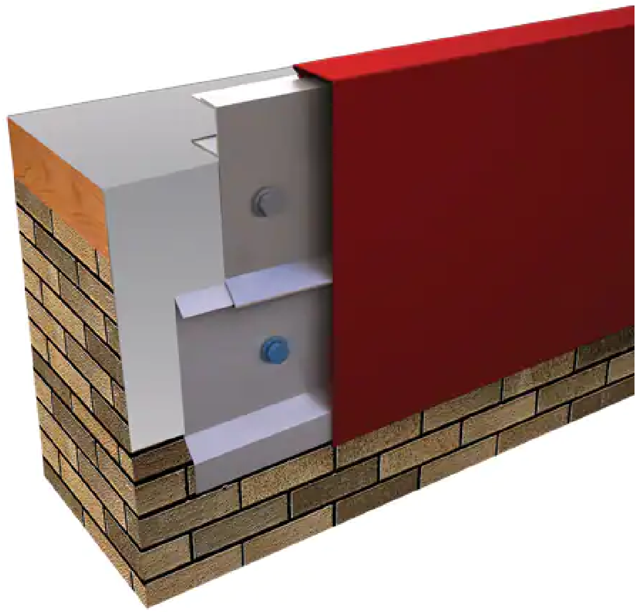
| Material | Maximum Face Height (in.) | Tested Capacity (psf) |
|---|---|---|
| 0.040 in. Aluminum<br>24 ga. Steel<br>22 ga. Steel | 5 | 419 |
| 0.040 in. Aluminum<br>24 ga. Steel<br>22 ga. Steel | 8 | 179 |

## EverGuard® Pro Fascia
## M-Weld™ Pro Standard Fascia



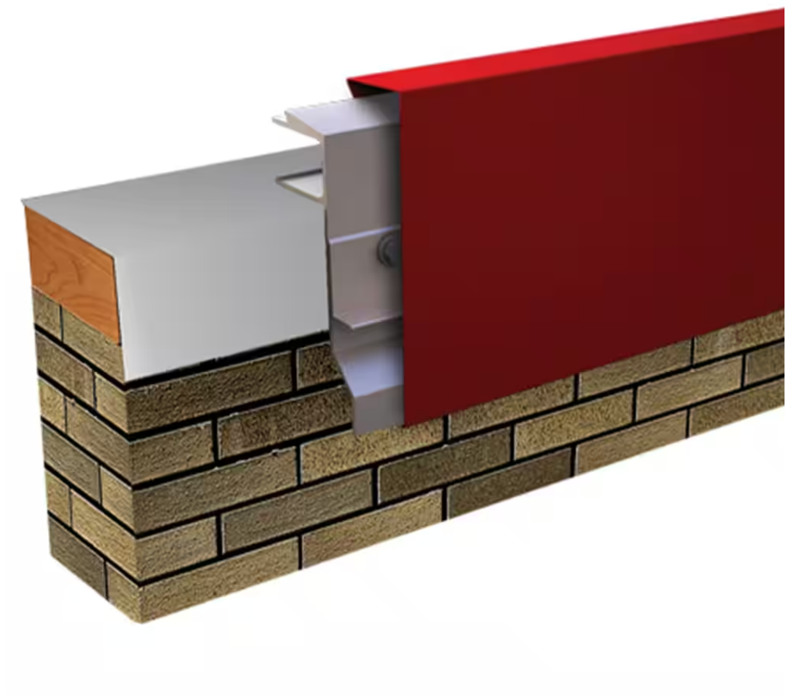
| Material | Maximum Face Height (in.) | Tested Capacity (psf) |
|---|---|---|
| 0.040 in. Aluminum<br>24 ga. Steel<br>22 ga. Steel | 5.5 | 275 |
| 0.040 in. Aluminum<br>24 ga. Steel<br>22 ga. Steel | 8.5 | 155 |

## EverGuard® Pro Extended Fascia
## M-Weld™ Pro Extended Fascia



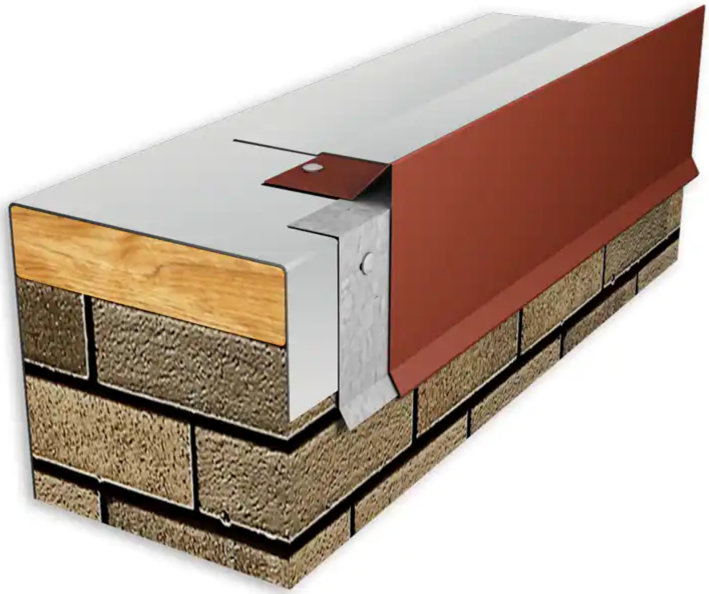
| Material | Maximum Face Height (in.) | Tested Capacity (psf) |
|---|---|---|
| 0.050 in. Aluminum<br>0.063 in. Aluminum<br>22 ga. Steel | 13 | 176 |

**EverGuard® Pro HG Fascia**
**M-Weld™ Pro HG Fascia**



| Material | Maximum Face Height (in.) | Tested Capacity (psf) |
|---|---|---|
| 0.040 in. Aluminum<br>24 ga. Steel | 8.5 | 179 |
| 0.050 in. Aluminum<br>0.063 in. Aluminum | 7 | 365 |
| 0.050 in. Aluminum<br>0.063 in. Aluminum | 8.5 | 293 |
| 0.050 in. Aluminum<br>0.063 in. Aluminum | 10 | 196 |
| 22 ga. Steel | 10 | 179 |

## EverGuard® Gravel Stop



| Material | Maximum Face Height (in.) | Tested Capacity (psf) |
|---|---|---|
| 0.040 in. Aluminum<br>0.050 in. Aluminum<br>0.063 in. Aluminum<br>24 ga. Steel<br>22 ga. Steel | 6 | 216 |
| 0.040 in. Aluminum<br>0.050 in. Aluminum<br>0.063 in. Aluminum<br>24 ga. Steel<br>22 ga. Steel | 10 | 258 |

# EverGuard® Edge Box RI


| Material | Maximum Face Height (in.) | Maximum Wall Width (in.) | Maximum Back Height (in.) | Tested Capacity (psf) | |
|---|---|---|---|---|---|
| | | | | Horizontal | Vertical |
| 24 ga. Steel | 4.5 | 5.5 | 4.5 | 526 | 911 |

## EverGuard® WR Box Gutter

| Material | Maximum Face Height (in.) | Maximum Top Width (in.) | Tested Capacity (psf) | |
|---|---|---|---|---|
| | | | Horizontal | Vertical |
| 0.040” Aluminum<br>0.050” Aluminum<br>0.063” Aluminum | 5.25 to 7.75 | 5.25 to 7.75 | 223 | 108 |
| 24 ga. Steel<br>22 ga. Steel | 5.25 to 7.75 | 5.25 to 7.75 | 223 | 136 |

## EverGuard WR Offset Gutter

| Material | Maximum Face Height (in.) | Maximum Top Width (in.) | Tested Capacity (psf) | |
|---|---|---|---|---|
| | | | Horizontal | Vertical |
| 0.040" Aluminum<br>0.050" Aluminum<br>0.063" Aluminum | 5.25 to 7.75 | 5.25 to 7.75 | 223 | 108 |
| 24 ga. Steel<br>22 ga. Steel | 5.25 to 7.75 | 5.25 to 7.75 | 223 | 136 |

## EverGuard WR Chamfer Gutter

| Material | Maximum Face Height (in.) | Maximum Top Width (in.) | Tested Capacity (psf) | |
|---|---|---|---|---|
| | | | Horizontal | Vertical |
| 0.040" Aluminum<br>0.050" Aluminum<br>0.063" Aluminum | 5.25 to 7.75 | 5.25 to 7.75 | 223 | 108 |
| 24 ga. Steel<br>22 ga. Steel | 5.25 to 7.75 | 5.25 to 7.75 | 223 | 136 |