



## Perimeter Edge Metal

EXCEPTIONAL® Metals is a division of



# Perimeter Roof Edge Design

The perimeter roof edge is the **First Line of Defense** against wind events and costly issues.

# Objective

- Define Perimeter Roof Edge
- Review Industry Standards
- ANSI/SPRI ES-1 Standards and Test Procedures
- Building Codes & Designing for ES-1
- EXCEPTIONAL<sup>®</sup> Metals Products

# A Perimeter Roof Edge is...

- A termination and transition between the roof and the other building components.
- An aesthetic feature of the building's exterior.
- One of the first components of the roof assembly to be value engineered out of the system.

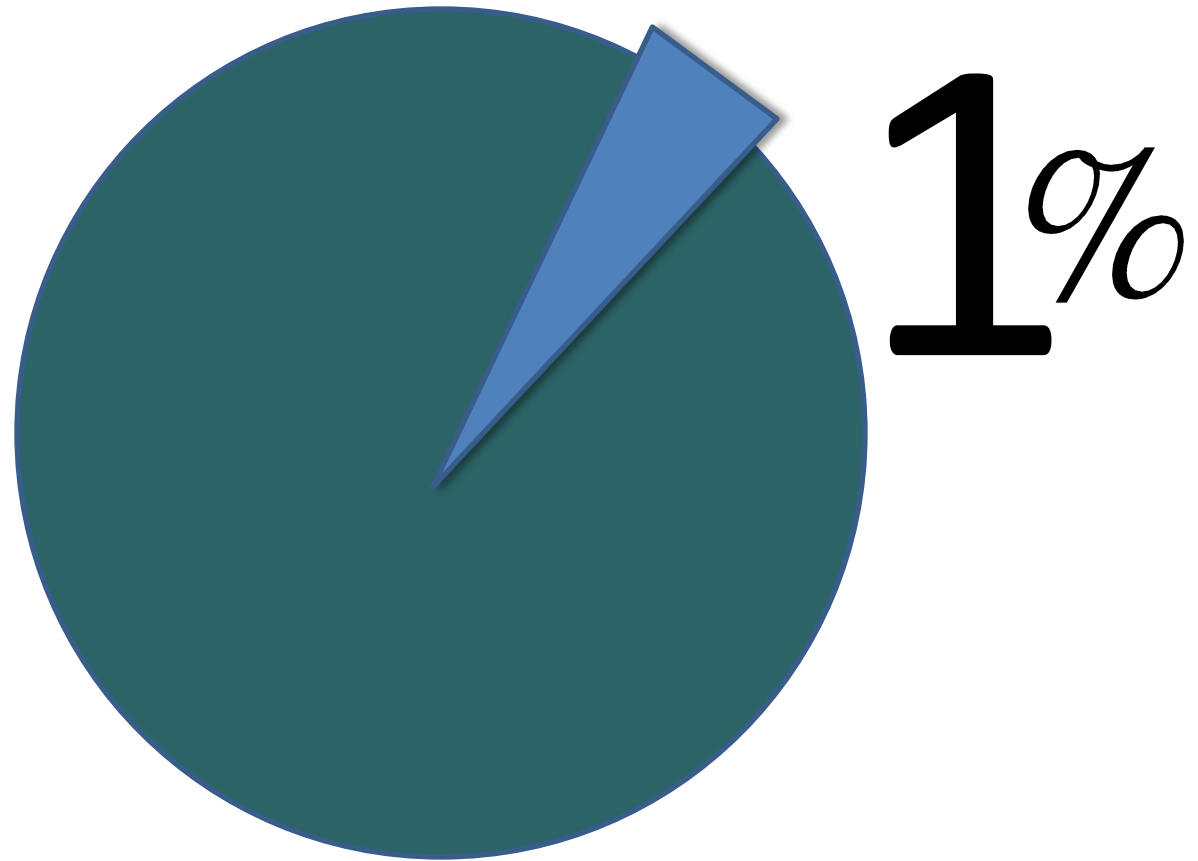


Approximately **60% of litigation claims** related to a building originate from the roof area.

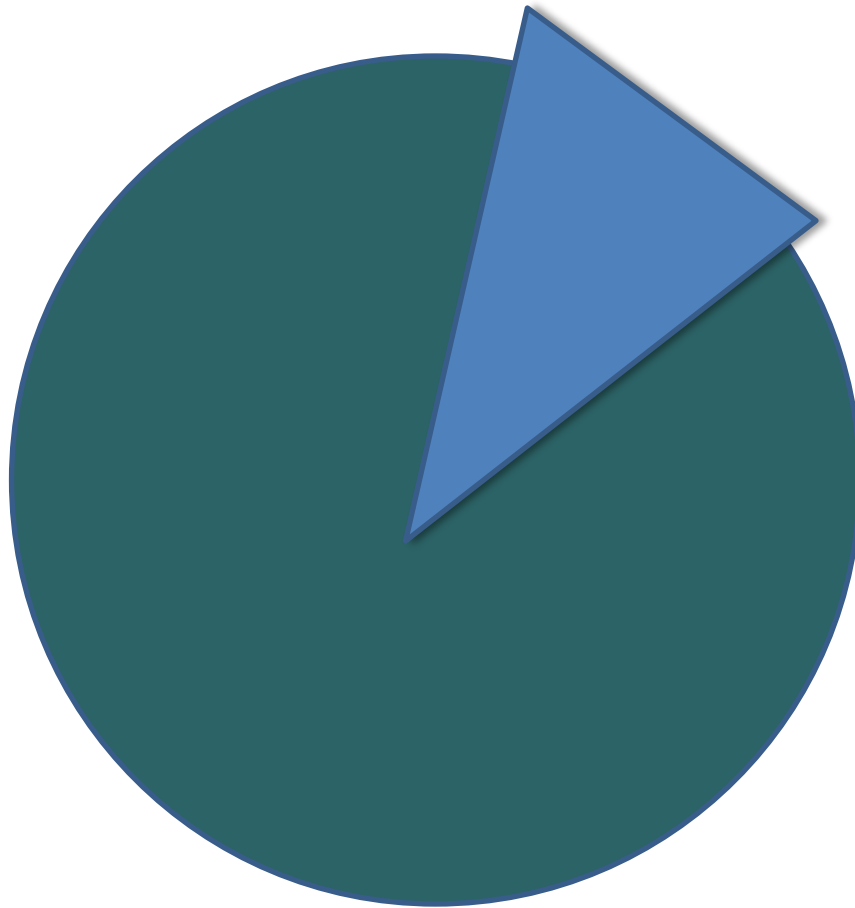
**60% of roof warranty claims** are attributed to metal edge failures.

By extension, out of all the litigation, **36% of litigation claims** are attributed to metal edge failures.





Perimeter edge metal is typically **1% of the building cost.**



36%

Just 1% of the building cost is carrying  
**36%** of the **exposure to risk of litigation.**

# Perimeter Roof Edge is...

**First Line of Defense** in a wind event and costly litigation.





# Industry Background & Historical Standards



# Industry Background & **NEW** Standards



# ANSI / SPRI ES-1...

The first **roof edge standard** was developed to aid design professionals and the roofing community in **designing and installing a quality roof edge system.**

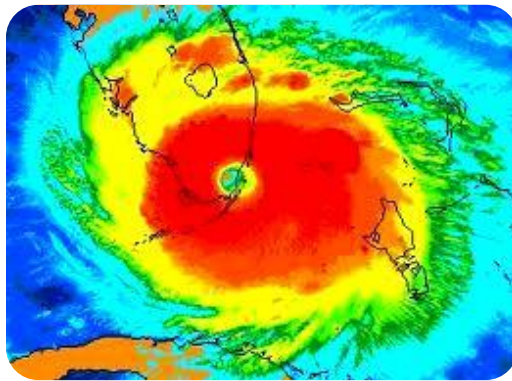




# Why **NEW** Standards

# Thank Hurricane Andrew

- It is estimated that 75% of all losses were related to roof failure.
- A study of 145 FM Global losses involving BUR systems showed **59% of losses occurred from roof perimeter failures.**



# RICOWI Investigations

The Roofing Industry Committee on Weather Issues (RICOWI) is a non-profit organization promoting education and **research on wind and hail issues**.

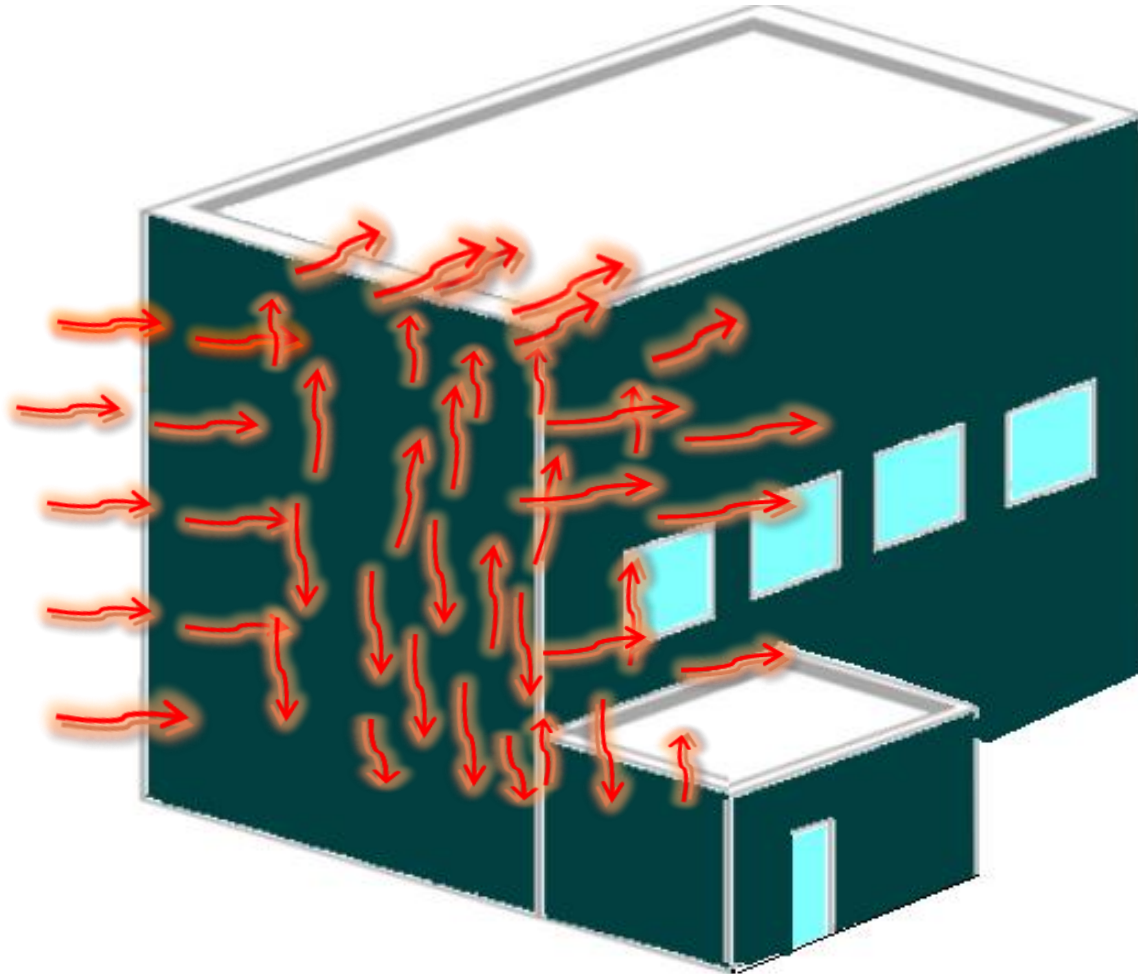
- 2006 report on Hurricanes Ivan & Charley
- 2007 report on Hurricane Katrina
- See **[www.ricowi.com](http://www.ricowi.com)** for full reports



# RICOWI Findings

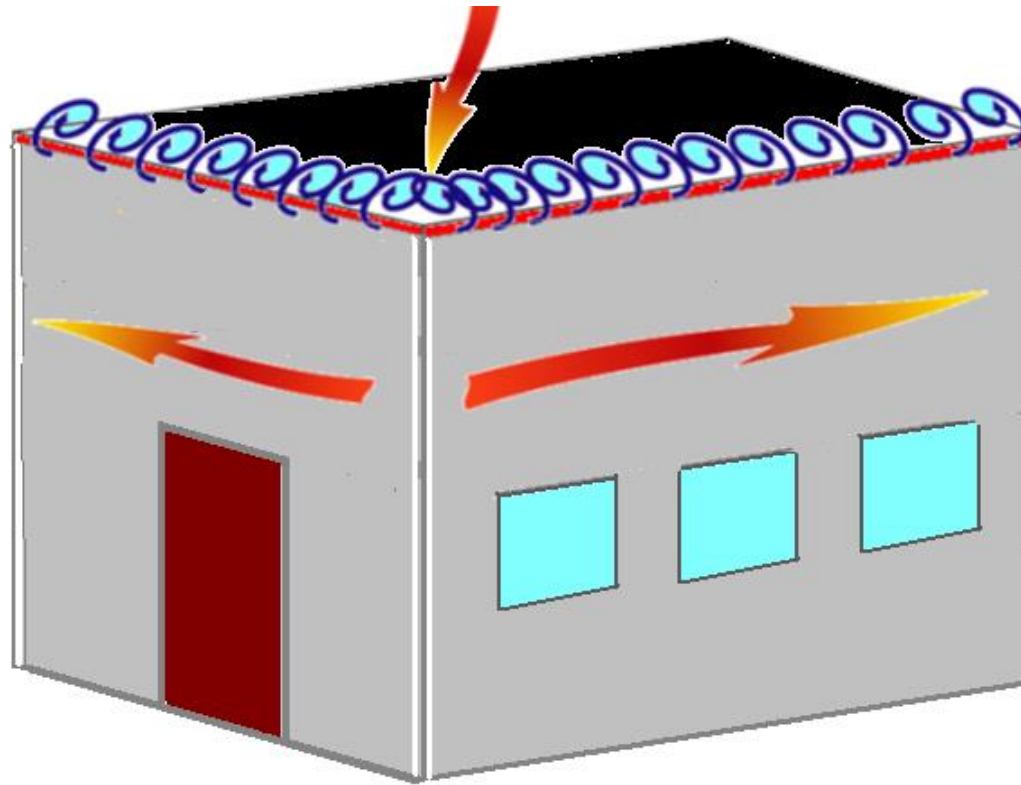
- Perimeter and corners of low slope buildings are the most vulnerable areas on the roof.
- Inadequate design and installation practices lead to damage (2007, p. 18).
- “Many examples of damage appeared to originate at failed edge details” (2007, p. xiv).
- “These studies reinforced the need for secure roof edges and codes that require secure roof edging need to be enforced” (2006, p. xiv).
- “Design/construct roof coverings in accordance with available high-wind design guidelines and roof materials manufactures’ instructions” (2006, p. 178).

# Wind Patterns on a Building



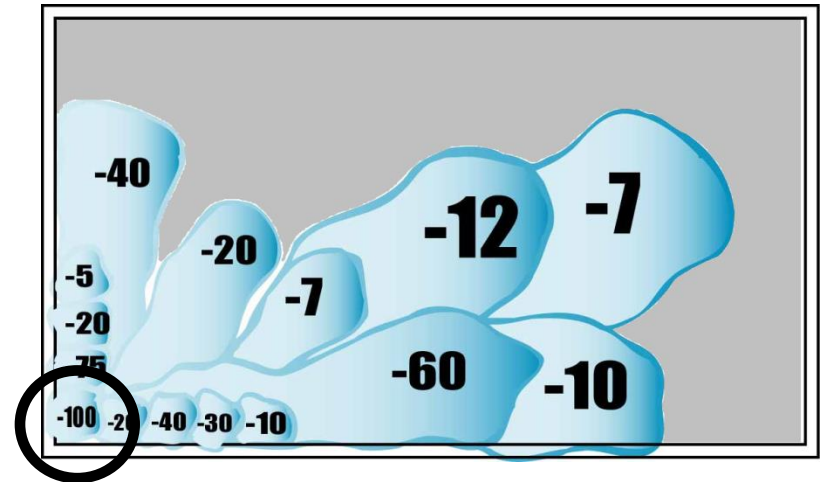
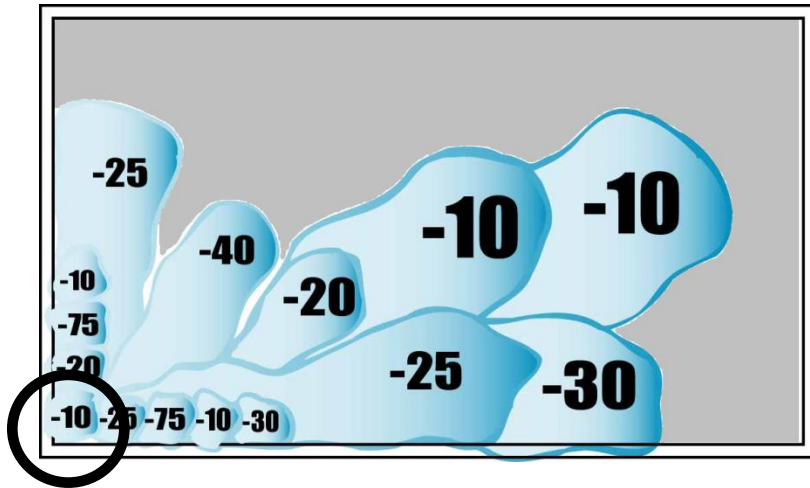


# Vortex Patterns on a Rooftop



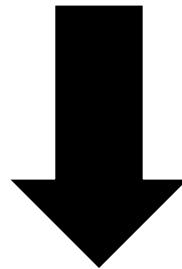
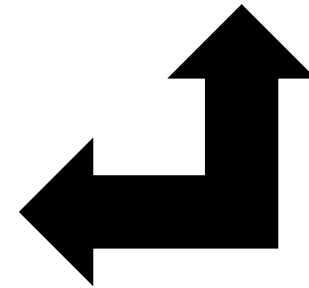
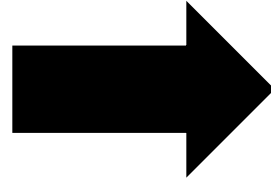
- Positive Wind Pressure
- Negative Wind Pressure

# Wind Uplift Pressure at an Instant in Time





# **ES-1 Development**

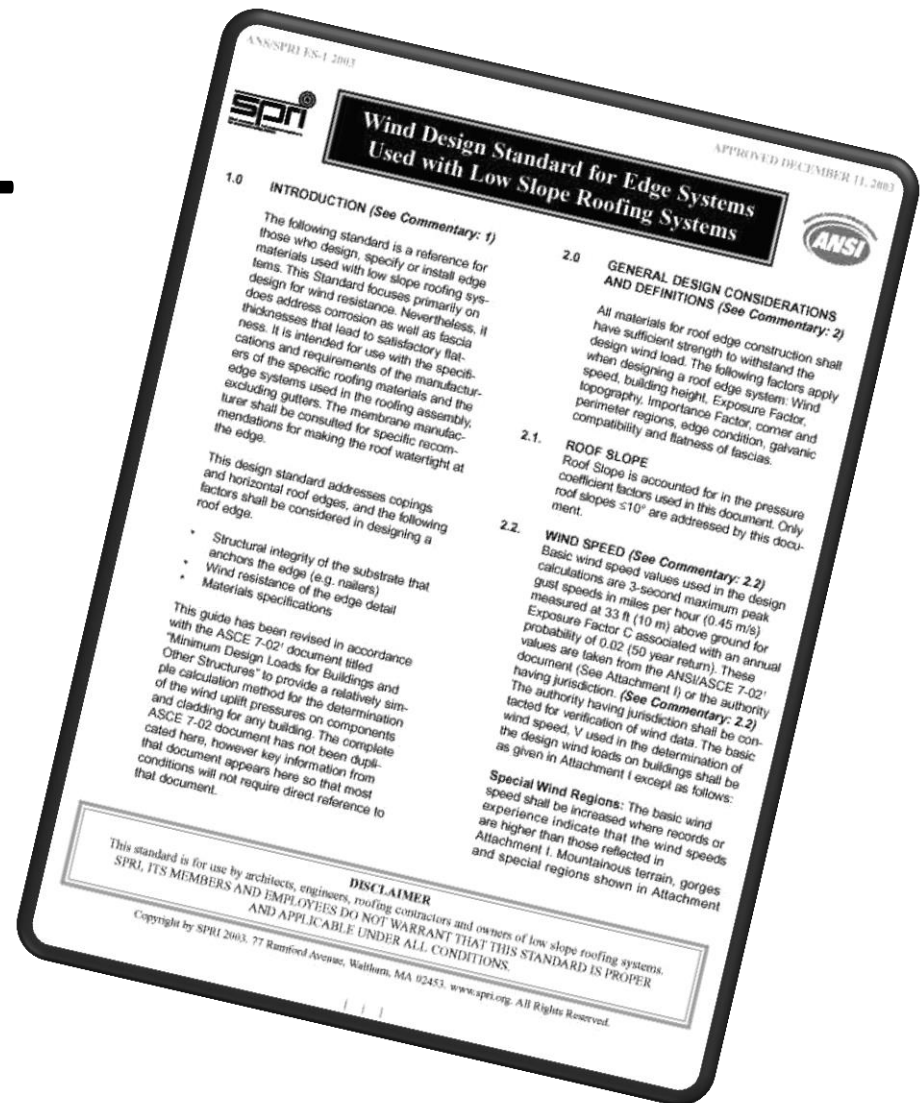


**Adopted By IBC in 2003**

# ANSI/SPRI ES-1 Standard

Free download at

[www.spri.org](http://www.spri.org)



# International Building Code Adoption



# IBC Requires ES-1 Testing

**1504.5 Edge securement for low slope roofs.** Low-slope membrane 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 ANSI / SPRI ES-1, except the basic wind speed shall be determined from Figure 1609.

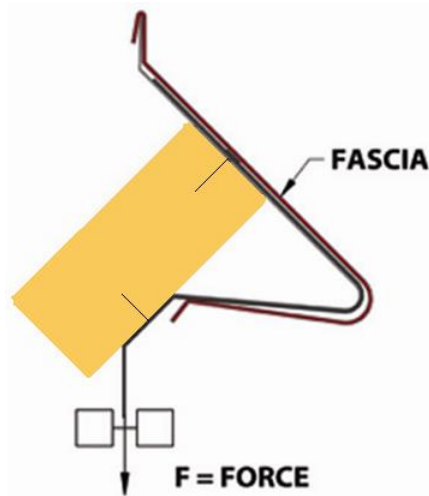
(Figure 1609 is a reference to the ASCE Wind Speed Map 7-02)

# ES-1 Testing Addresses...

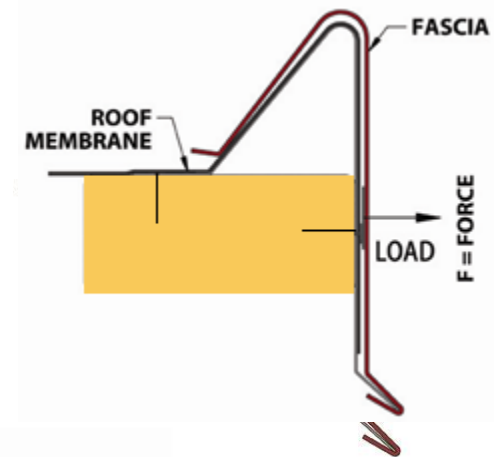
- Structural integrity of substrates that anchors the edge (i.e. nailers)
- Wind resistance of the edge detail
- Material specifications



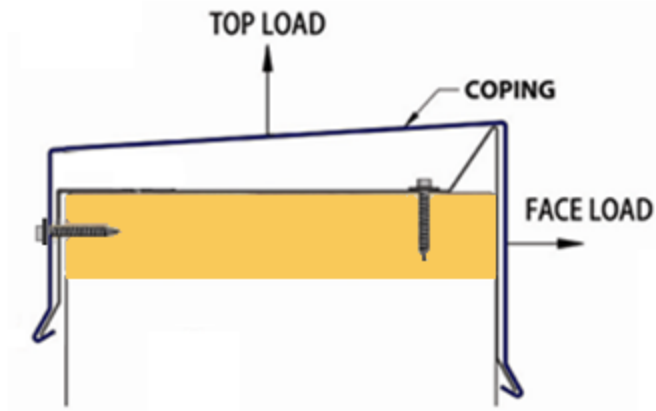
# ES-1 Testing



RE-1

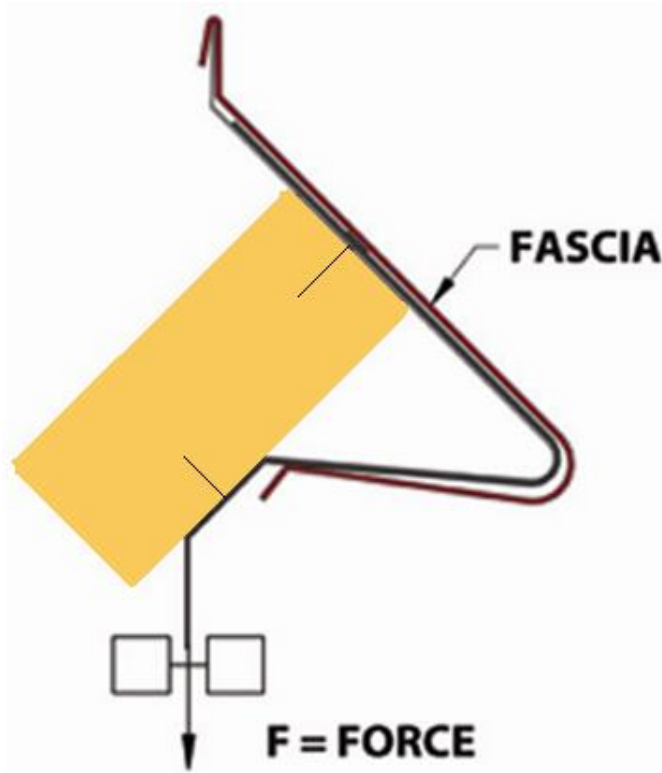


RE-2



RE-3

# ES-1 Testing



**RE-1**

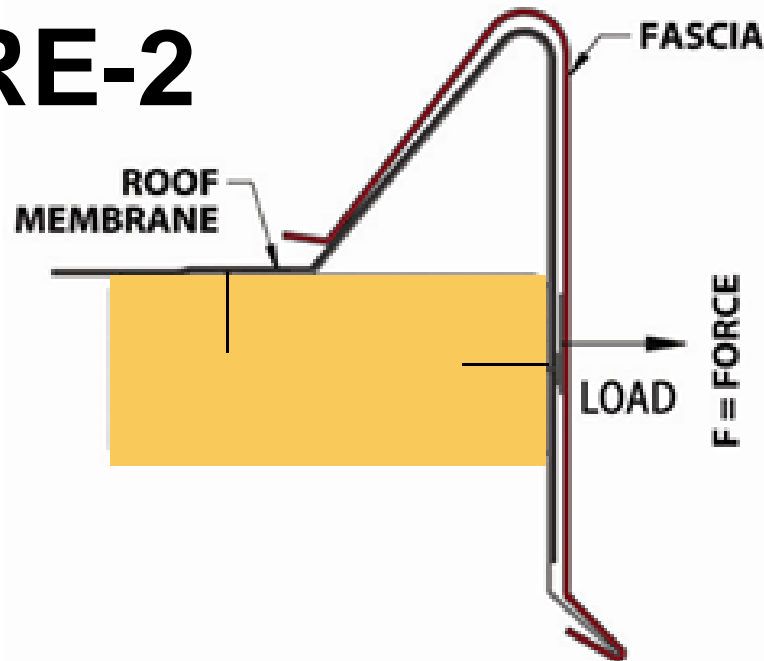
- 100 lbs./ft., with the force measured in a direction of  $45^\circ$  back onto the roof.
- RE-1 is a membrane termination test methodology specifically for fascia that act as termination to roofing membranes.



# ES-1 Testing

- This test method determines the maximum load at failure.

## RE-2

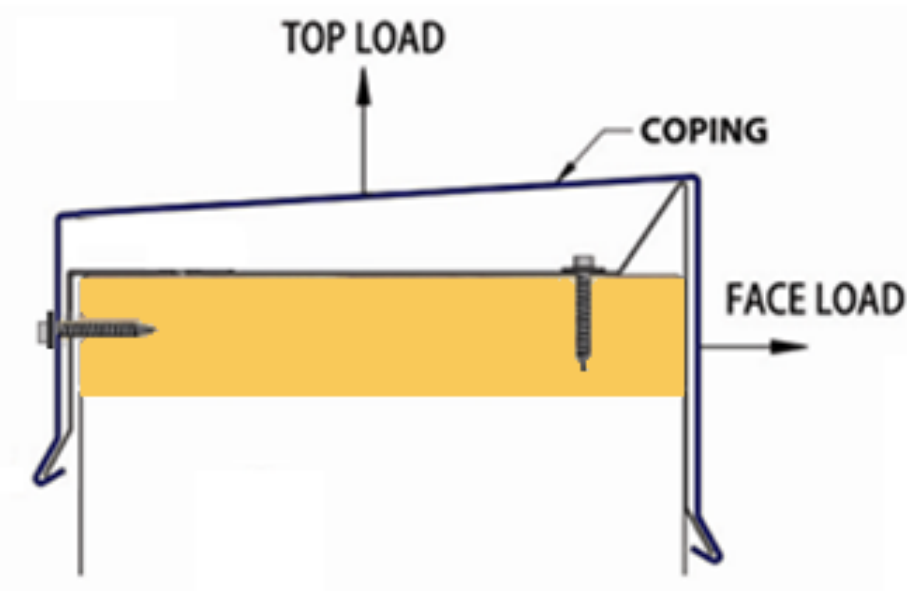


- Failure is the loss of securement of any component of the roof edge system.



# ES-1 Testing

- It simultaneously tests the vertical and horizontal wind gust load coefficient.
- Failure is loss of securement of any component of the roof edge system.



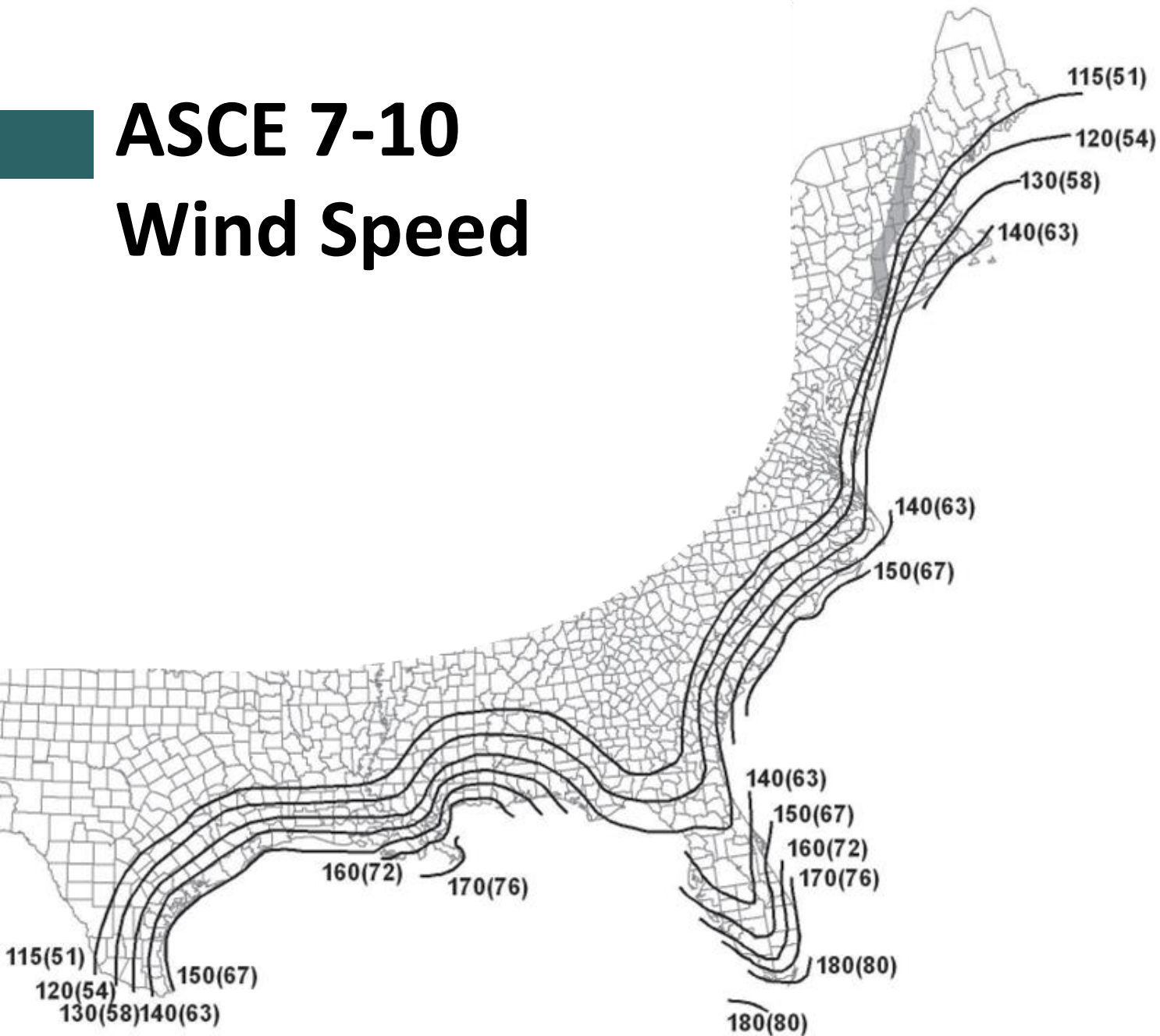
**RE-3**





# **Designing for ES-1**

# ASCE 7-10 Wind Speed



# ES-1 Factors for Roof Edge Loads

- Wind Speed
- Building Occupancy
- Building Height
- Location of the edge device on Roof
- Building Location

$$CG_p \times q_p \times I \times k_{zt}$$

$$= \underbrace{\times \times p \delta f}$$



# Design Pressure Measurements

$$CG_p \times q_p \times I \times kz_t$$

$CG_p$  = Gust Factor Products

$q_p$  = Velocity Pressure from Table 4

$I$  = Importance Factor

$kz_t$  = Topographical Factor



# Wind Calculator

**Wind Calculation**  
Use this form to discover what products meet specifications

**Project**  
Your project's name

**City**  
Your project's city

**State**  
Project's state

**Zip Code**  
Project's 5 digit zip

**Building Height**  
In feet

**Exposure**  
[explain this](#)

**Importance**  
[explain this](#)

**Wind Speed**  
MPH [wind map](#)

**Building Type**  
Apartment, Highrise,  
...

**Local Terrain**  
Describe the terrain

**Architect**  
Project architecture  
firm

Calculate

[http://www.spri.org/pdf/Wind\\_Calculator.htm](http://www.spri.org/pdf/Wind_Calculator.htm)

# Exposure Categories

- **Exposure A:** Now classified as Exposure B
- **Exposure B:** Urban & suburban areas, single family dwellings
- **Exposure C:** Open terrain with scattered obstructions
- **Exposure D:** Flat, unobstructed areas; open water for 1 mile +

**Note:** Exposure C is used in hurricane coastal areas due to the waves creating scattered obstructions.



# Locations

Saginaw, Michigan



Carrollton, Texas



Jackson, Mississippi



Grants Pass, Oregon



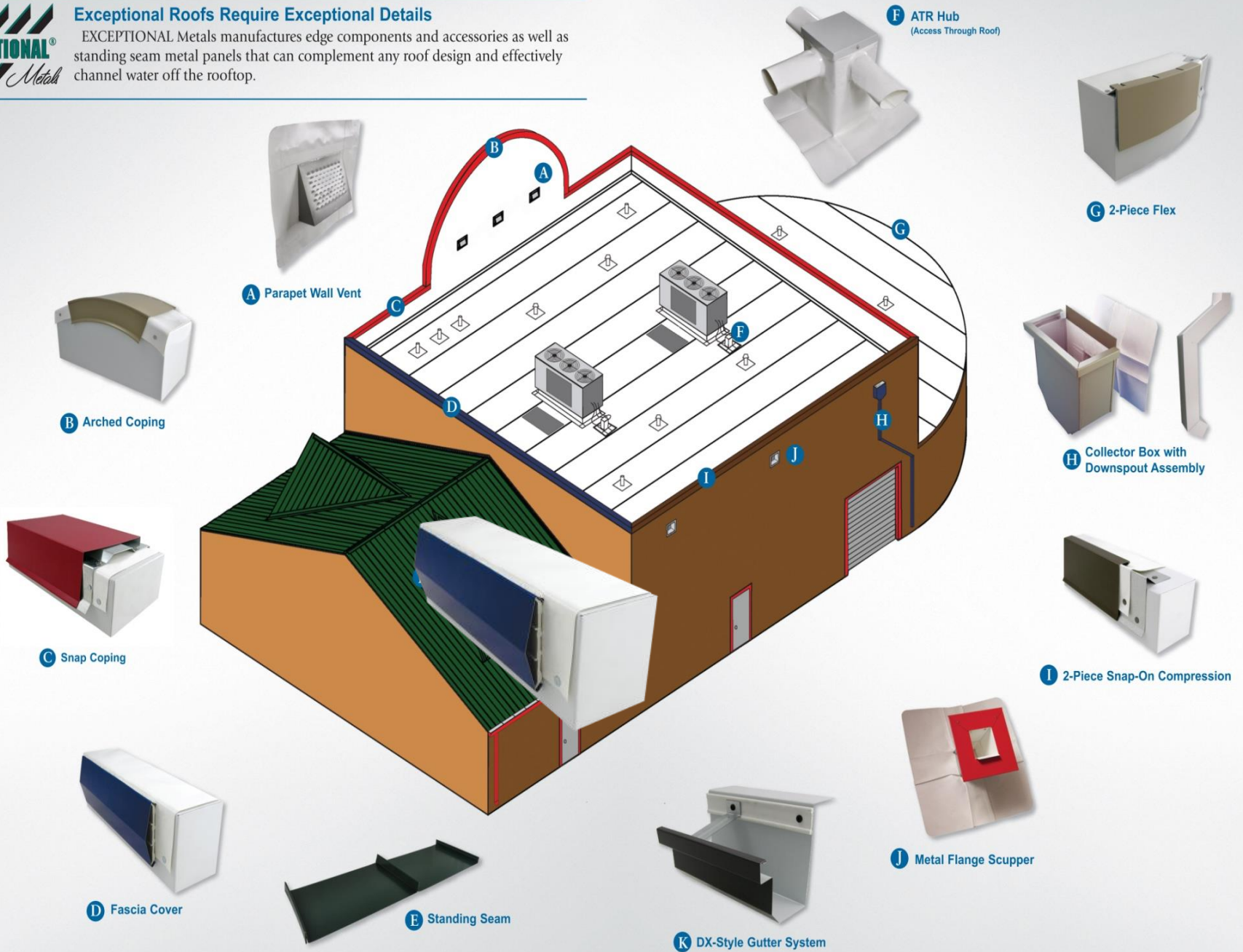
# EM Benefits

- Tested to be compliant with local & national codes  
**IBC ES-1 Requirements**
- 30+ Architectural Finishes  
**35 Year Finish Warranty**
- Standard 10' lengths, pre-punched holes, slotted covers  
**Quick & Easy Installation**  
**Saves Time & Money**
- Industry leading lead times.  
**Days not weeks**  
**Shipped directly to the jobsite**



## Exceptional Roofs Require Exceptional Details

EXCEPTIONAL Metals manufactures edge components and accessories as well as standing seam metal panels that can complement any roof design and effectively channel water off the rooftop.





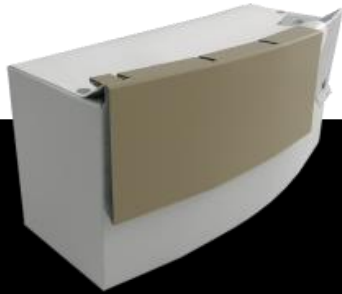
# An EXCEPTIONAL Roof Requires EXCEPTIONAL Details

- Roof Termination
- Drainage Products
- Custom Capabilities
- Metal Panels

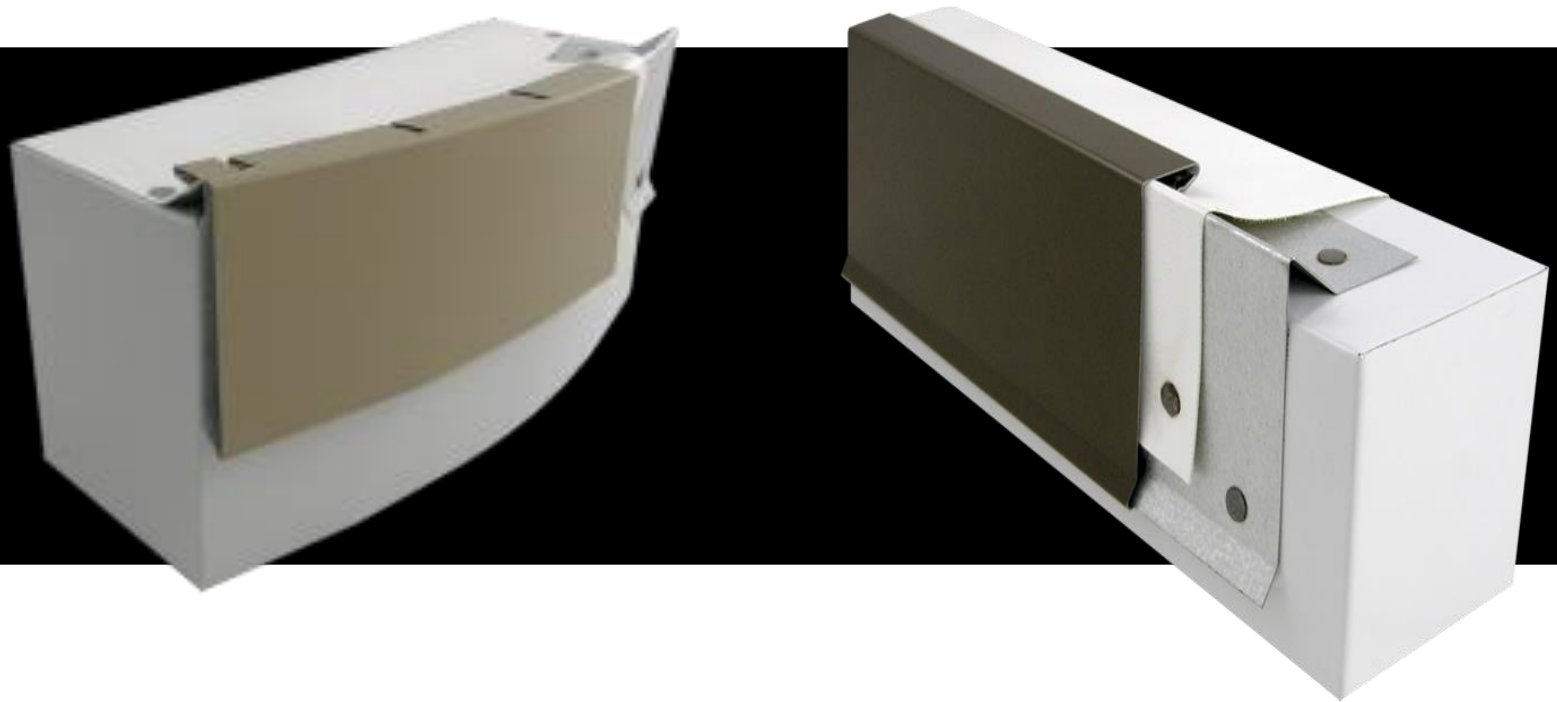




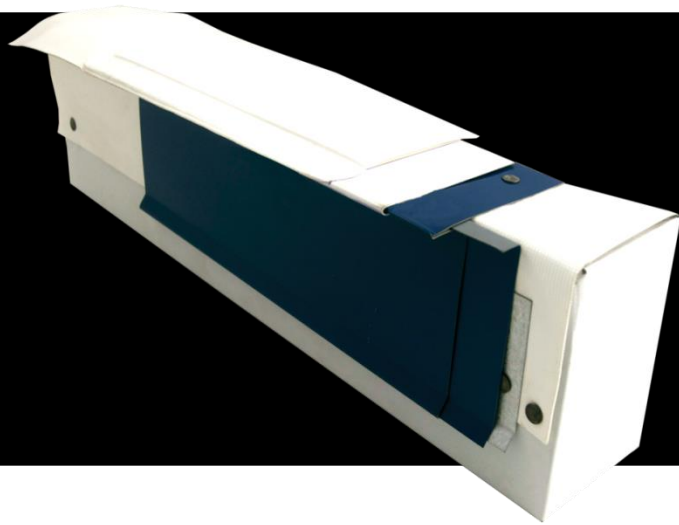
# Roof Termination & Copings



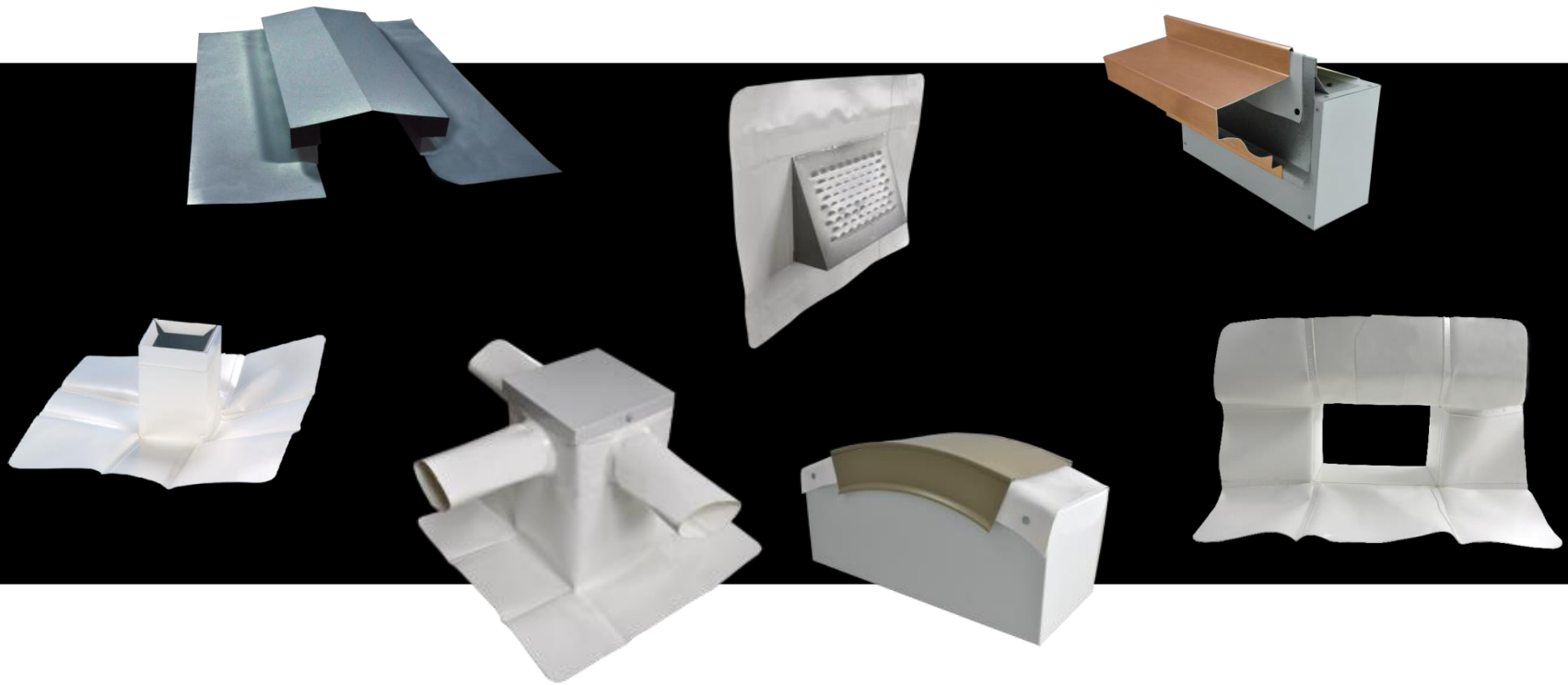
# 2-Piece Snap-on Flex & Compression



# T-Edge & T-Edge Plus



# Customization



# Drainage & Collector Products

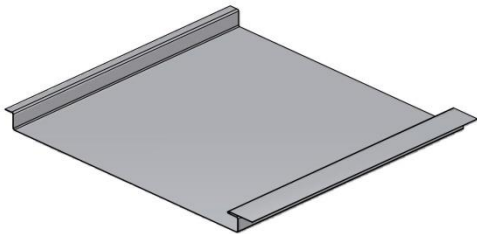


# Arched Coping & Radius Panels

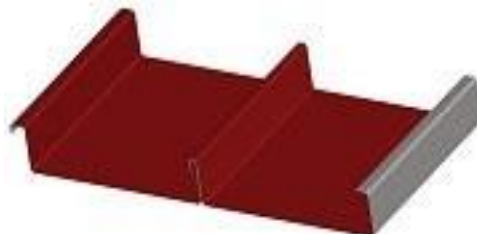




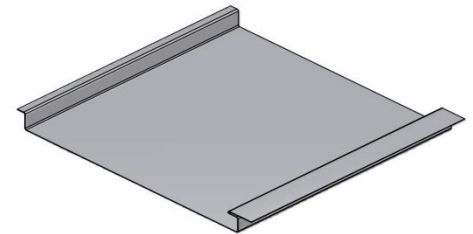
# Profile Options



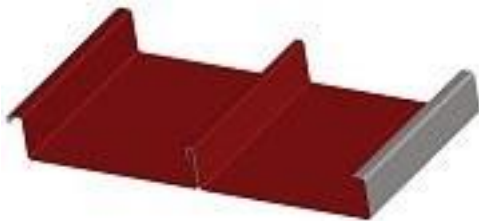
**FLUSH WALL PANEL**



**1.50" Standing Seam**



**SOFFIT PANEL**



**2" STANDING SEAM**



**1.50" SNAP LOCK**



**1.75 SNAP SEAM**



# Membrane & Metal

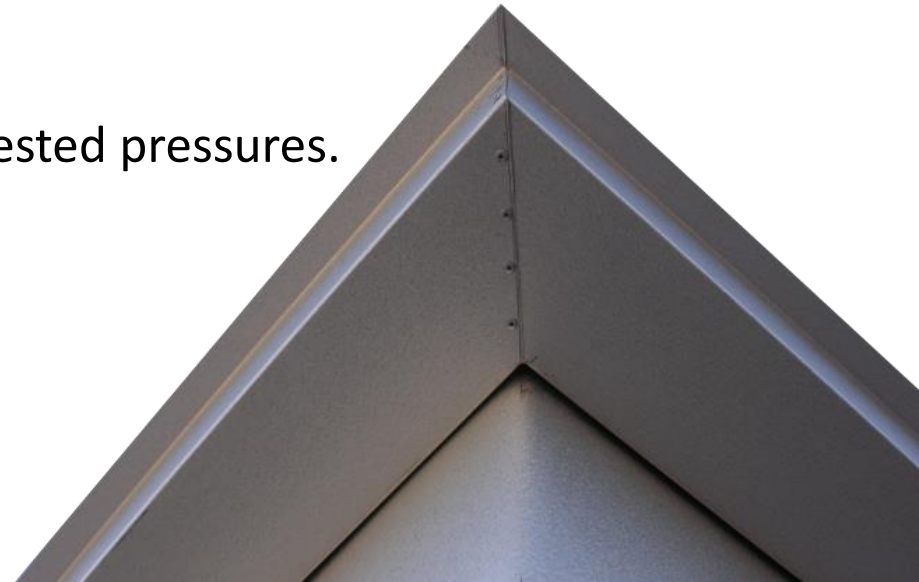
Edge to Edge and deck to Sky™





# Summary

- Perimeter roof edge is first line of defense.
- The roof edge carries a significant risk of liability.
- The ANSI / SPRI ES-1 standard was developed to maintain quality roof edge systems.
- A small percentage of contractors are capable of producing a ES-1 compliant product.
- Edge metal needs to meet the ES-1 tested pressures.



**Questions are welcome.  
Thank you for attending!**



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