

AIA PRESENTATION

Standing Seam Metal Roofing Seminar – SSRLU2B

1 LU/HSW Hour



Metal Roof and Wall Systems

Best Practice

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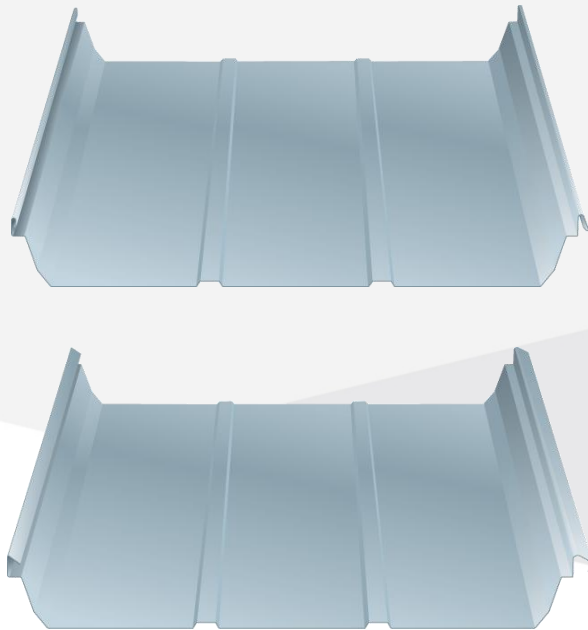
Learning Objectives

- ❖ Understand the differences in application parameters for various standing seam metal roofing systems
- ❖ Understand wind uplift testing as prescribed by Underwriters Laboratories and ASTM E1592
- ❖ Recognize complicated design details that should be carefully specified and reviewed when using metal roofing
- ❖ Comprehend available warranties and be able to select the appropriate one for a project

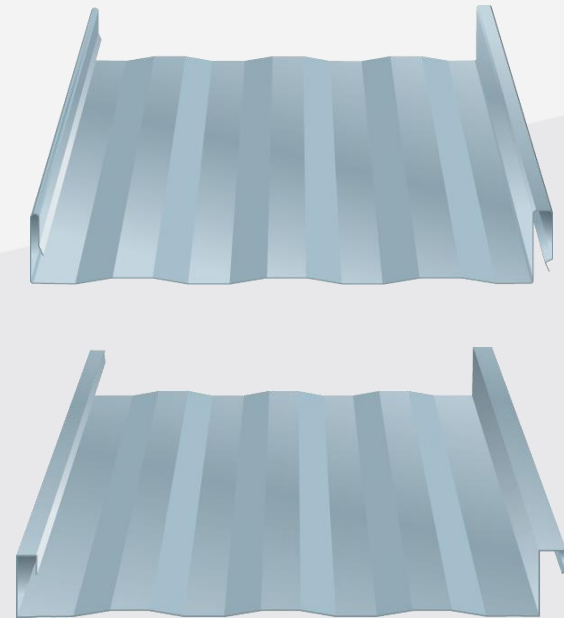
Standing Seam Profiles

- ❖ Utilitarian or Architectural in Nature
- ❖ Numerous Widths and Profiles
- ❖ Varying Seam Joinery – Snap or Field Seamed

TRAPEZOIDAL RIB



VERTICAL RIB



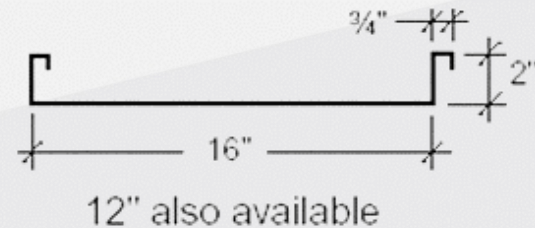
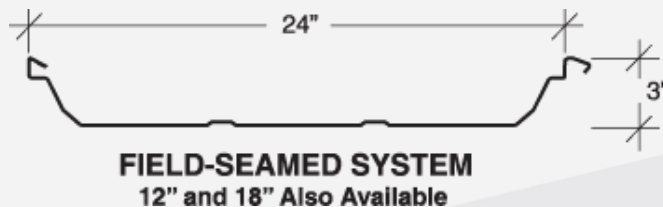
Standing Seam - Water Shedding (Hydrokinetic)

- ❖ Many different seam designs and panel widths
- ❖ Many, but not all, are architectural in nature
- ❖ Minimum roof pitch varies by panel and manufacturer
- ❖ Some systems are structural. Others may require a solid deck
- ❖ Some systems may require a waterproof underlayment
- ❖ Many systems lay flat to deck, causing inconsistencies in the deck to telegraph through the panels
- ❖ Always consult manufacturer for proper application parameters



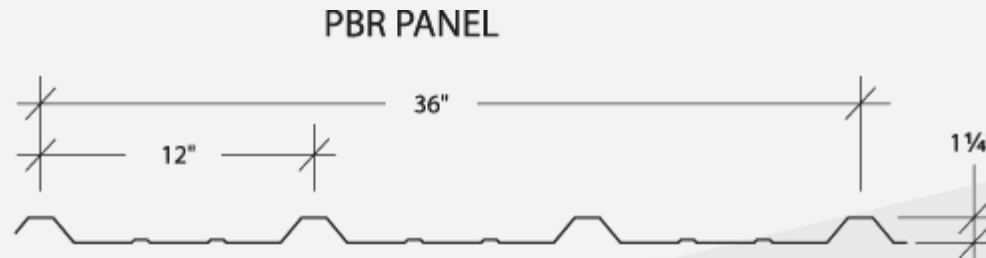
Standing Seam – Water Barrier (Hydrostatic)

- ❖ Generally have structural capacity
- ❖ Often mechanically field seamed
- ❖ May provide greater wind uplift resistance
- ❖ Critical trim design



Evolution Of Panel Design

- ❖ Through-Fastened Panel Systems Designed From Section Properties (Panels Do Not Change Shape Under Uplift)

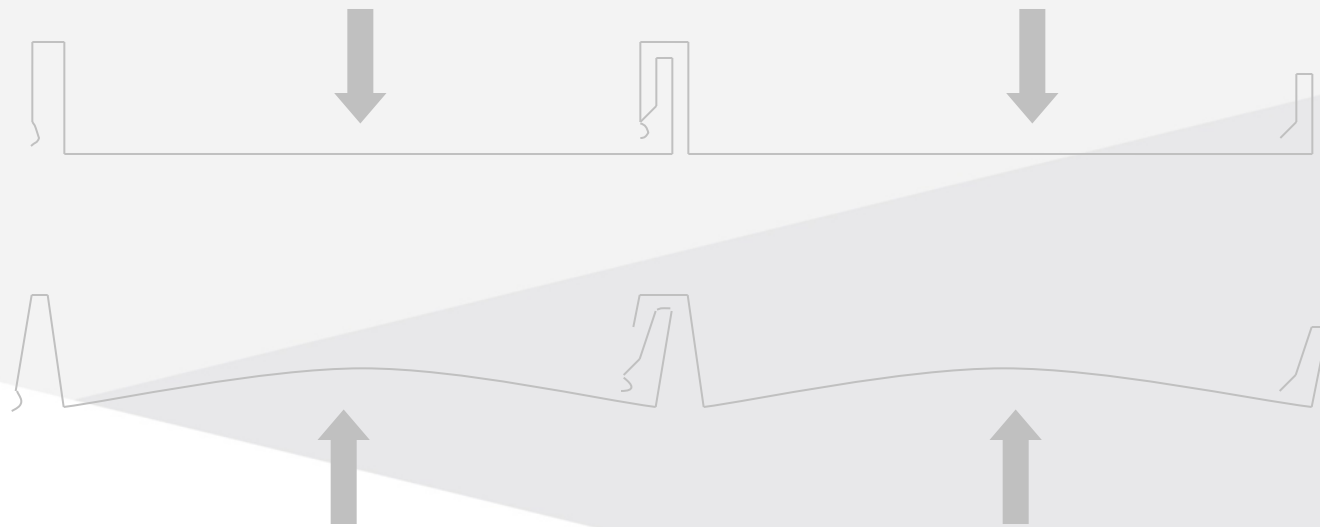


SECTION PROPERTIES								
PANEL	F _y	WEIGHT	NEGATIVE BENDING			POSITIVE BENDING		
			I _{xe}	S _{xe}	Maxo	I _{xe}	S _{xe}	Maxo
GAUGE	(KSI)	(PSF)	(IN.4/FT.)	(IN.3/FT.)	(KIP-IN.)	(IN.4/FT.)	(IN.3/FT.)	(KIP-IN.)
29	60 *	0.75	0.0219	0.0357	1.2835	0.0242	0.0234	0.8423
26	60 *	0.94	0.0302	0.0511	1.8366	0.0369	0.0372	1.3373
24	50	1.14	0.0404	0.0733	2.1953	0.0506	0.0521	1.5594
22	50	1.44	0.0544	0.1042	3.1201	0.0709	0.0749	2.2427

* F_y is 80-ksi reduced to 60-ksi in accordance with the 2001 edition of the North American Specification For Design Of Cold-Formed Steel Structural Members - A2.3.2.

Evolution Of Panel Design

- ❖ Standing Seam Roof Systems Designed From ASTM E1592 Testing (Panels Change Shape Under Uplift)



UL-90 - 580 Test

- ❖ Includes deck/roof assembly - not just panels alone
- ❖ Test specimen allows for perimeter fastening
- ❖ Field of roof and Product comparison test only
- ❖ Test does not simulate real conditions

Design & Testing



Design & Testing



ASTM E-1592

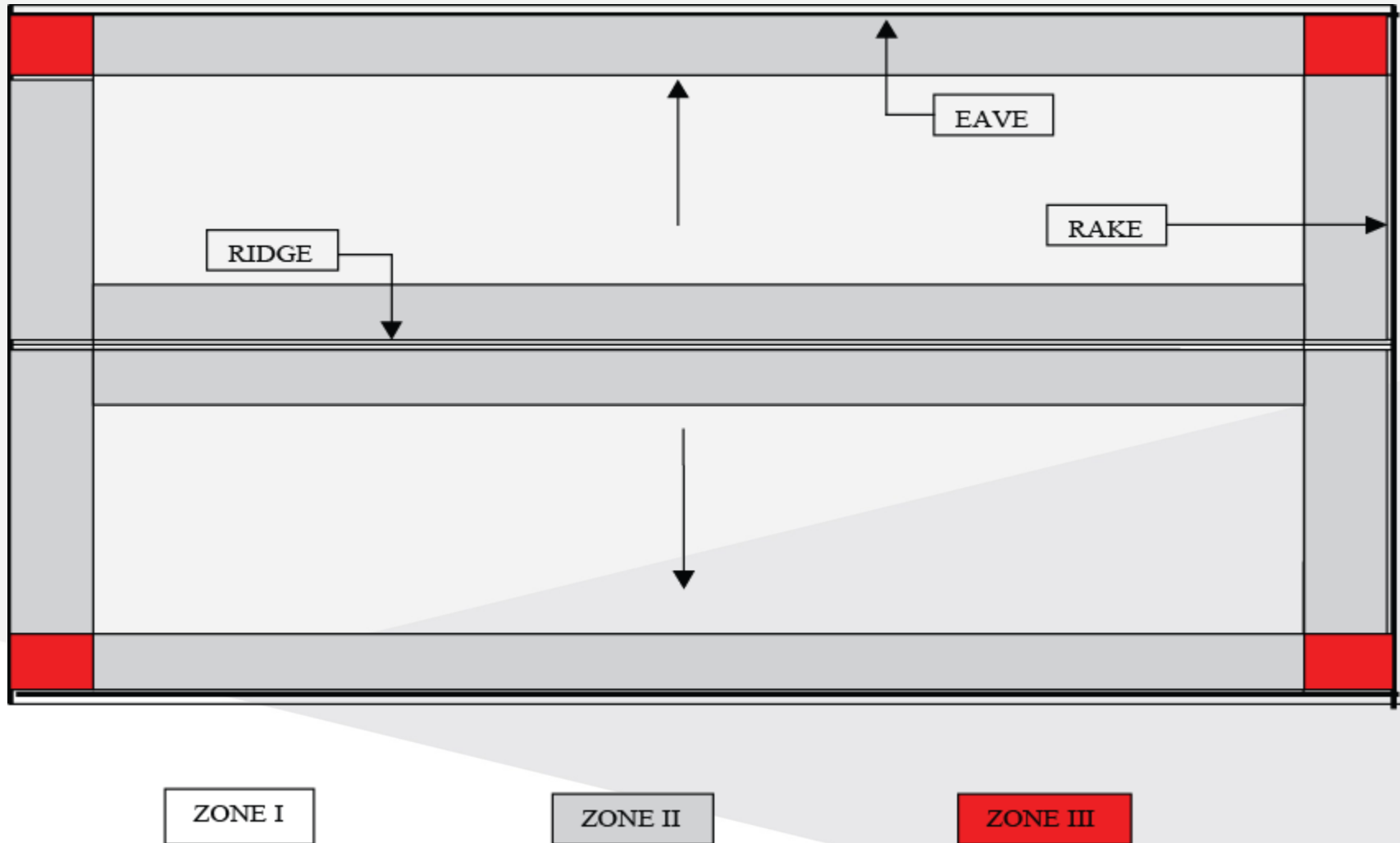
- ❖ Panel Length Based On Number And Length Of Clip Spacings
- ❖ Panel End(s) Fastened based on Panel Length
- ❖ Evaluates Panels And Clips, But Not Attachment To Substructure
- ❖ Tests To Ultimate Failure

Design & Testing





Corp of Engineers Roof Zoning

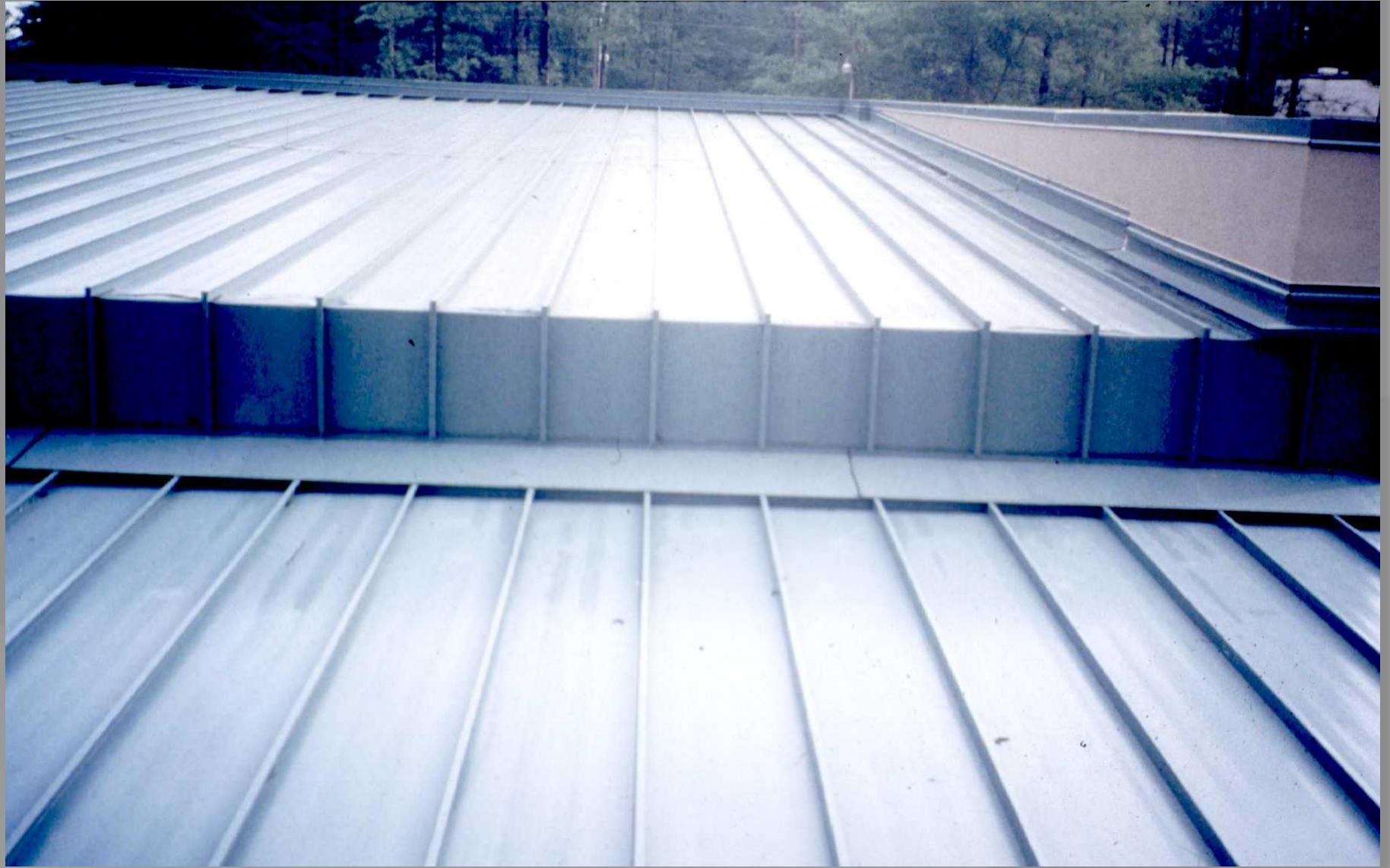


Special Details

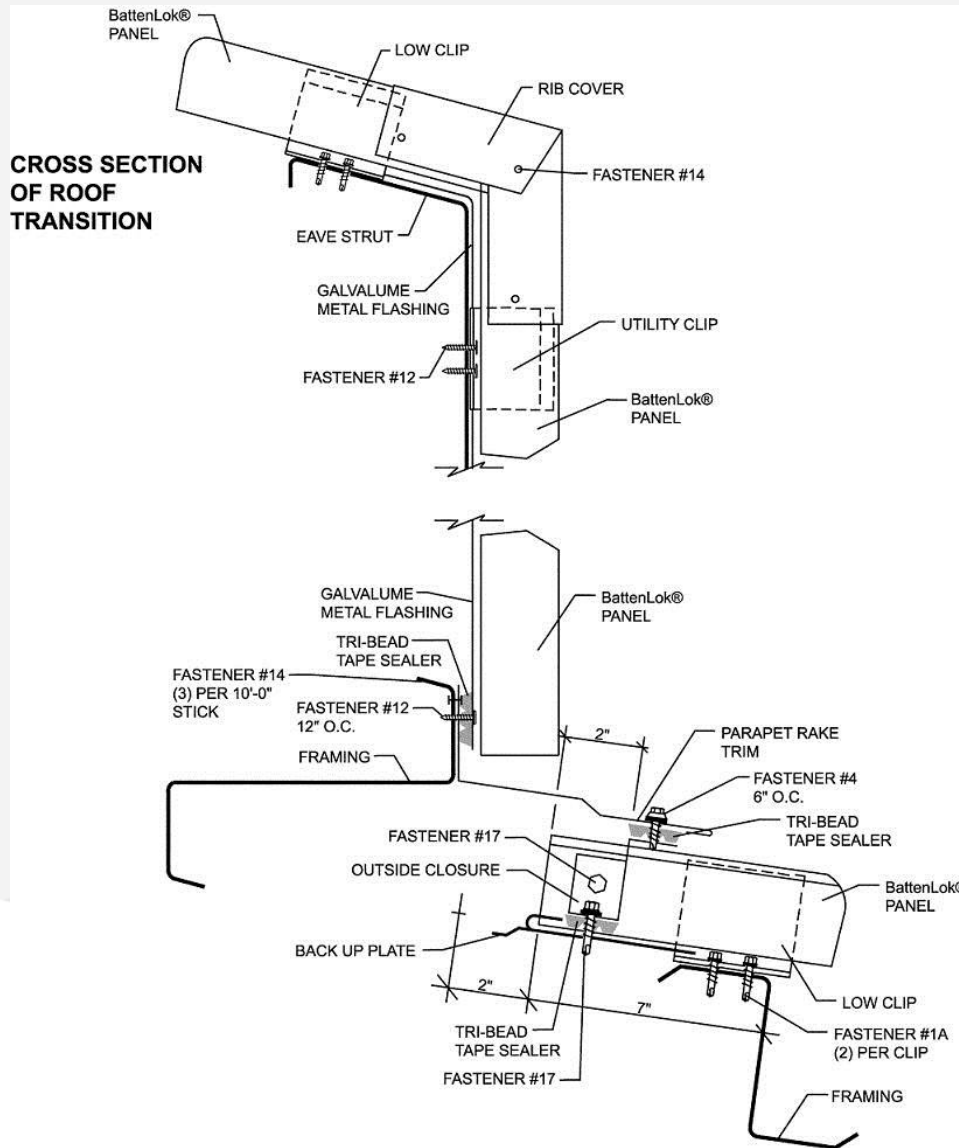
Design Conditions That Require Special Attention

- ❖ Roof Transitions
- ❖ Dead Valleys
- ❖ Dormers
- ❖ Eave Offsets
- ❖ Ridge Offsets
- ❖ Crickets

Roof Transitions



Roof Transition



Dead Valleys



Dead Valleys



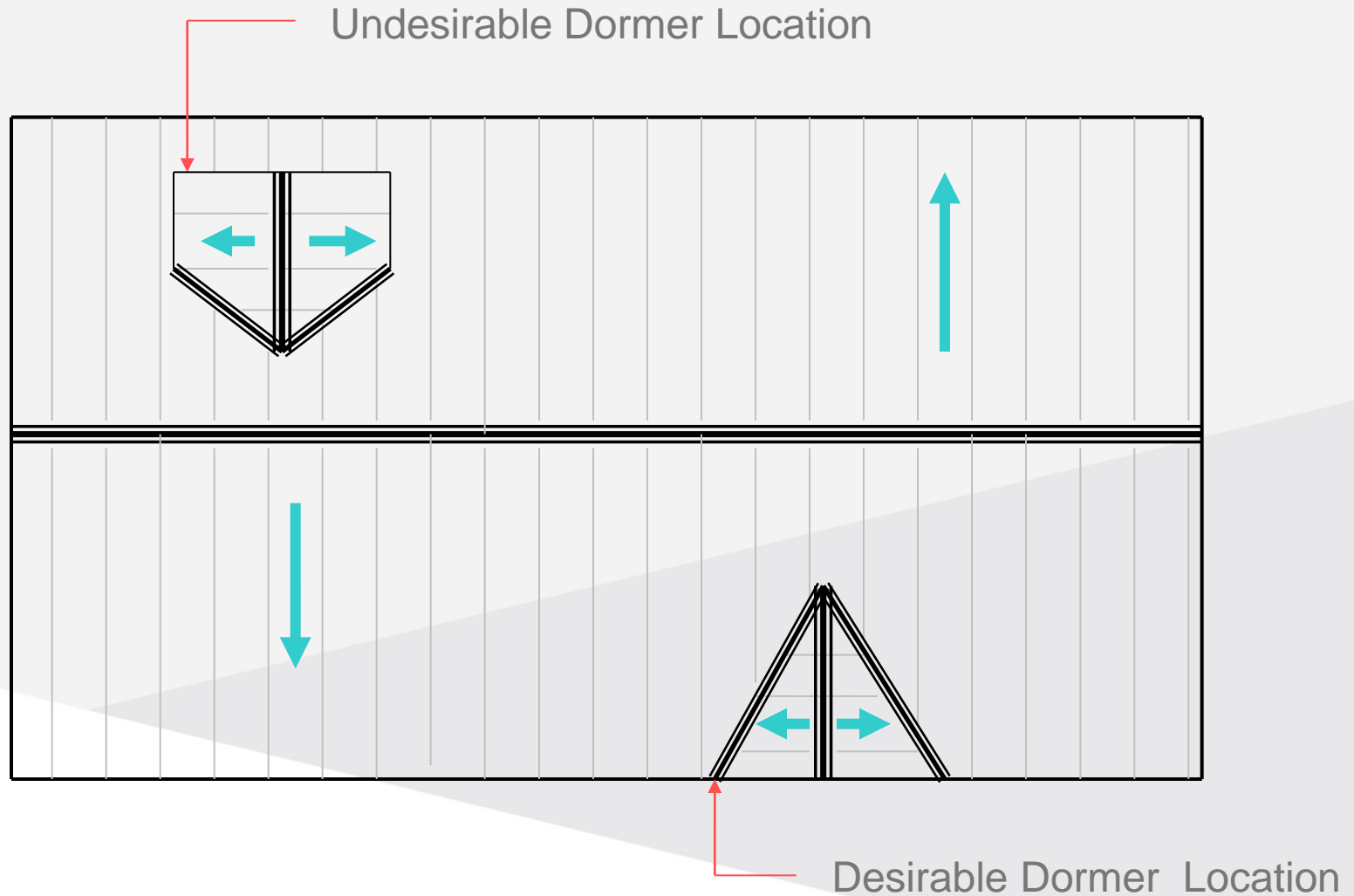
Dead Valleys



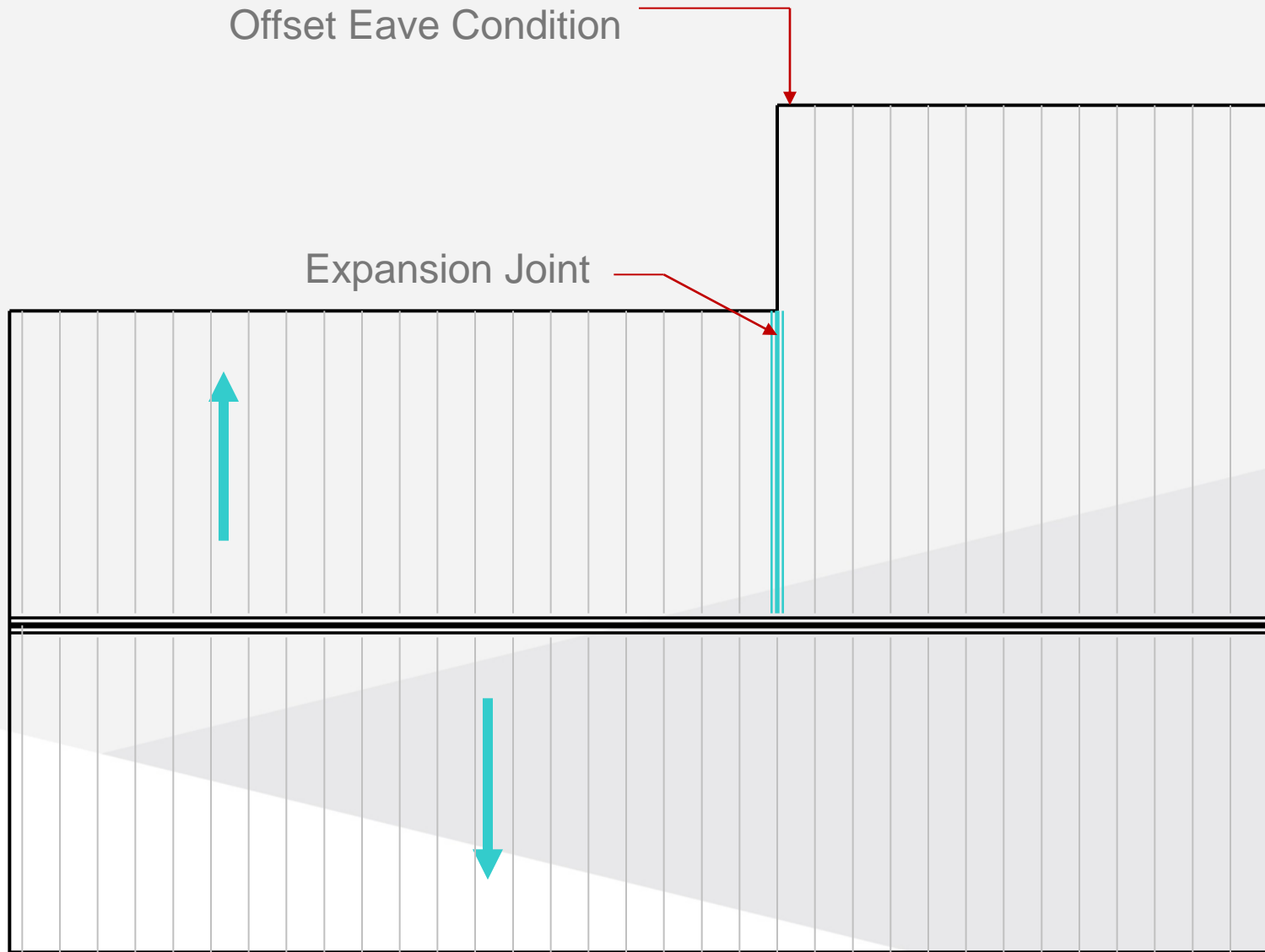
Dead Valleys



Roof Dormers



Offset Eave Conditions



Offset Eave Conditions



Offset Eave Conditions



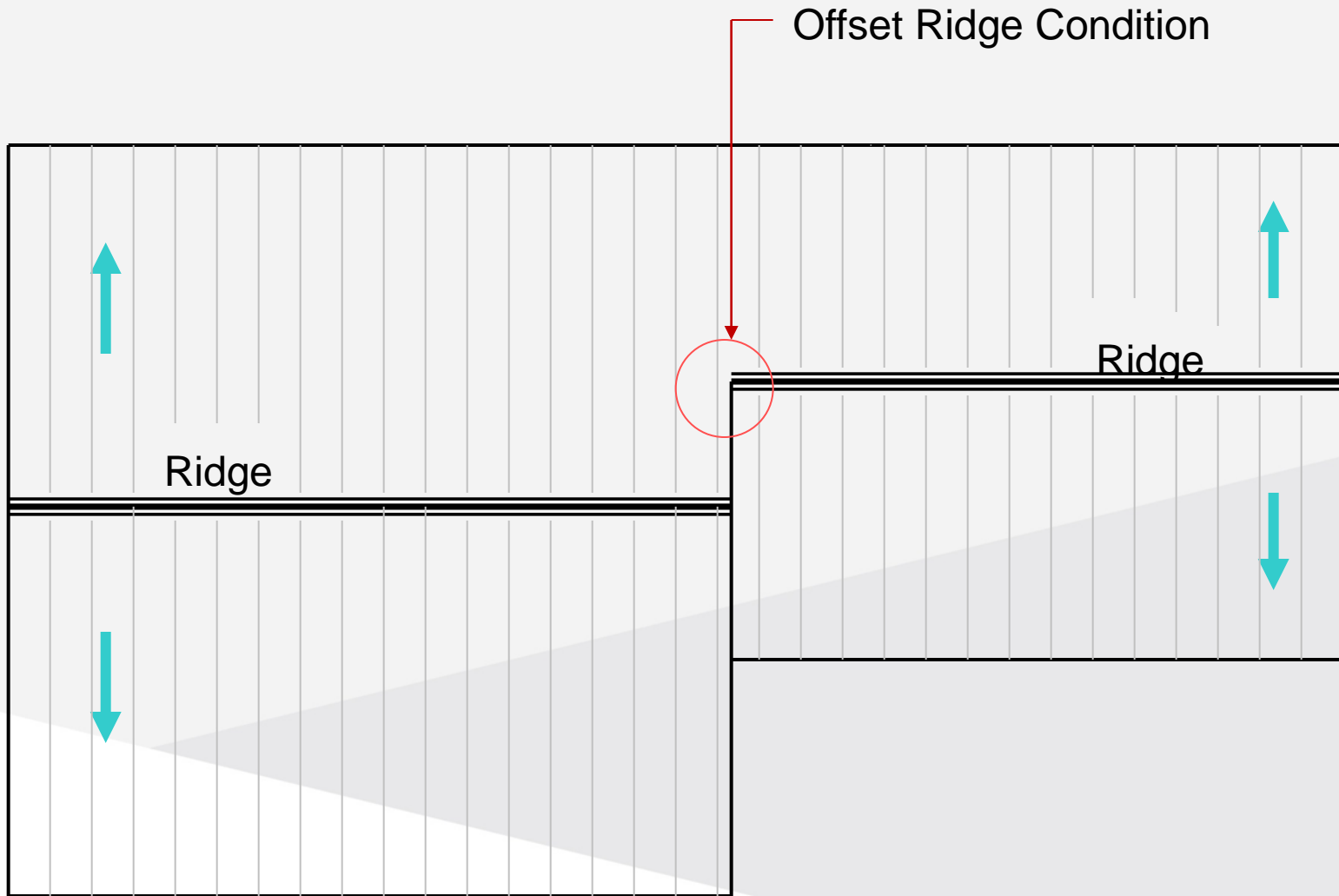
Offset Eave Conditions



Offset Eave Conditions



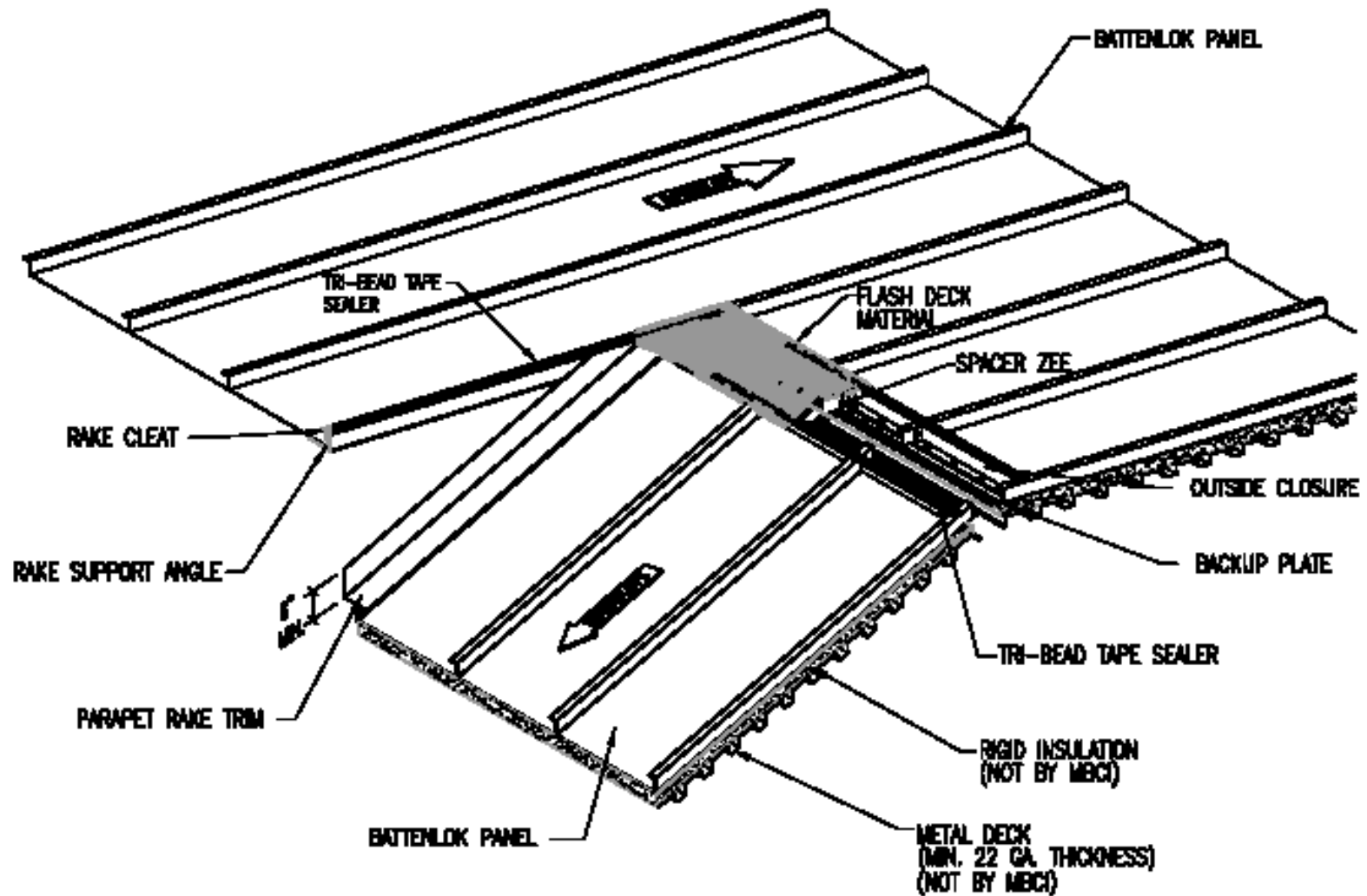
Offset Eave Conditions



Offset Ridge Conditions



Offset Ridge Conditions



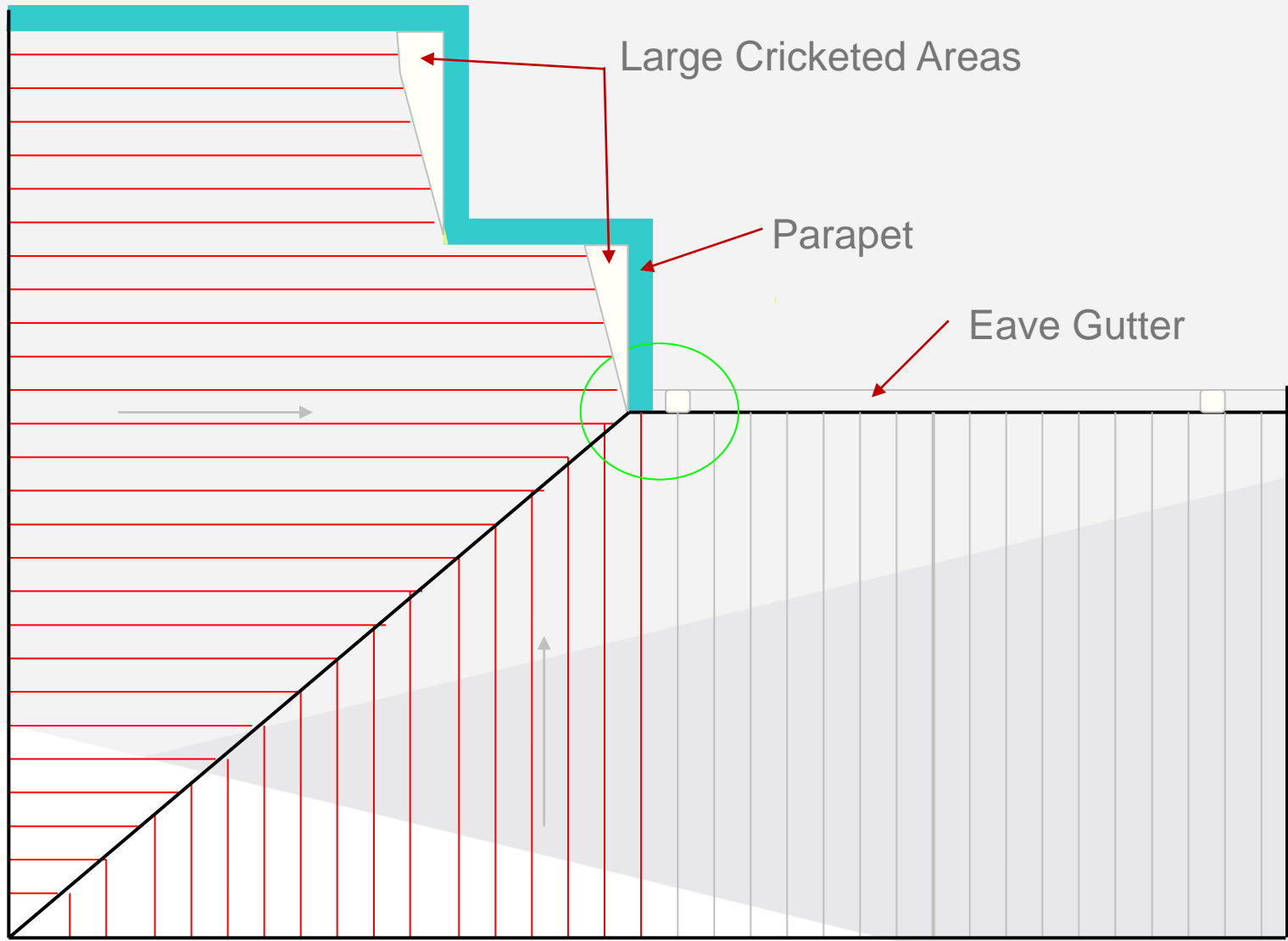
Offset Ridge Conditions



Cricket



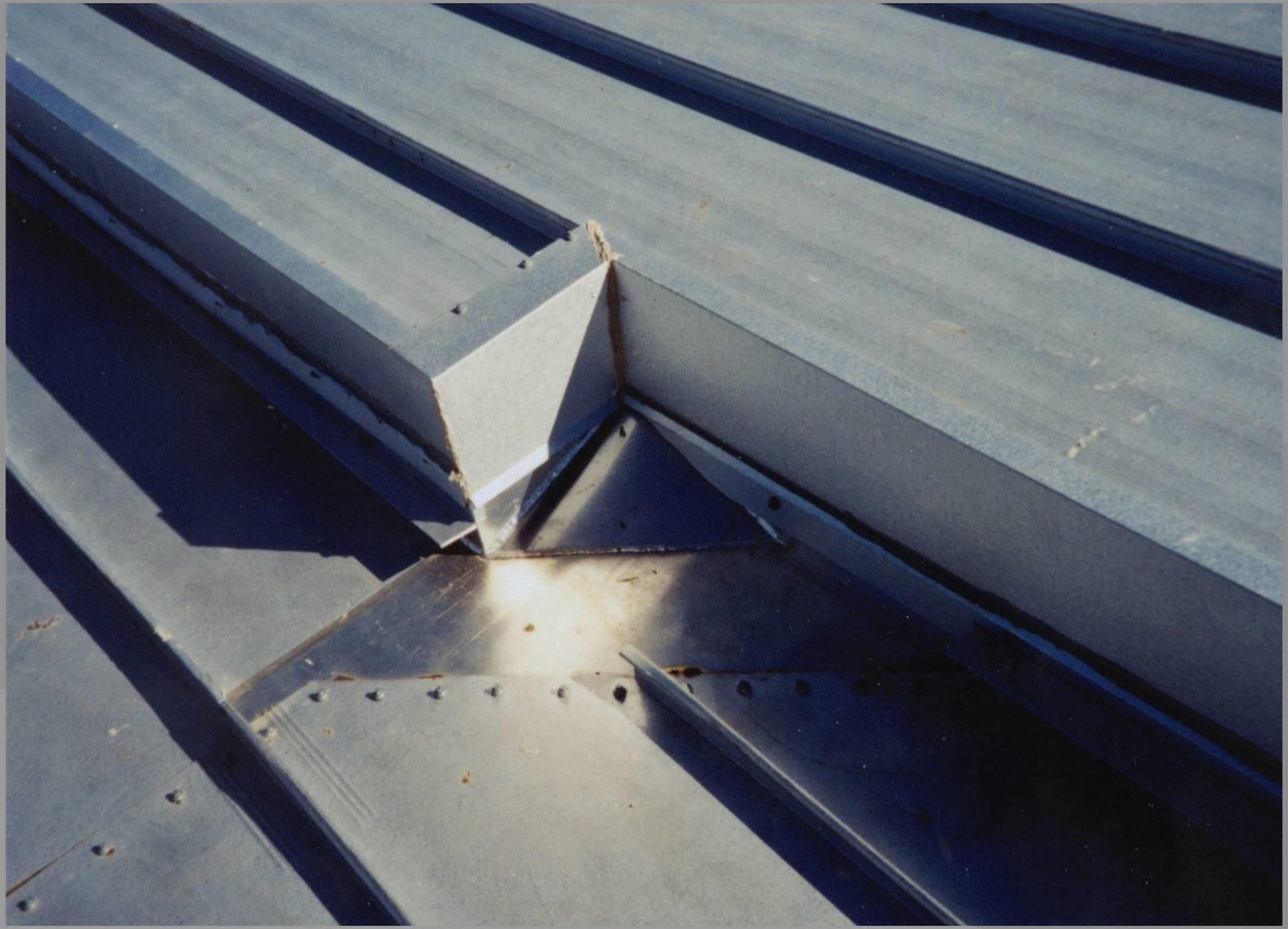
Crickets



Crickets



Cricket



Cricket



Roof Penetrations

Curbs

- ❖ Roofer To Furnish And Install
- ❖ Made From Aluminum
- ❖ Over/Under, Rib-To-Rib Style
- ❖ Provide Clearance At Sides And Upslope End

Curbs



Curbs



Curbs



Curbs



Roof Penetrations

Pipe Penetrations

- ❖ Roofer To Furnish And Install
- ❖ Use Rubber Roof Jacks
- ❖ Don't Cut Through Panel Seam
- ❖ Don't Block Water Flow

Pipe Penetrations



Pipe Penetrations



Pipe Penetrations



Pipe Penetrations



Pipe Penetrations



Pipe Penetrations



Warranties

- ❖ Galvalume Substrate
- ❖ Finish Warranties
 - Silicone Polyester - 25 years
 - Fluoropolymers -(Kynars) - 25 years
- ❖ Weathertightness Warranties
 - Industry Standard
 - “Day One” Responsibility

Industry Standard Warranties

- ❖ Installer is responsible for warranty work until roof has been leak-free for 24 consecutive months
(Manufacturer has no liability until this occurs)
- ❖ Installer is responsible for proper installation of the roof system for the full warranty term
- ❖ Most do not require a certified installer to be present during roof installation

“Day One” Warranty

- ❖ Requires certified installer on job at all times
- ❖ Requires minimum of three field inspections during installation by an independent or qualified roof consultant
- ❖ Inspection reports determine if action is required early on in the roof application
- ❖ Manufacturer is responsible for all warranty work from date of substantial completion

Specification Language

- ❖ The roofing manufacturer shall have the **SOLE AND EXCLUSIVE** obligation for all warranty work commencing on the date of substantial completion
- ❖ During the warranty period, the roofing manufacturer shall take appropriate action to cause any non-performing portions of the Roof System to perform their proper functions
- ❖ Submit specimen copy of W/T warranty, including evidence of application for warranty and manufacturer's acceptance of the applicator and warranty conditions

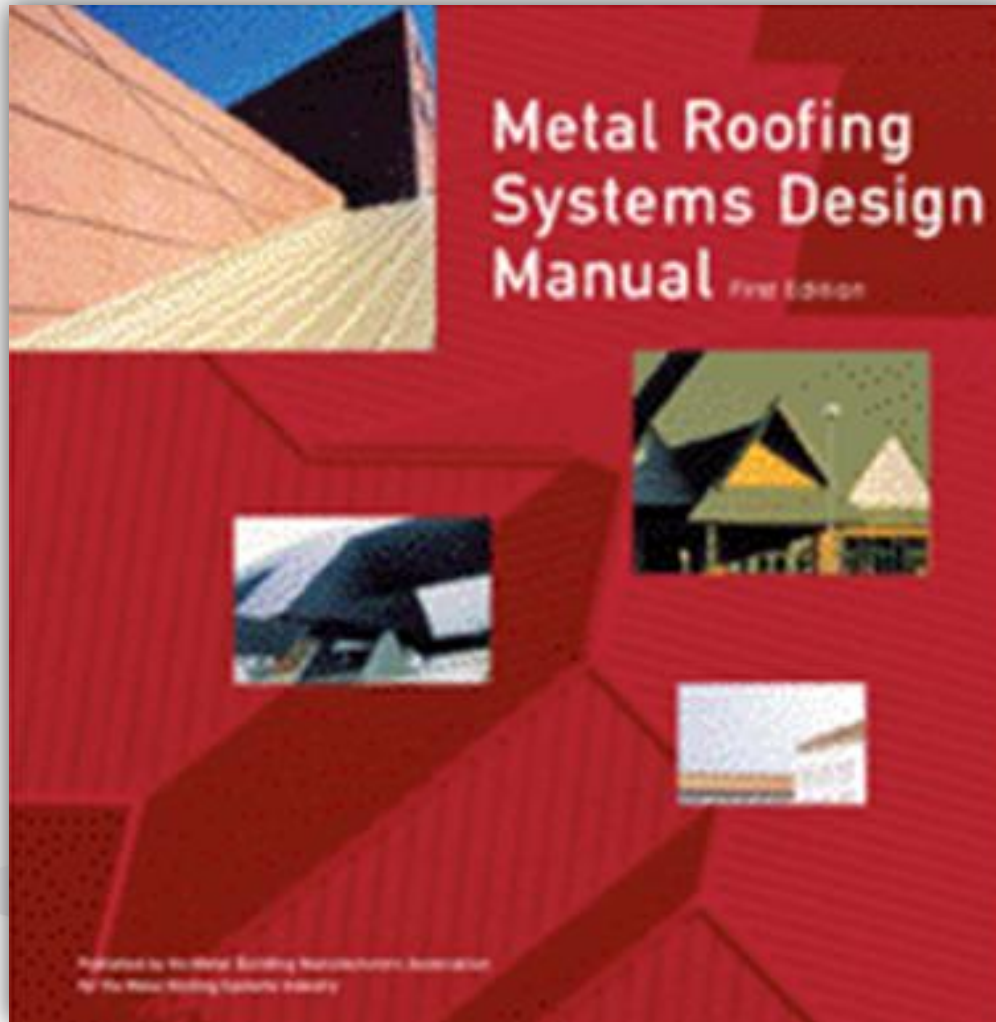
Uplift Testing Summary

- ❖ Do not use section properties to design standing seam roofs for wind uplift
- ❖ Use UL 90 for product comparison only
- ❖ Use ASTM E-1592 to design standing seam roofs for wind uplift

Warranty Summary

- ❖ Read and become familiar with manufacturer's standard warranty offerings
- ❖ If you do specify a "Day One" type warranty, make sure you are getting what you specified
- ❖ If the Architectural Community embraces this warranty, then all manufacturers will adopt the same or similar warranty
- ❖ **Get the Manufacturer Involved during the design stage!!**

Metal Roof Systems Design Manual



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QUESTIONS?

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- ❖ The Devil Is In The Details - 1 Hr
- ❖ Standing Seam Roof Design Details & Weathertightness - 3 Hr
- ❖ Insulated Metal Panels – 1Hr
- ❖ Retrofit Roof Systems – 1 Hr
- ❖ Retrofit Metal Roof Systems-Ensuring A Successful Project – 3 Hr
- ❖ A Review Of Metal Panel Warranties – 1 Hr



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