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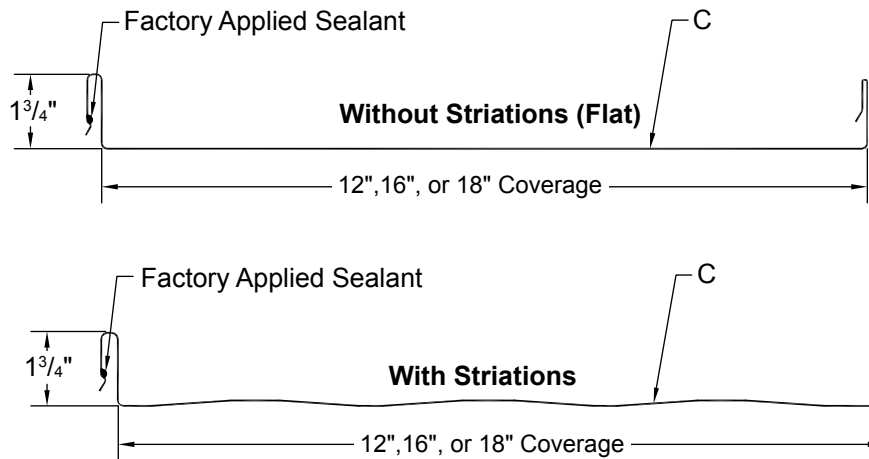
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VERTICAL SEAM PANEL OVERVIEW

PANEL PROFILES



SLOPE

The minimum recommended slope for any Vertical Seam roofing panel is 3:12.

SUBSTRATE

Vertical Seam is designed to be utilized over solid substrate, but can easily be used over an open structural framing. The recommended substrate is 5/8" plywood with a 30 pound felt moisture barrier. To avoid panel distortion, use a properly aligned and uniform substructure.

COVERAGE

Vertical Seam panels are available in a 12", 16", and 18" width with a 1 3/4" rib height.

LENGTH

Lengths under 5'-0" are available with some cutting restrictions. Maximum recommended panel length is 45'-0". Longer panels require additional consideration in packaging, shipping, and erection. Please consult your Metal Sales branch for recommendations (see PGI-2 and 3 for locations).

AVAILABILITY

Vertical Seam panels are available in 26, 24, and 22 gauge. Minimum quantities may apply.

APPLICATION

Commercial, Architectural, and Residential panel.

PERFORMANCE TEST

UL 580, ASTM E-1592, ASTM E-1646, ASTM E-1680, UL 790, UL 2218, UL 263, Texas Department of Insurance, Miami-Dade County.

FASTENING SYSTEM

Concealed Clip System.

FASTENERS

The fastener selection guide should be consulted for choosing proper fasteners for specific applications. Quantity and type of fastener must meet necessary loading and code requirements (see PGI-12-14).

MATERIALS

Steel grade 50, Per ASTM-A792

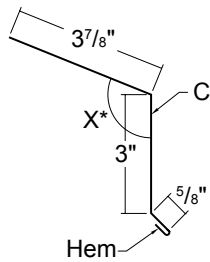
FINISH

- ▶ *Acrylic Coated Galvalume® (ACG) / ASTM A-792 - AZ55
- ▶ Prepainted Galvalume / ASTM A-792 - AZ50
- ▶ **Fluorocarbon (PVDF)

* Differential appearance of Acrylic Coated Galvalume roofing materials is not a cause for rejection.

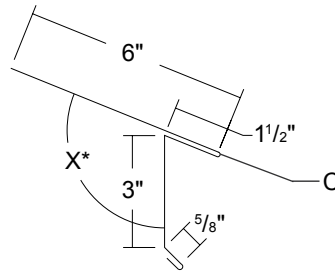
** Meets both Kynar 500 and Hylar 5000 specifications.

EAVE



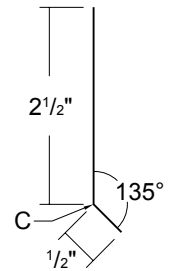
Length 10'-2" - *Specify Slope Angle

EXTENDED EAVE



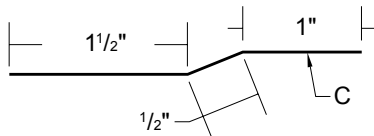
Length 10'-2" *Specify Slope Angle

CLEAT



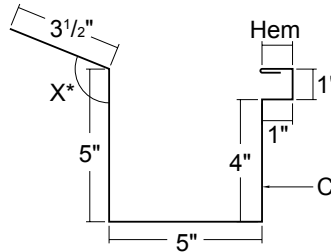
Length 10'-2"

OFFSET CLEAT



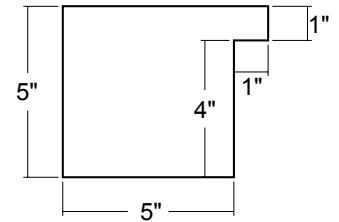
Length 10'-2"

BOX GUTTER

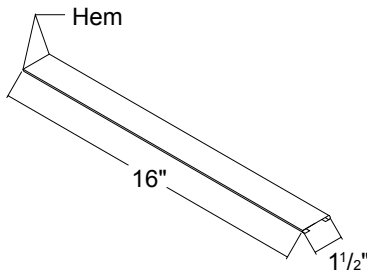


Length 10'-2", 20'-3" - *Specify Slope Angle

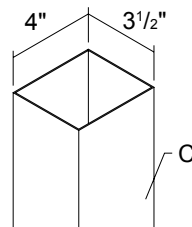
BOX GUTTER END



**UNIVERSAL GUTTER/
DOWNSPOUT STRAP**

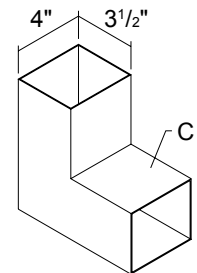


DOWNSPOUT 4" x 3 1/2"



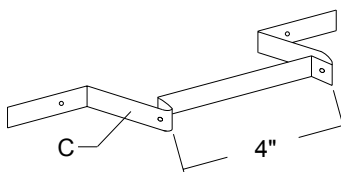
Length 10'-2", 20'-3"
(Also available 6" x 4")

95° ELBOW 4" x 3 1/2"



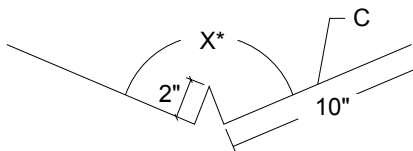
(Also available 6" x 4")
(Also available in 45°)

DOWNSPOUT BRACKET



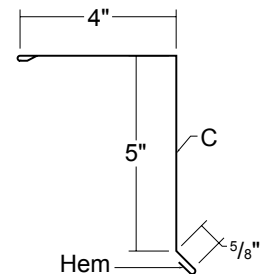
(Also available 6")

VALLEY



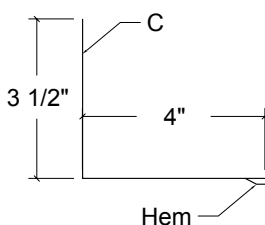
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RAKE



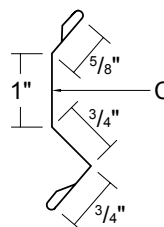
Length 10'-2", 20'-3"

RAKEWALL



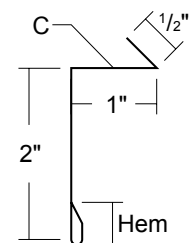
Length 10'-2", 20'-3"

COUNTER FLASHING



Length 10'-2"

REGLET FLASHING

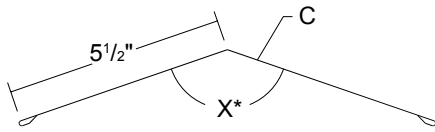


Length 10'-2"

VERTICAL SEAM

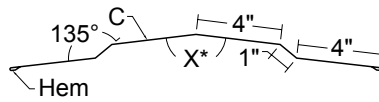
FLASHING PROFILES (CONT.)

11" RIDGE/HIP COVER



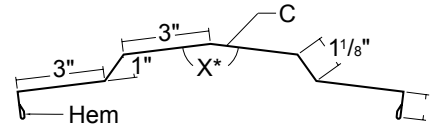
Length 10'-2", 20'-3" - *Specify Slope Angle

SSR RIDGE



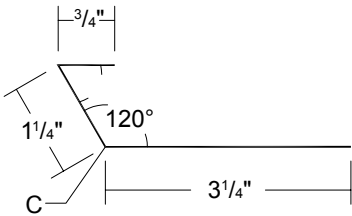
Length 10'-2", 20'-3" - *Specify Slope Angle

VENTED RIDGE COVER



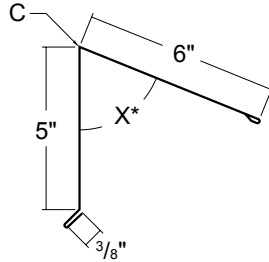
Length 10'-2", 20'-3" - *Specify Slope Angle

VENT DRIP



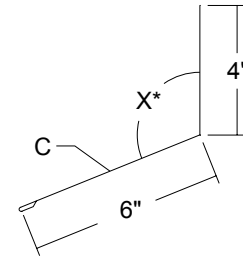
Length 10'-2"

PEAK



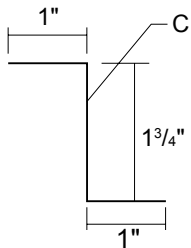
Length 10'-2", 20'-3" - *Specify Slope Angle

PITCH BREAK



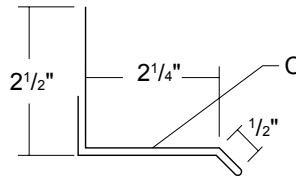
Length 10'-2", 20'-3" - *Specify Slope Angle

Z-CLOSURE



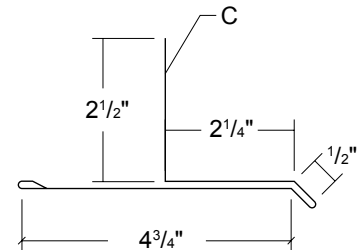
Length 10'-2"

2.25" SILL/HEAD



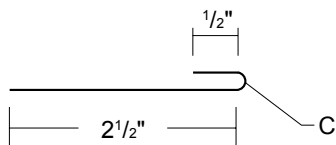
Length 10'-2", 20'-3"

2.25" SILL TO SOFFIT



Length 10'-2", 20'-3"

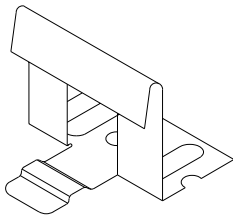
STARTER



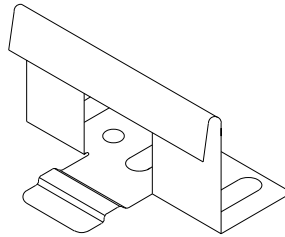
Length 10'-2"

C- Indicates color side of flashing.

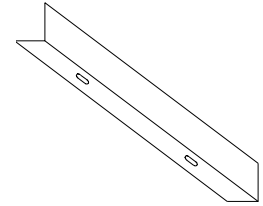
VERTICAL SEAM CLIP



**VERTICAL SEAM
UL-90 CLIP**

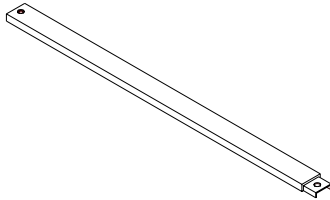


FLOATING RAKE ANGLE



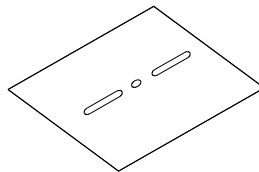
Length 10'-0"
Height 1 3/4"
Galvanized

BACK-UP CHANNEL



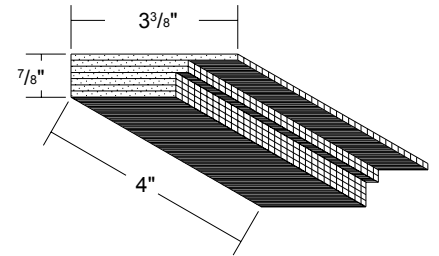
Length 48" and 72"
Galvanized

BEARING PLATE

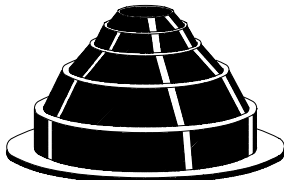


4" X 5"

VENT MATERIAL

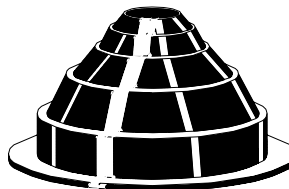


RUBBER ROOF JACK



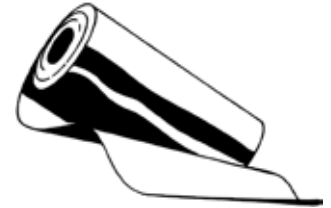
MINI (1/4" to 1 1/8" O.D. Pipe)
#2 (1 3/4" to 3" O.D. Pipe)
#4 (3" to 6" O.D. Pipe)
#6 (6" to 9" O.D. Pipe)
#8 (7" to 13" O.D. Pipe)

RETRO ROOF JACK



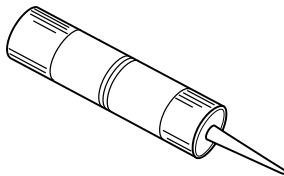
#801_{RETRO} (3/4" to 2 3/4" O.D. Pipe)
#802_{RETRO} (2" to 7 1/4" O.D. Pipe)
#803_{RETRO} (3 1/4" to 10" O.D. Pipe)

**RUBBER ROOF
FLASH KIT**



12" x 50'-0" Flash Kit
18" x 50'-0" Flash Kit

TUBE SEALANT



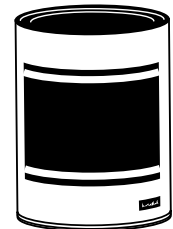
10.3 oz. Cartridge
Urethane

TAPE SEALANT



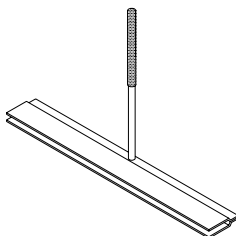
7/8" X 3/16" X 25'
Double Bead
Butyl - Gray

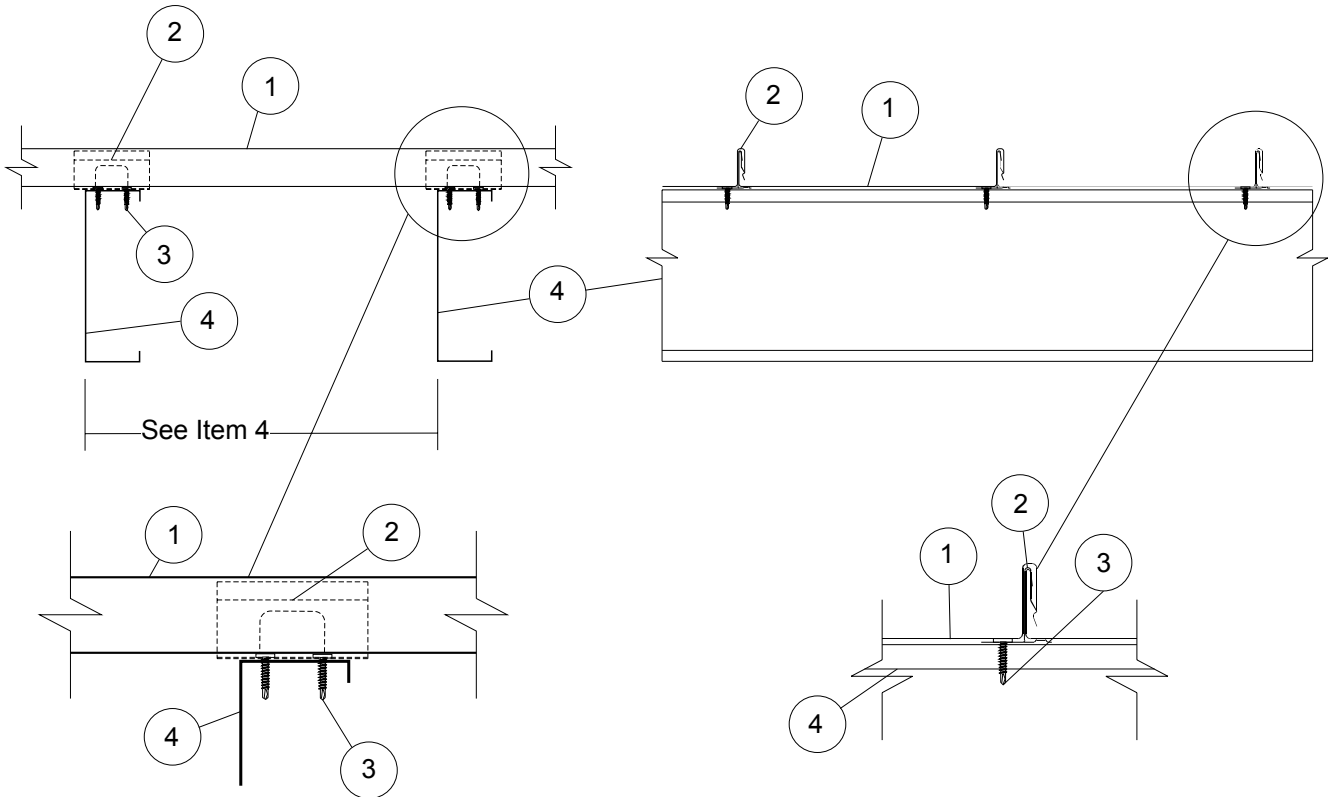
TOUCH-UP PAINT



Available in Pints
PVDF / MS Colorfast45

**METAL PANEL
HEMMING TOOL**





VERTICAL SEAM

Construction No. 254
 February 05, 2002
 Uplift - Class 90
 (See Item No. 4)
 Fire Not Investigated

1. Metal Roof Deck Panels * No. 22 MSG or No. 24 MSG min thickness coated steel panels. Panels 12 in. wide, 1-3/4 in. high at the ribs. Panels continuous over two or more spans. A bead of sealant may be used at panel side joints.
 METAL SALES MANUFACTURING CORPORATION - "Vertical Seam"

2. Roof Deck Fasteners * (Panel Clips) One piece assembly, 3-1/2 in. wide, 1-7/8 in. high, thickness 0.048 in. One panel clip located at each purlin intersection.
 METAL SALES MANUFACTURING CORPORATION - "Vertical Seam Clip"

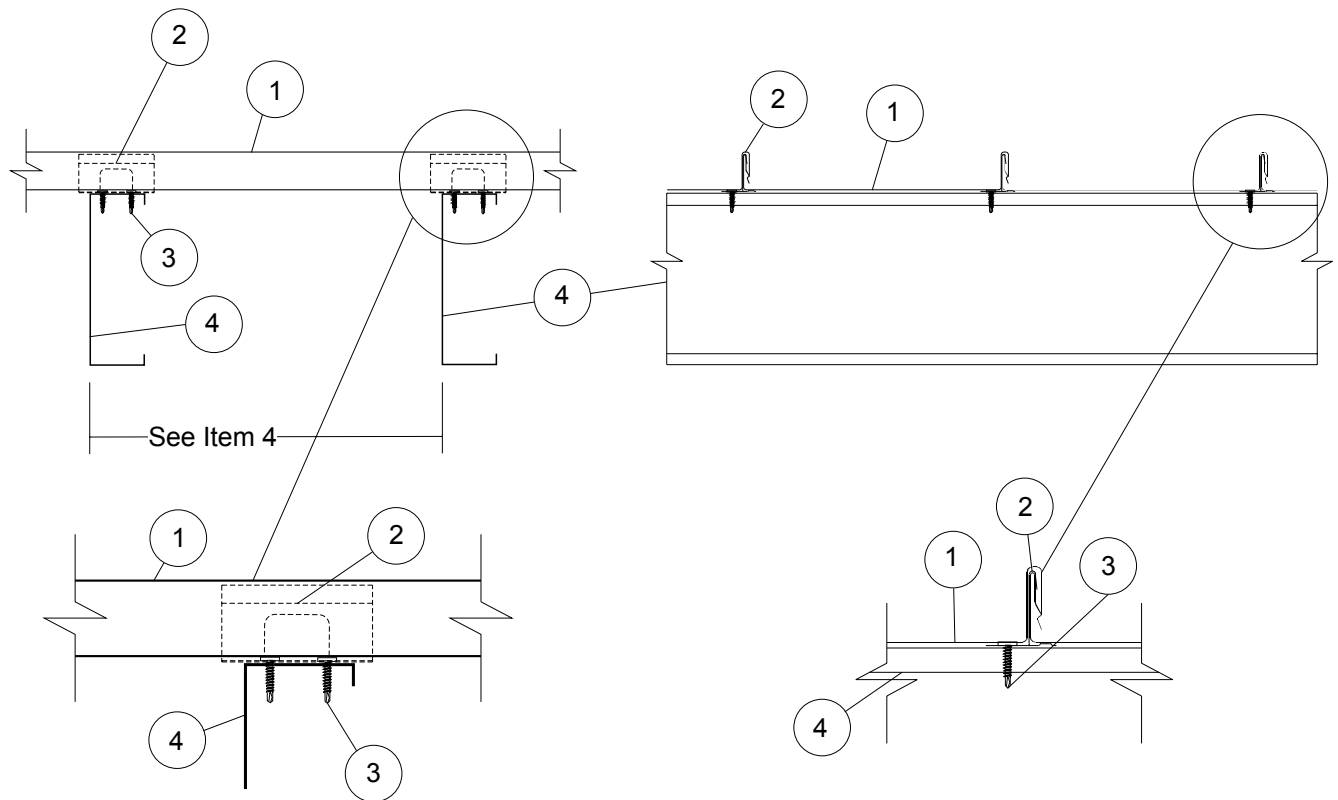
3. Panel Fasteners (Screws) Fasteners used to attach panel clips (Item 2) to purlins to be No. 10-16 by 1 in. long No. 3 self-drilling point, No. 2 Phillips drive head, plated steel screws. Two screws per clip to be used inserted through 1/4 in. diameter guide holes.

4. Purlins No. 16 MSG min thickness steel (50,000 psi min yield strength).
 Spacing - For 22 MSG thickness panels - 60 in. OC
 For 24 MSG thickness panels - 48 in. OC



Underwriters Laboratories Inc. ®

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VERTICAL SEAM

Construction No. 255

January 30, 2002

Uplift - Class 90 and 60

(See Item No. 4)

Fire Not Investigated

1. Metal Roof Deck Panels* No. 24 MSG min thickness coated steel. Panel width 18 in. max., 10 in. min. Rib height 1-3/4 in. at female side. Panels continuous over two or more spans. A bead of sealant may be used at panel side joints. METAL SALES MANUFACTURING CORPORATION - "Vertical Seam".

2. Roof Deck Fasteners* (Panel Clips) - One piece assembly, 3-1/2 in. wide, 1-7/8 in. high. One panel clip located at each purlin intersection. METAL SALES MANUFACTURING CORPORATION - "Vertical Seam Clip".

3. Panel Fasteners (Screws) Fasteners used to attach panel clips (Item 2) to purlins to be No. 10-16 by 1 in. long plated pancake head No. 2 phillips drive, No. 3 self-drilling point steel screws. Two screws per clip to be used inserted through 1/4 in. diam guide holes.

4. Purlins No. 16 MSG min thickness steel (50,000 psi min yield strength). Spacing for Class 90 to be 48 in. OC; For Class 60 to be 60 in. OC

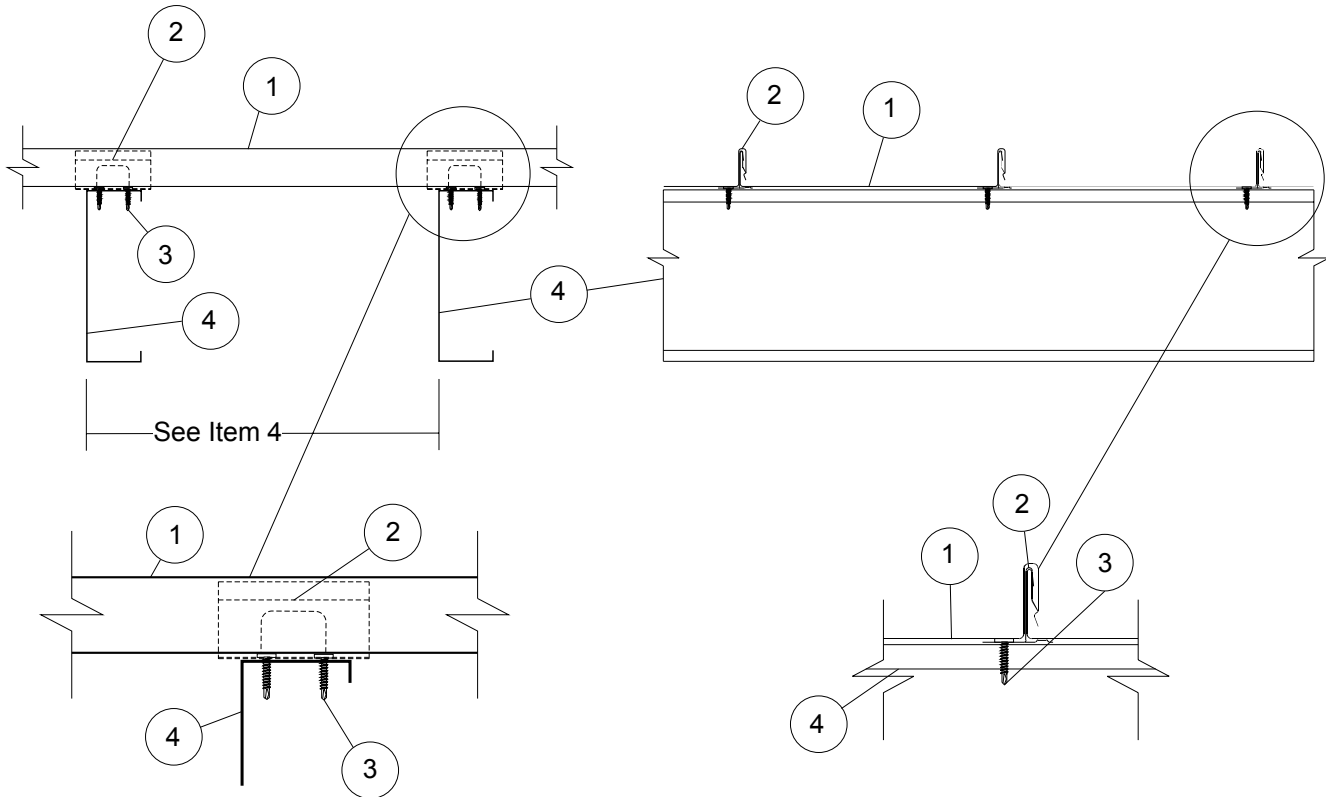
Refer to General Information Roof Deck Constructions for items not evaluated.

*Bearing the UL Classification Mark



Underwriters Laboratories Inc. ®

LISTED



VERTICAL SEAM

Construction No. 261
 January 30, 2002
 Uplift - Class 90 or 60
 Fire Not Investigated
 (See Item No.4)

1. Metal Roof Deck Panels* 0.032 in. thick aluminum or No. 24 MSG min thickness coated steel. Panels 10-1/2 in. wide, 1-3/4 in. high at the ribs. Panels continuous over two or more spans. A bead of sealant may be used at panel side joints.

METAL SALES MANUFACTURING CORPORATION - "Vertical Seam"

2. Roof Deck Fasteners* (Panel Clips) One piece assembly, 3-1/8 in. wide, 1-7/8 in. high. One panel clip located at each purlin intersection. Min thickness 0.048 in. (No. 18 MSG).

METAL SALES MANUFACTURING CORPORATION - "Vertical Seam Clip"

3. Panel Fasteners (Screws) Fasteners used to attach panel clips (Item 2) to purlins to be No. 10-16 by 1 in. long, cadmium plated, pancake head, No. 2 phillips drive, No. 3 self-drilling point. Two screws per clip to be used inserted through 1/4" diameter guide hole in clip base.

4. Purlins No. 16 MSG min thickness steel (50,000 psi min yield strength).

Spacing: For aluminum panels: For Class 90 to be 36 in. O.C. For Class 60 to be 48 in. O.C. For steel panels: 22 MSG thick to be 60 in. O.C. 24 MSG thick to be 48 in. O.C.

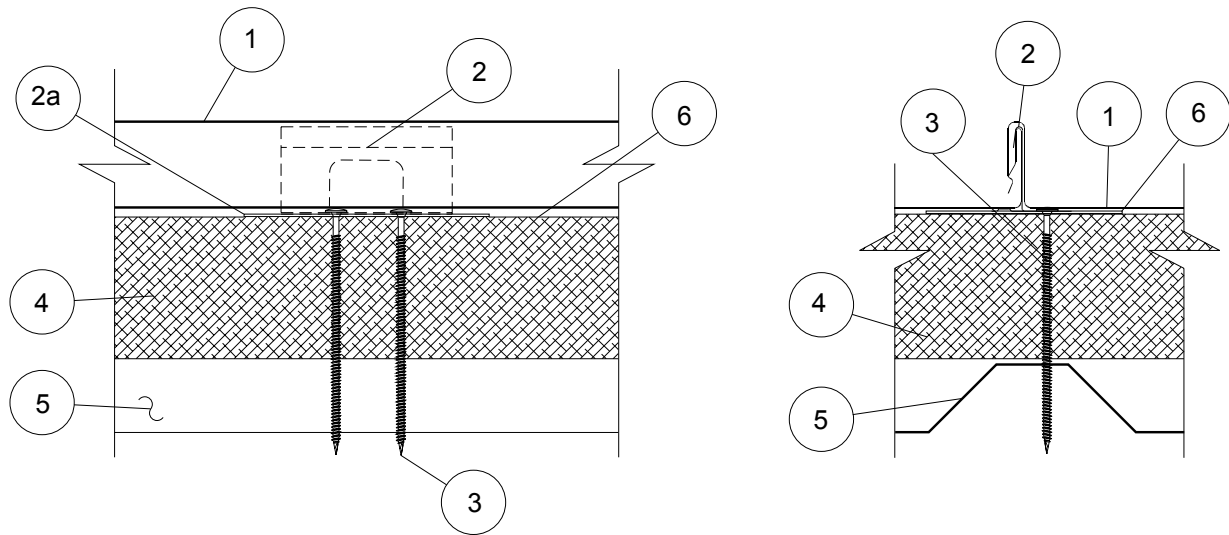
Refer to General information, Roof Deck Constructions (Roofing Materials and Systems Directory) for items not evaluated.

*Bearing the UL Classification Mark



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LISTED



VERTICAL SEAM

Construction No. 303
 January 30, 2002
 Uplift - Class 90
 Fire Not Investigated

1. Metal Roof Deck Panels* No. 24 MSG min thickness coated steel. Panel width 18 in. max., 10 in. min. ribs height 1-3/4 in. at female side. Panels continuous over three or more clips with no end laps. A bead of sealant may be used at panel side joints.
 METAL SALES MANUFACTURING CORPORATION - "Vertical Seam"

2. Roof Deck Fasteners* (Panel Clips) One piece assembly, No. 24 MSG min thickness, 3-1/2 in. wide, 1-15/16 in. high. Clip spacing to be 48 in. OC. Clips to interface with Item 2A (bearing plate).
 METAL SALES MANUFACTURING CORPORATION - "Vertical Seam Clip"

2A. Roof Deck Fasteners* (Bearing Plate) One piece assembly, No. 24 MSG min thickness steel, 4-1/2 in. wide, 6 in. long.

2D. Bearing Plate (Not Shown) - To be used with "Vertical Seam Clip" only (Item 2) - Flat plate, 4-1/2 in. wide, 6 in. long fabricated from No. 24 MSG coated steel. Two 1/4 in. diameter guide holes located to accommodate panel clip screw fasteners. (33,000 psi min yield strength).

3. Panel Fasteners - (Screws) Fasteners used to attach panel clips and bearing plates (Items 2 & 2A) through rigid insulation and optional OSB and/or gypsum board and into light gauge steel deck (Item No. 5) to be No. 14 truss head type with No. 3 Phillips drive, self-drilling steel screws. Two screws per clip to be used, inserted through 1/4 in. diam guide holes. Fasteners to penetrate liner panel 3/4 in. min.

4. Foamed Plastic - (Rigid Insulation) Min thickness 1 in., max thickness 4-1/2 in. Density to be a min of 2 pcf.

4A. Oriented Strand Board (OSB) (Optional) - (Not Shown) - Located over foamed plastic (Item 4). Max thickness 7/16 in. Note: Bearing plates not required when OSB is used.

4B. Gypsum Board (Optional) - Max thickness 5/8 in. Located over liner panel (Item 5).

5. Liner Panel Min thickness No. 22 MSG. Coated steel (33000 psi) min yield strength min depth 1-1/2 in., max pitch 6 in. fabricated to various profiles.

6. Underlayment (Not shown) - One ply of 30 lb roofing felt or one layer of bituminous resin type water proofing membrane.

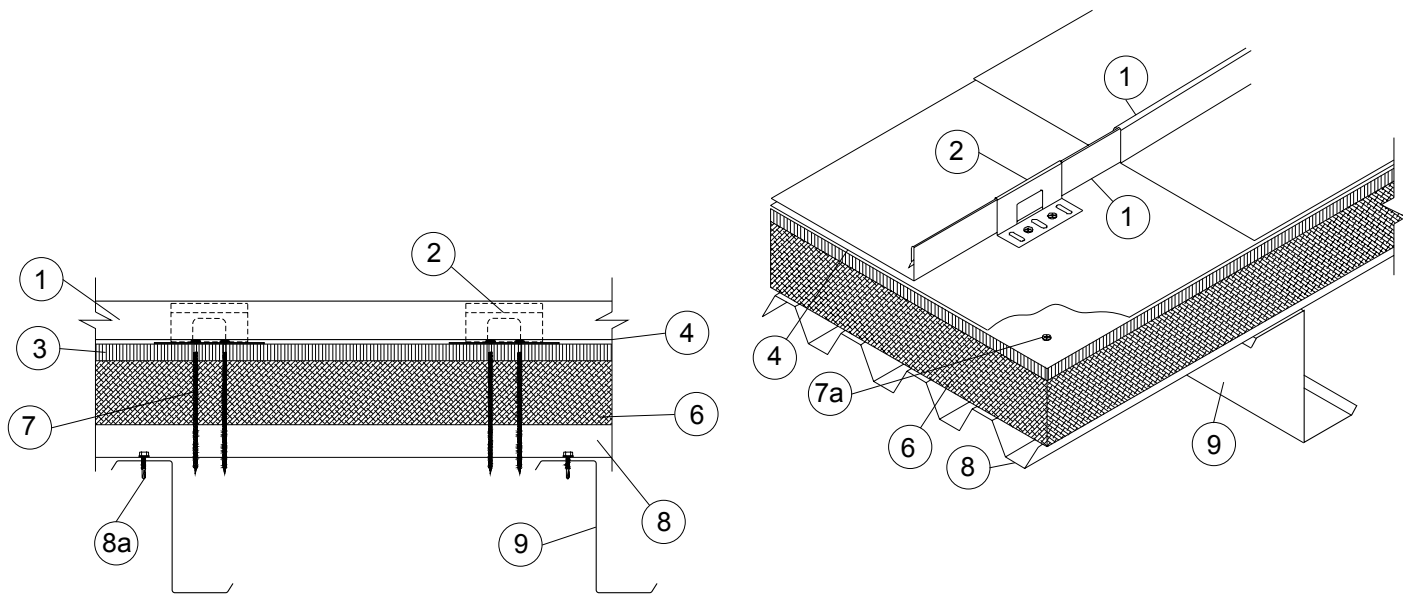
Refer to General information, Roof Deck Constructions (Roofing Materials and Systems Directory) for items not evaluated.

*Bearing the UL Classification Mark



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LISTED



VERTICAL SEAM

Construction No. 342
 October 16, 2001
 Uplift - Class 90
 Fire Not Investigated

1. Metal Roof Deck Panels* No. 24 MSG min gauge coated steel. Panel width 18 in. max., 10 in. min. Rib height 1-3/4 in. at female side. A bead of sealant may be used at panel side joints. Panels continuous over three or more clips with no end laps.
 METAL SALES MANUFACTURING CORPORATION - "Vertical Seam"

2. Roof Deck Fasteners* (Panel Clips) One piece assembly, No. 24 MSG min thickness, 3-1/2 in. wide, 1-15/16 in. high. Clip spacing to be 48 in. OC.
 METAL SALES MANUFACTURING CORPORATION - "Vertical Seam Clip"

3. Gypsum Board* (Mineral Board) Min thickness 1/2 in. Opposite side edges have a tongue and groove configuration. Butt (end) joints to be staggered and occur over steel deck crests. Wallboard installed perpendicular to steel deck corrugations. LOADMASTER SYSTEMS INC

4. Vapor Barrier (Optional) Installed on top of metal deck (Item 8) or on top of gypsum wallboard (Item 3). Minimum 6 mil plastic sheet.

5. Joint Tape (Not Shown) All wallboard joints shall be taped with 2.5 in. wide joint tape supplied by the manufacturer.

6. Foamed Plastic - (Rigid Insulation) (Optional) - Expanded polystyrene supplied in 4 by 8 ft sheets, min thickness 13/16 in., min density 1.0 pcf, or (Rigid Insulation) Polyisocyanurate supplied in 4 by 8 ft sheets or (Rigid Insulation) Phenolic supplied in 4 by 8 ft sheets. All end joints to be staggered with respect to adjoining rows. All joints to be offset from joints in mineral board (Item 3).

7. Fasteners For attaching panel clips to steel deck to be two 0.140 in. diam threaded shank Phillips, bugle or trumpet head, self-drilling, self-tapping corrosion resistant coated steel screws supplied by roof deck manufacturer. Screws shall penetrate steel deck min 1/2 in.

7A. Fasteners For attaching wallboard to steel deck (Item 8) to be min 0.140 in. diam threaded shank Phillips, bugle or trumpet head, self-drilling, self-tapping, corrosion resistant coated steel screws supplied by the manufacturer. Screws are installed into top corrugations of steel deck through nom 3 by 3 in. corrosion resistant steel roof deck plates, spaced in a pattern as determined by the pitch of the steel deck with the min density of 21 fasteners per 4 by 8 ft sheet (Item 3).

8. Steel Deck Fabricated to various profiles, min yield strength 33,000 psi. Steel deck profile, thickness, support spacing and method of positioning (end and side laps) and fastening deck to supports to be per deck manufacturers requirements for uplift loading.

8A. Deck Fasteners Steel deck panels to be fastened to structural supports and at laps using ARC spot welds with weld washers or screw fasteners per deck manufacturer's requirements for uplift loading.

9. Purlins 16 MSG min gauge steel (min yield strength 50,000 PSI) or min Type H open web joists.

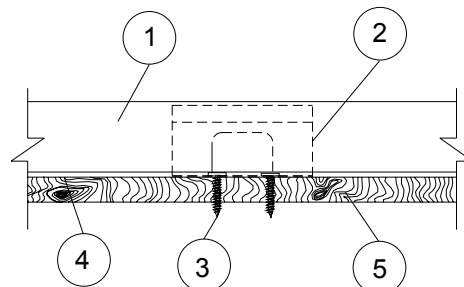
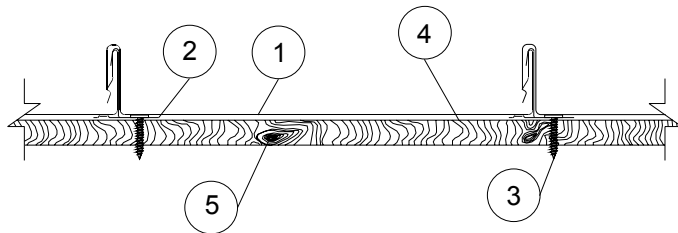
Refer to General information, Roof Deck Constructions (Roofing Materials and Systems Directory) for items not evaluated.

*Bearing the UL Classification Mark



Underwriters Laboratories Inc.®

LISTED



Construction No. 343
 December 07, 2001
 Uplift - Class 90
 Fire Not Investigated

1. Metal Roof Deck Panels* No. 24 MSG min coated steel. Panel width 18 in. max., 10 in. min. Rib height 1-3/4 in. at female side. Panels continuous over three or more clips with no endlaps. A bead of sealant may be used at panel side joints.

METAL SALES MANUFACTURING CORPORATION - "Vertical Seam"

2. Roof Deck Fasteners*(Panel Clips) One piece assembly, 3-1/2 in. wide, 1-7/8 in. high. Min thickness No. 18 MSG. Clips spaced 36 in. OC, max, fastened to plywood deck.

METAL SALES MANUFACTURING CORPORATION - "Vertical Seam Clip"

3. Fasteners (Screws) Fasteners used to attach panel clips (Item 2) to plywood to be No. 10-12 by 1 in. long pancake head, No. 2 Phillips drive, A-point, coated steel screw. Min two fasteners per clip to be used.

4. Underlayment used over plywood deck to be Type 15 or 30 organic felt. Sides overlapped min 2 in., end laps per manufacturer's instructions. Felt nailed to plywood deck with 1-1/4 in. long steel cap nails, located per manufacturer's instructions. Nail spacing to be max 12 in. OC at the side lap and max 24 in. OC in interior rows. **As An Alternate A** self-adhering modified bitumen water proofing membrane may be used, installed per manufacturer's instructions. Note - when alternate is used the plywood joints need not be sealed.

5. Plywood Decking to be graded per PS83 specifications, 19/32 in. thick, exposure 1, APA Rated Sheathing (42/20) square edged. Butt ends not blocked. All butt and side joints to be sealed with a one part urethane caulk sealant applied with a caulking gun and feathered outward from the joint. (Note exception under Item No. 4, Alternate.)

6. Supports (Not Shown)-Spaced max of 24 in. OC. Any of the following types may be used to support the plywood decking:

- a) Nom 2 by 6 in., No. 2 grade or better S-P-F, Hemlock Fir, Douglas Fir or Southern Yellow Pine or equivalent.
- b) Wood trusses with a nom 2 by 4 in. upper chord of the same grade as item a.
- c) No. 22 MSG min cold formed coated steel (min yield to be 33,000 psi).

7. Plywood Fasteners (Not Shown)-Fasteners used to attach the plywood deck to the supports to be as follows:

- a) For plywood-to-wood supports No. 8-18 by 1-7/8 in. long bugle-head steel screws with a No. 2 Phillips drive, a "Hi-Low" thread pattern and an "S-Point".
- b) As an alternate to Item a, 8d common nails may be used.
- c) For plywood-to-steel supports for a steel thickness less than No. 20 MSG No. 7-19 by 1-1/4 in. long bugle-head steel screws with a No. 2 Phillips head drive "Hi-Low" threads and an "S-Point". For a steel thickness greater than No. 20 MSG to No. 16 MSG, No. 6-20 by 1-1/4 in. long bugle-head steel screws with a No. 2 Phillips drive and a S12 (TEK/3) supR point.

Spacing: Fastener spacing for all fastener types to be 6 in. OC at the plywood edges and 12 in. OC in the interior.

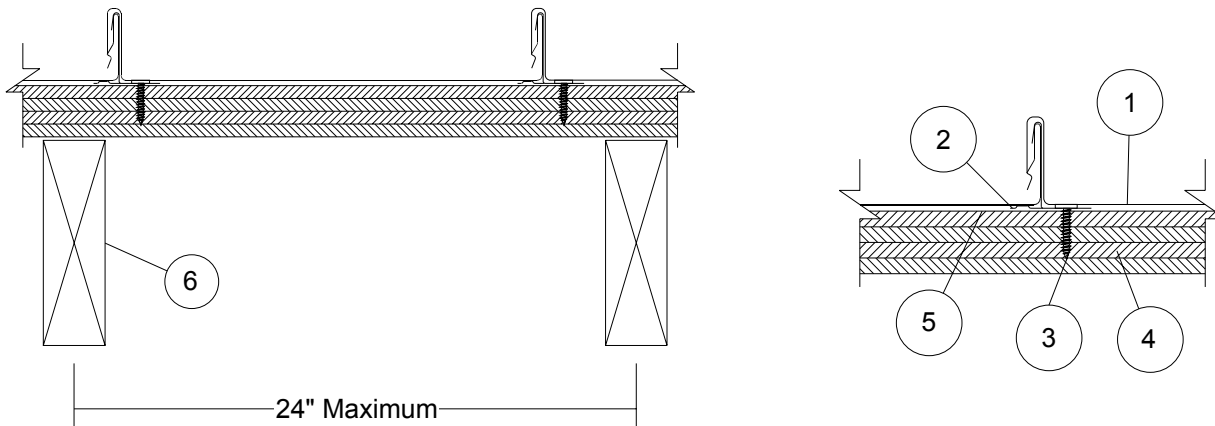
Refer to General information, Roof Deck Construction (Building Materials Directory) for items not evaluated.

*Bearing the UL Classification Mark



Underwriters Laboratories Inc. ®

LISTED



VERTICAL SEAM

Construction No. 436
 February 27, 2001
 Uplift - Class 90
 Fire Not Investigated

1. Metal Roof Deck Panels* No. 24 MSG min coated steel. Max panel width 18 in., rib height 1-3/4 in. Panels continuous over two or more spans. Endlap for panels to be overlapped 6 in. A bead of sealant may be used at panel ends and side joints.

METAL SALES MANUFACTURING CORPORATION - "Vertical Seam"

2. Roof Deck Fasteners* - (Panel Clips) One piece assembly, 3-1/2 in. wide by 1-7/8 in high. Clip spacing to be 48 in. OC.

METAL SALES MANUFACTURING CORPORATION - "Vertical Seam Clip"

3. Fasteners - (Screws) Screws used to attach the panel clips to Substructure (Item 4) to be No. 10 by 1 in long Pancake head wood screws with a No. 2 Phillips head or 10x1 in., 1/4 in. Hex Head Woodgrip. Two screws per clip. Screws used to attach Substructure (Item 4) to wood trusses or joists (Item 6) to be No. 8 by 2 in. Bugle head screws. As an optional fastener, 2-1/2 in. long 8d common deformed shank nails may be used. Fasteners used at endlaps to be 14x1 in. Type AB or 10x1 in. woodgrip.

When light gauge structural steel joists are used, screws to be No. 12 by 1-5/8 in. long with a Phillips head. Spacing of screws to be 6 in. OC at plywood or OSB ends and 12 in. OC at interior joists.

4. Substructure (Plywood or OSB) Plywood decking or oriented strand board (OSB) to be a nom 5/8 in. thick, exposure sheathing span C-D, 40/20 plywood. (All butt joints to be sealed against leakage by using tape and/or caulking). In lieu of plywood, 1 in. tongue and groove decking may be used.

5. Moisture Barrier - (Optional) Any suitable membrane to protect Substructure (Item 4).

6. Joists Joists, spaced at 2 ft, 0 in. OC max (when tongue and groove decking is used, joist spacing may be 30 in. OC max), may be one of the following:

A. Nom 2 by 6 in. wood joists, No. 2 or better.

B. Nom 2 by 4 in wood when used on a top chord of a wood truss, No. 2 or better.

C. Light gauge structural steel framing with the member against the plywood to be a min No. 22 MSG coated steel.

Refer to General Information, Roof Deck Constructions, for Items Not Evaluated.

*Bearing the UL Classification Mark



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LISTED

METAL SALES MANUFACTURING CORPORATION

R9697

Mechanically attached metal roof panels - Type "Vertical Seam" secured by steel anchor clips. Anchor clips are attached to a hat shaped member* (minimum depth 1 in.) or a bearing plate**.

For use in Design Nos. P224 , P225 , P227 , P230 , P237 , P508 , P510 , P512 , P701 , P711 , P712 , P713 , P715 , P717 , P720 , P722 , P723 , P724 , P726 , P731 , P734 , P736 , P803 , P814 , P815 , P818 , P819 , P821 , P823 , P824 .

*Hat shaped member to be a minimum of 16 gauge. The member will be fastened through the roof insulation to the steel roof deck with min. No. 14 self-drilling and/or self-tapping fasteners. Spacing to be determined by the structural loading requirements. In addition any compressible UL Classified glass fiber blanket insulation with or without a vapor retarder facing may be used between the specified roof insulation and the metal roof panels.

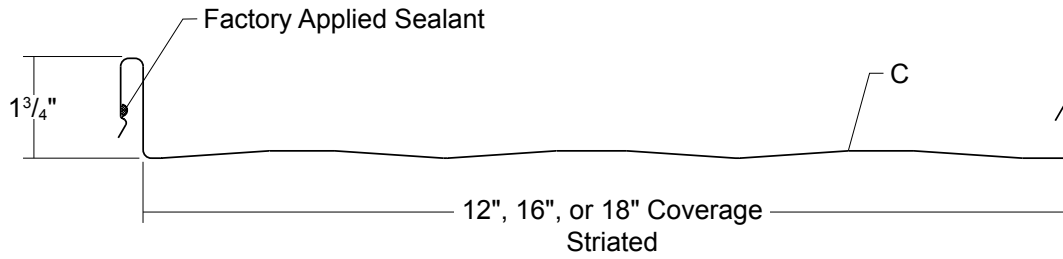
**Bearing plate to be a minimum of 16 gauge. Member will be fastened through the roof insulation to the steel deck with min. No. 14 self-drilling and/or self-tapping fasteners.

See the UL Fire Resistance Directory for explanation of each design number listed above.



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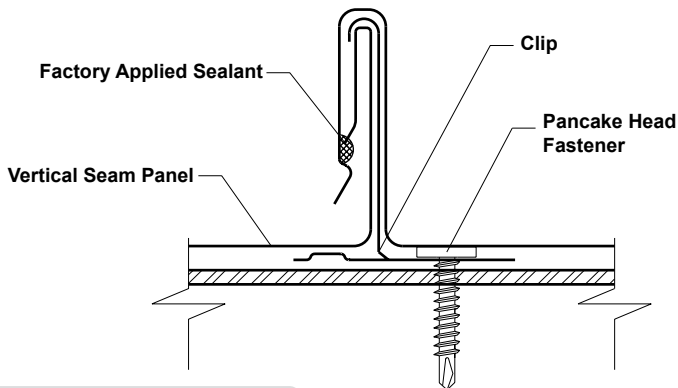
LISTED



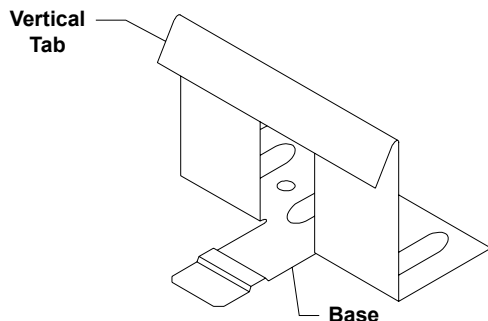
SECTION PROPERTIES								ALLOWABLE UNIFORM LOADS psf (3 or More Equal Spans)											
Ga.	Width in	Yield ksi	Weight psf	Top In Compression		Bottom In Compression		Inward Load						Outward Load					
				Ixx in ⁴ /ft	Sxx in ³ /ft	Ixx in ⁴ /ft	Sxx in ³ /ft	2.5'	3'	3.5'	4'	4.5'	5'	2.5'	3'	3.5'	4'	4.5'	5'
26	12	50	1.04	0.0769	0.0521	0.0371	0.0403	78	60	48	39	32	27	185	130	97	74	59	48
26	16	50	0.96	0.0605	0.0395	0.0278	0.0302	58	45	36	29	24	20	140	99	73	56	45	36
26	18	50	0.93	0.0547	0.0353	0.0247	0.0269	52	40	32	26	21	18	125	179	131	101	80	64
24	12	50	1.38	0.1118	0.0774	0.0533	0.0557	128	97	76	62	51	43	44	43	42	41	40	39
24	16	50	1.26	0.0885	0.0589	0.0398	0.0419	96	73	57	46	38	32	26	26	25	25	24	24
24	18	50	1.22	0.0800	0.0526	0.0353	0.0372	85	65	51	41	34	28	23	22	21	21	20	19
22	12	50	1.81	0.1533	0.1071	0.0773	0.0771	201	151	118	95	75	61	69	67	65	62	60	58
22	16	50	1.66	0.1230	0.0822	0.0585	0.0579	151	113	88	71	59	46	41	40	39	37	36	35
22	18	50	1.60	0.1113	0.0736	0.0520	0.0515	134	101	79	63	50	41	31	30	29	29	28	27

- Theoretical section properties have been calculated per AISI 2001 "Specification for the Design of Cold-formed Steel Structural Members." Ixx and Sxx are effective section properties for deflection and bending.
- Allowable load is calculated in accordance with AISI 2001 specifications considering bending, shear, combined bending and shear, and deflection and ASTM E 1592 uplift testing for 24 gauge and 22 gauge. Allowable load considers the worst case of 3 and 4 equal span conditions. Allowable load does not address web crippling, fasteners/support connection, or panel testing. Panel weight is not considered. Outward Loads for 26 gauge do not include uplift testing.
- Deflection consideration is limited by a maximum deflection ratio of L/180 of span.
- Allowable loads do not include a 1/3 stress increase in uplift.

ATTACHMENT DETAIL



PANEL CLIPS



UL90 CLIP
2 Fasteners

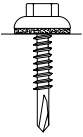
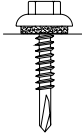
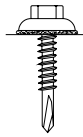
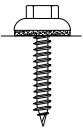
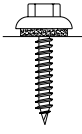
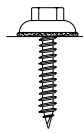
GENERAL INFORMATION

- Slope**
 The minimum recommended slope for the Vertical Seam roof panel is 3:12 over open framing and 1:12 over solid substrate.
- Clips**
 Clip spacing is based upon the spacing of structural framing members and loading requirements.
- Coverage**
 Vertical Seam panels are available in a 1³/₄" seam height with a 12", 16", or 18" width coverage.
- Lengths**
 Minimum factory cut length is 5'-0". Maximum recommended panel length is 45'-0". Longer panels require additional consideration in packaging, shipping, and erection. Please consult Metal Sales for recommendations.
- Fasteners**
 The fastener selection guide should be consulted for choosing the proper fastener for specific applications. Quantity and type of fastener must meet necessary loading and code requirements.
NOTE: All panels are subject to surface distortion due to improperly applied fasteners. Overdriven fasteners will cause stress and induce oil canning across the face of the panel at or near the point of attachment.
- Availability**
 Finishes: in PVDF (Kynar 500), MS Colorfast45®, and Acrylic Coated Galvalume®.
 Gauges: 24 ga standard, or 26 ga and 22 ga optional

FASTENER INSTALLATION TECHNIQUE

Recommended Tool Type - Use depth locating nose or adjustable clutch on screw gun to prevent overdrilling and strip out. **Do not use impact tools or runners.**

Seating the washer - Apply sufficient torque to seat the washer - do not overdrive the fastener.

	CORRECT Sealing material slightly visible at edge of metal washer. Assembly is watertight.	TOO LOOSE Sealing material is not visible; not enough compression to seal properly.	TOO TIGHT Metal washer deformed; sealing material pressed beyond washer edge.
SELF DRILLER			
WOODSCREW			

To prevent wobbling - Make sure fastener head is completely engaged in the socket. If the head does not go all the way in the socket - tap the magnet deeper into the socket to allow full head engagement. Metal chips will build up from drilling and should be removed from time to time.

Protect drill point - Push only hard enough on the screw gun to engage clutch. This prevents excess friction and burn out of the drill point. Correct pressure will allow screw to drill and tap without binding.

Drilling through sheet and insulation - Ease up on pressure when drilling through insulation to avoid striking the purlin or girt with the point - apply more pressure after drill point contacts purlin or girt.

Drilling through purlin overlaps - Drilling through lapped purlins requires extra care. Excessive voids between purlins sometimes damages drill points and two self-drillers might be necessary to complete the operation. It is sometimes advantageous to predrill.

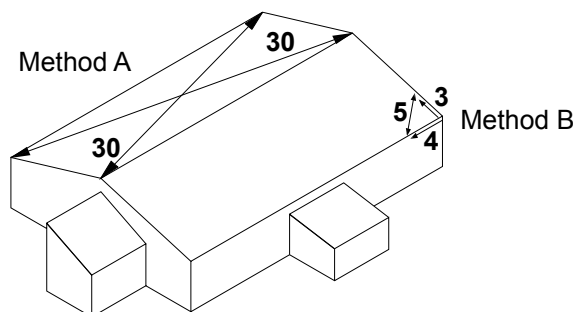
CONDITION OF SUBSTRUCTURE

Whether over solid substrate or open structural framing, panel distortion may occur if not applied over properly aligned and uniform substructure.

The installer should check the roof deck for squareness before installing Vertical Seam panels. Several methods can be used to verify squareness of the structure for proper installation of the panels.

METHOD "A" - One method for checking the roof for squareness is to measure diagonally across one slope of the roof from similar points at the ridge and eave and obtain the same dimension.

METHOD "B" - The 3-4-5 triangle system may also be used. To use this system measure a point from the corner along the edge of the roof at a module of three (3). Measure a point from the same corner along another edge at a module of four (4). Then by measuring diagonally between the two points established, the dimension should be exactly a module of five (5) to have a square corner. Multiple uses of this system may be required to determine building squareness. If the endwall cannot be made square, the roof system cannot be installed as shown in these instructions.



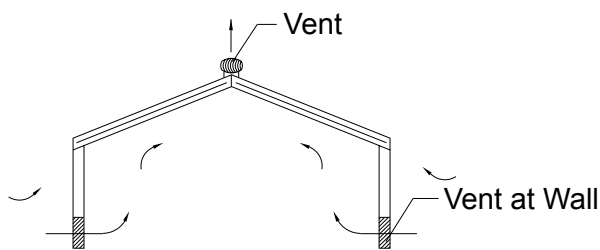
VENTILATION

Proper design and installation of vapor barriers and ventilation systems are important to prevent condensation and the resulting problems of moisture damage and loss of insulation efficiency.

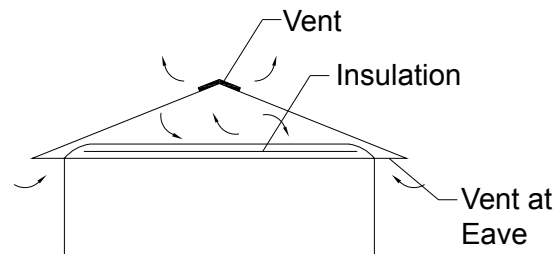
Condensation occurs when moisture laden air comes in contact with a surface temperature equal to or below the dew point of the air. This phenomenon creates problems that are not unique with metal buildings; these problems are common to all types of construction.

The underside of the metal roof on a typical metal building (no attic) should be protected from condensation by insulating with a faced insulation. This should reduce the potential of condensation forming on the underside of the panels.

On buildings that have an attic space or are being retrofitted with a metal roofing system, vents should be placed at both the eave and peak of the roof in order to prevent a buildup of moisture (humidity) in the attic space.



Typical Metal Building (No Attic)

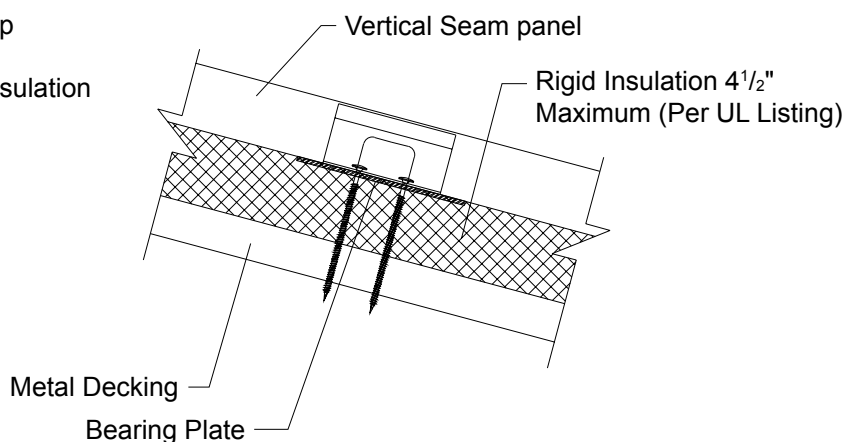
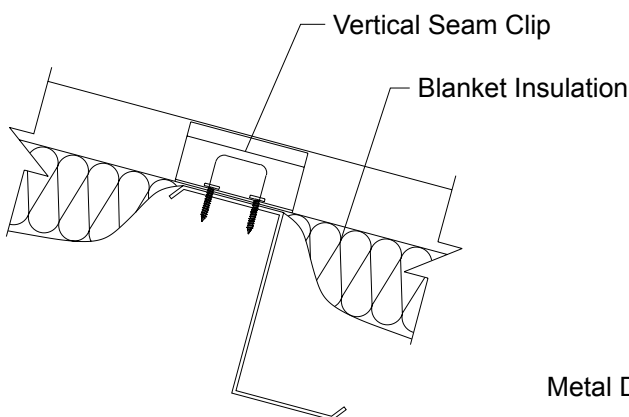


Building with Attic or Retrofitted

INSULATION

Insulation is recommended on all applications to act as a sound barrier, prevent condensation, and increase insulating value of the roof or ceiling system.

Typically, panels are installed over solid substrate but can be installed over open framing or metal decking (shown below) with many different types of insulation. Blanket, rigid, and reflective insulation are just a few. Maximum thickness for blanket insulation is three inches. Please contact your insulation supplier for specific recommendations on type of insulation, vapor barriers, and installation procedures.



CAUTION

Use extreme care when working next to insulation. The insulation will provide a false sense of security by hiding the view of the ground below the insulation.

SYSTEM EXPANSION / CONTRACTION

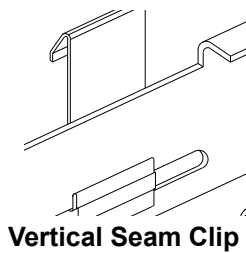
Steel roofing panels are subject to dimensional changes after installation due to exposure to varying temperatures. The greatest influence is solar energy. Steel roofing absorbs various amounts of heat depending upon color, finish, angle of exposure, and time of exposure.

The relationship of ambient temperature to building structural temperature must be considered when designing a Vertical Seam roof system. The floating clips for the Vertical Seam panels are designed for expansion and contraction of the panels in the longitudinal direction. Lateral expansion and contraction is accommodated by the configuration of the panel cross section and causes negligible panel movement.

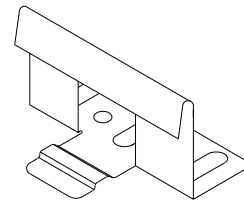
When the total length of panel run exceeds the capability of the clips to accommodate the thermal movement, expansion joints must be designed into the structure.

SELECTION OF SYSTEM COMPONENTS

Vertical Seam panel clips - Clips are placed along the male leg of each panel prior to installing adjacent panels. Design wind uplift must be considered for proper clip spacing.



Vertical Seam Clip



Vertical Seam UL-90 Clip
(2 fasteners required)

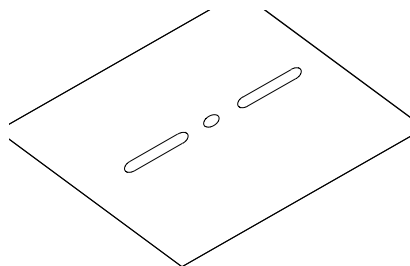
The following chart should be used to determine proper fasteners required for clip installation on the selected applications. (See Fastener Selection Guide page 16 for other fasteners available.)

APPLICATION	INSTALLATION REQUIREMENTS		**CLIP SPACING	TYPE OF FASTENER	# REQ.
CLIPS OVER PURLINS (16 GA. MIN)	UL-90	24 GAUGE	4'-0" O.C.	#10 X 1" PANCAKE HEAD DRILLER	2 FASTENERS
	UL-90	22 GAUGE	4'-0" O.C.	#10 X 1" PANCAKE HEAD DRILLER	2 FASTENERS
	UL-90	22 GAUGE	5'-0" O.C.***	#10 X 1" PANCAKE HEAD DRILLER	2 FASTENERS
CLIPS OVER 5/8" WOOD DECK	UL-90	24 GAUGE	4'-0" O.C.	#10 X 1" PANCAKE HEAD WOOD	2 FASTENERS
	UL-90	22 GAUGE	4'-0" O.C.	#10 X 1" PANCAKE HEAD WOOD	2 FASTENERS
Max suction pressure of 32 psf	Standard clip	24 GAUGE	1'-6" O.C.	#10 X 1" PANCAKE HEAD WOOD	1 FASTENER
	Standard clip	22 GAUGE	1'-6" O.C.	#10 X 1" PANCAKE HEAD WOOD	1 FASTENER
CLIP OVER RIGID INSULATION / METAL DECK	UL-90	24 GAUGE	4'-0" O.C.	DECK SCREW #14*	2 FASTENERS
	UL-90	22 GAUGE	4'-0" O.C.	DECK SCREW #14*	2 FASTENERS

* Length of Deck Screw will vary depending on the total thickness of the rigid insulation and metal.

** Contact your local Metal Sales branch representative for more information (see pages 2 and 3).

*** 12" Panel Only

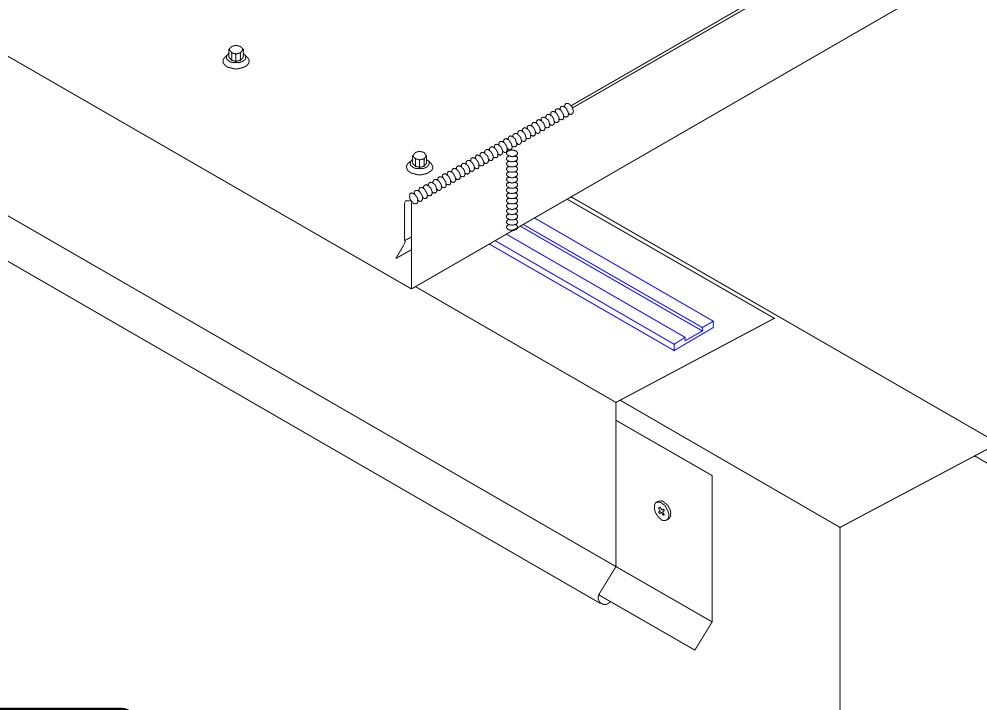
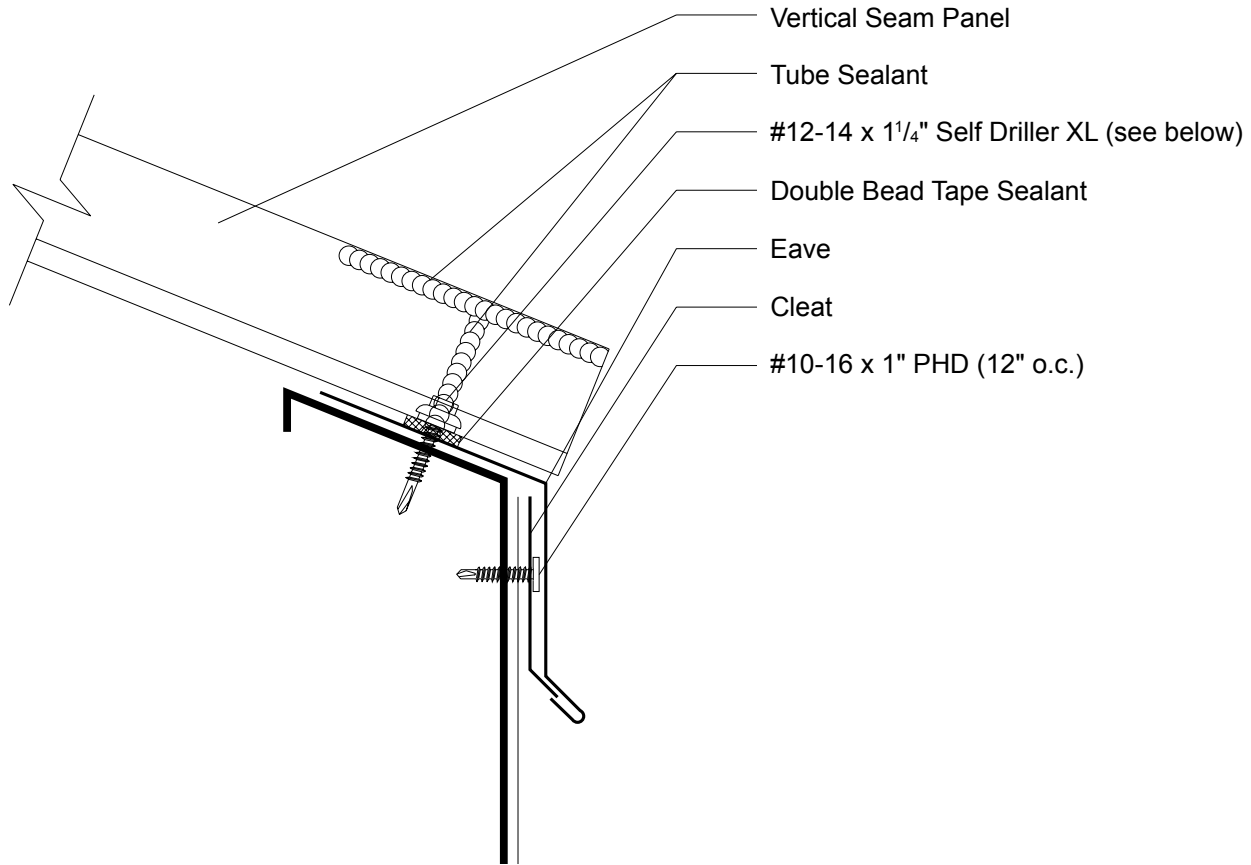


Flat Bearing Plate

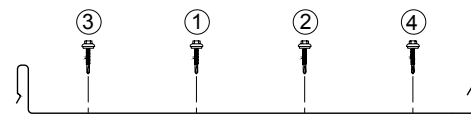
VERTICAL SEAM

EAVE DETAIL

**3:12 SLOPE
MINIMUM**



CAUTION
Additional screws
may be required for
high snow loading
and steep slopes.

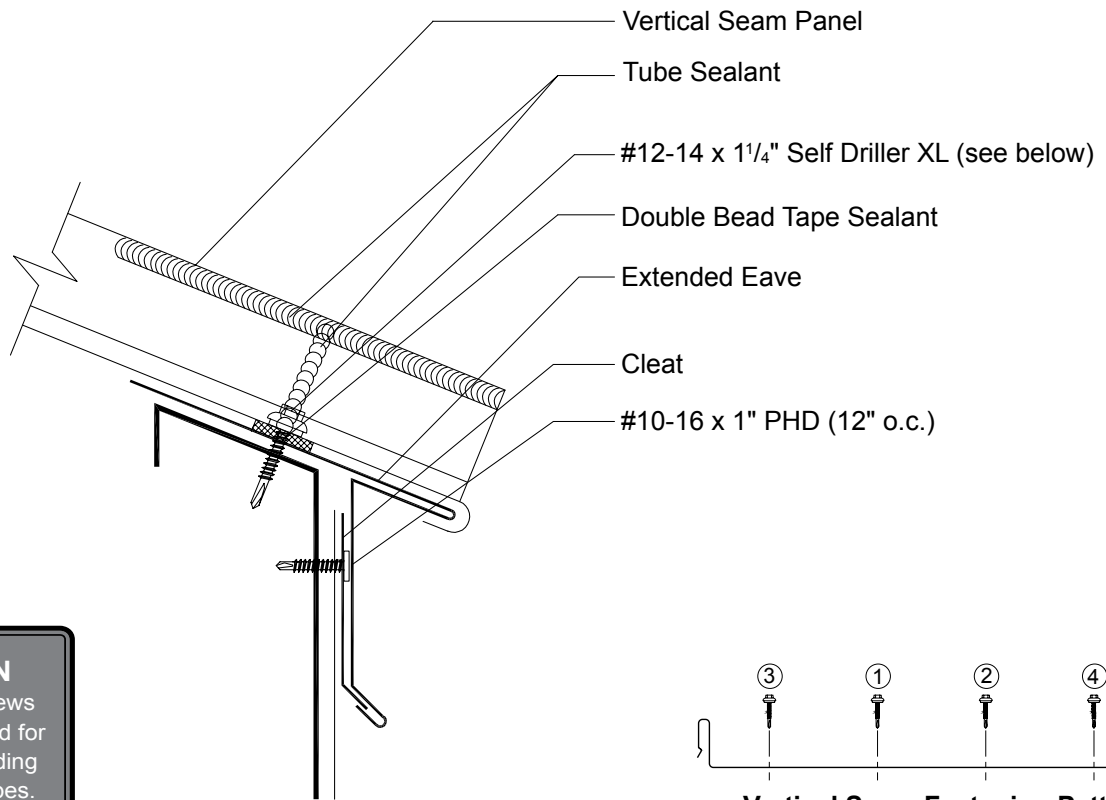


Vertical Seam Fastening Pattern

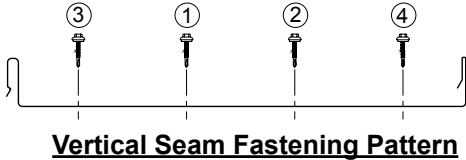
VERTICAL SEAM

EXTENDED EAVE DETAIL

**3:12 SLOPE
MINIMUM**



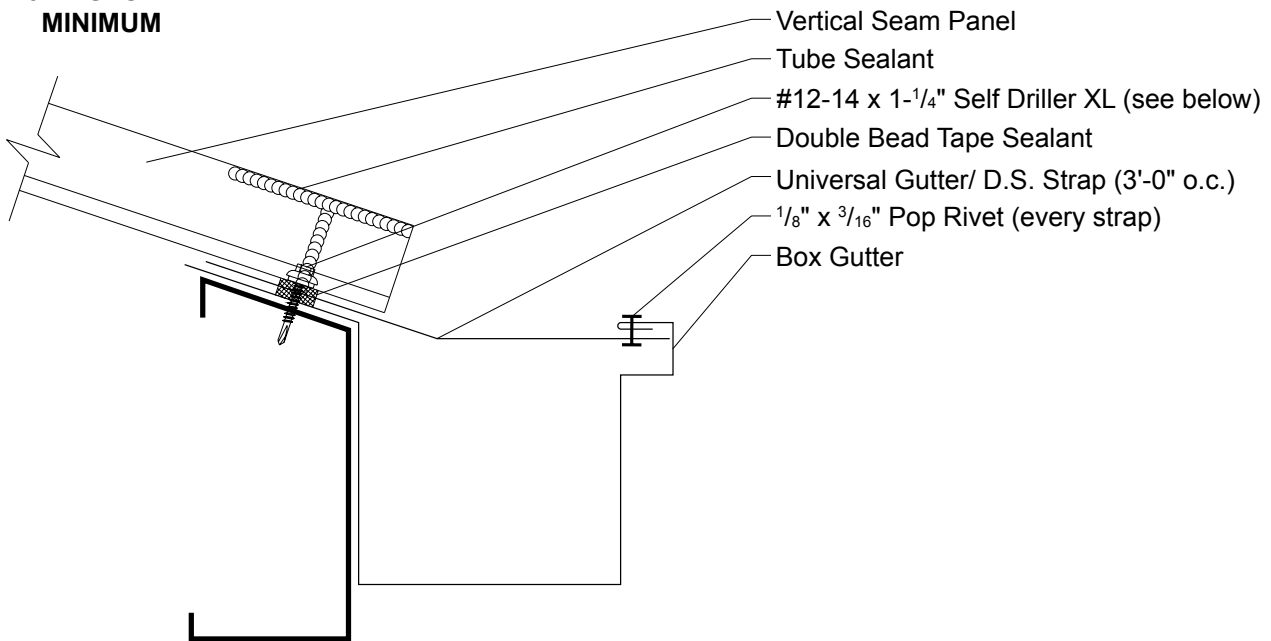
CAUTION
 Additional screws
 may be required for
 high snow loading
 and steep slopes.



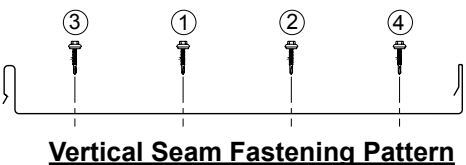
VERTICAL SEAM

BOX GUTTER DETAIL

**3:12 SLOPE
MINIMUM**



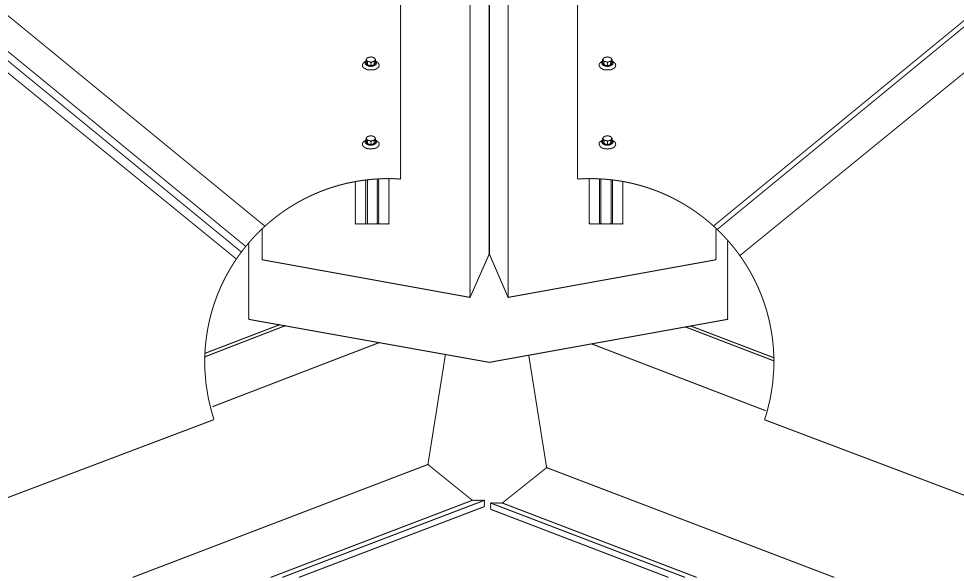
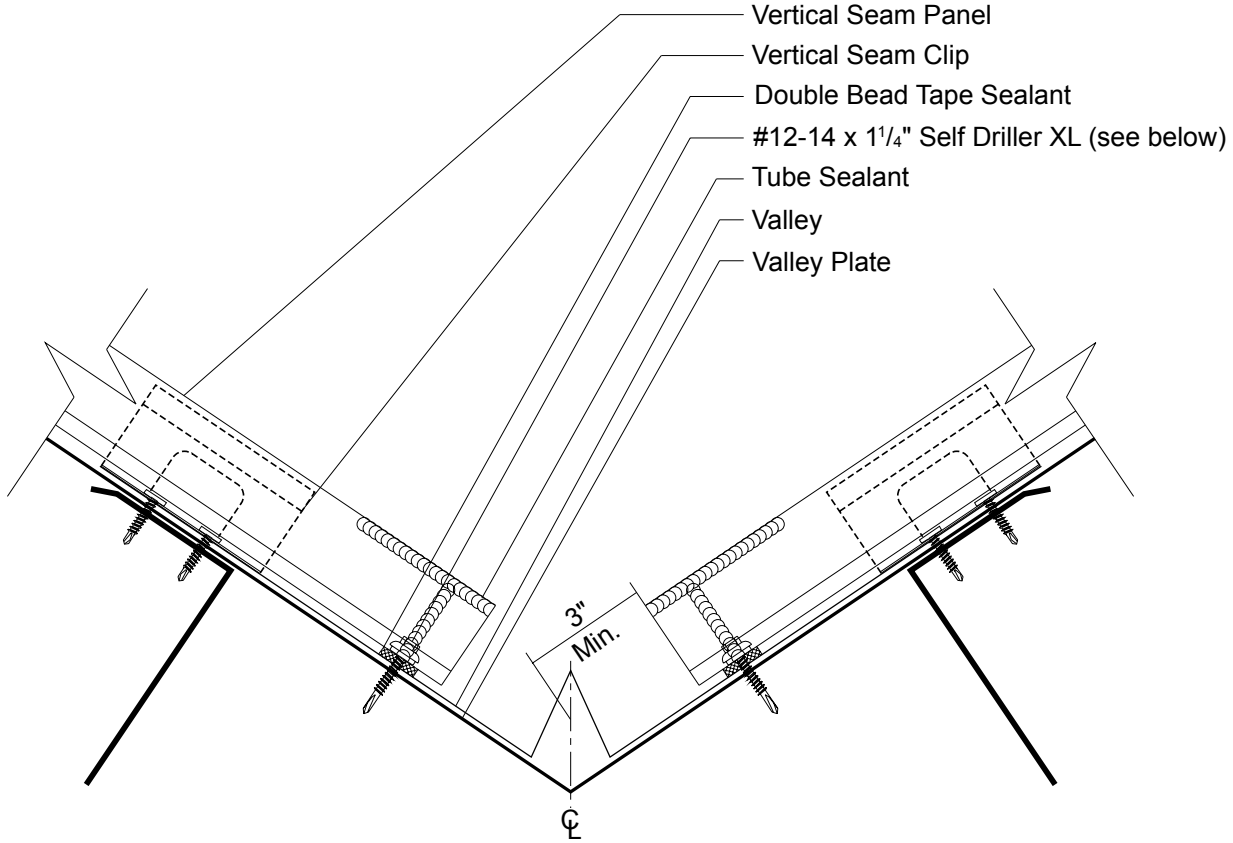
CAUTION
 In locations where heavy
 rainfall or severe ice and
 snow may occur, Metal
 Sales' standard gutters may
 not be suitable for use.



VERTICAL SEAM

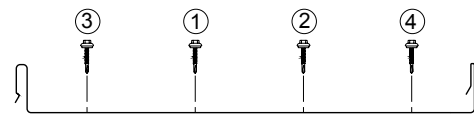
VALLEY DETAIL

**3:12 SLOPE
MINIMUM**

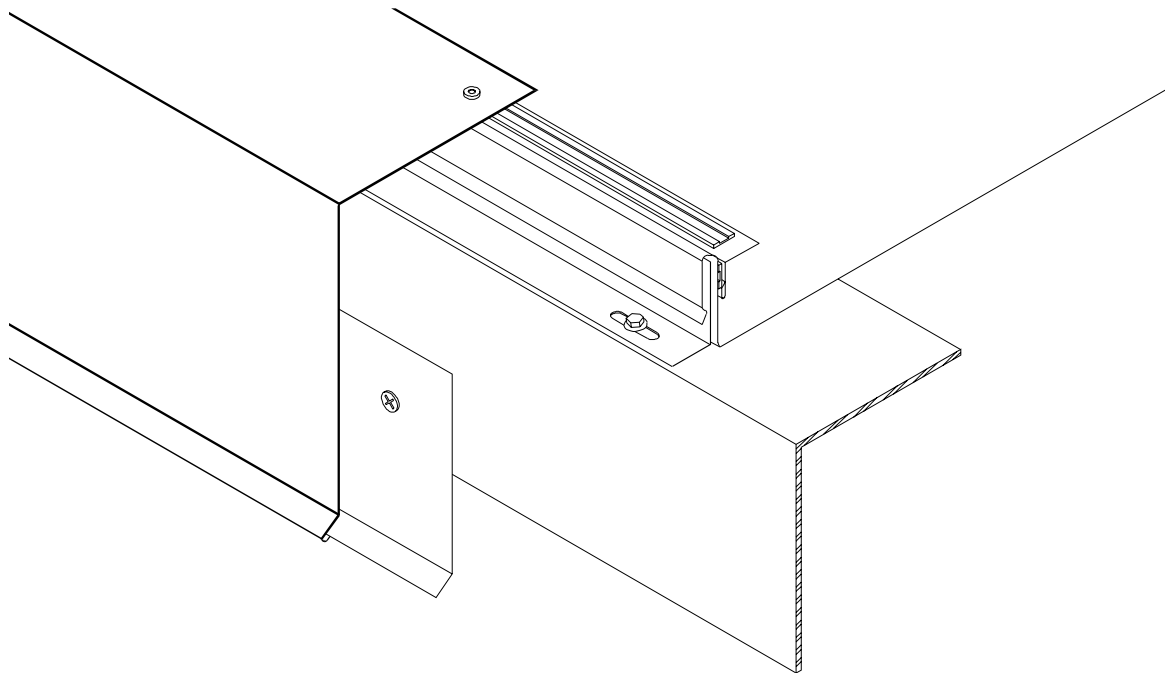
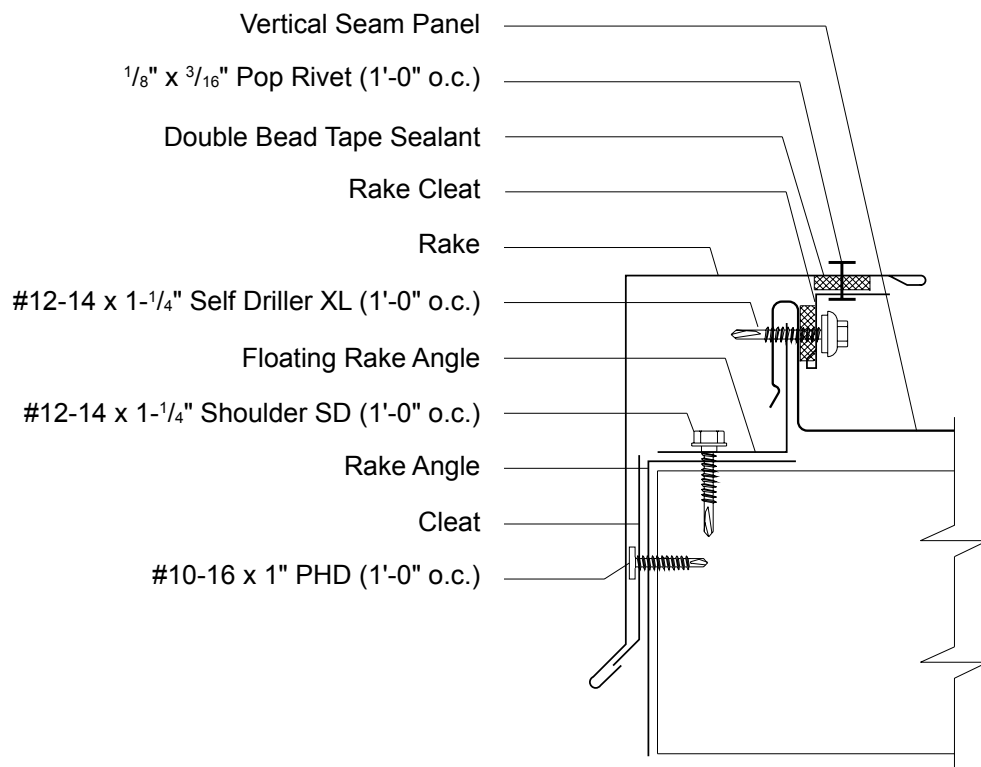


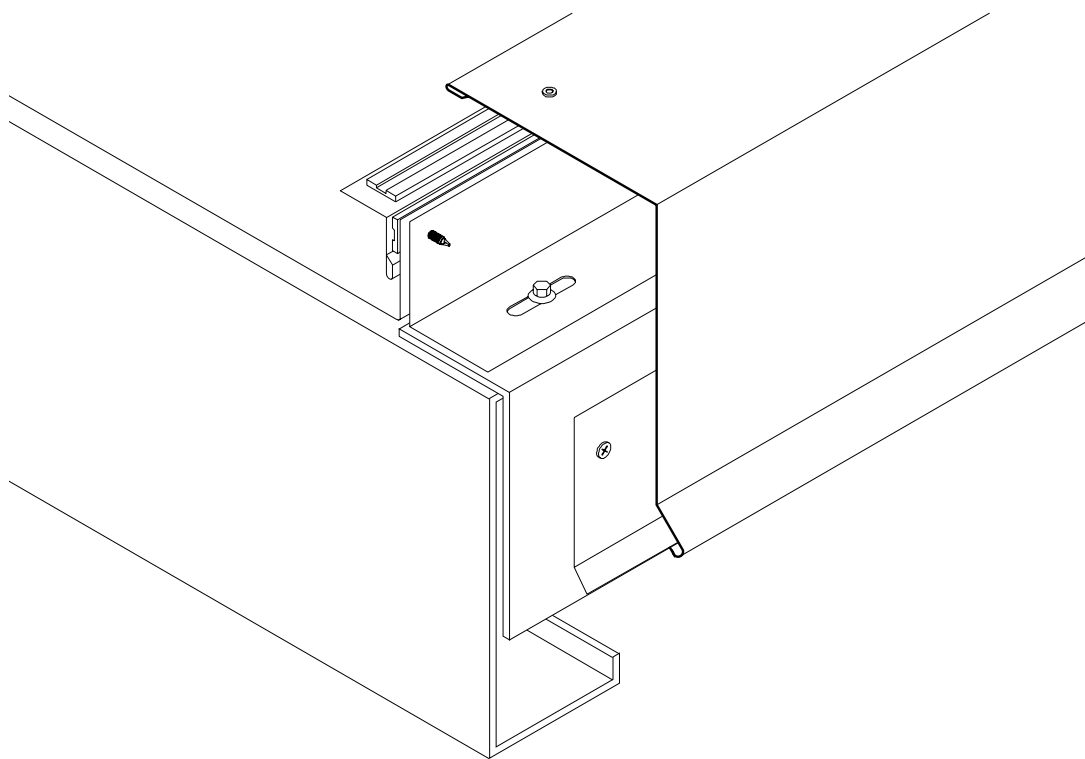
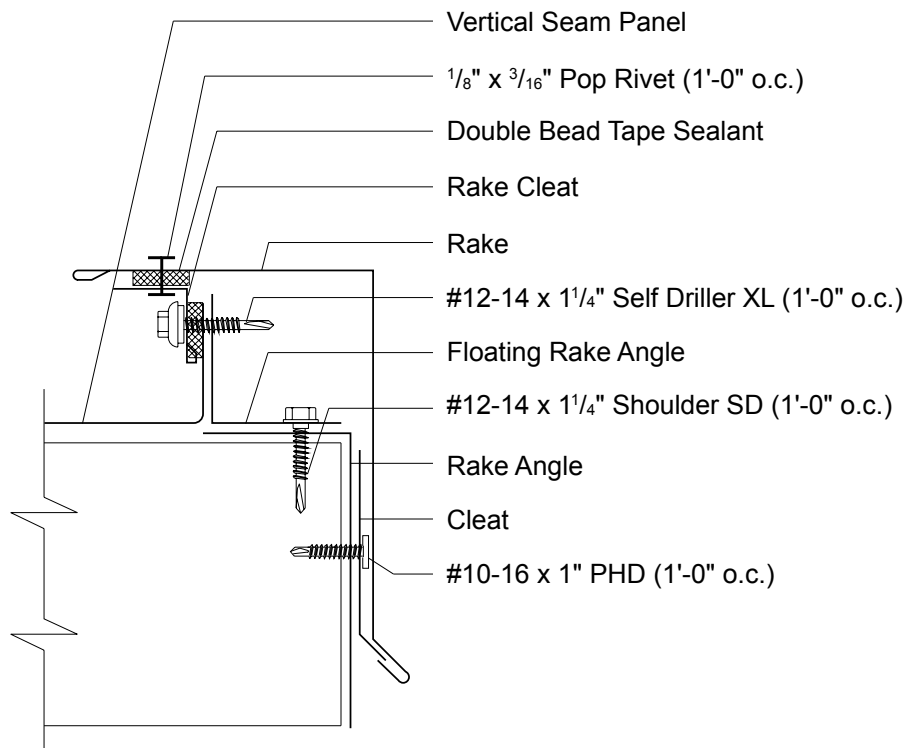
CAUTION

Additional screws may be required for high snow loading and steep slopes.



Vertical Seam Fastening Pattern

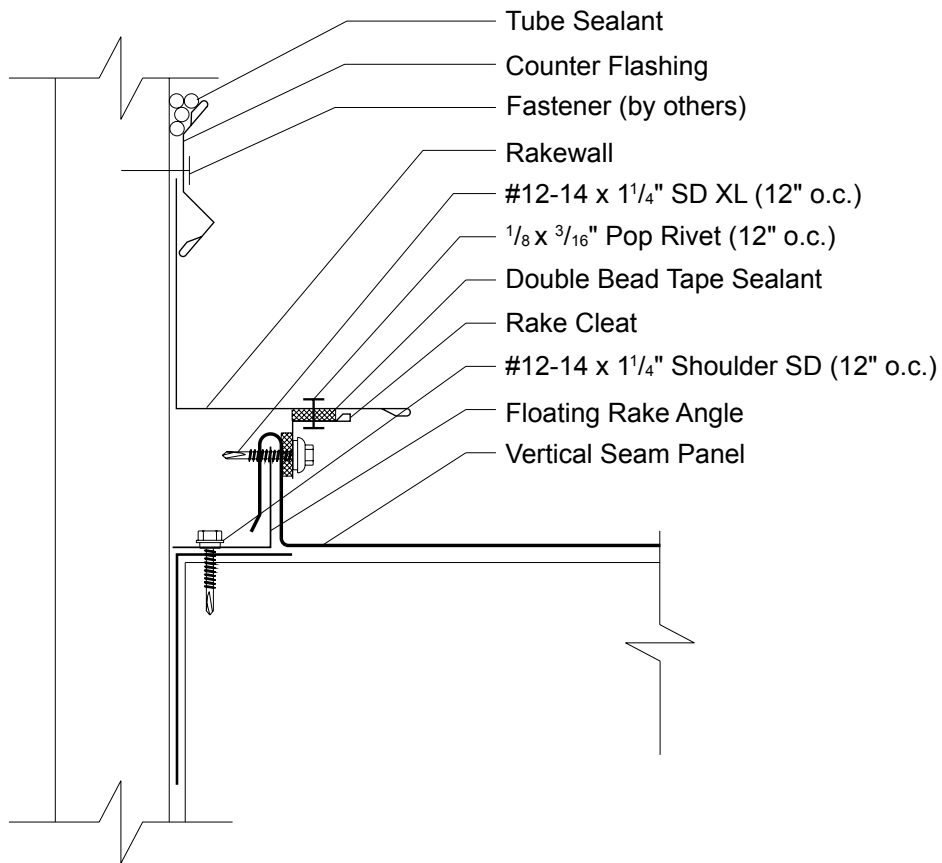




VERTICAL SEAM

RAKE PARAPET (ON MODULE) DETAIL

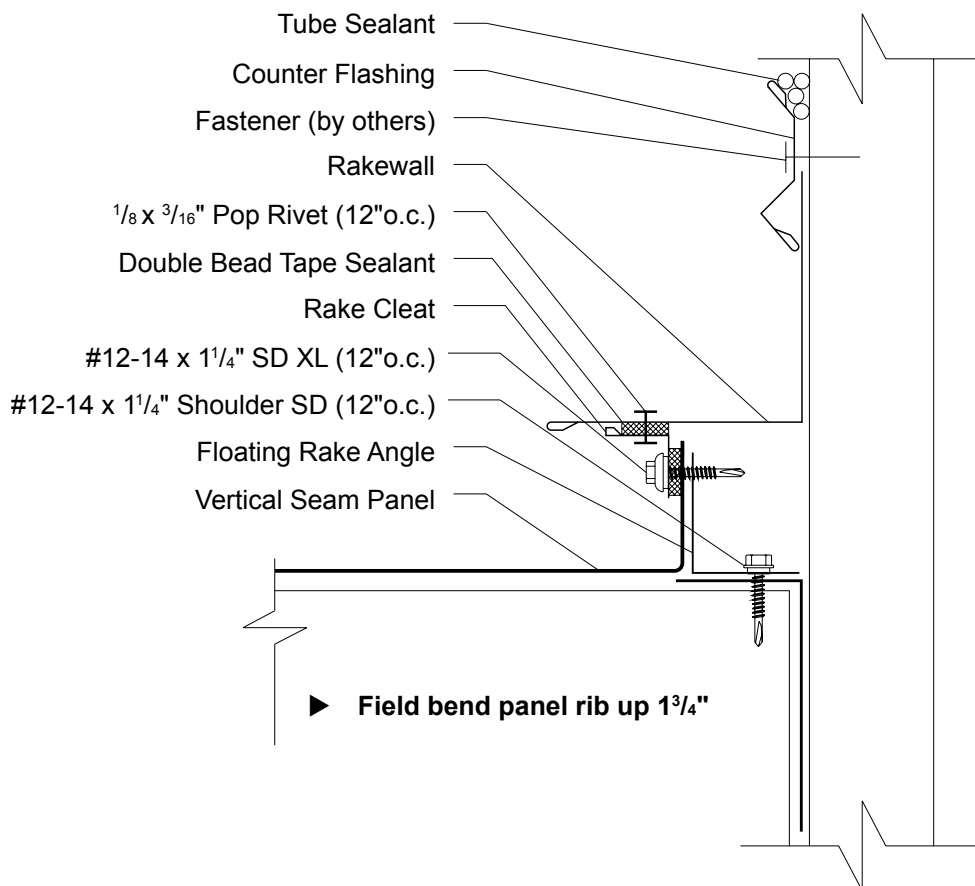
3:12 SLOPE
MINIMUM



VERTICAL SEAM

RAKE PARAPET (OFF MODULE) DETAIL

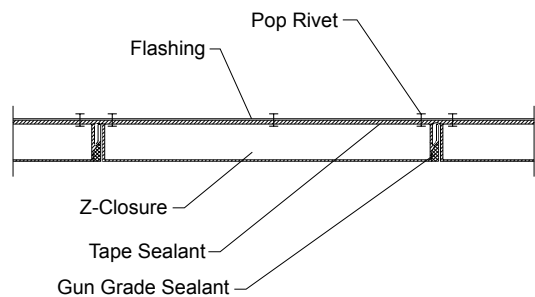
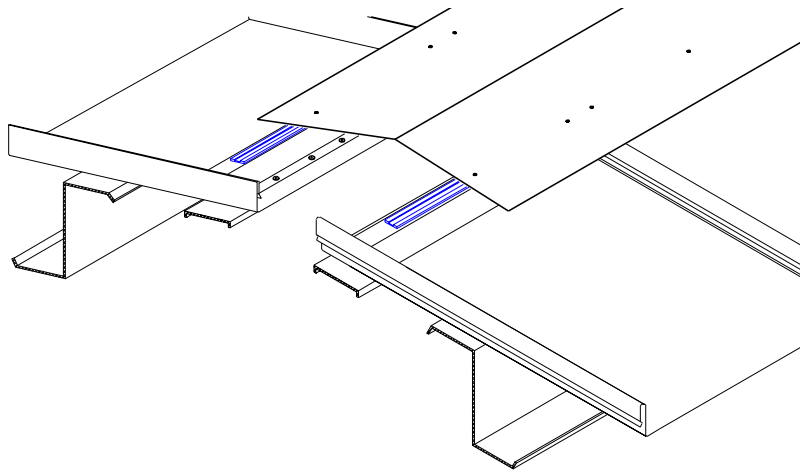
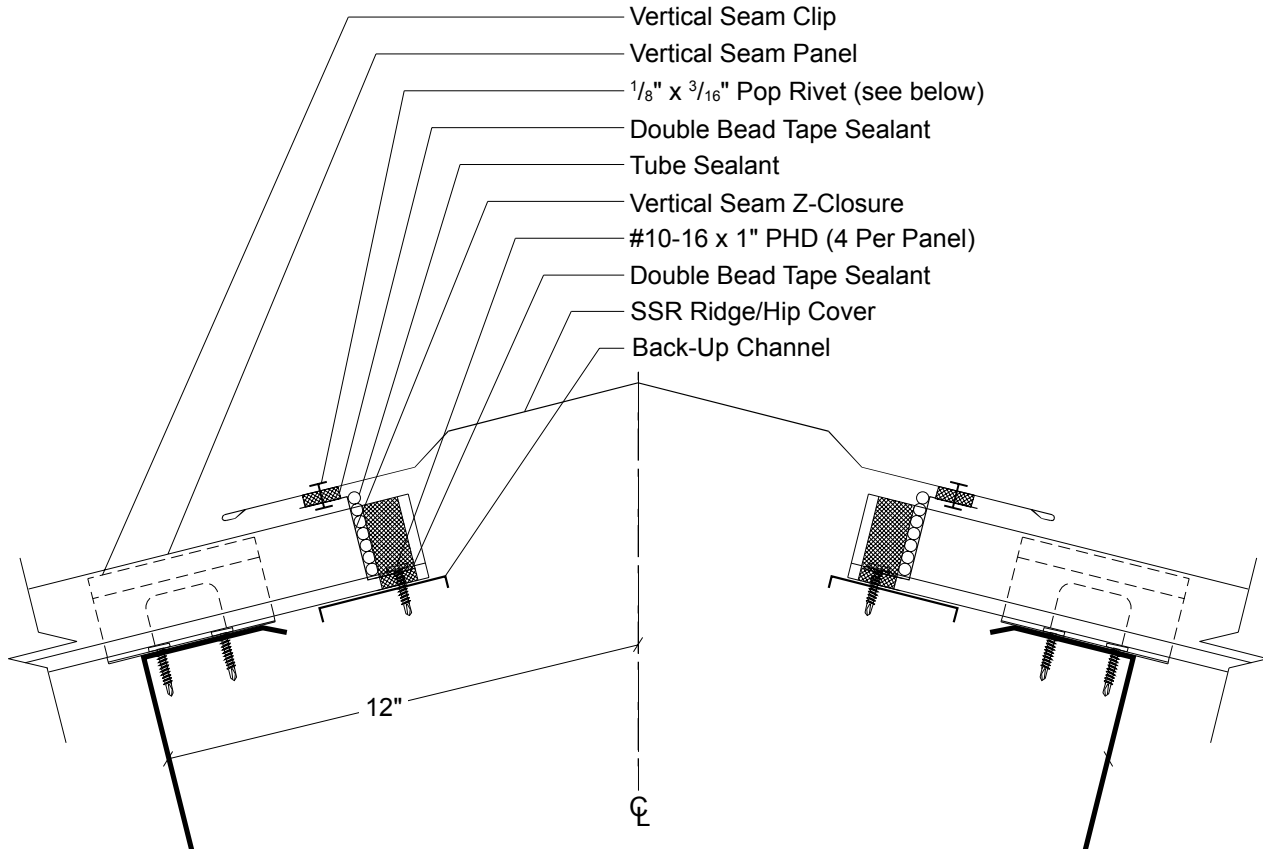
3:12 SLOPE
MINIMUM



VERTICAL SEAM

SSR RIDGE/HIP DETAIL

3:12 SLOPE
MINIMUM

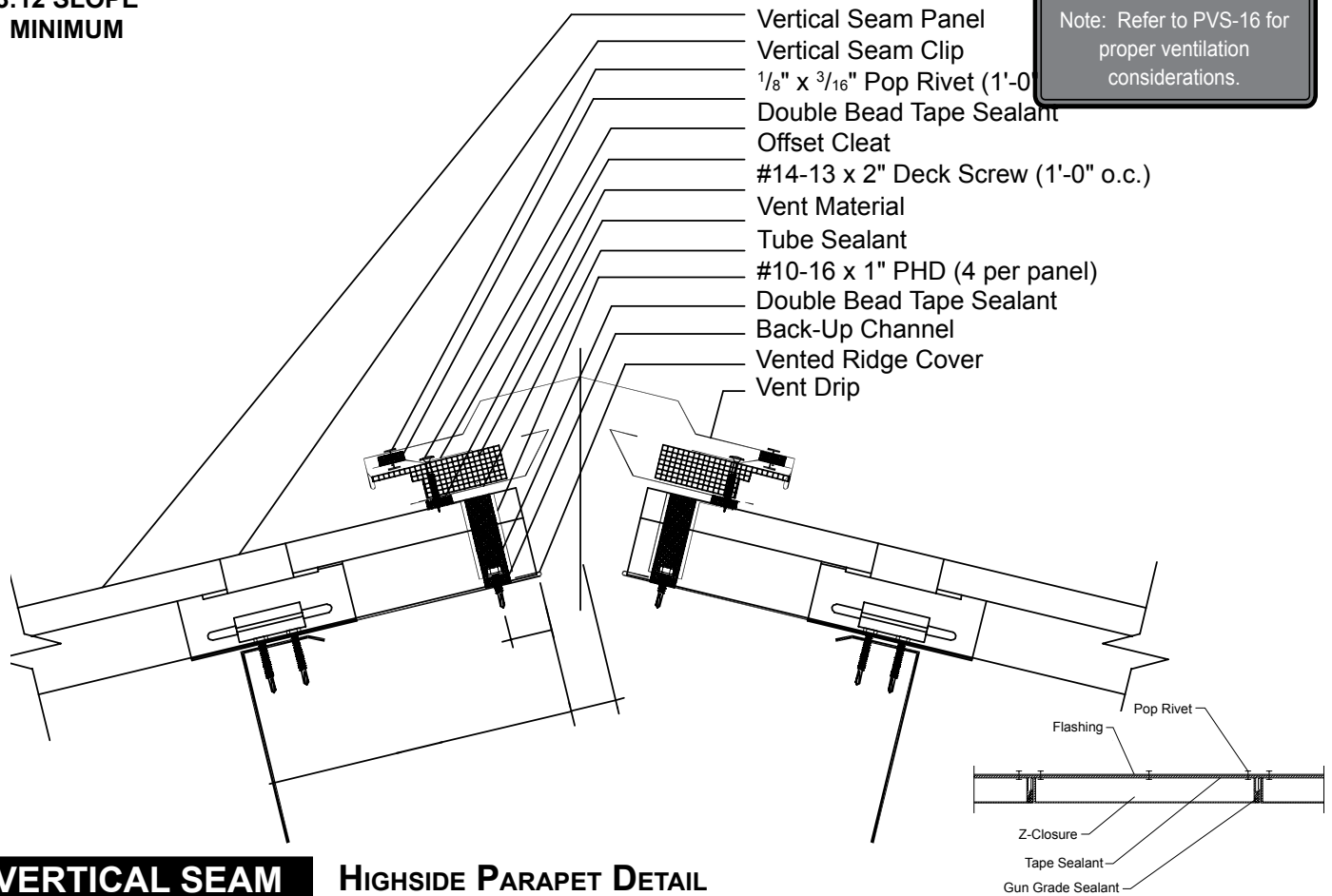


VERTICAL SEAM

VENTED RIDGE DETAIL

3:12 SLOPE
MINIMUM

Note: Refer to PVS-16 for proper ventilation considerations.



VERTICAL SEAM

HIGHSIDE PARAPET DETAIL

3:12 SLOPE
MINIMUM

CAUTION
Additional screws may be required for high snow loading and steep slopes.

- Tube Sealant
- Fastener (by others)
- Counter Flashing
- Pitch Break
- Back-Up Channel
- #10-16 x 1" PHD (4 per panel)
- Tube Sealant
- Double Bead Tape Sealant
- 1/8" x 3/16" Pop Rivet (see below)
- Vertical Seam Z-Closure
- Vertical Seam Panel

