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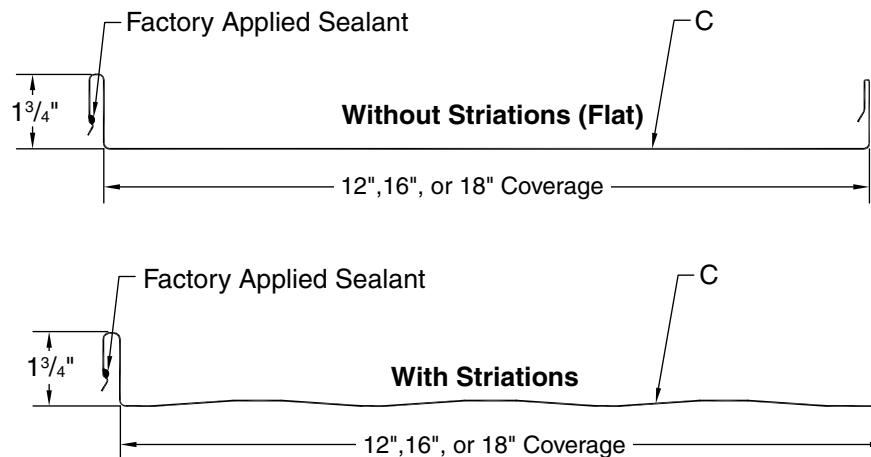
**Notes**

Notes ..... PVS-26

# 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  $\frac{5}{8}$ " 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  $1\frac{3}{4}$ " 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

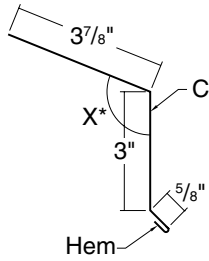
## FINISH

- ▶ \*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.

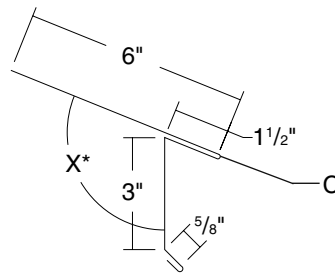
\*\* Meets both Kynar 500 and Hylar 5000 specifications.

**EAVE**



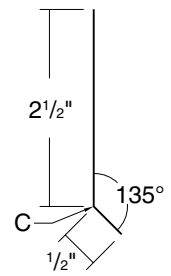
Length 10'-2" - \*Specify Slope Angle

**EXTENDED EAVE**



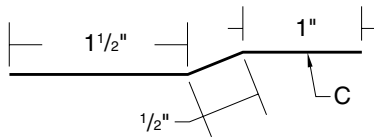
Length 10'-2" \*Specify Slope Angle

**CLEAT**



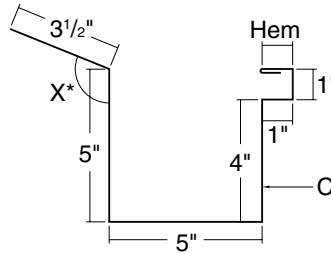
Length 10'-2"

**OFFSET CLEAT**



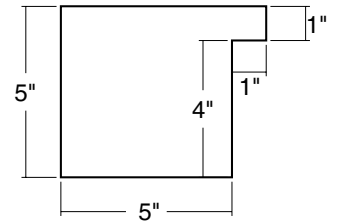
Length 10'-2"

**BOX GUTTER**

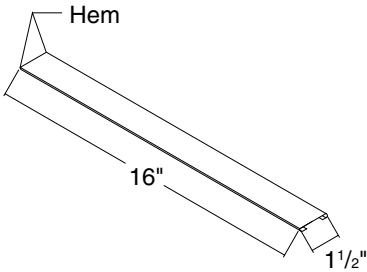


Length 10'-2", 20'-3" - \*Specify Slope Angle

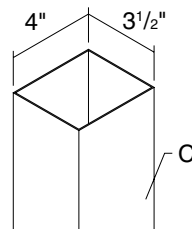
**BOX GUTTER END**



**UNIVERSAL GUTTER/  
DOWNSPOUT STRAP**

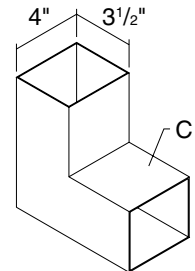


**DOWNSPOUT 4" x 3 1/2"**



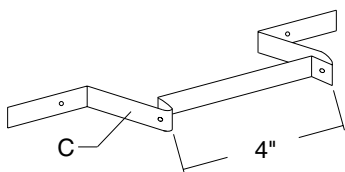
Length 10'-2", 20'-3"  
(Also available 6" x 4")

**95° ELBOW 4" x 3 1/2"**



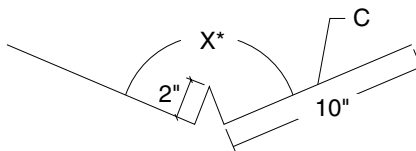
(Also available 6" x 4")  
(Also available in 45°)

**DOWNSPOUT BRACKET**



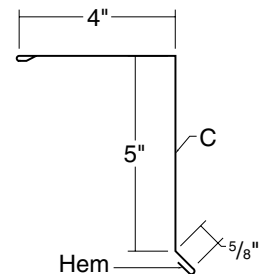
(Also available 6")

**VALLEY**



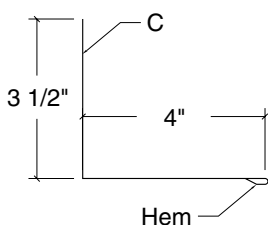
Length 10'-2", 20'-3" - \*Specify Slope Angle

**RAKE**



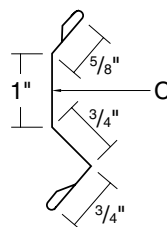
Length 10'-2", 20'-3"

**RAKEWALL**



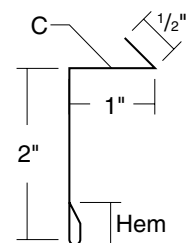
Length 10'-2", 20'-3"

**COUNTER FLASHING**



Length 10'-2"

**REGLET FLASHING**

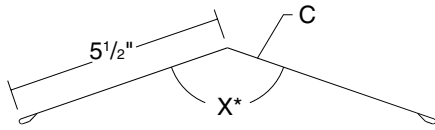


Length 10'-2"

# VERTICAL SEAM

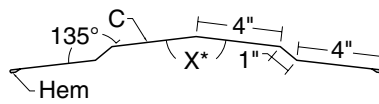
# FLASHING PROFILES (CONT.)

## 11" RIDGE/HIP COVER



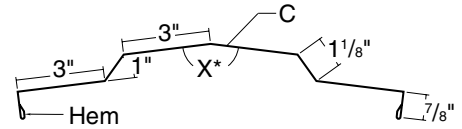
Length 10'-2", 20'-3" - \*Specify Slope Angle

## SSR RIDGE



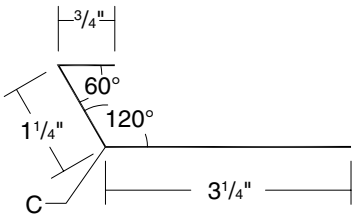
Length 10'-2", 20'-3" - \*Specify Slope Angle

## VENTED RIDGE COVER



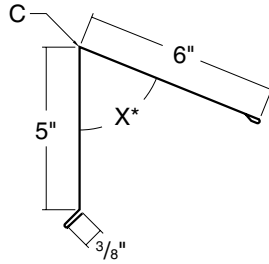
Length 10'-2", 20'-3" - \*Specify Slope Angle

## VENT DRIP



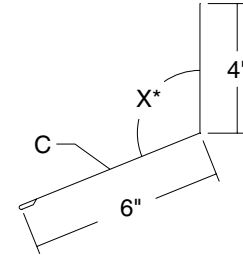
Length 10'-2"

## PEAK



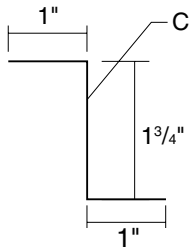
Length 10'-2", 20'-3" - \*Specify Slope Angle

## PITCH BREAK



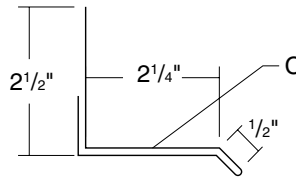
Length 10'-2", 20'-3" - \*Specify Slope Angle

## Z-CLOSURE



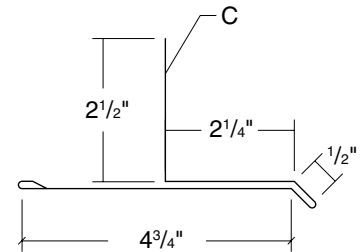
Length 10'-2"

## 2.25" SILL/HEAD



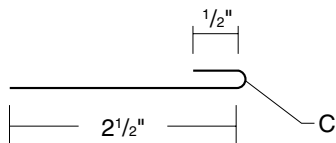
Length 10'-2", 20'-3"

## 2.25" SILL TO SOFFIT



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

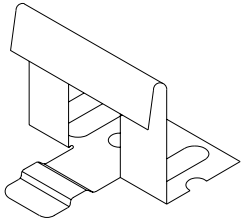
## STARTER



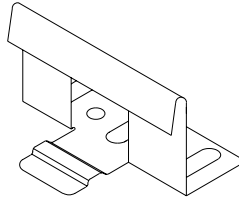
Length 10'-2"

C- Indicates color side of flashing.

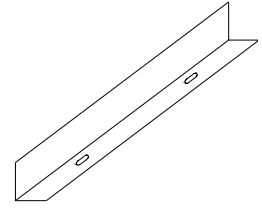
**VERTICAL SEAM CLIP**



**VERTICAL SEAM  
UL-90 CLIP**

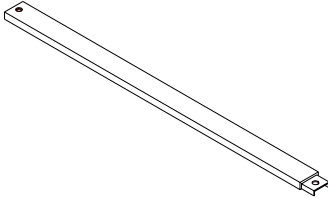


**FLOATING RAKE ANGLE**



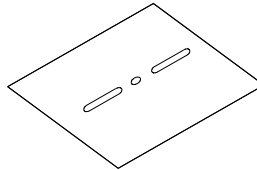
Length 10'-0"  
Height 1<sup>3</sup>/<sub>4</sub>"  
Galvanized

**BACK-UP CHANNEL**



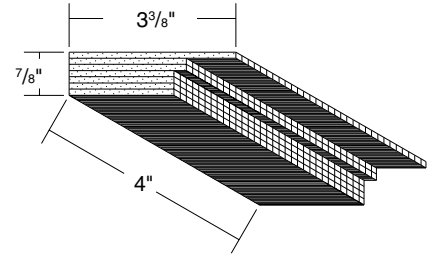
Length 48" and 72"  
Galvanized

**BEARING PLATE**

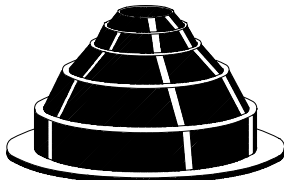


4" X 5"

**VENT MATERIAL**

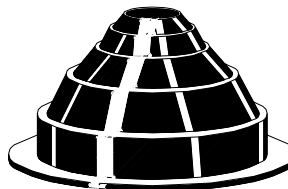


**RUBBER ROOF JACK**



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**



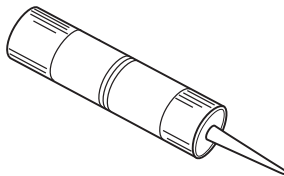
#801<sub>RETRO</sub> (3/4" to 2 3/4" O.D. Pipe)  
#802<sub>RETRO</sub> (2" to 7 1/4" O.D. Pipe)  
#803<sub>RETRO</sub> (3 1/4" to 10" O.D. Pipe)

**RUBBER ROOF  
FLASH KIT**



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

**TUBE SEALANT**



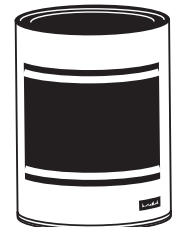
10.3 oz. Cartridge  
Urethane

**TAPE SEALANT**



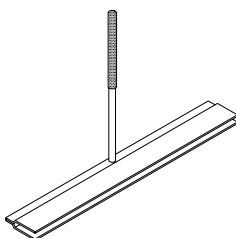
7/8" X 3/16" X 25'  
Double Bead  
Butyl - Gray

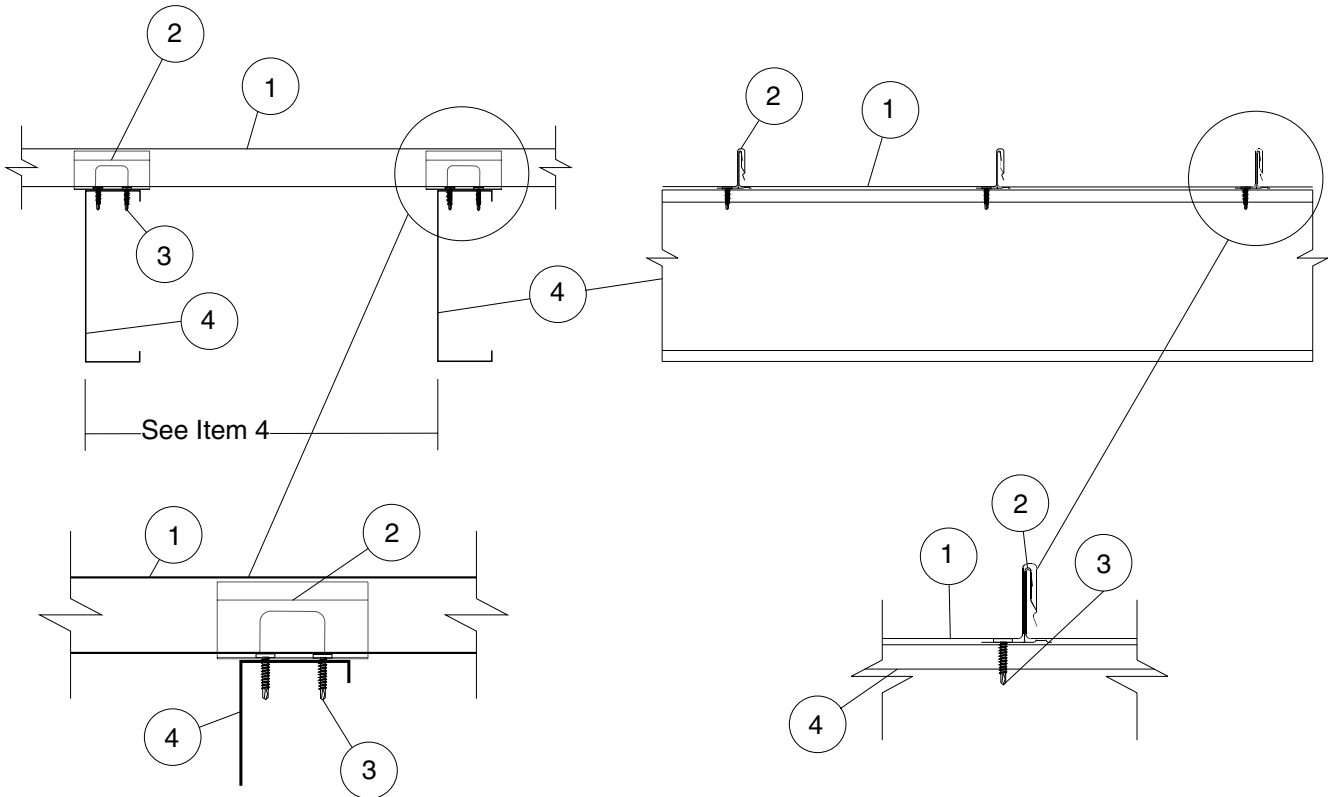
**TOUCH-UP PAINT**



Available in Pints  
PVDF / MS CF30

**METAL PANEL  
HEMMING TOOL**





**VERTICAL SEAM**

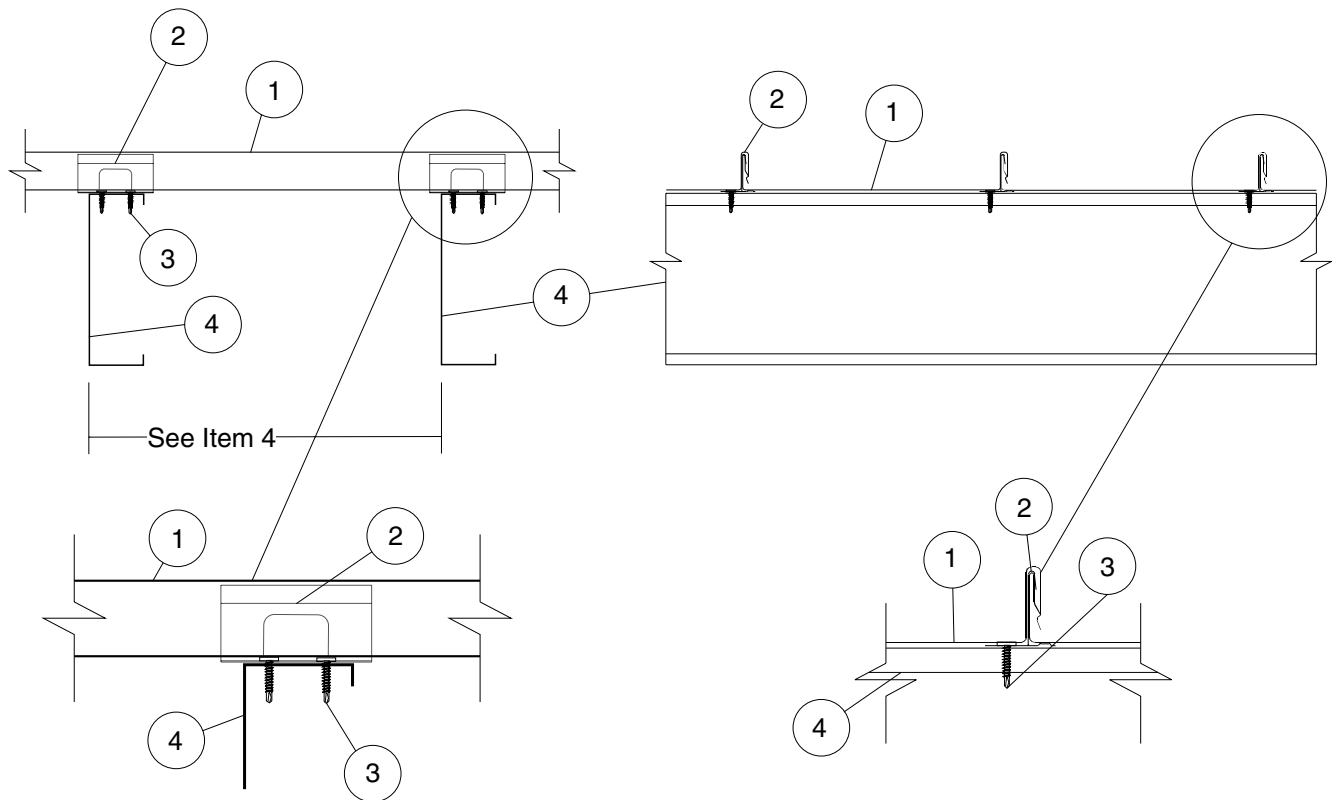
**Construction No. 254**  
 February 05, 2002  
 Uplift - Class 90  
 (See Item No. 4)  
 Fire Not Investigated

- 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 MFG CORP - "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 MFG CORP - "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



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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 MFG CORP - "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 MFG CORP - "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

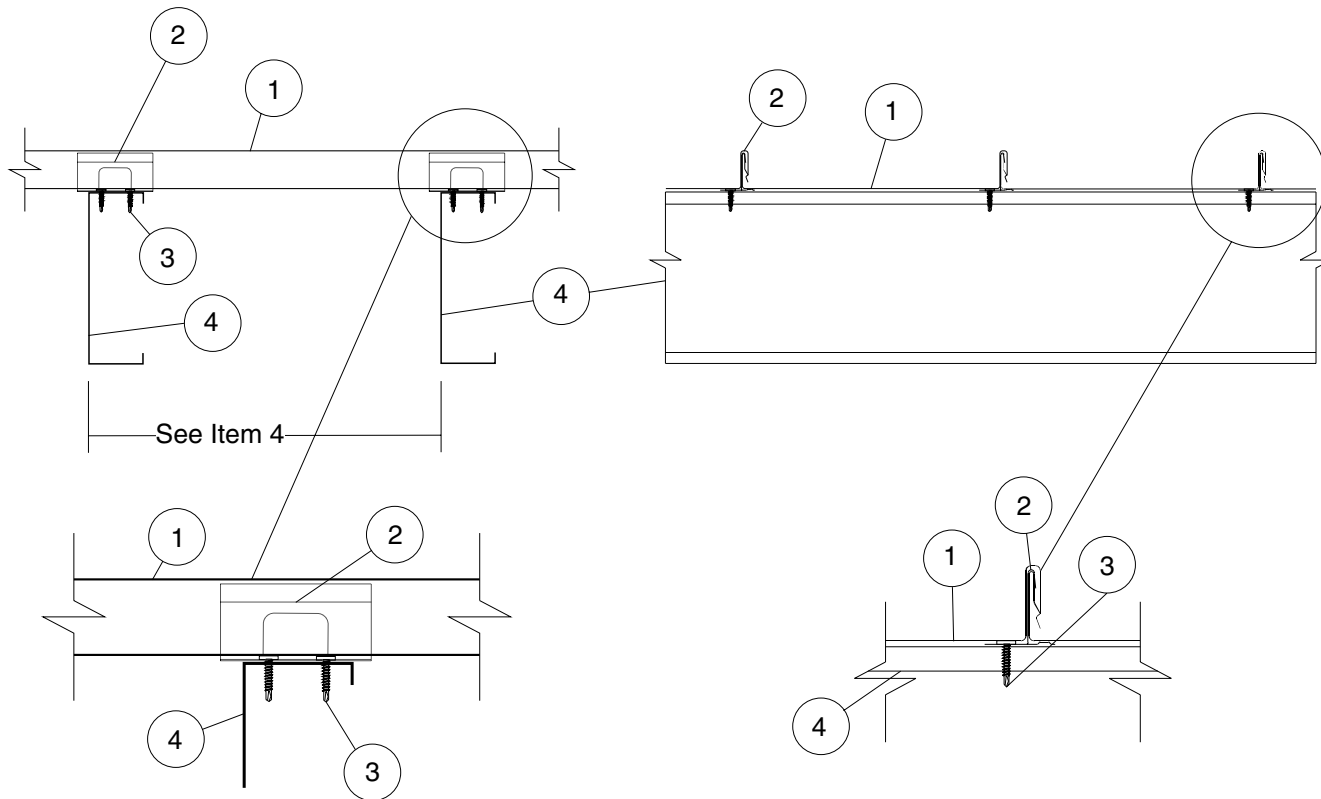
Refer to General Information Roof Deck Constructions for items not evaluated.

\*Bearing the UL Classification Mark



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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 MFG CORP - "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 MFG CORP - "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 in. diam 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. OC. For Class 60 to be 48 in. OC. For steel panels: 22 MSG thick to be 60 in. OC. 24 MSG thick to be 48 in. OC.

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

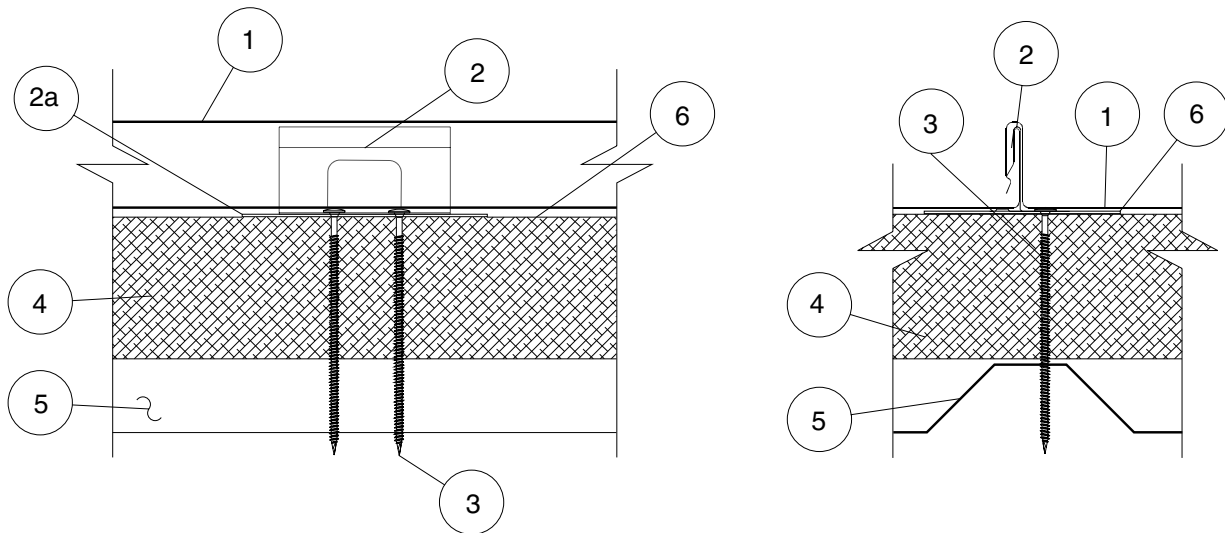
\*Bearing the UL Classification Mark



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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 MFG CORP - "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 MFG CORP - "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. diam 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.

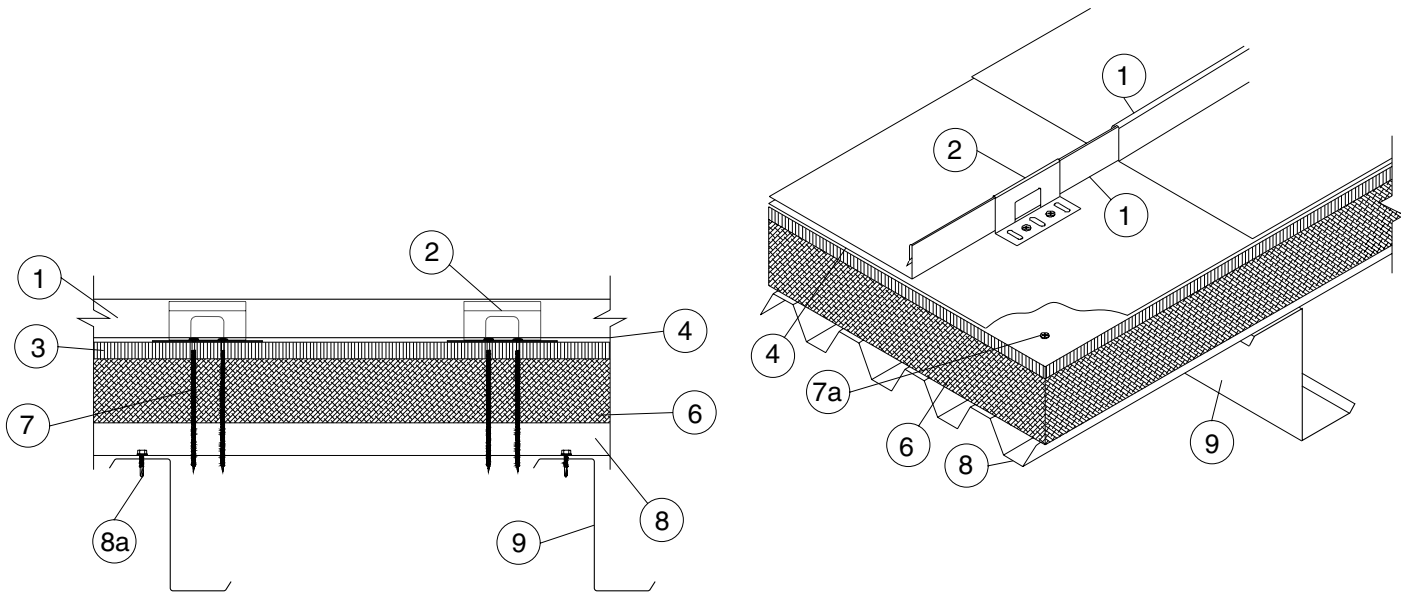
Refer to General information, Roof Deck Constructions (Roofing Materials and Systems Directory) for items not evaluated.

\*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 MFG CORP - "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 MFG CORP - "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.

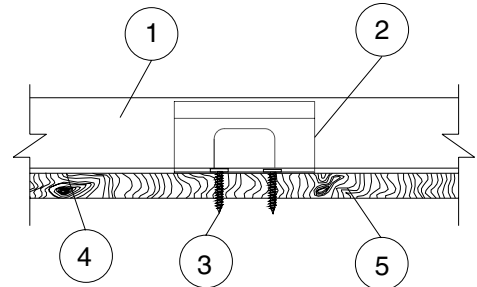
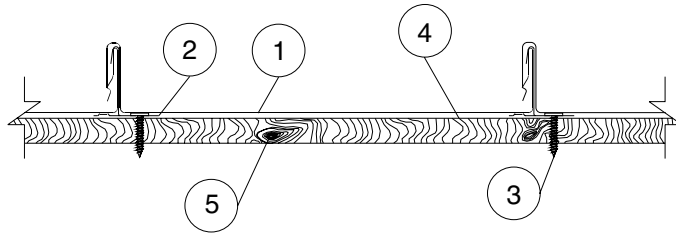
Refer to General information, Roof Deck Constructions (Roofing Materials and Systems Directory) for items not evaluated.

\*Bearing the UL Classification Mark



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LISTED



**VERTICAL SEAM**

**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 MFG CORP - "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 MFG CORP - "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** 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** 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 (TEKS/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.

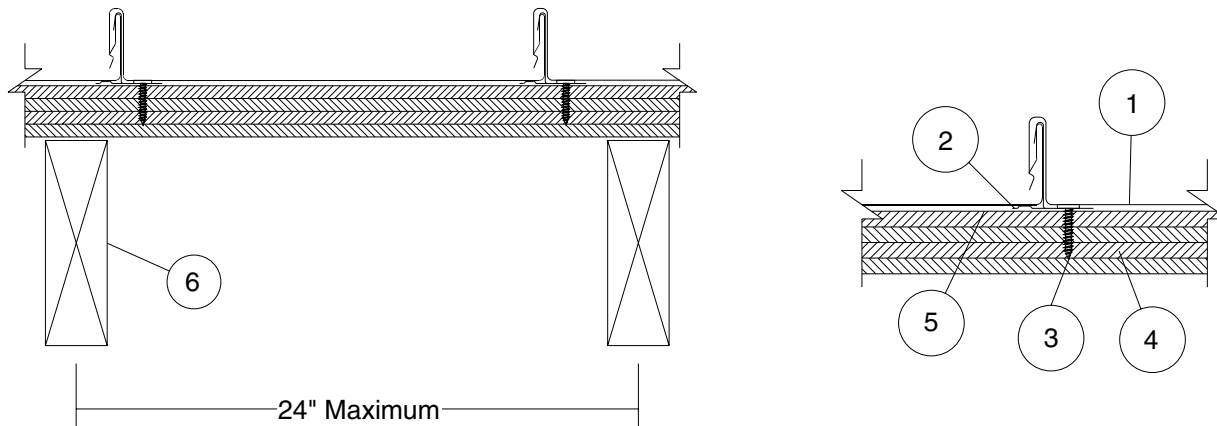
Refer to General information, Roof Deck Construction (Building Materials Directory) for items not evaluated.

\*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 MFG CORP - "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 MFG CORP - "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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### Metal Roof Deck Panels

Metal Sales Manufacturing Corporation has obtained fire resistance ratings for various products conducted according to test criteria set forth by 'Underwriters Laboratories' "Standard Fire Tests of Building Construction and Material" (ANSI/UL 263). This test procedure is identical to ASTM E-119 and NFPA 251.

The fire resistance rating is for the total assembly and not just the external metal panel. Ratings are expressed in hours and vary depending upon the assemblies. In general, the test criteria is to evaluate the assembly's ability to continue to support the superimposed loads and resist the passage of flame, high temperatures, or hot gases which will ignite combustible materials. The test assemblies are identified by an alpha-numeric design number.

For detail information on specific assemblies and hourly ratings see UL Fire Resistance Directory.

### METAL SALES MFG CORP

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.

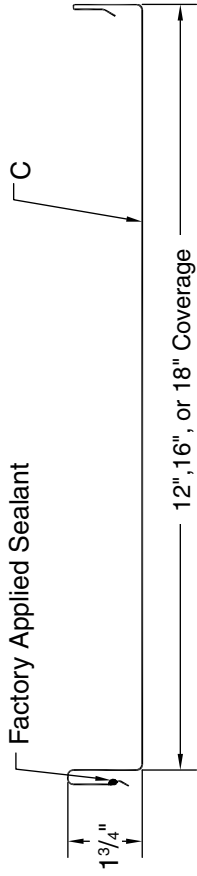
\*\*Bearing plate to be a minimum of 16 gauge. Member will be fastened through the roof insulation to the steel deck with min. No. 14 self-drilling and/or self-tapping fasteners.

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



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**VERTICAL SEAM SECTION PROPERTIES**

GAUGE	WIDTH (in)	YEILD KSI	WEIGHT PSF	TOP IN COMPRESSION <sup>1</sup> :			BOTTOM IN COMPRESSION <sup>1</sup> :		
				Ixx in <sup>4</sup> /ft	Sxx in <sup>3</sup> /ft	Ma (k-in)	Ixx in <sup>4</sup> /ft	Sxx in <sup>3</sup> /ft	Ma (k-in)
24	12"	50	1.48	.1158	.0810	2.43	.0533	.0557	1.67
24	16"	50	1.35	.0908	.0608	1.82	.0398	.0419	1.25
24	18"	50	1.31	.0820	.0539	1.61	.0353	.0372	1.11

**ALLOWABLE UNIFORM LIVE LOADS PSF<sup>1,2,3,4</sup>**

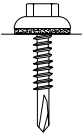
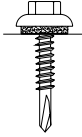
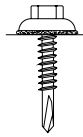
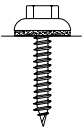
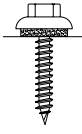
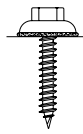
3 or more-Equal Spans	Inward (Gravity / Deflection) Load <sup>2,4</sup> :					Outward Uplift (Stress) Load <sup>3</sup> :							
	GA. Width	2.5'	3'	3.5'	4'	4.5'	5'	2.5'	3'	3.5'	4'	4.5'	5'
24	12"	50	199	140	104	80	63	51	370	257	189	145	93
24	16"	50	150	105	78	60	48	39	278	193	142	109	70
24	18"	50	133	94	69	53	42	34	246	172	126	97	62

- Theoretical section properties have been calculated per AISI 1996. "Specifications for the design of cold formed steel members." Ixx and Sxx are effective section proper ties for deflection and bending.
- Tabulated gravity loads are allowable loads calculated in accordance with AISI 1996 specifications considering, bending, shear, and combine stresses. (Combined bending and web crippling is omitted per AISI section C 3.5). Gravity Load considers worst of 3 and 4 multiple equal span condition. Panel weight has not been accounted for in gravity load tables. Allowable loads do not address web crippling requirement or fastener/support connection.
- Allowable wind uplift loads have been increased by 33 1/3% and are based on AISI 1996 "specifications for the Design of Cold Formed Steel Members". **Note: During uplift or suction condition, panel flat will deflect due to upward load changing shape and reducing these loads. Contact Metal Sales Technical Services for ASTM E-1592 uplift design loads.**
- Deflection consideration is limited by a maximum deflection ratio of L/180 of span.

## 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.

	<b>CORRECT</b> Sealing material slightly visible at edge of metal washer. Assembly is watertight.	<b>TOO LOOSE</b> Sealing material is not visible; not enough compression to seal properly.	<b>TOO TIGHT</b> 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.

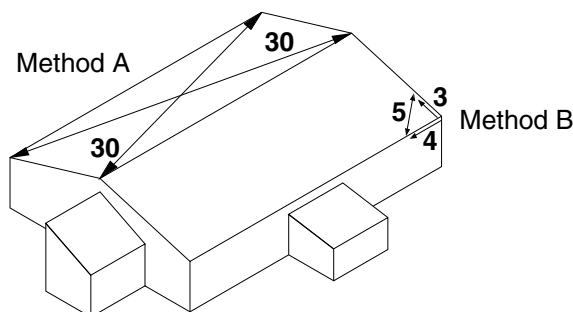
## CONDITION OF SUBSTRUCTURE

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.



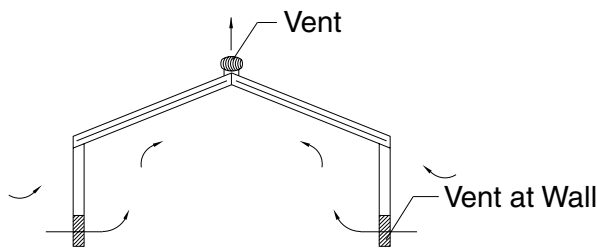
## VENTILATION

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.

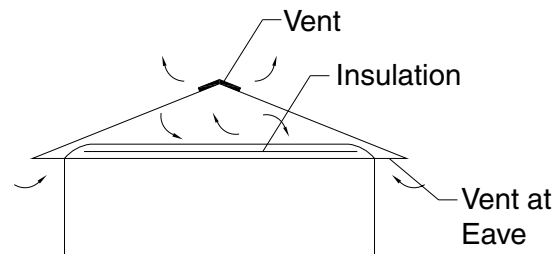
Condensation occurs when moisture laden air comes in contact with a surface temperature equal to or below the dew point of the air. This phenomenon creates problems that are not unique with metal buildings; these problems are common to all types of construction.

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)**

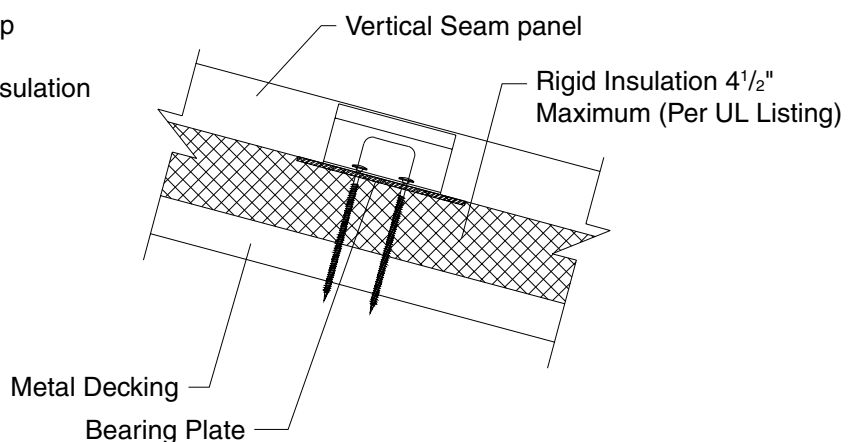
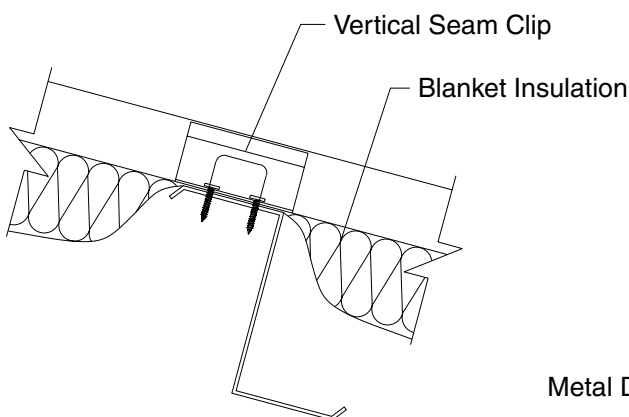


**Building with Attic or Retrofitted**

## 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

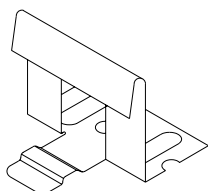
Steel roofing panels are subject to dimensional changes after installation due to exposure to varying temperatures. The greatest influence is solar energy. Steel roofing absorbs various amounts of heat depending upon color, finish, angle of exposure, and time of exposure.

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.

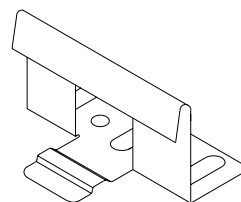
When the total length of panel run exceeds the capability of the clips to accommodate the thermal movement, expansion joints must be designed into the structure.

## 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)

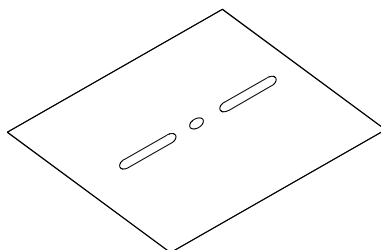
The following chart should be used to determine proper fasteners required for clip installation on the selected applications. (See Fastener Selection Guide page 16 for other fasteners available.)

APPLICATION	INSTALLATION REQUIREMENTS		**CLIP SPACING	TYPE OF FASTENER	# REQ.
<b>CLIPS OVER PURLINS (16 GA. MIN)</b>	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
<b>CLIPS OVER 5/8" WOOD DECK</b>	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
<b>Max suction pressure of 32 psf</b>	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
<b>CLIP OVER RIGID INSULATION / METAL DECK</b>	UL-90	24 GAUGE	4'-0" O.C.	DEKFAST #14*	2 FASTENERS
	UL-90	22 GAUGE	4'-0" O.C.	DEKFAST #14*	2 FASTENERS

\* Length of Dekfast 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

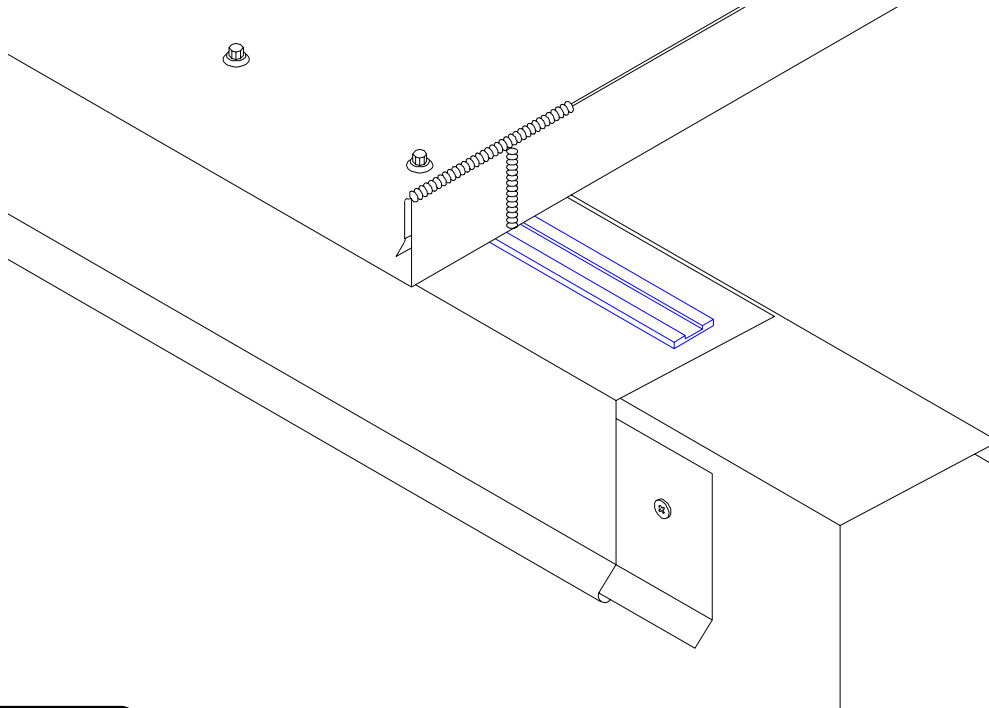
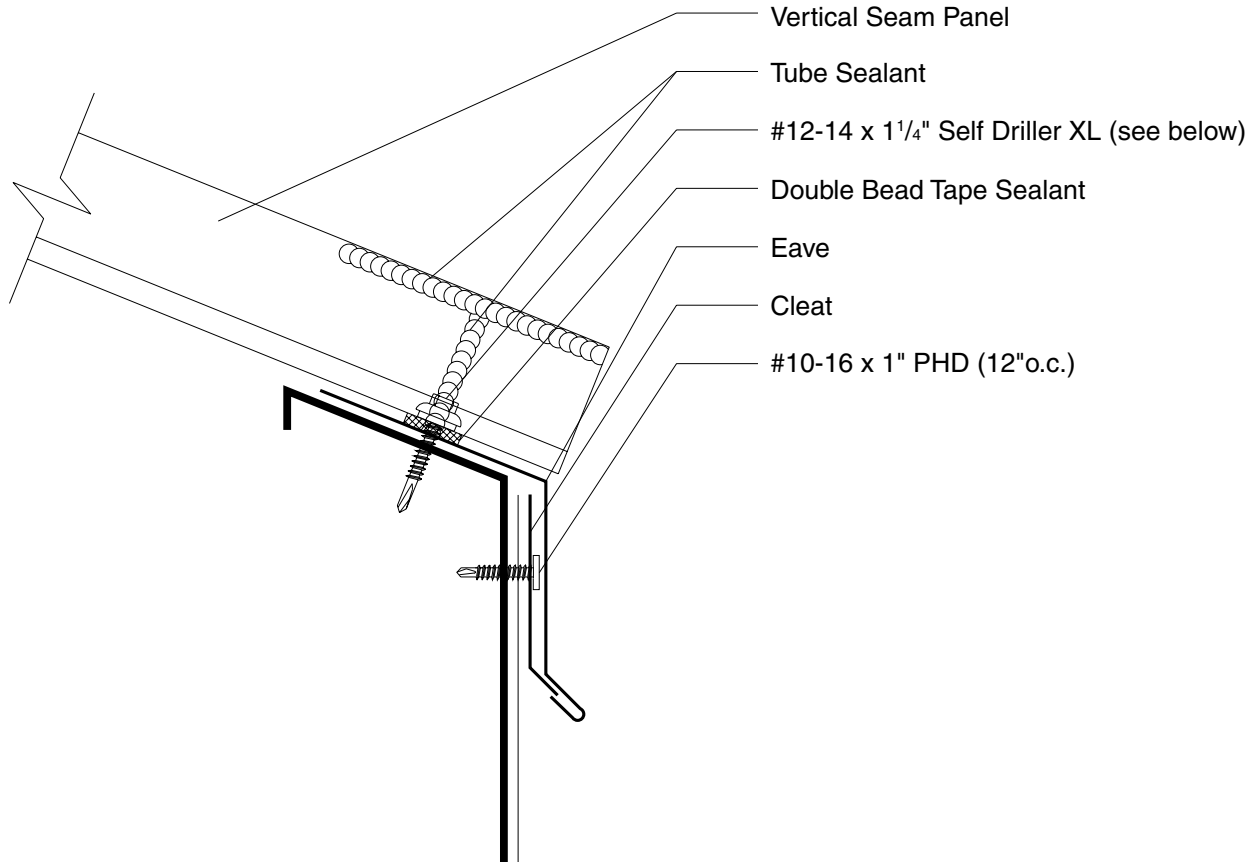


**Bearing Plate**  
(Flat)

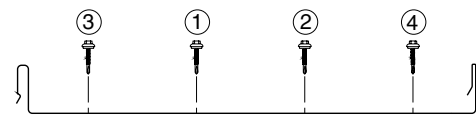
# VERTICAL SEAM

# EAVE DETAIL

**3:12 SLOPE  
MINIMUM**



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

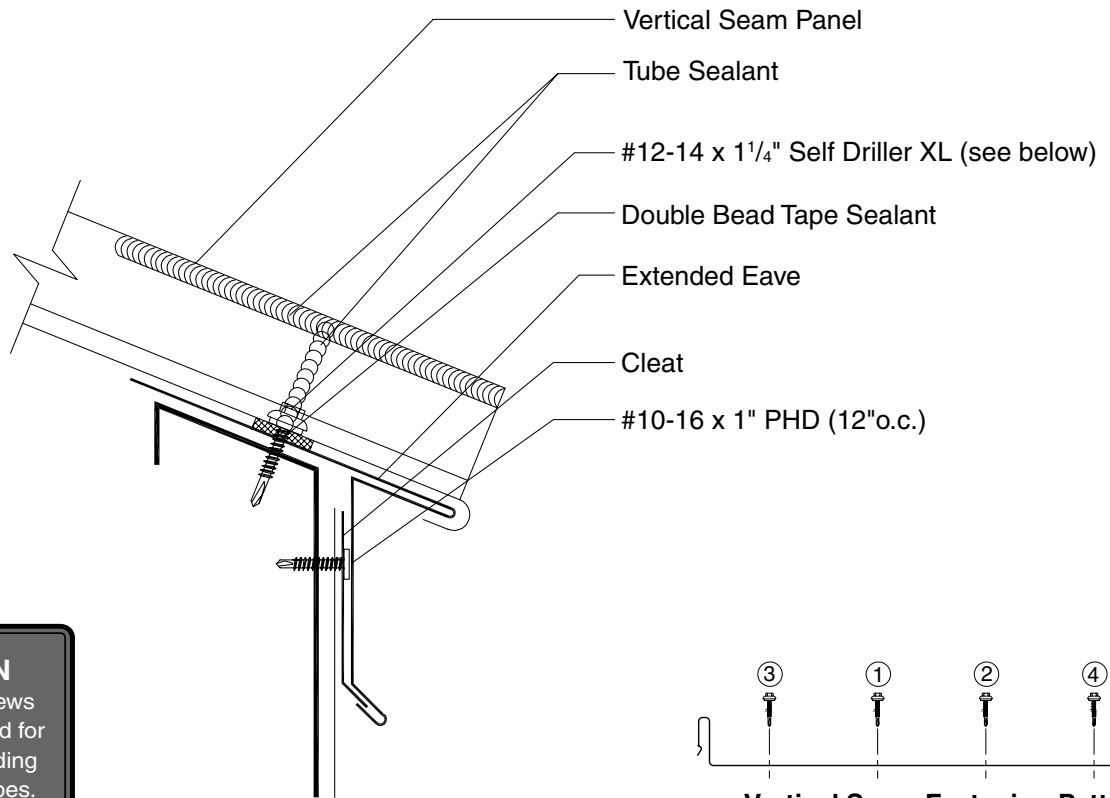


**Vertical Seam Fastening Pattern**

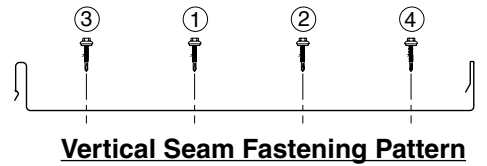
# VERTICAL SEAM

## EXTENDED EAVE DETAIL

**3:12 SLOPE  
MINIMUM**



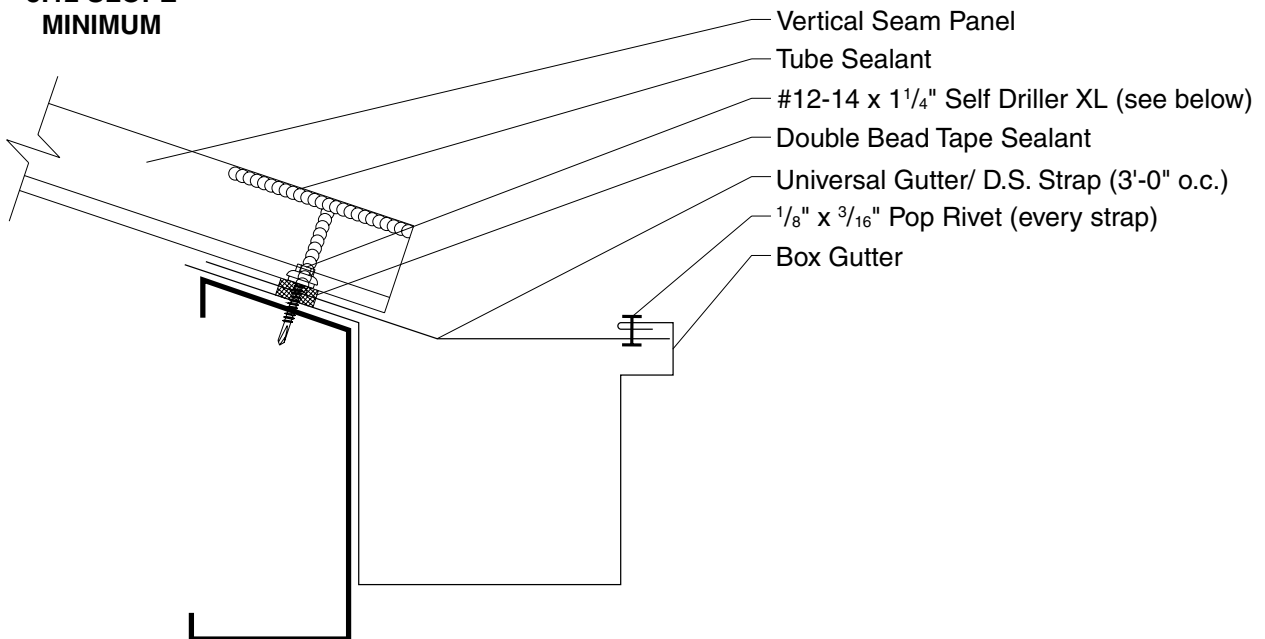
**CAUTION**  
 Additional screws  
 may be required for  
 high snow loading  
 and steep slopes.



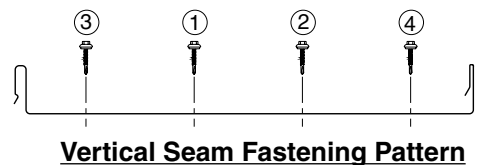
# VERTICAL SEAM

## BOX GUTTER DETAIL

**3:12 SLOPE  
MINIMUM**



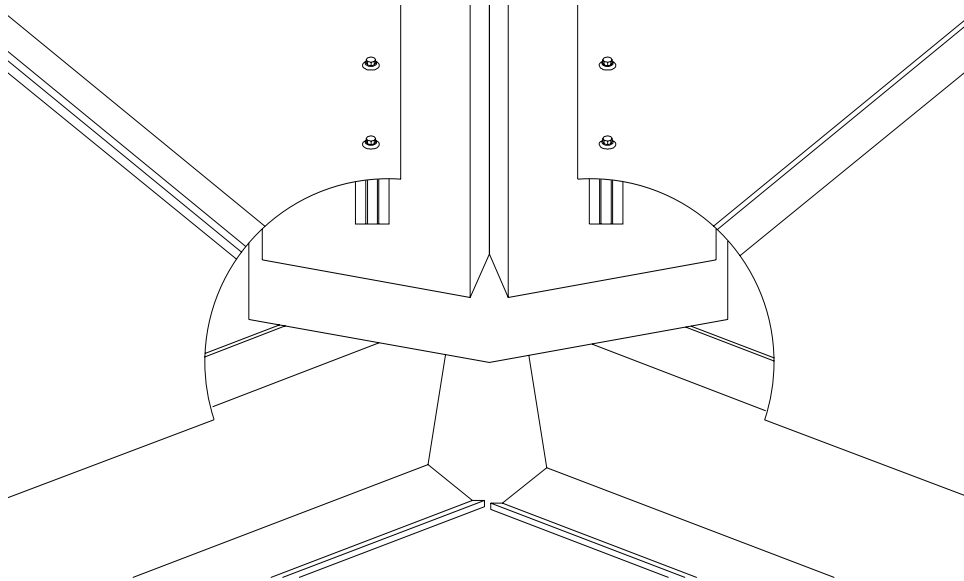
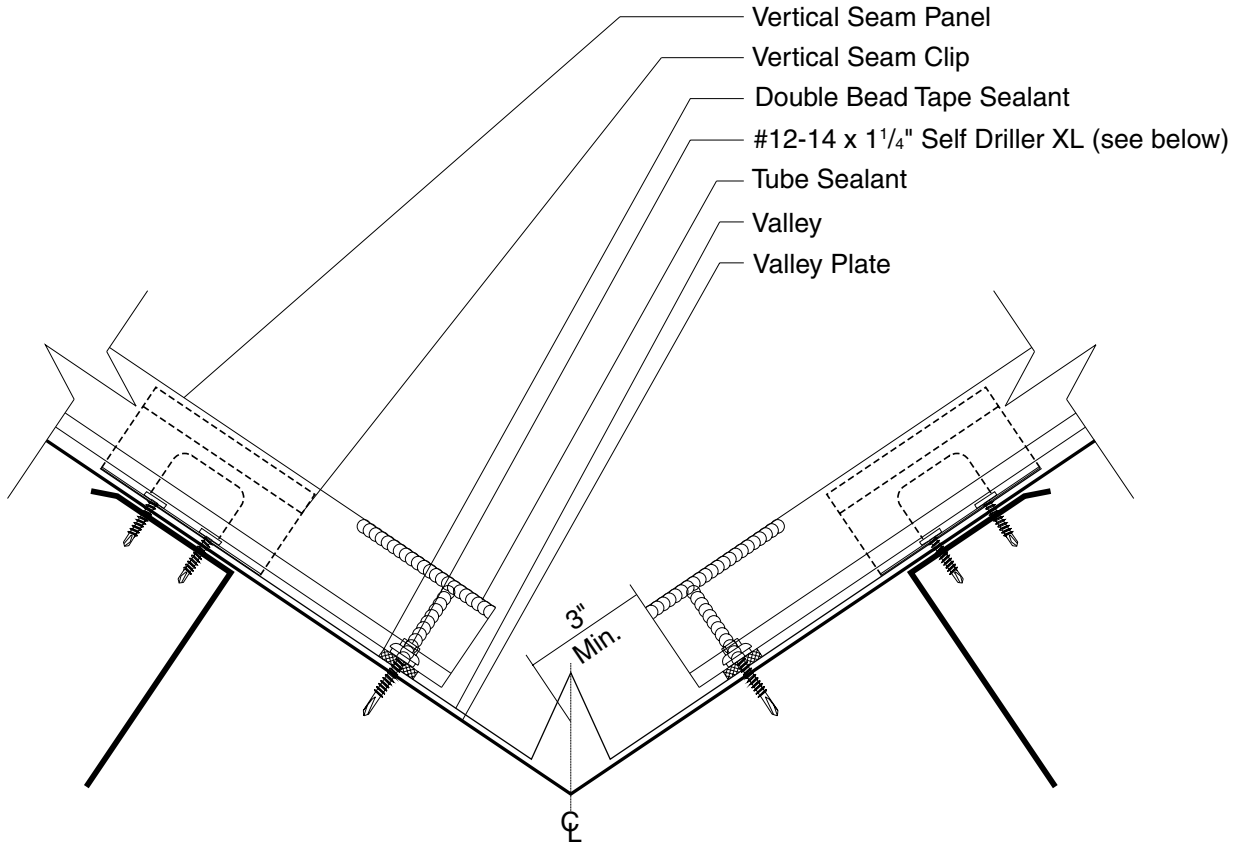
**CAUTION**  
 In locations where heavy  
 rainfall or severe ice and  
 snow may occur, Metal Sales'  
 standard gutters may not be  
 suitable for use.



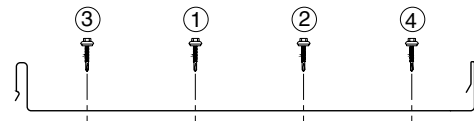
# VERTICAL SEAM

# VALLEY DETAIL

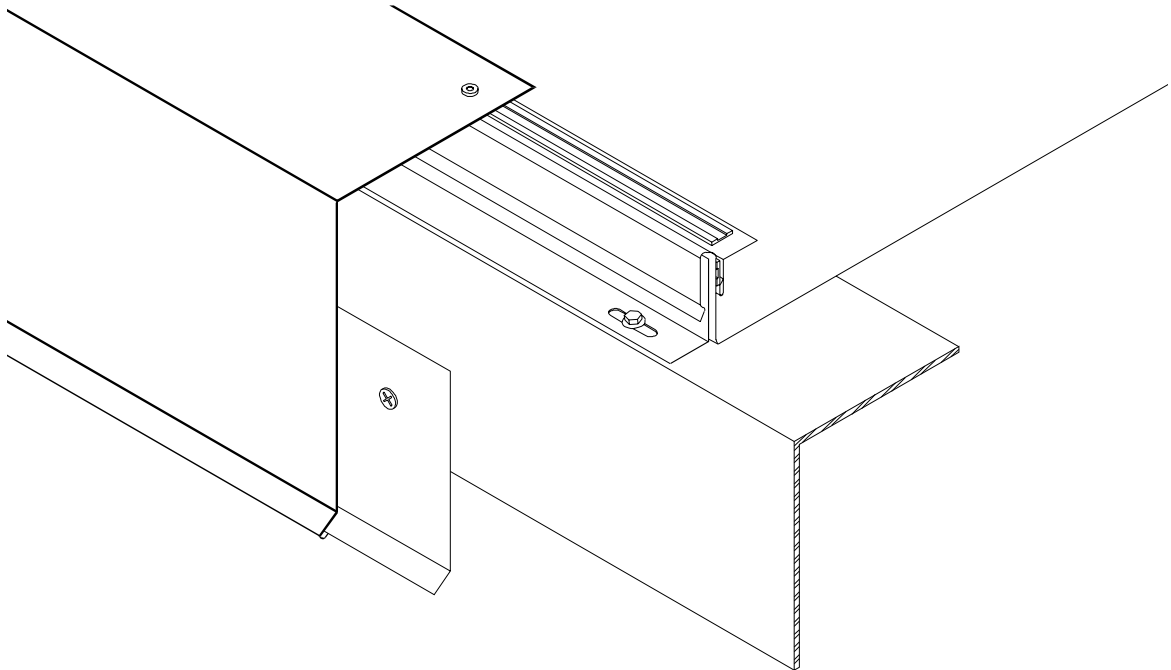
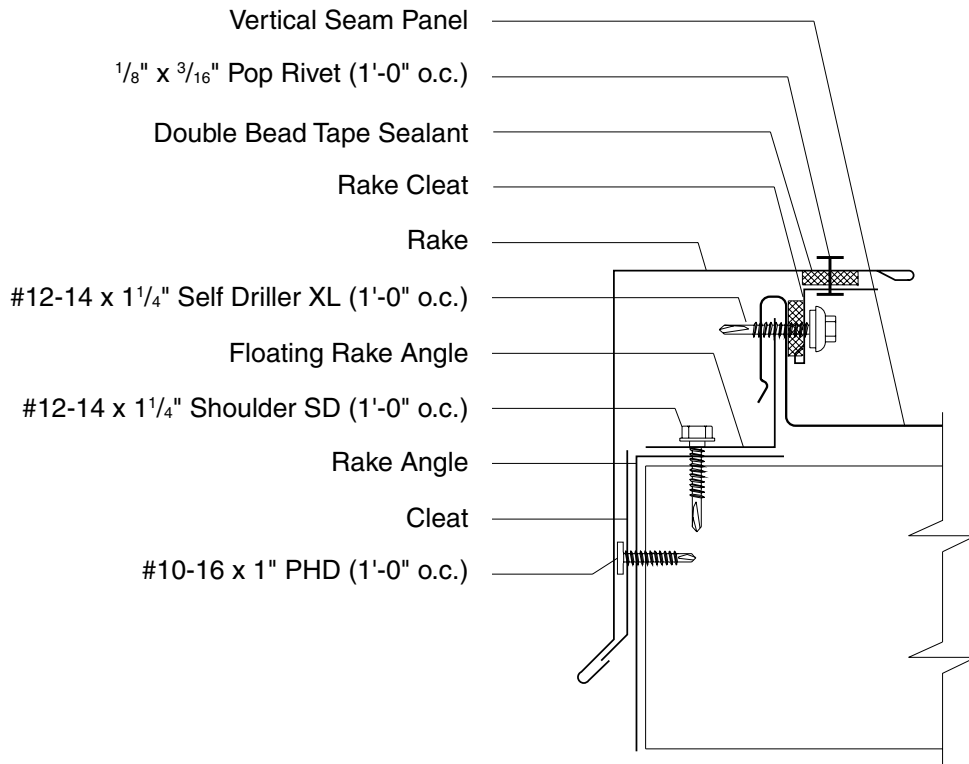
3:12 SLOPE  
MINIMUM

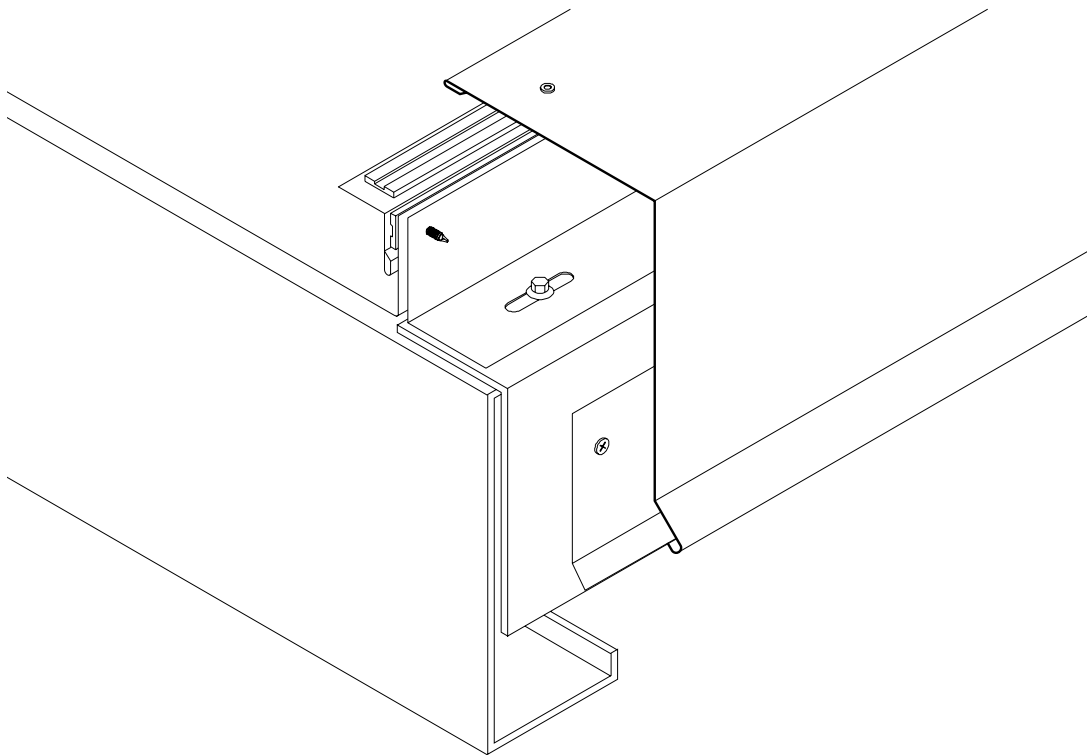
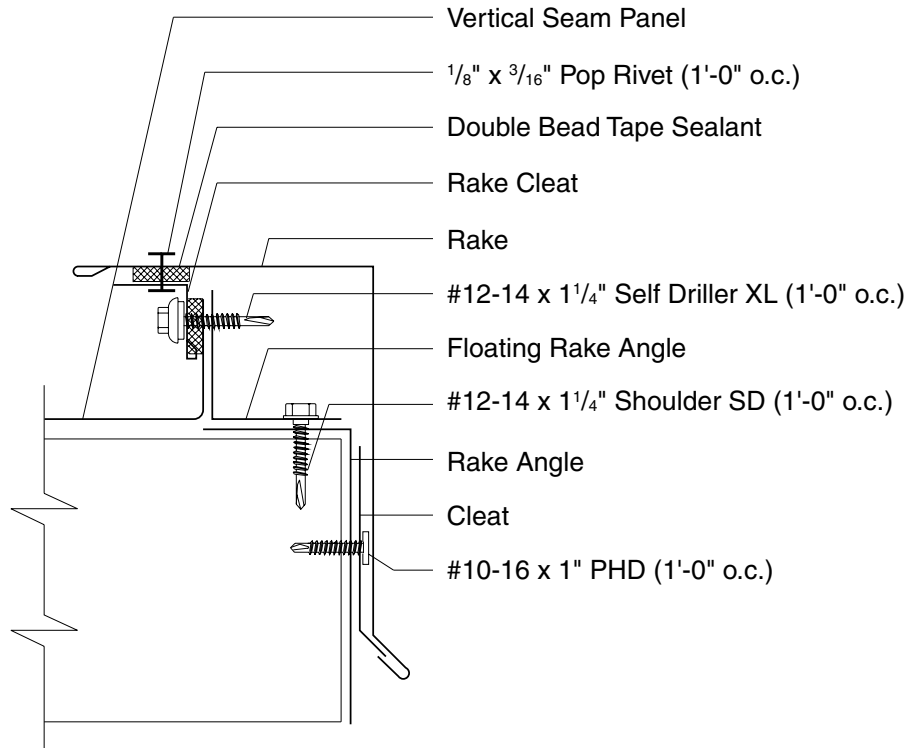


**CAUTION**  
Additional screws  
may be required for  
high snow loading  
and steep slopes.



**Vertical Seam Fastening Pattern**

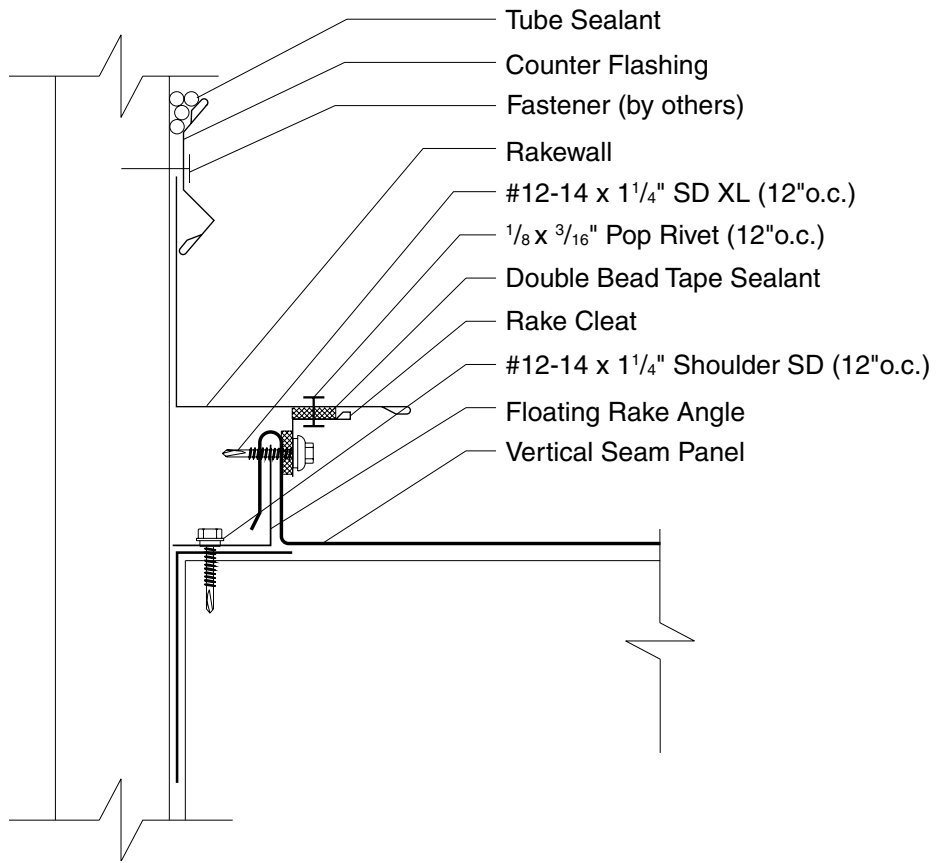




# VERTICAL SEAM

# RAKE PARAPET (ON MODULE) DETAIL

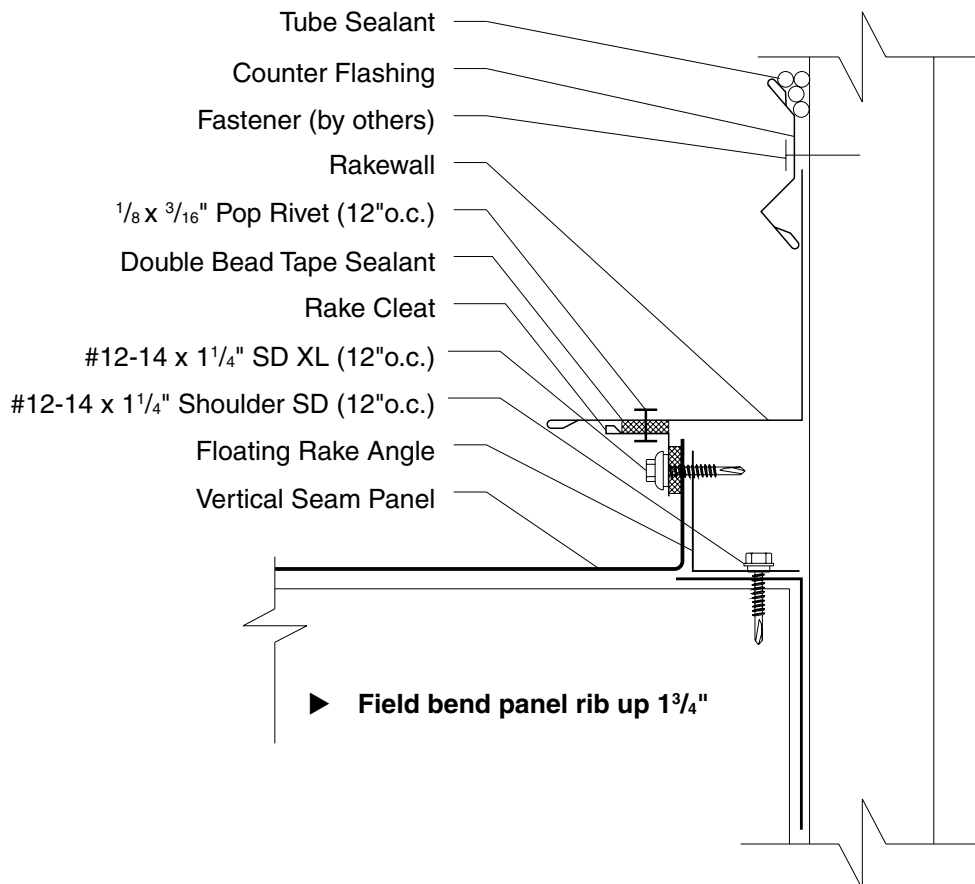
3:12 SLOPE  
MINIMUM



# VERTICAL SEAM

# RAKE PARAPET (OFF MODULE) DETAIL

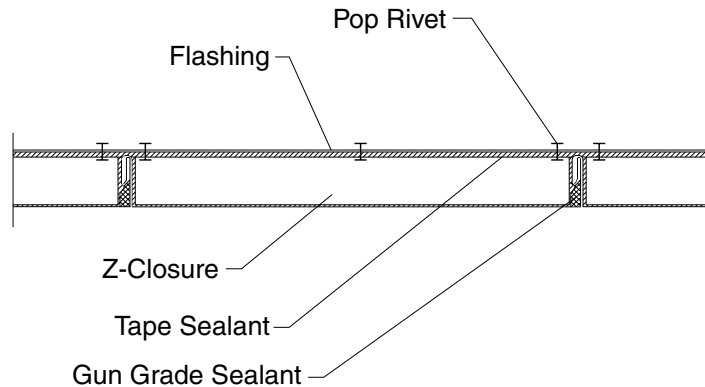
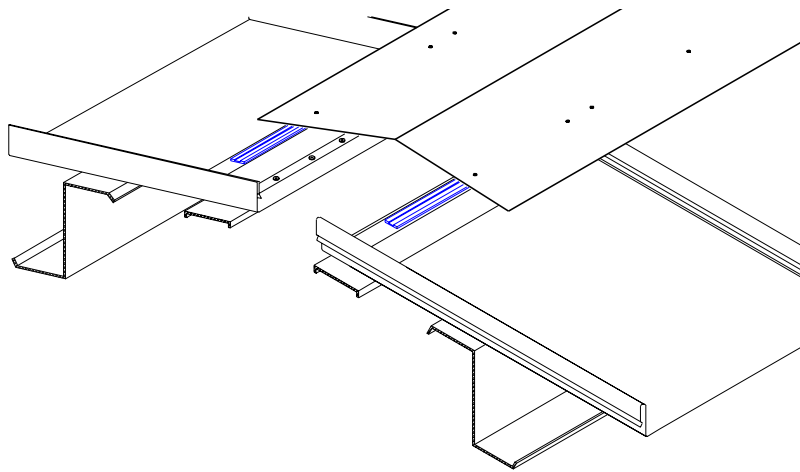
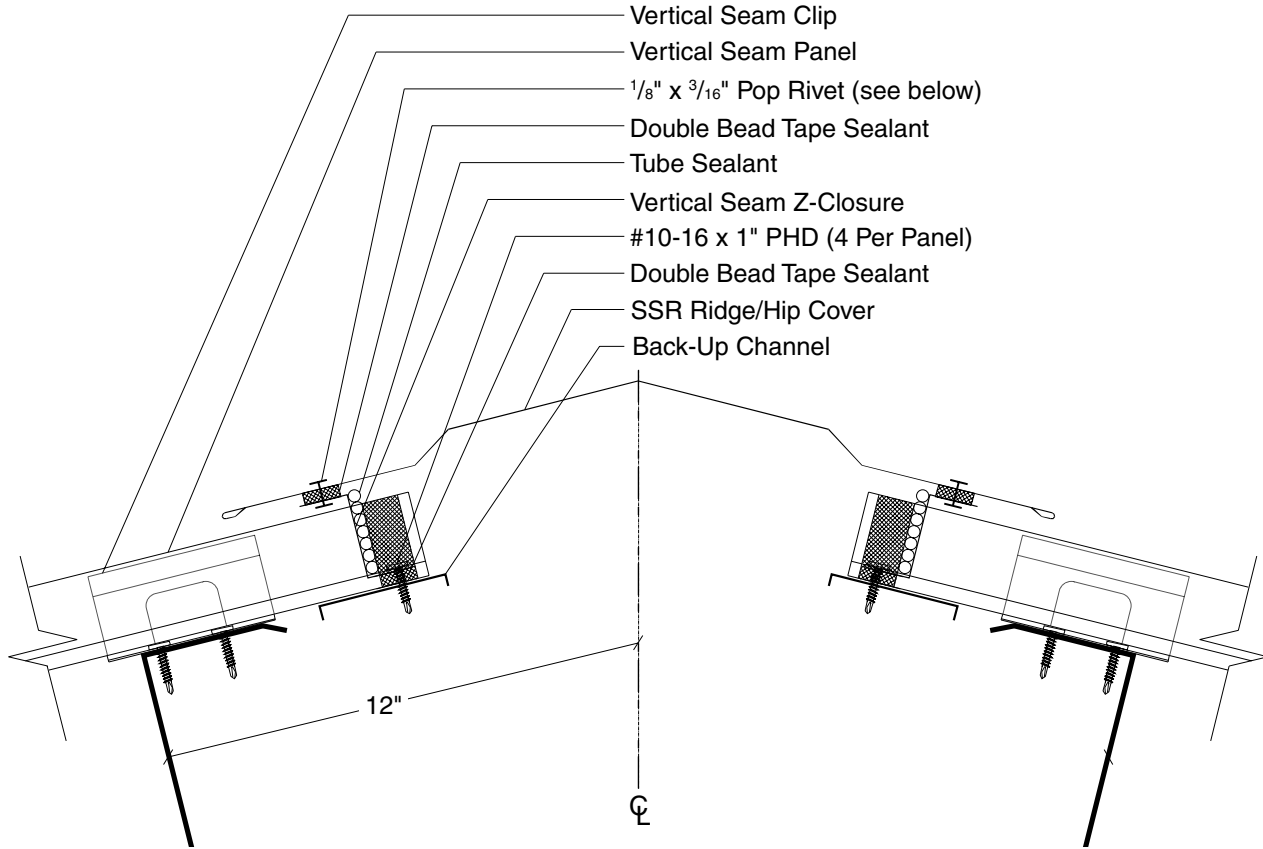
3:12 SLOPE  
MINIMUM



# VERTICAL SEAM

# SSR RIDGE/HIP DETAIL

3:12 SLOPE  
MINIMUM



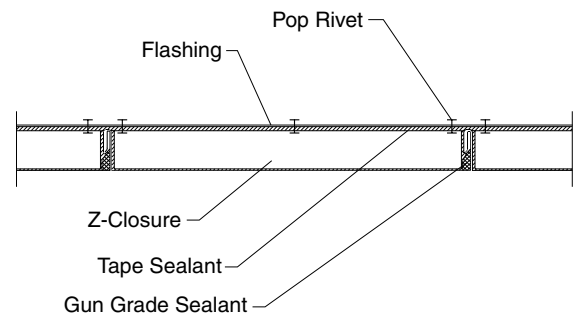
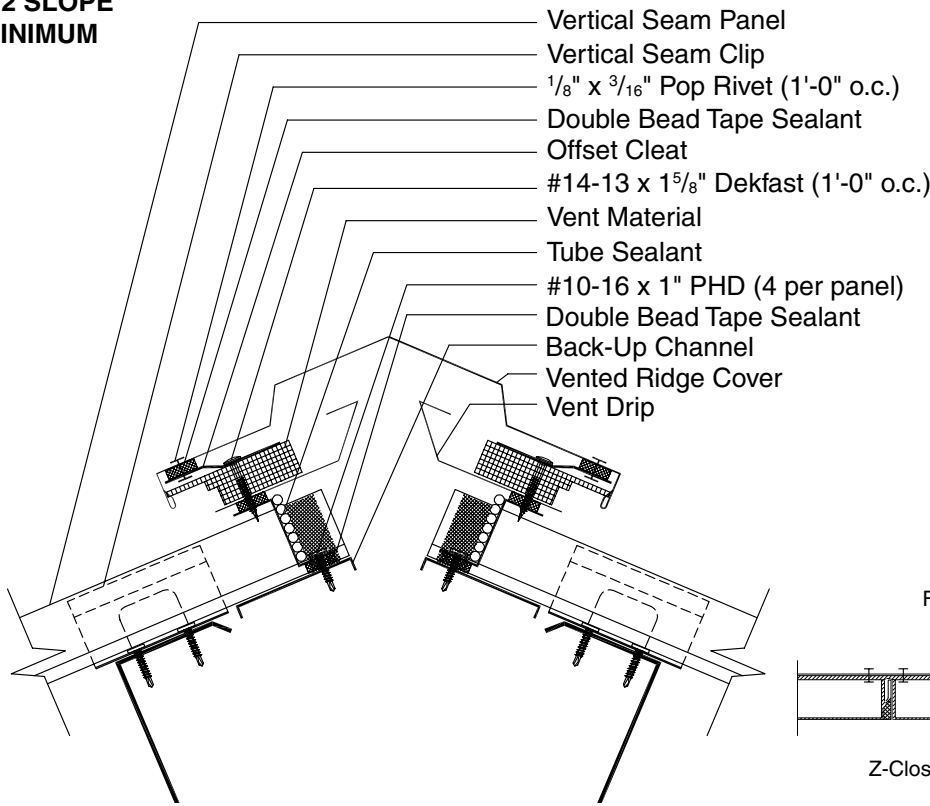


# VERTICAL SEAM

# VENTED RIDGE DETAIL

3:12 SLOPE  
MINIMUM

Note: Refer to PSL-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

