

FABRAL®

A FLACK GLOBAL METALS COMPANY

Stand'N Seam® Roofing System

Installation Manual

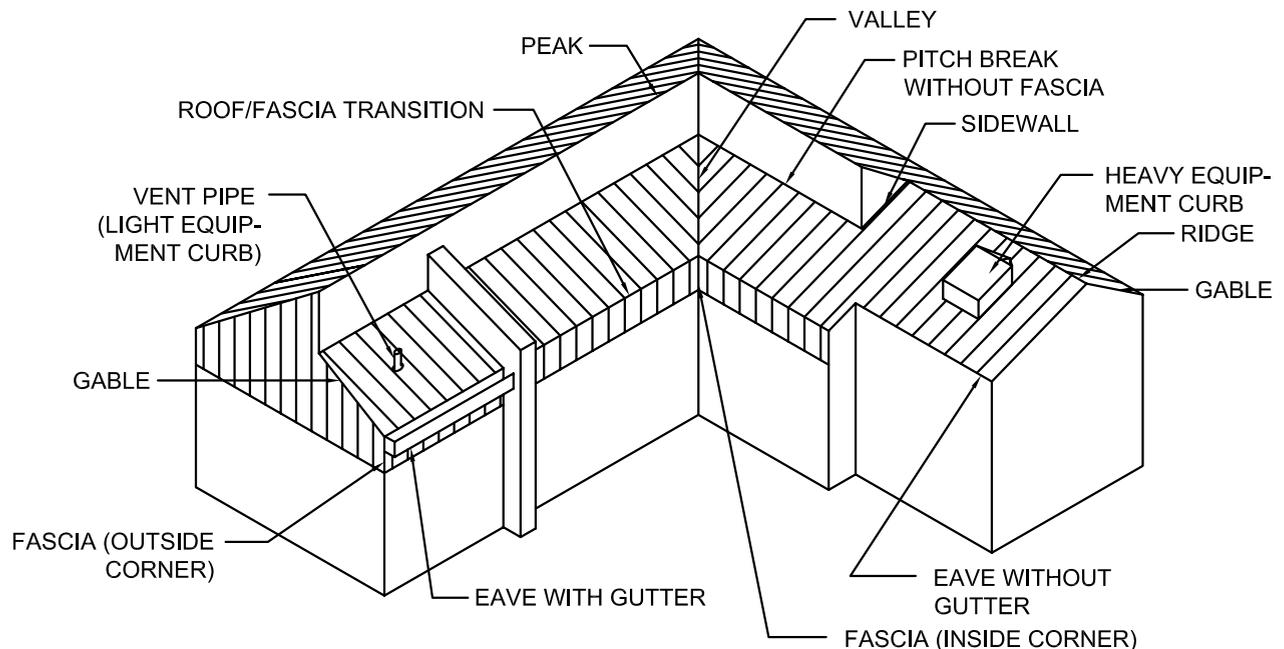


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STAND'N SEAM® PANEL GENERAL NOTES

The details in this manual are suggested methods for installing Fabral's Stand'N Seam® roofing system and are proven methods of construction. However, the details may require adaptations, changes, or revisions for your particular project since conditions vary and may be unique.

It is the responsibility of the designer and installer to ensure that the details are adapted and applied to meet the particular building requirements and to provide adequate weathertightness. Weathertightness can be assured through the use of these details, good materials and workmanship, the use of the right types of sealant, and sealing all joints adequately. Fabral shall be held harmless from any and all claims arising from a lack of weathertightness as a result of the following these suggested typical detailed drawings.

The designer and installer must be aware of, and allow for, expansion and contraction of roof panels when designing and/or installing panels and flashings. To allow thermal movement in one direction, the panel must be fastened to the substrate below, either at the top of the panel or at the bottom of the panel. NEVER FASTEN BOTH ENDS OF THE PANEL. Always use a sliding ridge with a fixed eave. An eave bend-down detail will fix the panel at the eave.

The installer must be familiar with all erection instructions before starting work. Before beginning installation of the panels, the installer must examine the substrate to ensure that all supporting members are straight, level, plumb, and true in accordance with the minimum tolerances. Report any variations and potential problems to the general contractor. Do not start work until unsatisfactory conditions have been corrected.

The roofing/fascia system shall be installed plumb, straight, and true to adjacent work. Horizontal panel endlap joints are not acceptable. EPDM closures and metal closures shall be caulked around their perimeter. Panel clips allow for thermal movement and shall be installed at all panel joints. Longitudinal spacing of clips shall be specified for design loads. No perforations shall be made in the panels by fasteners except as shown on the drawings.

All flashings, closures, and accessories shall be provided by Fabral as indicated and as necessary to provide a weathertight installation. Installation procedures, which are not indicated, shall be in accordance with Fabral's printed instructions and details or approved shop drawings. Flashing and trim shall be installed true and in proper alignment with any exposed fasteners equally spaced for the best appearance.

Sealant for joints and flashing endlaps shall be nondrying, nontoxic, and nonshrinking and shall have a serviceable temperature of -50° to 212° F. Sealant shall be field-applied on dry, clean surfaces. To ensure weathertightness, the sealant shall be installed where indicated without skips or voids. Sealant shall be furnished by others.

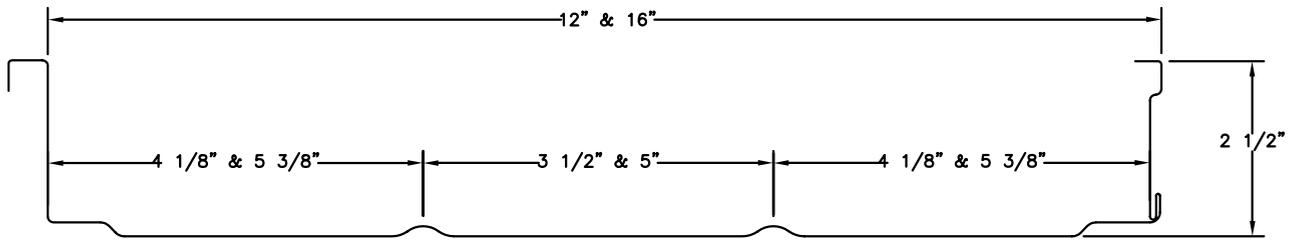
The installer may utilize details provided and procedures recommended for installation of materials. Some field-cutting and fitting of panels and flashings is expected of the installer and minor field corrections of materials is a part of normal erection work. Workmanship will be by the best industry standards, and installation shall be preformed by experienced metal craftsmen. SMACNA (Sheet Metal and Air Conditioning Contractors National Association) architectural sheet metal manual specifications shall govern for material and workmanship not shown. Oil-canning in panels is common to the industry and shall not be cause for product refusal.

The clip screws used for Stand'N Seam panels require a low-profile head that does not contact the panels. Therefore, the clip screws should be purchased from Fabral. The self-drilling screw furnished by Fabral has a maximum drilling thickness of $3/16"$. If it is necessary to attach the clips to thicker steel, predrill sizes for the clip screw in question:

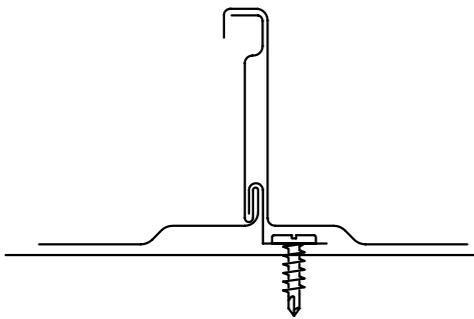
#12-14 x 2" self-drilling screw (predrill with 0.201" drill or drill #7)

#14 x 2" AB stainless steel screw (predrill with 0.228" drill or drill #1)

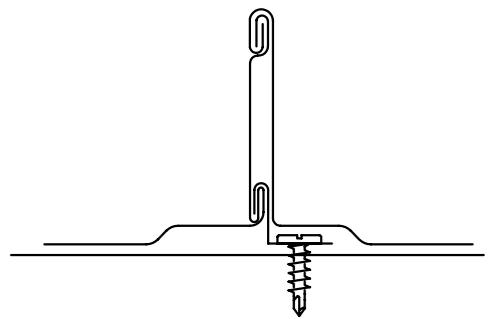
#14-13 Dekfast screw (predrill with 0.221" drill or drill #2)



STAND'N SEAM PANEL PROFILE

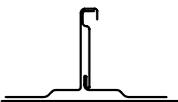
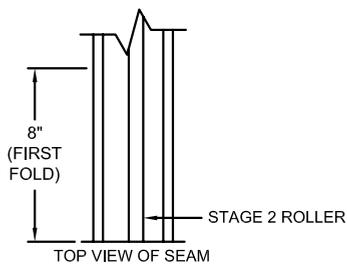
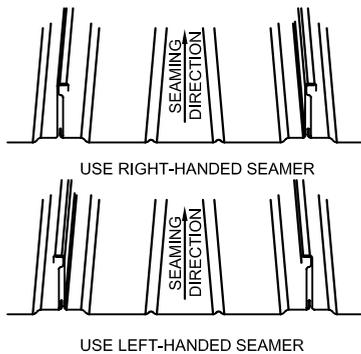


PANEL BEFORE SEAMING

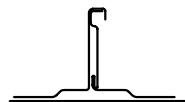
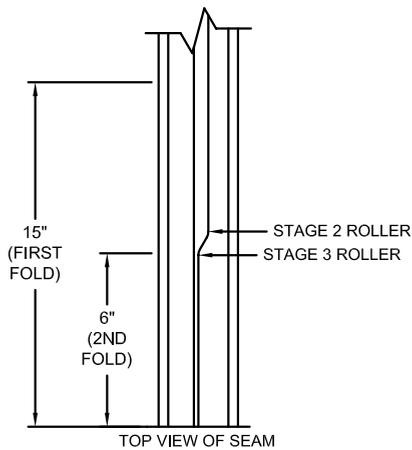


PANEL AFTER SEAMING

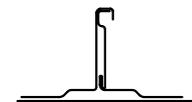
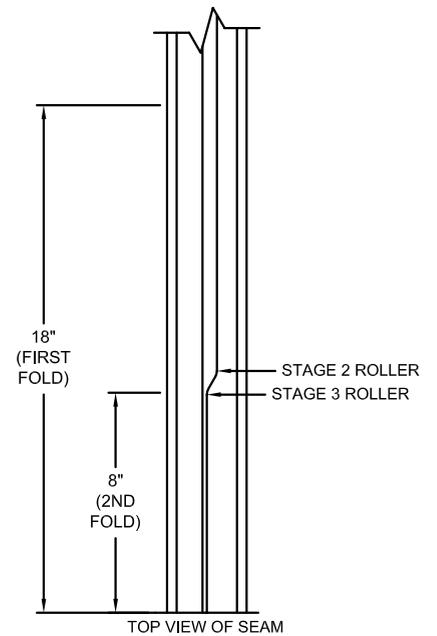
*CLIP SCREWS MUST HAVE LOW-PROFILE HEADS. PURCHASE FROM FABRAL ONLY.



SEAMING METHOD #1



SEAMING METHOD #2A



SEAMING METHOD #2B

PREPARING THE SEAM WITH HAND TOOLS

Seaming Stand'N Seam® Panels

Stand'N Seam panels require seaming adjacent panels to one another by folding the sidelap. This increases the strength and weathertightness of the panel system over other panel types. Stand'N Seam panels have a double-folded seam. These seams may be made with hand tools or an electric power seamer. **Only use tools that were purchased from FABRAL.** Included with the power seamer are detailed instructions on how to use it and the hand tools. This page provides an overview of that material. Refer to the drawings on the preceding page.

The electric seaming machine is self-propelled. It rides on four, non-marring wheels at approximately 30' per minute. Run the seamer downhill (i.e. from ridge to eave). On vertical applications, the seamer must be run from top to bottom.

There are right-hand and left-hand power seamers available because the panels can be installed so the seam is on the left or right of the webs. To determine which seamer to use, see the drawings on the preceding page. When the seam is on the right side of the webs (while looking down the panels in the direction you wish to seam), use a right handed seamer. (In this case, the panels were installed from right to left). When the seam is on the left side of the webs, use a left-handed seamer. (In this case, the panels were installed from left to right.)

Position the first panel in place and secure it to its substrate with clips. Position the second panel so that the overlap fits over the underlap.

Before using the power seamer, make the first fold at every clip for the entire panel using hand tool – 1. This holds the panels together for the best seam. Do not make the second fold with hand tool – 2.

If the seamer can be started partially off the panel, make the first fold for the first 8" of the panel. Then, engage the power seamer onto the seam so that the first two rollers are under the first fold and the last two

rollers are hanging off the panel. Rotate the handle to its horizontal position to lock the seamer onto the seam. Turn on the seamer, and let it pull itself onto the panel.

If the power seamer can't be started partially off of the panels, make the first fold with hand tool – 1 for the first 15", then make the second fold for the first 6" with hand tool – 2. Place the power seamer so that its front tow rollers are under the first fold and the back tow rollers are over the second fold. The middle of the power seamer will be at the transition point between the first and second folds. Placement of the seamer is very critical. Then, lock the seamer onto the seam by rotating the handle to its horizontal position.

HAND TOOL – 1 ON THE SEAM

A heavy-duty power seamer is used to seam 22 ga. steel or .040" Aluminum. When it is used, the first fold length should be 18" and the second fold length should be 8".

HAND TOOL – 2 ON THE SEAM

The power seamer is equipped with safety hooks that ropes should be attached to, to prevent the seamer from falling.

Extension cords must be furnished by the installer. Extension cord length and minimum wire size are:

Cord Length	Min. Gauge
25 ft.	18 ga.
50 ft.	16 ga.
75 ft.	14 ga.
150 ft.	12 ga.
200 ft.	10 ga.

POWER SEAMER ON SEAM

Using the power seamer, seam the interlock. Do not walk or stand on the panel being seamed. If it is necessary to walk with the electric seamer, stay behind the seamer to prevent interference with the forming action of the seamer. After seaming, secure the second panel to the substrate with roof clips. Repeat this process until the last roof panel is electrically seamed and secured to the substrate with roof clips.

Because the seamer travels at approximately 30 feet per minute, it is important that the installer stops the seaming machine when it arrives at the panel end. The installer must then raise the locking handle, lift the seamer, and move it to the next panel. The seam should be completed using the hand tools.

Ideally, the panels should not all be installed and then seamed later. Seaming the panels as they are installed eases metal stress and strain and will provide a more professional and aesthetically pleasing installation.

If it is necessary to install all panels and seam them later, it is necessary to follow additional instructions. First, verify that the panels and power seamer will work together by seaming some extra or scrap panels. If there are no problems seaming, the panels may be installed. It is very critical that the panel webs are tight together along the entire panel length before installing the clips. If panel webs are not tight together when clipped, the seaming machine will not be able to pull the webs together and may result in the seamer running off the seam, causing damage to the panels. Make the first fold over the clips as stated before.

A video that demonstrates these instructions is available from Fabral. Contact the Lancaster, PA, office to receive a copy.

LOAD-SPAN TABLES FOR STAND'N SEAM PANELS OVER VARIOUS SUBSTRATES
All loads below are allowable loads.

LOAD-SPAN TABLE FOR 16" WIDE STAND'N SEAM® PANELS

		WIND UPLIFT LOAD (psf)											
SUBSTRATE		1.00'	1.25'	1.50'	1.75'	2.00'	2.25'	2.50'	3.00'	3.50'	4.00'	4.50'	5.00'
24 GA STEEL	16 ga. purlins(CEGS) ¹	240	192	160	137	120	107	96	87	74	65	58	52
	22 ga. deck ²	161	125	107	92	80	71	64	54	46	40	36	32
	¾" plywood ³	94	75	63	54	47	42	38	31	27	24	21	NR
	½" plywood ³	59	47	40	34	30	26	24	20	NR	NR	NR	NR
.040" ALUM	16 ga. purlins(CEGS) ¹	205	164	137	117	103	91	82	79	74	65	58	52
	22 ga. deck ²	161	125	107	92	80	71	64	54	46	40	36	32
	¾" plywood ³	94	75	63	54	47	42	38	31	27	24	21	NR
	½" plywood ³	59	47	40	34	30	26	24	20	NR	NR	NR	NR
.032" ALUM	16 ga. purlins(CEGS) ¹	168	134	112	96	84	74	67	63	59	56	52	48
	22 ga. deck ²	161	129	107	92	80	71	64	54	46	40	36	32
	¾" plywood ³	94	75	63	54	47	42	38	31	27	24	21	NR
	½" plywood ³	59	47	40	34	30	26	24	20	NR	NR	NR	NR

LOAD-SPAN TABLE FOR 12" WIDE STAND'N SEAM® PANELS

		WIND UPLIFT LOAD (psf)											
SUBSTRATE		1.00'	1.25'	1.50'	1.75'	2.00'	2.25'	2.50'	3.00'	3.50'	4.00'	4.50'	5.00'
24 GA STEEL	16 ga. purlins(CEGS) ¹	319	255	213	182	160	142	128	116	99	87	77	70
	22 ga. deck ²	214	172	143	123	107	95	86	71	61	54	48	43
	¾" plywood ³	125	100	84	72	63	56	50	42	36	31	28	25
	½" plywood ³	79	63	53	45	40	35	32	26	23	20	NR	NR
.040" ALUM	16 ga. purlins(CEGS) ¹	273	218	182	156	136	121	110	105	98	86	76	68
	22 ga. deck ²	214	172	143	123	107	95	86	71	61	54	48	43
	¾" plywood ³	125	100	84	72	63	56	50	42	36	31	28	25
	½" plywood ³	79	63	53	45	40	35	32	26	23	20	NR	NR
.032" ALUM	16 ga. purlins(CEGS) ¹	223	178	149	127	111	99	89	84	79	74	69	64
	22 ga. deck ²	214	172	143	123	107	95	86	71	61	54	48	43
	¾" plywood ³	125	100	84	72	63	56	50	42	36	31	28	25
	½" plywood ³	79	63	53	45	40	35	32	26	23	20	NR	NR

The above load table values were derived from panel uplift tests done in accordance with ASTM E 1592. Panel uplift tests were conducted at spans of 2'-6" and 5'-0". These values were interpolated or extrapolated as needed. Screw and clip ultimate loads were also determined. All above load table values assume using stainless steel (UL90) clip. A safety factor of 1.65 was used for the panel uplift test results. A pry factor of 2 was used for the screws in addition to a pullout safety factor.

1. Two #12-14 self-drilling screws per clip were accounted for. A safety factor of 2.25 was used for the screws and clips.
2. Two #12-14 self-drilling screws per clip were accounted for. A safety factor of 1.875 was used for the screws and clips.
3. Two #12-13 Dekfast screws were accounted for. A safety factor of 1.875 was used for the screws and clips.
4. Two #12-11 self-tapping wood screws per clip were accounted for. A safety factor of 1.875 was used for the clips. A safety factor of 4.5 was used for the screws.

WIND UPLIFT, AIR INFILTRATION, AND WATER PENETRATION TEST SUMMARIES

(All results are for 16" wide panels)

WIND UPLIFT (UL90): 24 ga. steel or .032" Aluminum panels over open purlins spaced a maximum of 5'-0" o.c. with stainless steel clips with 2 #12 self-drilling screws (UL Construction No. 275)

WIND UPLIFT (UL90): 24 ga. steel or .032" Aluminum panels over 22 ga. steel deck with up to 2.0 pcf rigid insulation with stainless steel clips spaced 4'-0" o.c. supported by 24 ga. 6" x 6" bearing plates and fastened to the deck with 2 #12-13 self-drilling Dekfast screws (UL Construction No. 275a)

WIND UPLIFT (UL90): 24 ga. steel or .032" Aluminum panels over 1/2" plywood deck with stainless steel clips spaced 2'-0" o.c. and fastened with 2 #10 hex-head wood screws (UL Construction No. 275b)

WIND UPLIFT (UL90): 24 ga. steel or .032" aluminum panels over LoadMaster roof deck system with stainless steel clips spaced 3'-0" o.c. with two 0.140" diameter LoadMaster screws per clip (UL Construction No. 319)

WIND UPLIFT (ASTM E 330): 24 ga. steel or .032" aluminum panels over open purlins spaced 5'-0" o.c. Tests were run to a total uplift load of 90 psf with no panel failure.

WIND UPLIFT (ASTM E 1592/CEGS 07416): 24 ga. steel panels were tested in compliance with the US Corps of Engineers Guide Specification for structural testing of metal roof panel systems. The ultimate load values are: 115 psf at 5'-0" purlin spacing and 158 psf at 2'-6" purlin spacing.

WIND UPLIFT (ASTM E 1592/CEGS 07416): .032" aluminum panels were tested in compliance with US Corps of Engineers Guide Specification for structural testing of metal roof panel systems. The ultimate load values are: 110 psf at 5'-0" purlin spacing and 110 psf at 2'-6" purlin spacing.

WIND UPLIFT (ASTM E 1592/CEGS 07416): .040" aluminum panels were tested in compliance with the US Corps of Engineers Guide Specification for structural testing of metal roof panel systems. The ultimate load values are: 110 psf at 5'-0" purlin spacing and 136 psf at 2'-6" purlin spacing.

WATER PENETRATION (ASTM E 1646): There was no leakage with a 5 gal./hr. spray at 20 psf pressure differential.

WATER PENETRATION (ASTM E 331): There was no uncontrolled leakage with a 5 gal./hr. spray at 20 psf pressure differential.

AIR INFILTRATION (ASTM E 1680): There was no air leakage when tested to 20 psf pressure differential.

AIR EXFILTRATION (ASTM E 1680): There was no air leakage when tested at 20 psf pressure differential.

AIR INFILTRATION (ASTM E 283): There was 0.01 cfm/ft.² of leakage when tested at 20 psf pressure differential.

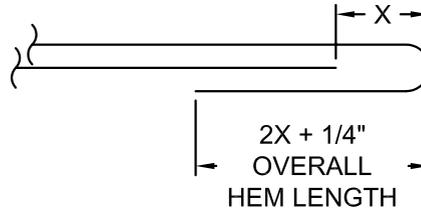
RAIN-CARRYING CAPACITY (MAXIMUM RUN LENGTH IN FEET)

Roof Slope	1/2:12	3/4:12	1:12	1 1/2:12	2:12	2 1/2:12	3:12	4:12	5:12
16" wide	93	103	110	123	133	141	149	164	178
12" wide	91	100	108	120	130	138	146	160	174

1. Values indicate point when water will reach top of rib during storm of 4"/hour intensity.
2. Slopes less than 1/2:12 are not recommended.
3. Penetrations can greatly reduce the rain carrying capacity.

HEM LENGTHS

The length of the hem at the end of a panel will vary with the change in temperature that the panel experiences and the length of the panel. Unless a more exact analysis of the temperature during installation compared to the maximum and minimum anticipated temperature is conducted, use the following equation and Thermal Movement Table. When installing panels, be sure to leave room at the end of the panel that will experience movement for the "starting gap" which is the required air space (X) between the panel and cleat.



THERMAL MOVEMENT TABLE

Panel movement (in.) with a 100°F temperature change in the panel and a 50°F temperature change in the substrate.

PANEL MATERIAL	SUBSTRATE MATERIAL	PANEL LENGTH(FT.)		
		10'	50'	100'
steel	rigid insulation	3/32"	13/32"	25/32"
	wood	1/16"	3/8"	5/8"
	steel	1/16"	3/8"	13/32"
	concrete	1/16"	3/8"	15/32"
aluminum	rigid insulation	5/32"	25/32"	1 9/16"
	wood	5/32"	11/16"	1 3/8"
	steel	1/8"	19/32"	1 5/32"
	concrete	1/8"	5/8"	1 7/32"

ACCESSORIES

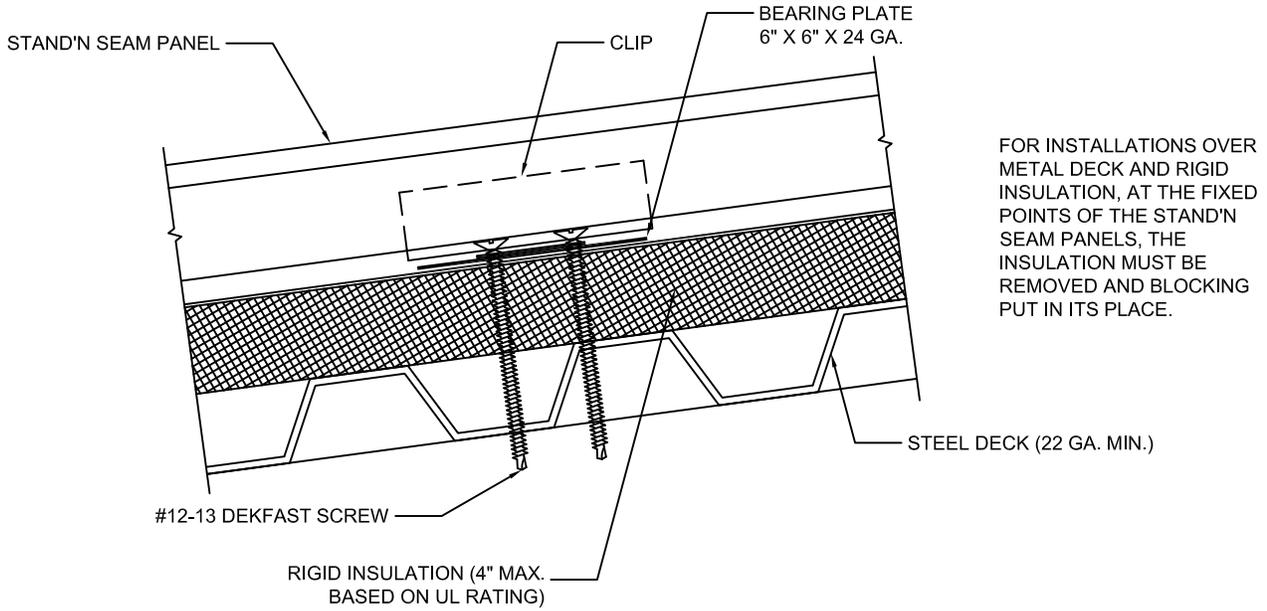
CLOSURES			
<p>METAL CLOSURE</p>	<p>FORMED EPDM CLOSURE</p>	<p>UNIVERSAL EPDM CLOSURE</p>	
FASTENERS			CLIP
<p>#12-11 x 1" WOODGRIP</p>	<p>#12-14 x 2" SELF-DRILLING</p>	<p>14 x 2" AB STAINLESS STEEL</p>	<p>CLIP</p>
<p>TRANSITION SEAM COVER</p>	<p>CLIP BASE PAD</p>	<p>S-5 COLORGARD SYSTEM</p>	<p>CLIPS ARE AVAILABLE IN STAINLESS STEEL AND GALVANIZED STEEL.</p> <p>USE STAINLESS STEEL CLIPS FOR EITHER STEEL OR ALUMINUM PANELS. USE GALVANIZED STEEL CLIPS FOR STEEL PANELS ONLY.</p>

Specification for Stand 'N Seam Panel System

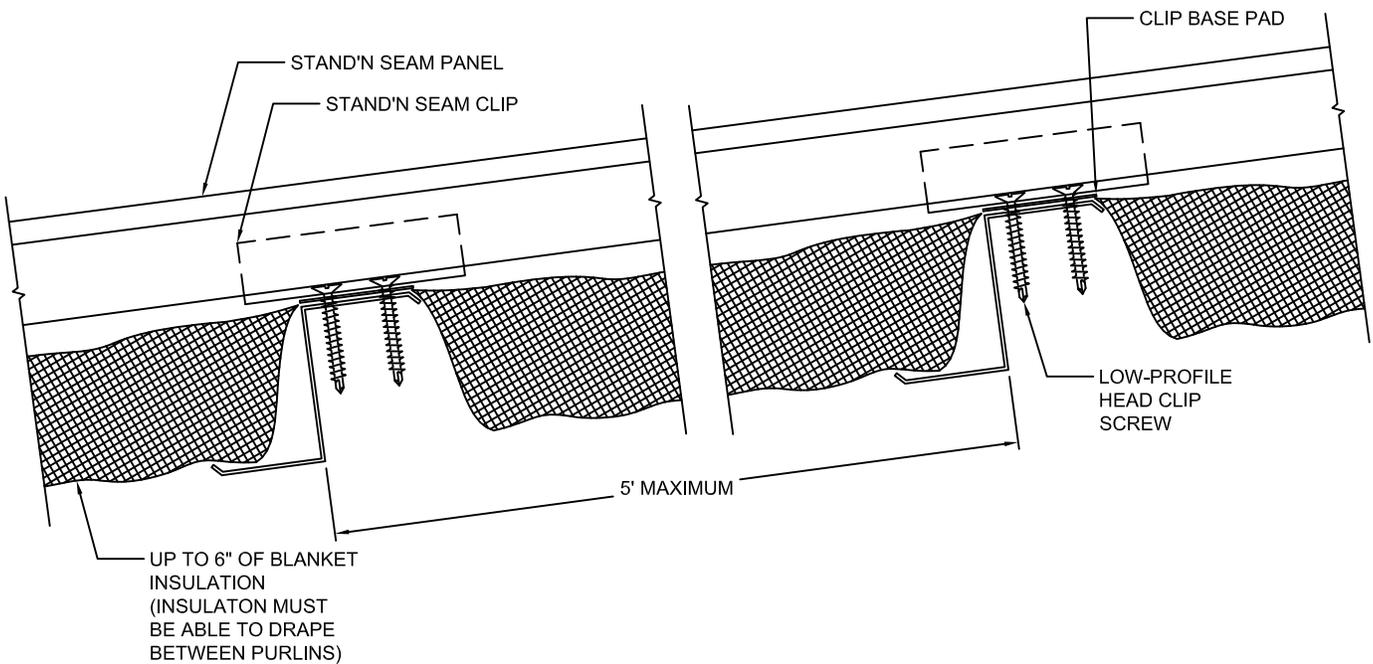
PART 1: GENERAL

1.01	<p>SUMMARY</p> <p>A. Section includes: Prefinished, prefabricated, snap-together, structural standing seam roof system and accessories. 2.03</p> <p>B. Related Sections</p> <ol style="list-style-type: none"> 1. Metal decking 2. Rough carpentry, plywood, and underlayment 3. Insulation 4. Membrane roofing 5. Flashing and sheet metal 6. Joint sealers: sealants and caulk 7. Structural framing. 	
1.02	<p>REFERENCES</p> <p>A. American Society for Testing and Materials (ASTM)</p> <ol style="list-style-type: none"> 1. ASTM A 653: Steel Sheet, Zinc-Coated by the Hot Dip Process 2. ASTM A 792: Steel Sheet, Aluminum-Zinc Alloy Coated by the Hot Dip Process. 3. ASTM B 209: Aluminum and Aluminum Alloy Sheet and Plate. 4. ASTM E 283: Air leakage 5. ASTM E 331: Water penetration 6. ASTM E 1646-95 Water Penetration 7. ASTM E 1680-95 Air Infiltration and Exfiltration <p>B. Underwriters Laboratory</p> <ol style="list-style-type: none"> 1. UL Building Materials Directory 2. Underwriters Laboratories Construction No. 275, 275a, 275b, and 319 for Uplift Test 580 Class 90. <p>C. Sheet Metal and Air Condition Contractors National Association, Inc. (SMACNA)</p> <ol style="list-style-type: none"> 1. SMACNA Architectural Sheet Metal Manual, 1993 Edition. <p>D. American Iron and Steel Institute (AISI)</p> <ol style="list-style-type: none"> 1. AISI Cold Formed Steel Design Manual <p>E. Aluminum Association</p> <ol style="list-style-type: none"> 1. Aluminum Design Manual <p>F. Metal Construction Association (MCA)</p> <ol style="list-style-type: none"> 1. Preformed Metal Wall Guidelines <p>G. Code references 2.04</p> <ol style="list-style-type: none"> 1. ASCE, Minimum Loads for Buildings and Other Structures 2. BOCA National Building Code 3. UBC Uniform Building Code 4. SBC Standard Building Code 	<p>B. Manufacturers listed in this section are prequalified manufacturers. Substitution of manufacturer's products for those specified shall not be allowed at anytime during construction.</p> <p>MATERIALS AND FINISHES</p> <p>A. Roof panel materials</p> <ol style="list-style-type: none"> 1. 24 or 22 gauge, Grade 40 (40 ksi yield strength) structural steel with G90 (0.90 oz./ft.²) hot dipped galvanized coating, both conforming to ASTM A 653. 2. 24 or 22 ga., Grade 40 (40 ksi yield strength) structural steel with AZ50 (0.50 oz./ft.²) aluminum-zinc alloy coating, both conforming to ASTM A 792. 3. 0.032 or 0.040", 3105-H14 or equivalent (20 ksi yield strength) aluminum alloy conforming to ASTM B 209. <p>B. Texture: panels shall be smooth.</p> <p>C. Finish: Refer to manufacturer's standard color card to determine appropriate finish and color. All panels shall receive a factory-applied Kynar[®] 500/Hylar[®] 5000[®] conforming to the following:</p> <ol style="list-style-type: none"> 1. Metal preparation: all metal shall have the surfaces carefully prepared for painting on a continuous process coil coating line by alkali cleaning, hot water rinsing, application of chemical conversion coating, cold water rinsing, sealing with an acid rinse, and thorough drying. 2. Prime coating: a base coat of epoxy paint, specifically formulated to interact with the top-coat, shall be applied to the prepared surfaces by roll coating to a dry film thickness of 0.20 ± 0.05 mils. This prime coat shall be oven cured prior to application of finish coat. 3. Exterior coating: a Kynar[®] 500/Hylar[®] 5000 finish coating shall be applied over the primer by roll coating to a dry film thickness of 0.80 ± 0.05 mils for a total dry film thickness of 1.00 ± 0.10. This finish coating shall be oven-cured. 4. Interior finish coating: a washcoat shall be applied on the reverse side over the primer by roll coating to a dry film thickness of 0.30 ± 0.05 mils for a total dry film thickness of 0.50 ± 0.10 mils. The washcoat shall be oven-cured. 5. Color: the color of the exterior finish shall be _____ as chosen from the manufacturer's standard color chart. 6. Physical properties: the coating shall conform to the manufacturer's standard performance criteria as listed by certified test reports for fade, chalk, abrasion, humidity, adhesion, pollution resistance, and others as required and standard within the industry. <p>ACCESSORIES</p> <p>A. Concealed roof clips:</p> <ol style="list-style-type: none"> 1. 1 pc.: 18 ga. stainless steel UL90 rated clip, 3" long. 2. 1 pc.: 18 ga. galvanized steel clip, 3" long. <p>B. Flashing and Trim</p> <ol style="list-style-type: none"> 1. All flashing and trim shall be of the same material, gauge, finish, and color as the roof panels and fabricated in accordance with standard SMACNA procedure and details. 2. Provide transition rib covers where roofing changes pitch. 3. Fabricate gutters and downspouts in the same gauge, material, finish, and color as the roof panels. <p>C. Fasteners</p> <ol style="list-style-type: none"> 1. Clips to substrate: screw shall be #12 diameter, self tapping type (for attachment to wood) or self-drilling, self tapping (for attachment to light gauge structurals), zinc-plated steel with a low-profile, phillips drive head. 2. Flashings to panels: exposed screws shall be zinc plated with a #14 x 1" combination steel and neoprene washer, color to match panel. <p>D. Sealants</p> <ol style="list-style-type: none"> 1. Shall not contain oil, asbestos, or asphalt. 2. Factory applied sealant shall be applied in the seam and designed for metal to metal concealed joints. 3. Field applied panel end sealant shall be mastic tape sealant. 4. Exposed sealant shall be one-part polyurethane joint sealant. Coordinate color with roof panels. <p>E. Closures</p> <ol style="list-style-type: none"> 1. Ridge and hip closures shall be protected and supported by a formed metal closure manufactured from the same material, color, and finish as the panels. 2. Metal closures shall be factory fabricated and field-cut as needed. <p>F. Vapor Retarder:</p> <ol style="list-style-type: none"> 1. Retarder with a permeance of 0.05 or less as determined by ASTM E 98. <p>RELATED MATERIALS</p> <p>A. Refer to other sections listed in Related Sections paragraph for related materials.</p> <p>FABRICATION</p> <p>A. Roof panels shall be formed in continuous lengths. End laps will not be allowed.</p> <p>B. Panels shall to be roll formed on a stationary industrial type rolling mill to gradually shape the sheet metal. Portable rollformers, rented or owned by the installer, are not acceptable.</p> <p>C. Fabricate flashings from the same material as the roof system.</p> <p>SOURCE QUALITY</p> <p>A. Source Quality: obtain metal panels and accessories from a single manufacturer.</p> <p>B. Fabrication tolerances: follow tolerances in MCA=s Preformed Metal Wall Guidelines.</p> <p>C. Tests and inspections</p> <p>D. Verification of performance</p>
1.03	<p>SYSTEM DESCRIPTION</p> <p>A. Performance Requirements: Provide factory formed, prefinished, field-seamed, concealed clip, structural standing seam metal roof system that has been prestressed and certified by manufacturer to comply with specified requirements under installed conditions.</p> <ol style="list-style-type: none"> 1. Provide UL90 rated roofing system that has been tested in accordance with UL 580 test procedure. Panels shall be capable of spanning 5'-0" o.c. purlins with UL90 rating. Resistance to air leakage: there was no air infiltration at 20 psf pressure differential. There was no air exfiltration at 20 psf pressure differential. 2. Resistance to water penetration: There was no leakage through panel joints when tested in accordance with ASTM E 1646 at static pressure differential of 20.0 psf. <p>B. Structural Requirements: Engineer panels for structural properties in accordance with latest edition of American Iron and Steel Institute <i>Cold Formed Steel Design Manual</i> using "effective width" concept and Aluminum Association=s <i>Aluminum Design Manual</i>.</p>	<p>EXECUTION</p> <p>MANUFACTURER=S INSTRUCTIONS</p> <p>A. Compliance: Comply with manufacturer=s product data, including product technical bulletins, product catalog installation instructions, and product cartons for installation.</p> <p>EXAMINATION</p> <p>A. Installer shall:</p> <ol style="list-style-type: none"> 1. Inspect roof deck to verify deck layout complies with shop drawing layout and is smooth, even, sound, and free of depressions. 2. Report variations and potential problems in writing to the architect. <p>INSTALLATION</p> <p>A. Conform to the standard set forth in the SMACNA architectural sheet metal manuals and the approved shop drawings detailed for the project.</p> <p>B. Install panels plumb, level, and straight with the seams parallel, conforming to the design as indicated.</p> <p>C. Install panel system so it is watertight, without waves, warps, buckles or distortions, and allow for thermal movement considerations.</p> <p>D. Abrasive devices shall not be used to cut on or near roof panel system.</p> <p>E. Apply sealant tape or caulking as necessary at flashing and panel joints to prevent water penetration.</p> <p>F. Remove any strippable film immediately upon exposure to direct sunlight.</p> <p>G. Hand-crimp seams at each clip or mechanically seam before workers stand on panels.</p> <p>H. Seam panels together with electric-powered seaming machine supplied by the panel manufacturer for a weathertight seam.</p> <p>I. Vapor retarder: The joints, perimeter, and all openings shall be sealed per the manufacturer's instructions to provide a continuous vapor retarder.</p> <p>J. Underlayment (solid substrate):</p> <ol style="list-style-type: none"> 1. Provide one layer of 30# felt with horizontal overlaps and endlaps staggered between layers. 2. Provide ice and water shield membrane at all valley and eave conditions as well as any area at less than a 3:12 slope. 3. Lay parallel to ridge line with 22" horizontal laps and 6" vertical laps
1.04	<p>SUBMITTALS</p> <p>A. Product Data: submit manufacturer's specifications, standard profile sheet, product data brochure and finish warranty.</p> <p>B. Shop Drawings: shop drawings showing roof plan with layout of panels, clips, clip attachment, underlayment and sections of each flashing/trim condition shall be submitted for approval prior to fabrication. Drawings shall contain material type, metal thickness and finish. Drawings shall distinguish between factory and field fabrication.</p> <p>C. Samples:</p> <ol style="list-style-type: none"> 1. Submit sample 12" long x full width panel, showing proposed metal gauge, seam profile and specified finish. 2. Submit manufacturers standard colors for Architect's selection. <p>D. Test Reports:</p> <ol style="list-style-type: none"> 1. Submit the test reports prepared by Underwriters Laboratory indicating wind uplift rating of proposed roof system. The manufacturer must be listed by name in the UL Directory. 2. Air leakage per ASTM E 1680 and Water penetration per ASTM E 1646 (Actual independent laboratory certified test results must be submitted). <p>E. Certification: Submit manufacturer's certification that materials and finishes meet specification requirements.</p>	<p>2.05</p> <p>2.06</p> <p>2.07</p>
1.05	<p>QUALITY ASSURANCE</p> <p>A. Panel manufacturer shall have a minimum of ten (10) years of experience in manufacturing architectural roofing in a permanent stationary indoor facility.</p> <p>B. Panel installer shall have a minimum of two (2) years experience in the installation of concealed clip architectural standing seam metal roofing and show evidence of successful completion of at least three (3) projects of similar size, scope, and complexity.</p>	<p>2.08</p>
1.06	<p>DELIVERY, STORAGE, AND HANDLING</p> <p>A. Panels and flashings shall be protected and properly packaged to protect against transportation damage in transit to the jobsite.</p> <p>B. Upon delivery, exercise care in unloading, stacking, moving, storing, and erecting panels and flashings to prevent twisting, bending, scratching, or denting.</p> <p>C. Store panels and flashings in a safe, dry environment under a waterproof covering to prevent water damage. Allow for adequate ventilation to prevent condensation. Panels and flashings with strippable film shall not be stored in direct sunlight.</p> <p>D. Upon installation immediately remove strippable film from panels and flashings. Protect panels and flashings from foot traffic and from all other trades.</p>	<p>PART 3</p> <p>3.01</p> <p>3.02</p> <p>3.03</p>
1.07	<p>PROJECT CONDITIONS</p> <p>A. Field dimensions shall be taken prior to fabrication to verify jobsite conditions.</p> <p>B. Minimum recommended pitch for this panel is 2:12.</p> <p>C. Maximum panel length is 48' (contact the factory for longer panels).</p>	<p>3.04</p>
1.08	<p>WARRANTIES</p> <p>A. Panel manufacturer shall provide a twenty (20) year warranty on the paint finish covering chalking, cracking, chipping, blistering, peeling, flaking, and fading.</p> <p>B. Applicator shall furnish written warranty for a two (2) year period from date of substantial completion of building covering repairs required to maintain roof and flashings in watertight conditions.</p>	<p>*</p>
Part 2	<p>PRODUCTS</p> <p>PRODUCT DESCRIPTION</p> <p>A. Stand=N Seam structural standing seam roof system as manufactured by Fabral, 3449 Hempland Road, Lancaster, PA 17601; ph: 717-397-2741; fax: 717-397-1040.</p> <p>B. The Stand=N Seam panel shall have a coverage of 12" or 16". Seams shall be 22" high.</p> <p>C. Roof panels shall use a one-piece roof clip allowing for unlimited thermal movement of the panel system.</p> <p>D. The panel shall have a factory applied mastic and be sealed by using a portable electric seamer that joins adjacent panels together with a double-lock seam. This portable electric seamer will be provided by the panel manufacturer. The double-lock seam shall be closed flat and tight.</p> <p>E. The one-piece clip will engage an interior bi-fold vertical hem which permits the panel unlimited thermal expansion and contraction. Clips folded into the double lock seam will not be permitted.</p> <p>F. The panel system shall be as a true standing seam shape requiring no trapezoidal foam closures, plugs, or fillers at eaves.</p> <p>G. The panel shall not rub against the fastener heads during thermal movement.</p>	<p>Kynar[®] 500 is a registered trademark of Elf Atochem North America, Inc.</p> <p>Hylar[®] 5000 is a registered trademark of Ausimont USA, Inc.</p>
2.01	<p>PRODUCT SUBSTITUTIONS</p> <p>A. Requests to use alternate systems shall be submitted in writing to the project designer at least ten (10) days prior to bid date. Request shall demonstrate proposed substitution meets or exceeds specified performance requirements. Certified statements, samples and descriptive data shall be included in this submittal request.</p>	<p>CLEANING</p> <p>A. Dispose of excess materials and debris from jobsite.</p> <p>B. Remove filings, grease, stains, marks, or excess sealants from roof panel system to prevent staining.</p> <p>C. Protect work from damage from other trades until final acceptance.</p>
2.02	<p>PRODUCT SUBSTITUTIONS</p> <p>A. Requests to use alternate systems shall be submitted in writing to the project designer at least ten (10) days prior to bid date. Request shall demonstrate proposed substitution meets or exceeds specified performance requirements. Certified statements, samples and descriptive data shall be included in this submittal request.</p>	<p>*</p>

Stand'N Seam panels can be installed over a variety of substrates and can accommodate most insulation requirements. Continuous horizontal members are required for roof clip attachment and must be spaced to meet loading requirements. The horizontal members must have a flat surface at least as wide as the clip. Two fasteners per clip are required. Because Thin-Seam is a type of standing seam roof that accommodates thermal movement, the roof panels will not act as a diaphragm for wind design. Therefore, bracing is required to resist wind loads.



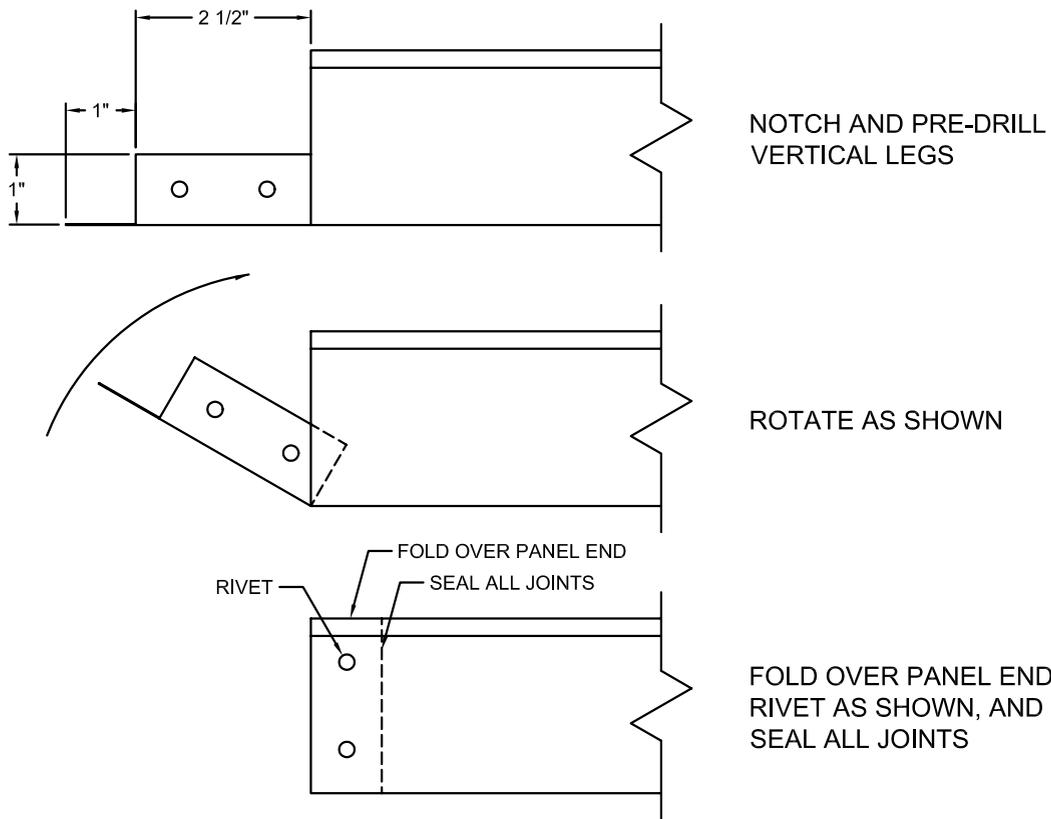
INSTALLATION OVER RIGID INSULATION AND METAL DECK



INSTALLATION OVER RIGID INSULATION AND METAL DECK

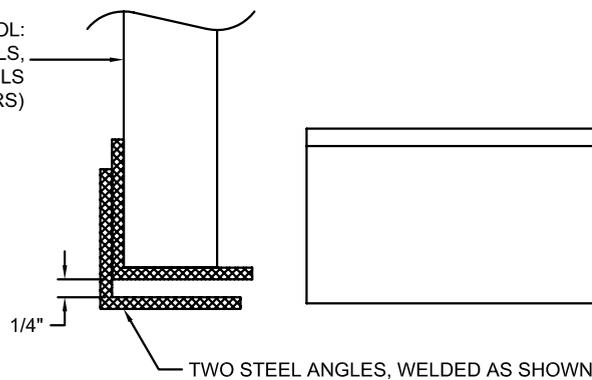
NOTE: PURLIN TELEGRAPHING MAY OCCUR WHENEVER PANELS ARE INSTALLED OVER OPEN PURLINS BUT DOES NOT IMPACT THE PERFORMANCE OF THE PANEL AND IS NOT CAUSE FOR REJECTION. CLIP BASE PADS MUST BE USED WHENEVER BLANKET INSULATION IS USED TO HELP COMPRESS THE INSULATION UNDER THE CLIP AND PANEL.

Panel boxed ends are used at the ridge, hip, peak, and end wall conditions. The bend-up at the panel end closes off the roof, preventing water penetration. Boxing the panel ends may be used in place of the EPDM closures for the details shown in this manual.

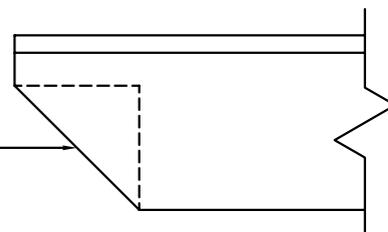


PANEL BOXED END

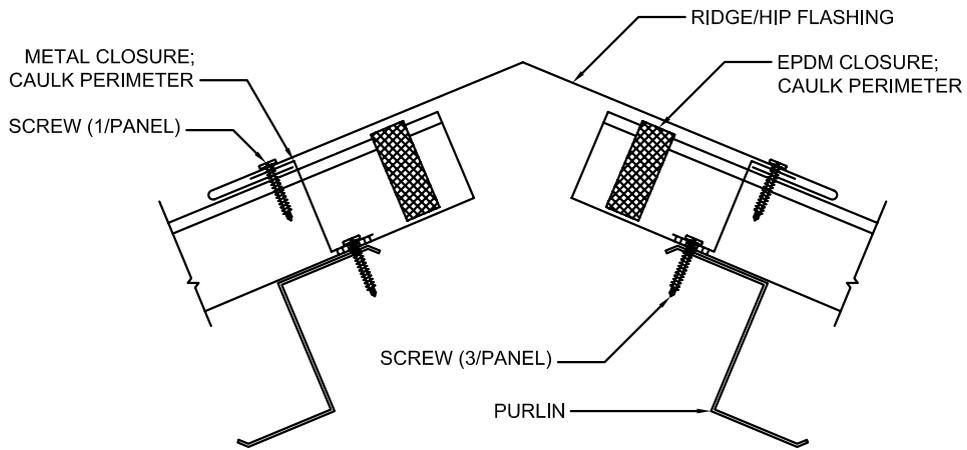
PANEL END DAM TOOL:
15" WIDE FOR 16" PANELS,
11" WIDE FOR 12" PANELS
(BY OTHERS)



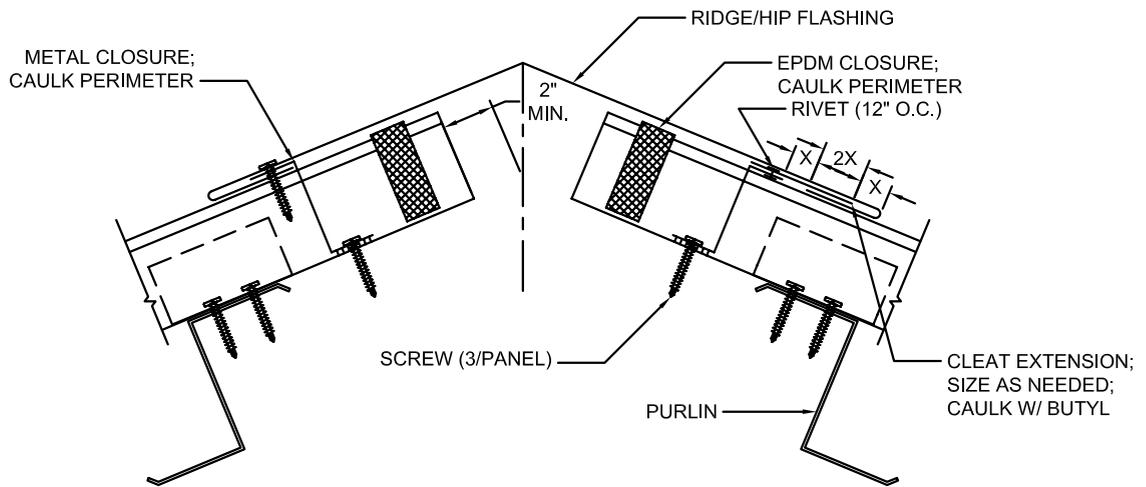
FIRLD-BEND PANEL END WITHOUT CUTTING PANEL



ALTERNATE PANEL BOXED END

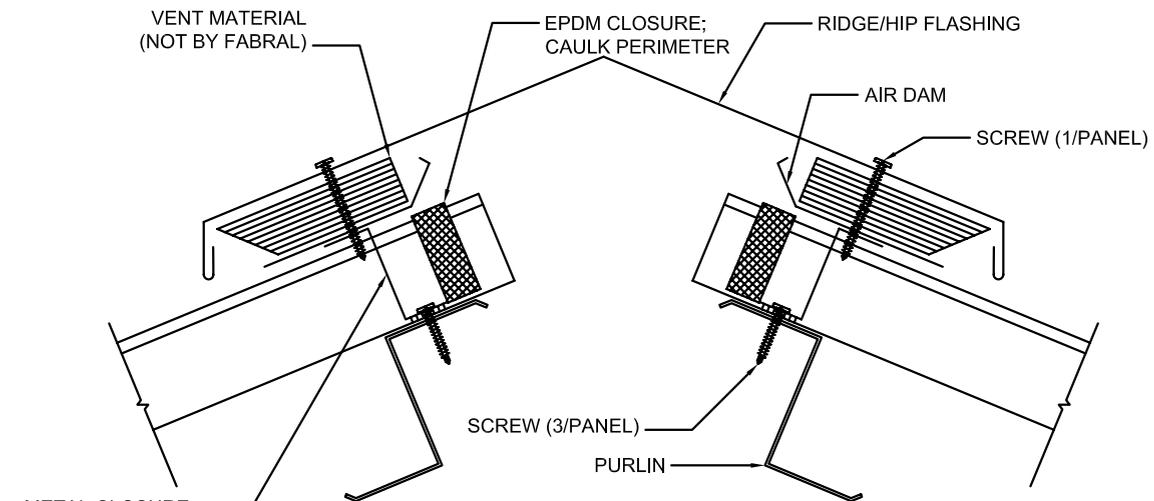


FIXED RIDGE/HIP DETAIL (USE WITH SLIDING EAVE AND VALLEY DETAILS)



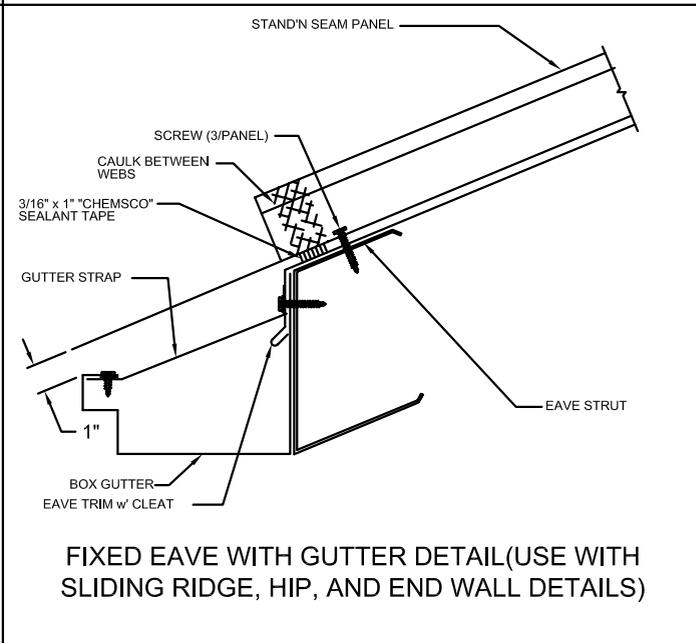
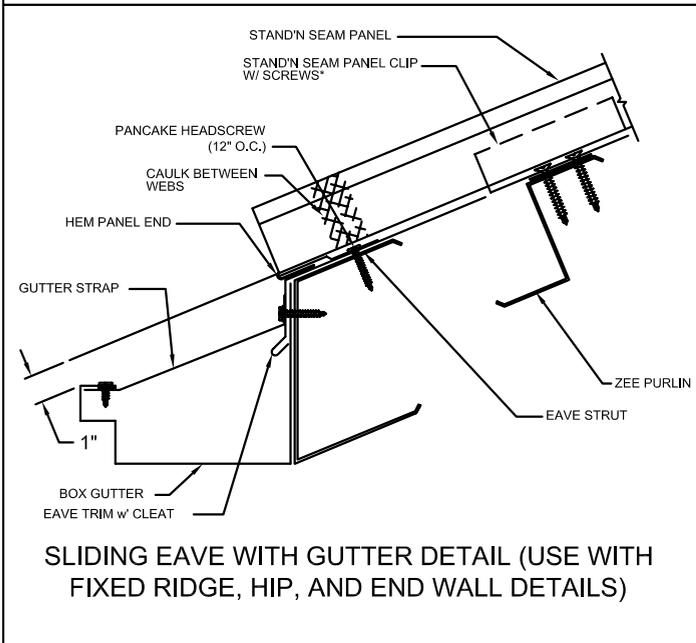
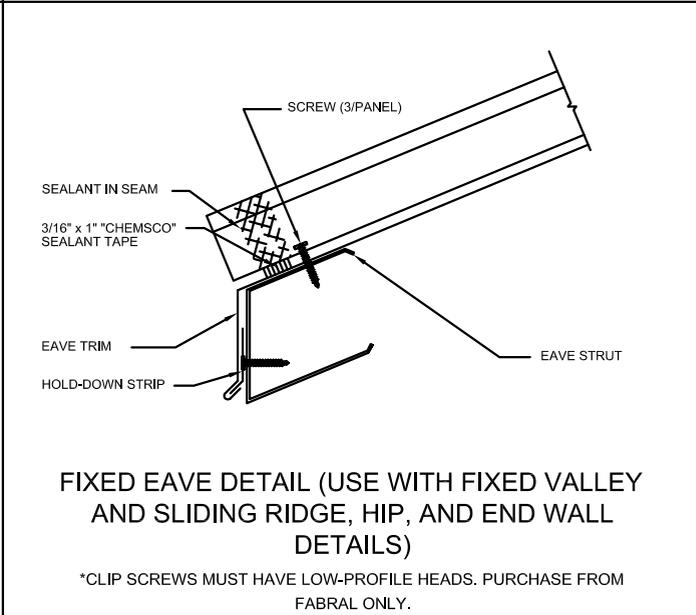
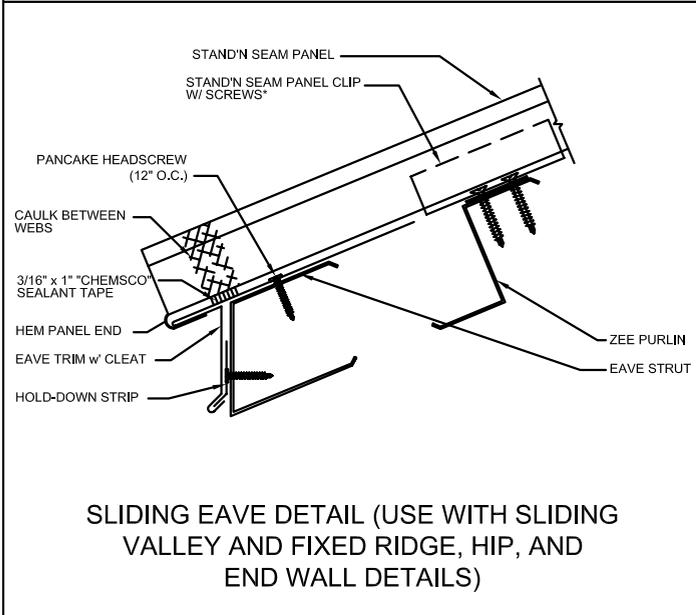
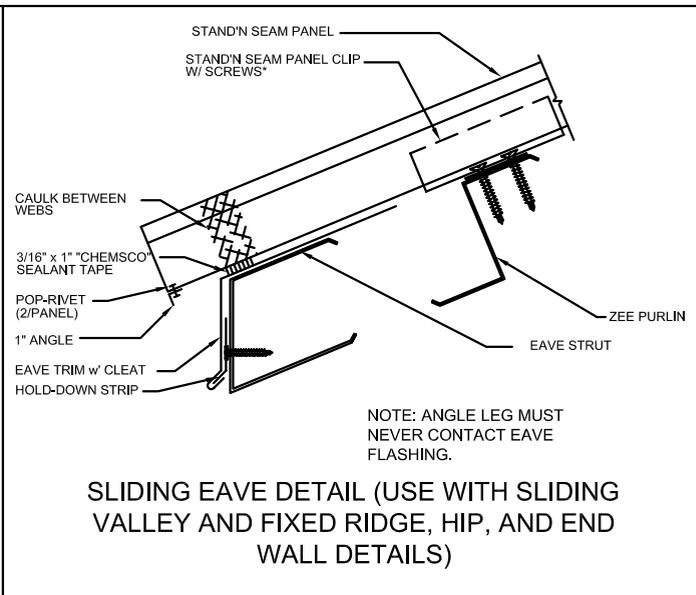
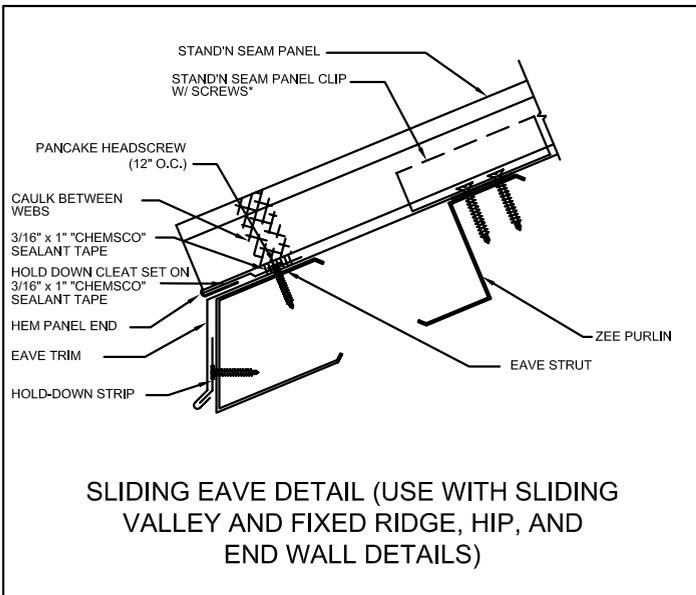
SLIDING RIDGE/HIP DETAIL (USE WITH SLIDING EAVE AND VALLEY DETAILS)

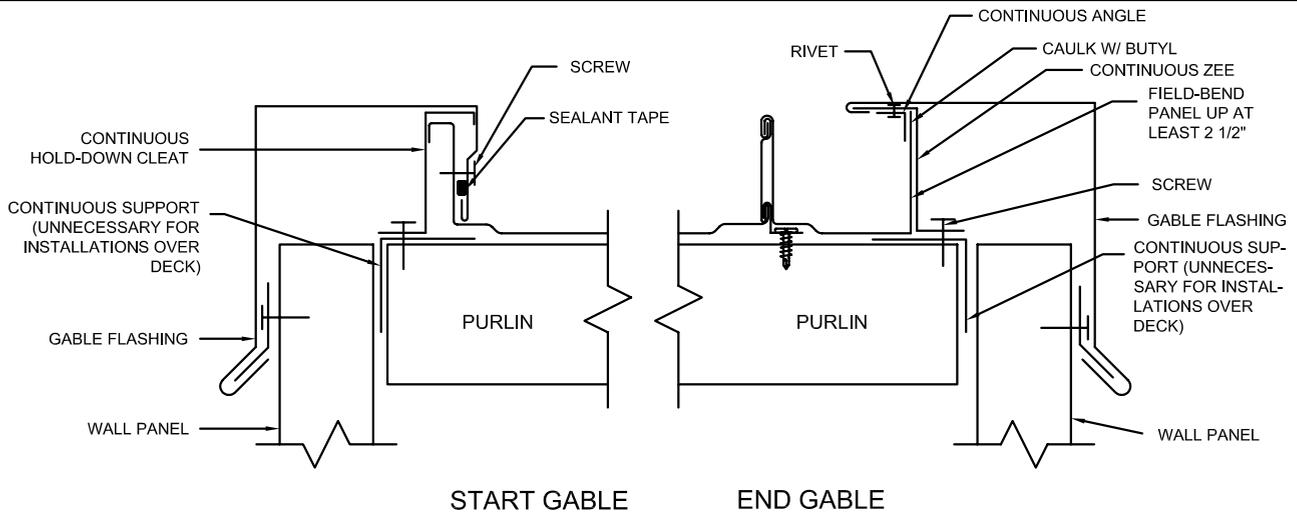
X=CALCULATED THERMAL MOVEMENT x 2



VENTED, FIXED RIDGE/HIP DETAIL (USE WITH SLIDING EAVE AND VALLEY DETAILS)

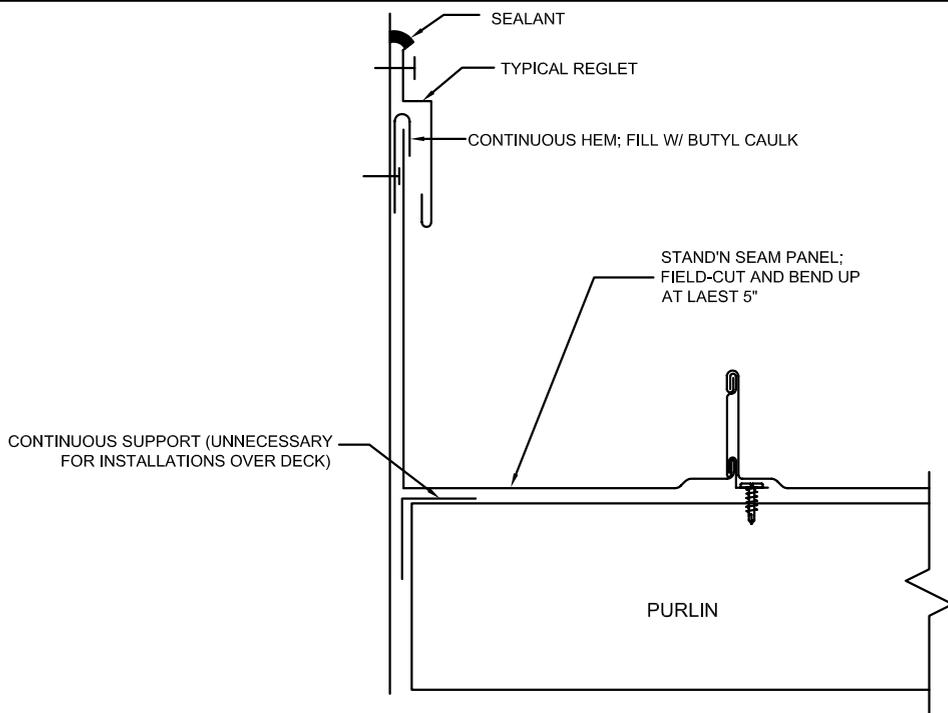
* CLIP SCREWS MUST HAVE LOW-PROFILE HEADS. PURCHASE FROM FABRAL ONLY.



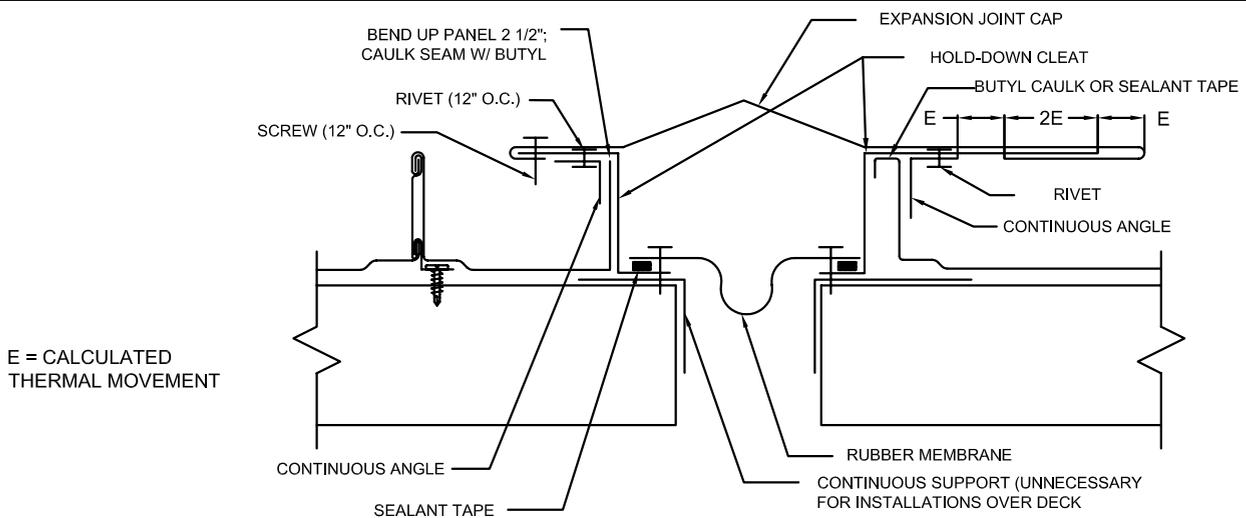


START GABLE

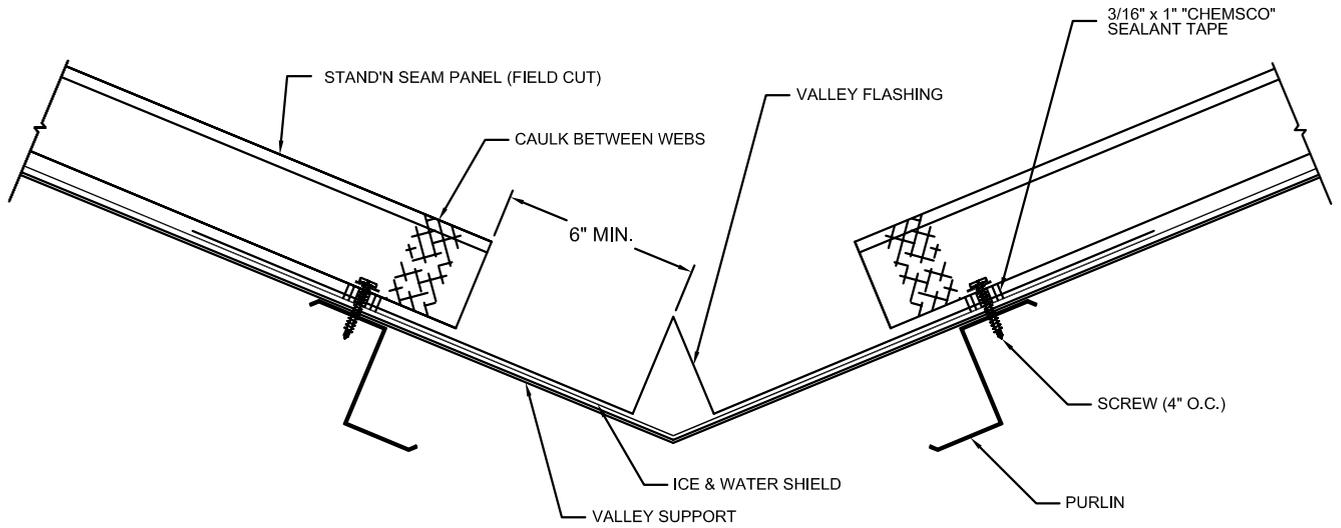
END GABLE



SIDEWALL DETAIL

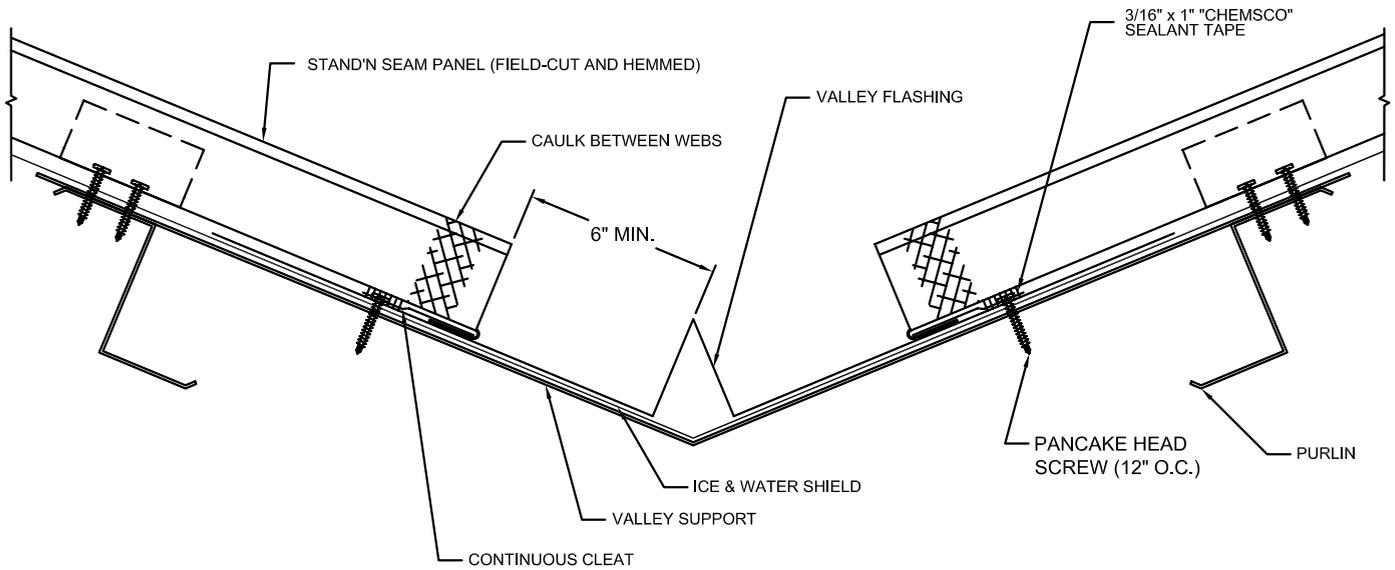


EXPANSION JOINT DETAIL



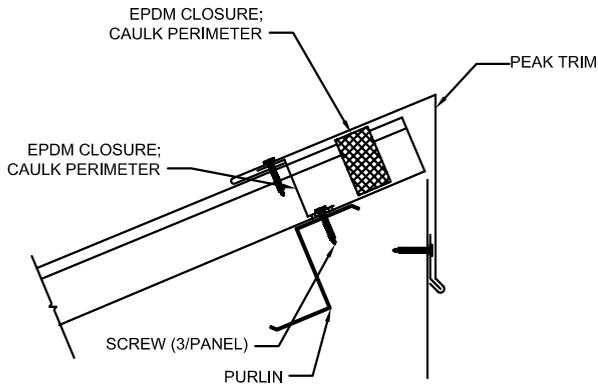
FIXED VALLEY DETAIL (USE WITH FIXED EAVE AND SLIDING RIDGE, HIP, AND END WALL DETAILS)

* CLIP SCREWS MUST HAVE LOW-PROFILE HEADS. PURCHASE FROM FABRAL ONLY.

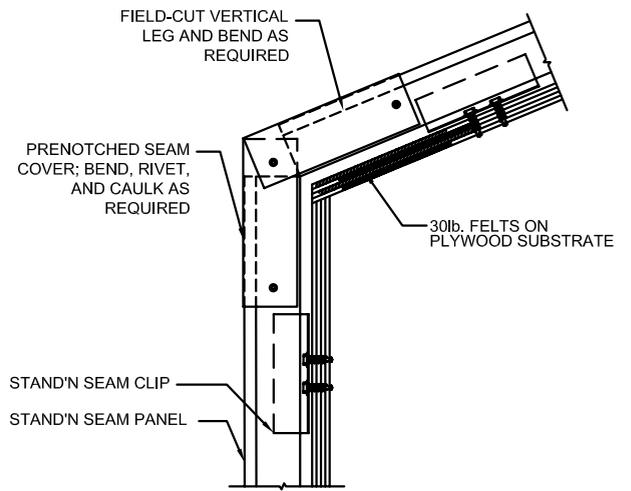


SLIDING VALLEY DETAIL (USE WITH SLIDING EAVE AND FIXED RIDGE, HIP, AND END WALL DETAILS)

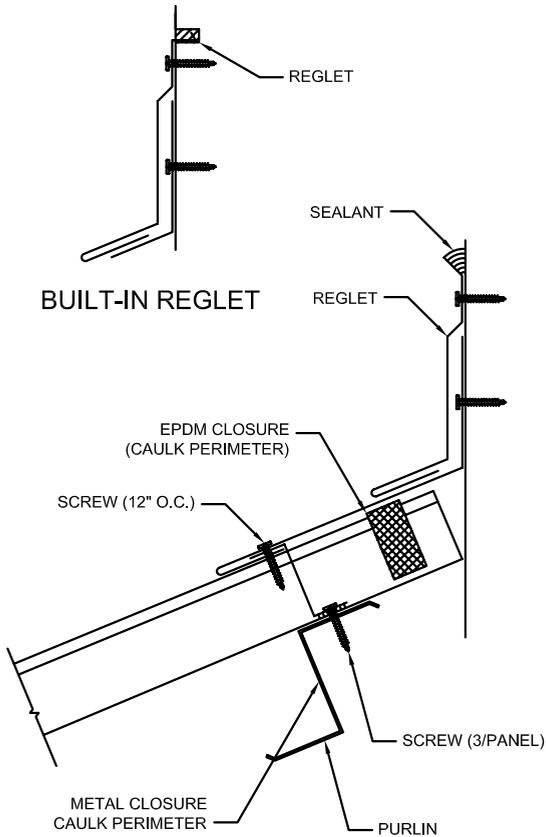
* CLIP SCREWS MUST HAVE LOW-PROFILE HEADS. PURCHASE FROM FABRAL ONLY.



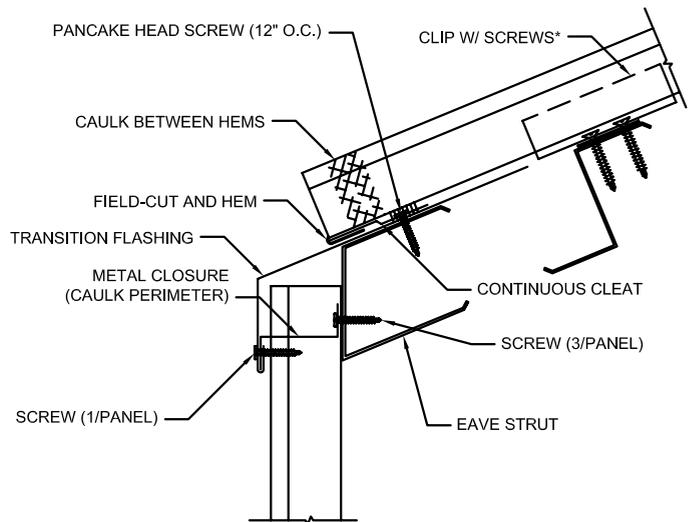
FIXED PEAK DETAIL
(USE WITH FIXED RIDGE, HIP, AND END
WALL DETAILS AND SLIDING EAVE AND
VALLEY DETAILS)



**ROOF/FASCIA TRANSITION (FIXED AT
TRANSITION; USE WITH SLIDING RIDGE, HIP,
AND PEAK DETAILS AND SLIDING DETAIL AT
FASCIA BOTTOM)**



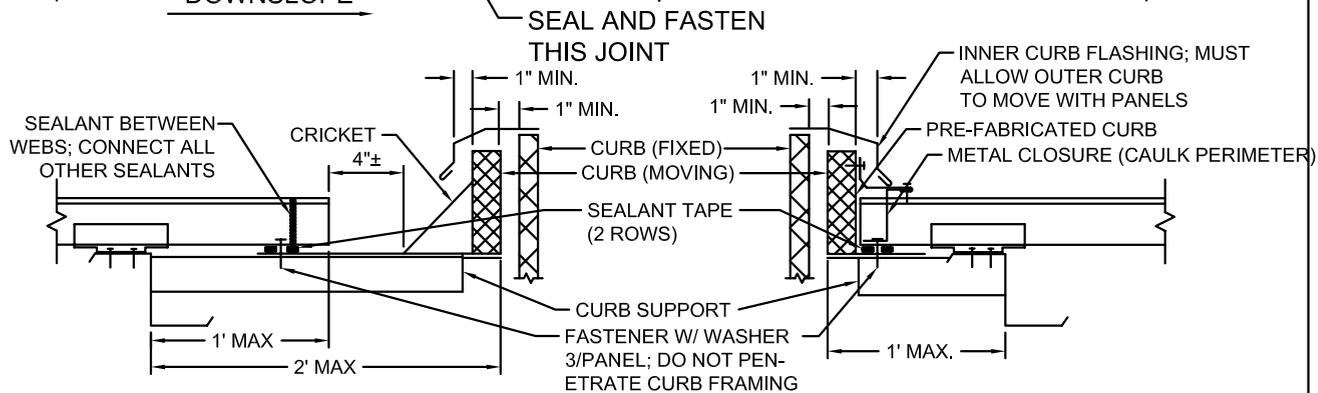
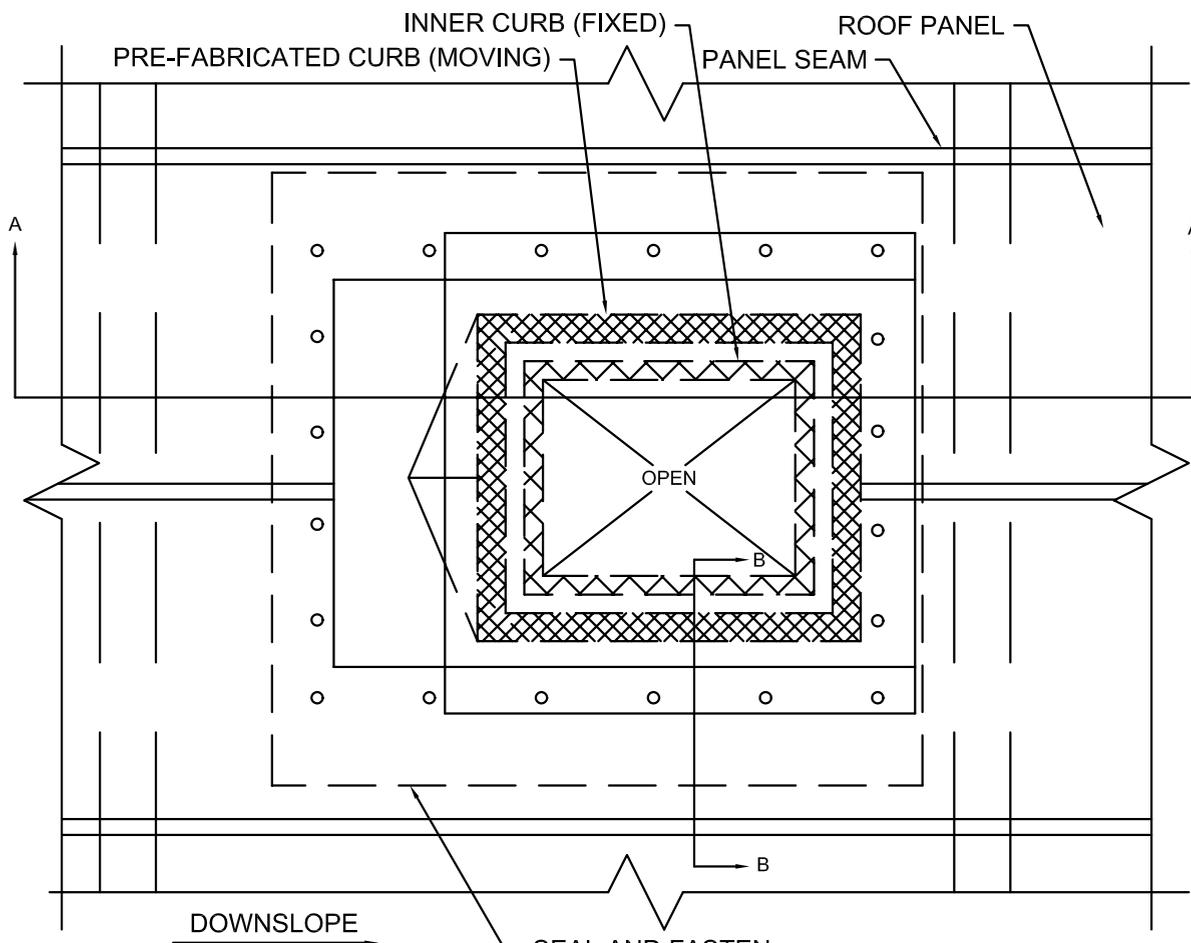
**FIXED END WALL DETAIL WITH
SURFACE-MOUNTED REGLET (USE WITH
SLIDING EAVE AND VALLEY DETAILS)**



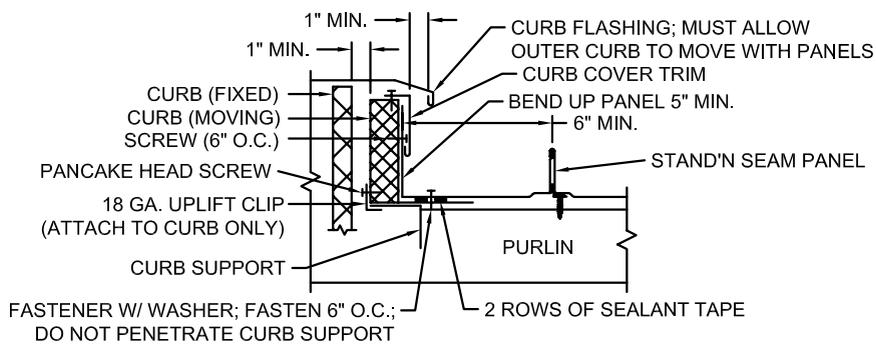
**ROOF/FASCIA TRANSITION (SLIDING PANEL
AT EAVE AND BOTTOM OF FASCIA; USE WITH
FIXED RIDGE, HIP, AND END WALL DETAILS)**

* CLIP SCREWS MUST HAVE LOW-PROFILE HEADS. PURCHASE FROM
FABRAL ONLY.

CURB OVER PURLINS

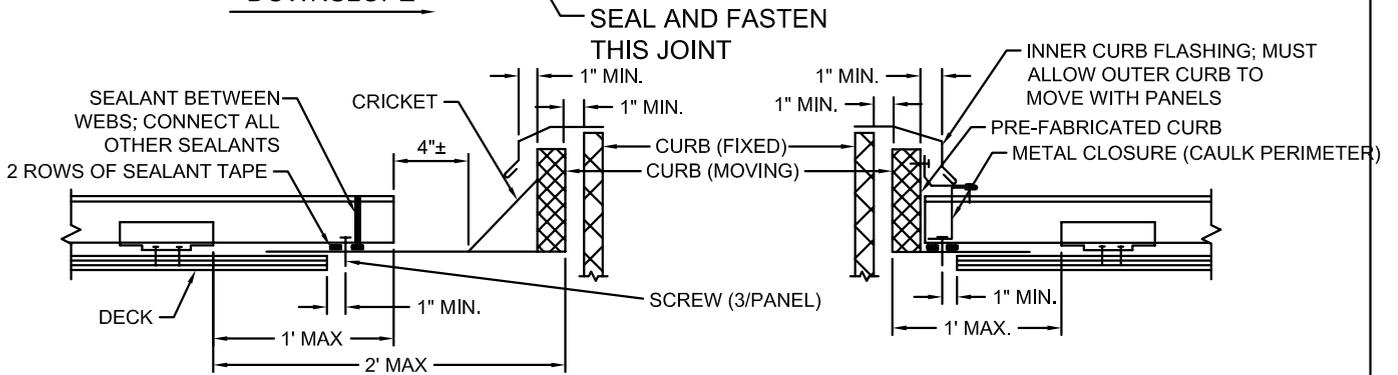
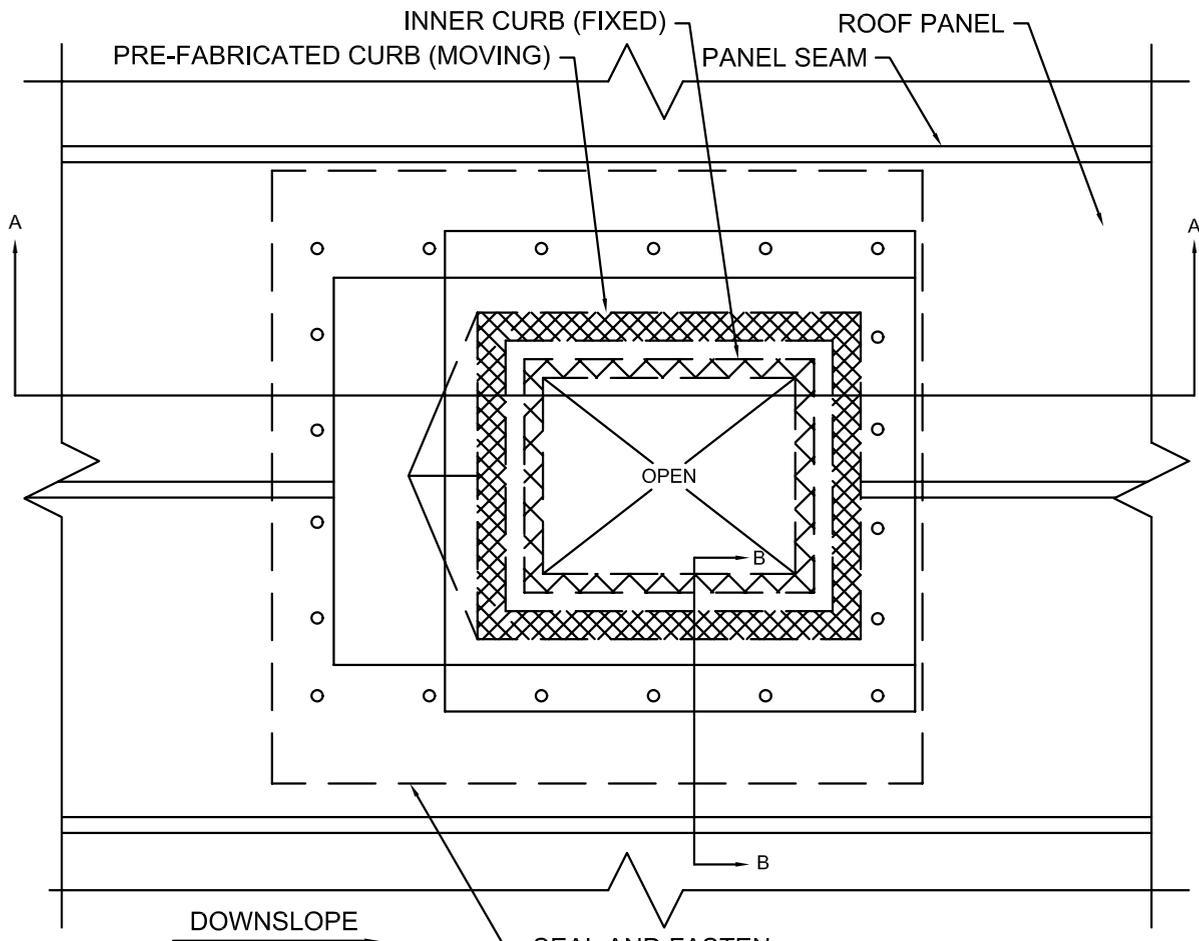


SECTION A-A

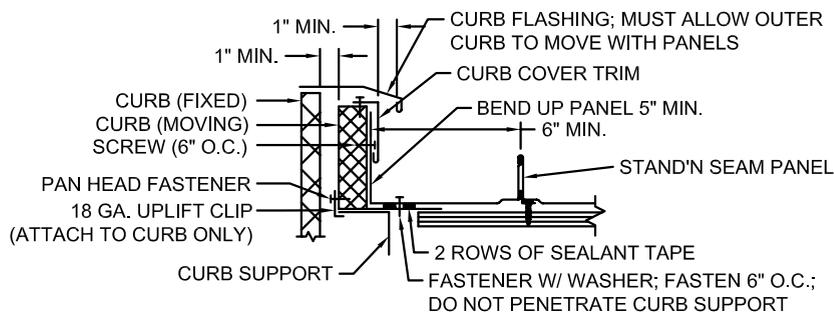


SECTION B-B

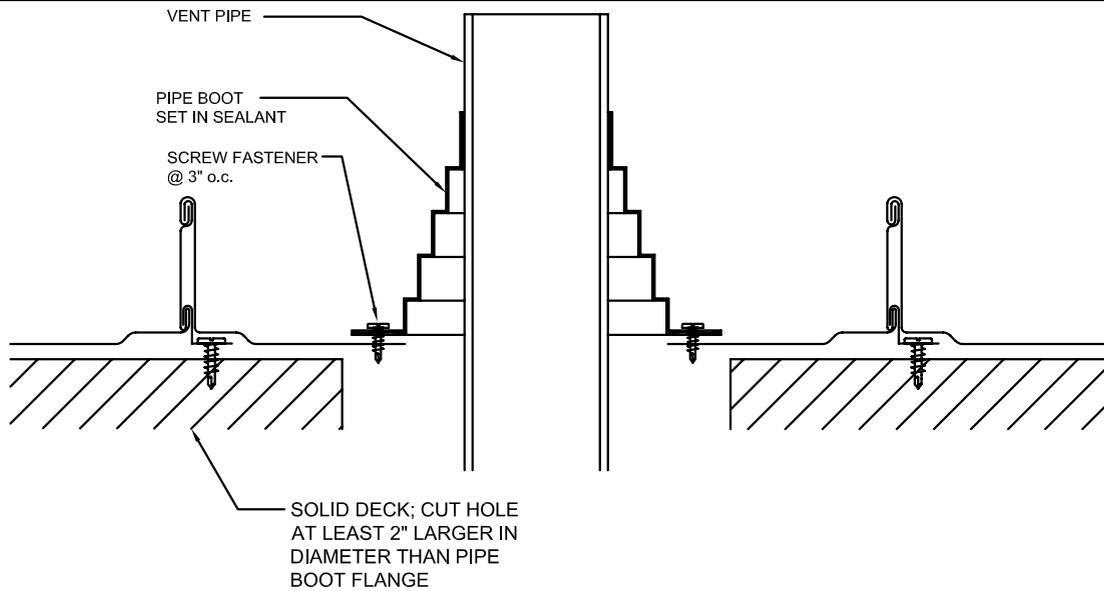
CURB OVER DECK



SECTION A-A

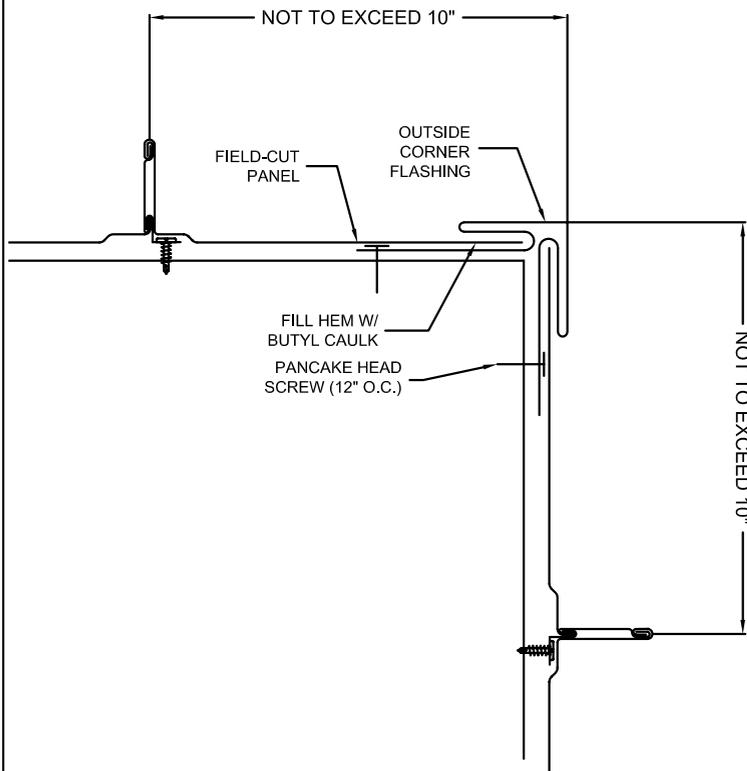


SECTION B-B



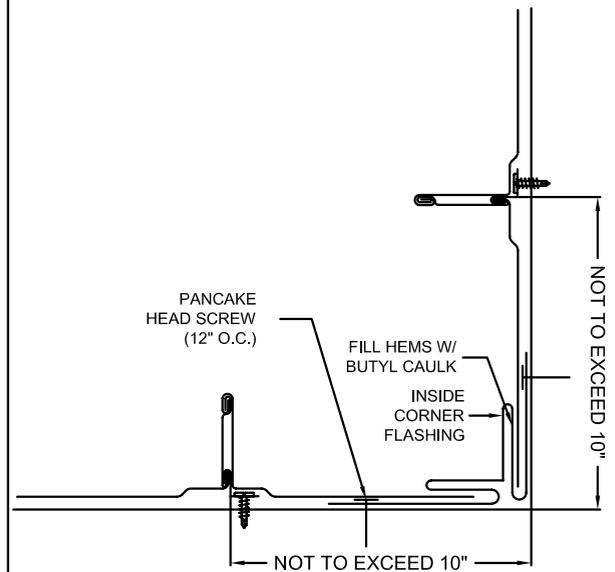
VENT PIPE FLASHING
(ALSO APPLIES TO LIGHT EQUIPMENT CURBS)

FOR ATTACHING PIPE BOOTS TO PANELS ON PURLINS, DO NOT PENETRATE PURLINS WITH SCREWS AND KEEP SCREWS AND PIPE AT LEAST 1" FROM PURLINS.

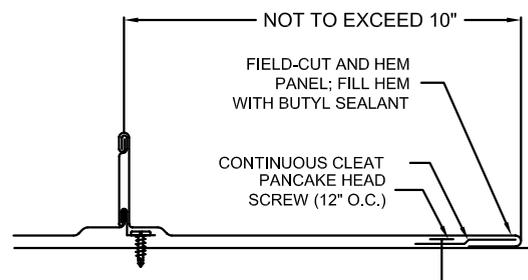


FASCIA OUTSIDE CORNER

FOR VERTICAL FASCIA PANELS LESS THAN 10' LONG, MAKING THE FIRST FOLD ONLY OF THE SEAM IS PERMISSIBLE.



FASCIA INSIDE CORNER



FASCIA EDGE

FABRAL®

A FLACK GLOBAL METALS COMPANY

FABRAL.COM

1-800-4FABRAL (432-2725)

Manufacturing Facilities:

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Jackson, GA: (770) 230-8093

Ft. Worth, TX: (817) 286-5100

Gridley IL: (309) 280-6205

St. Joseph, MN: (816) 205-8111

Marshfield, WI: (715) 800-6006

Salt Lake City, UT: (385) 243-6333

Spokane, WA: (509) 204-8013

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