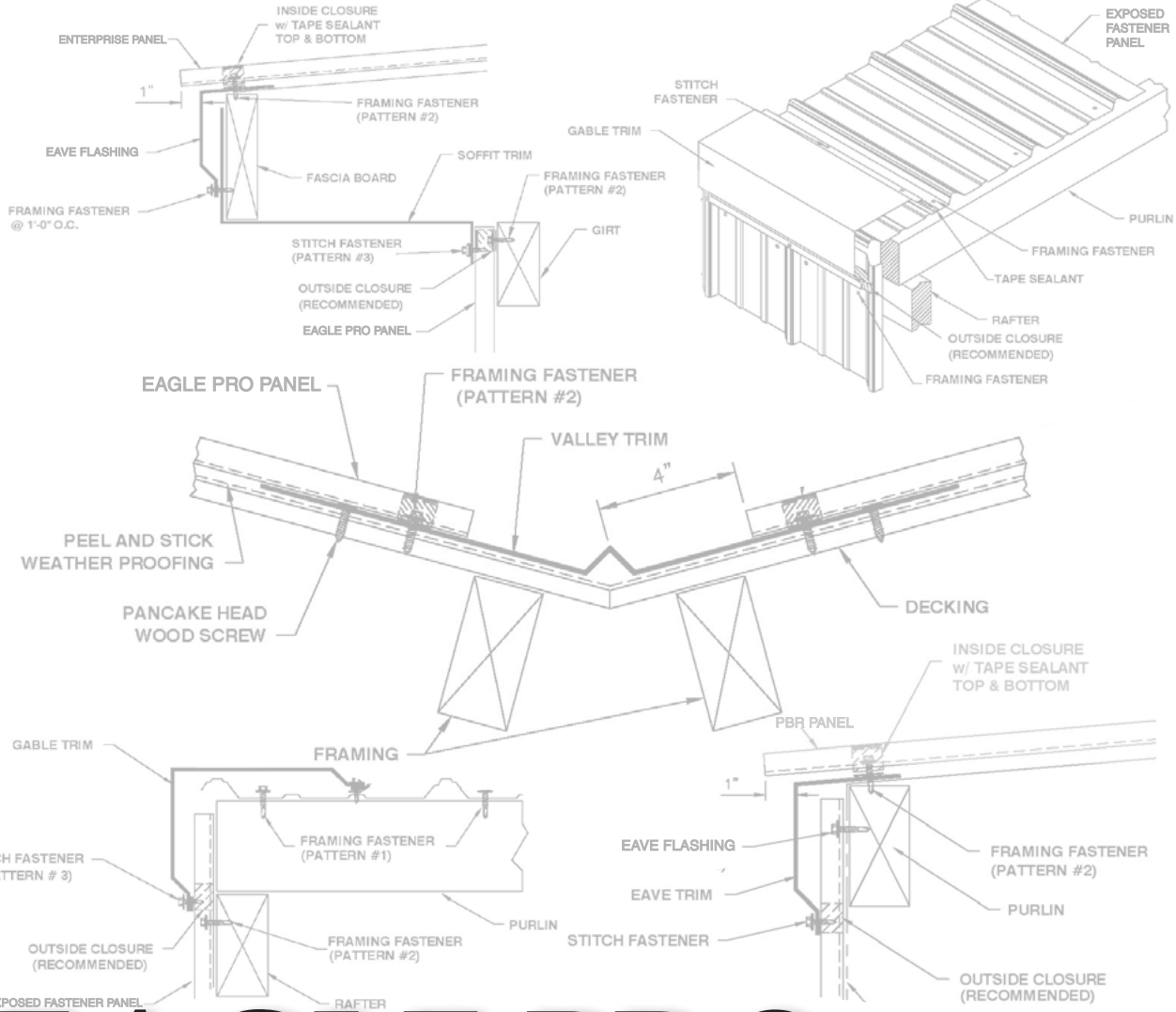
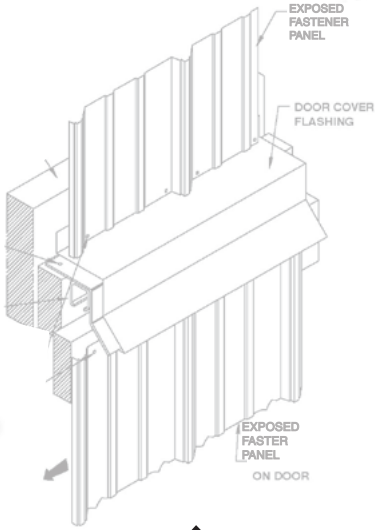


EAGLE PRO PATRIOT 4 ENTERPRISE PANEL MAX PBR-PANEL CORRUGATED

EXPOSED FASTENER PANELS



ALL AMERICAN STEEL™

INSTALLATION MANUAL

www.allamericansteel.net 608-377-7200

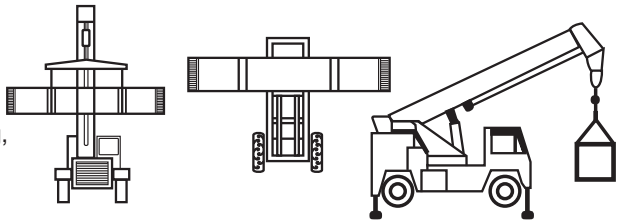
GENERAL INFORMATION 1

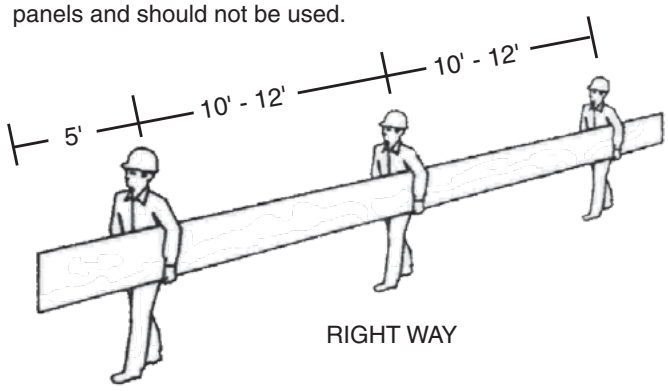
1. Notice

- The details shown on the following pages are suggestions or guidelines for installing the Lexington and Concord Systems. The installation details shown here are proven methods of construction, but they are not intended to cover all building requirements, designs or codes. The details may require changes or revisions due to individual project conditions.
- Installation procedures shall be in accordance with All American Steel's printed instructions, details or approved shop drawings. Installers should thoroughly familiarize themselves with all instructions prior to beginning the installation process.
- The designer/installer is responsible to ensure the following:
  - That the details here meet the particular building requirements.
  - Awareness of and allowance for expansion/contraction of the roof panels.
  - That adequate water tightness is maintained.
  - That a proper uniform substructure is used to avoid panel distortion and that the substructure meets necessary code requirements.
  - That all supporting members have been examined and are straight, level, and plumb.
- Some field cutting and fitting of panels and flashings is to be expected and to be considered a part of normal installation work. Workmanship shall be of the best industry standards with installation performed by experienced metal craftsmen.
- Contents of this manual are subject to change without notice. To confirm this book is the most current copy, please visit All American Steel website at **www.allamericansteel.net.**

2. Material Handling and Storage

- When receiving materials, check the condition of the product and review the shipment against the shipping ticket to ensure all items are accounted for. If damages or shortages are discovered, it should be noted on the shipping copy at the time of deliver. All American Steel will not be responsible for shortages or damages unless they are noted on the shipping ticket. In addition, all damages and shortages should be reported to All American Steel within 48 hours from time of shipment.
- A forklift or crane can be used to handle unopened bundles up to 25' in length. For forklift unloading, forks should be spread to maximum width and placed at center line weight distribution of bundle. For crane unloading, a spreader bar should be used to evenly distribute the weight of the bundle. Cable supports will cause damage to the panels and should not be used.

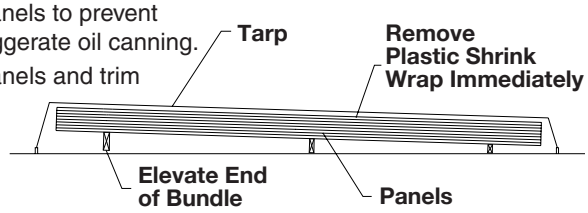




RIGHT WAY

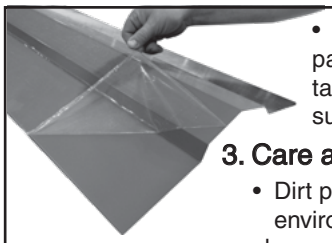
WRONG WAY

- Individual panels should be carried on edge by hand and supported evenly with a maximum spacing of 10 to 12 feet.
- Handlers should maintain uniform movements while transporting panels to prevent bending or twisting that will cause permanent damage and will exaggerate oil canning.
- Store all materials in a protected area away from standing water. Panels and trim should be covered to protect from moisture, debris, and long term exposure to sunlight. Keep bundles elevated above the ground to allow air to circulate freely. Elevate one end of bundles to prevent moisture from resting on panels.



- Panels should be kept dry and above grade. Panels should be tarped or protected from the weather and at the same time be able to have continuous air flow. Shrink wrap packing must be removed immediately. Shrink wrap is used for damage free transportation only. It can not be used for weather protection. Failure to remove plastic wrap immediately can result in damage to panels and may void the warranty. Panels in a stack that are wet, over a period of time, will promote oxidation that can damage panels.

2 GENERAL INFORMATION

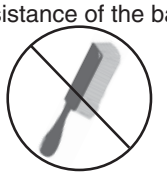


• Panels and trim may have strippable polyfilm applied to surfaces for protection during fabrication, packaging and transit. This film must be removed immediately prior to installation. Care should be taken to protect film from long term exposure to moisture and direct sunlight. Extended exposure to sunlight will cause polyfilm to be permanently adhered to panel surface.

3. Care and Maintenance

• Dirt pickup may cause apparent discoloration of the paint when it has been exposed in some dirt-laden environments for long periods of time. In areas of strong sunlight, slight chalking may cause some change in appearance. A good cleaning will often restore the appearance of these buildings and render repainting unnecessary. An occasional light cleaning will help maintain a good appearance.

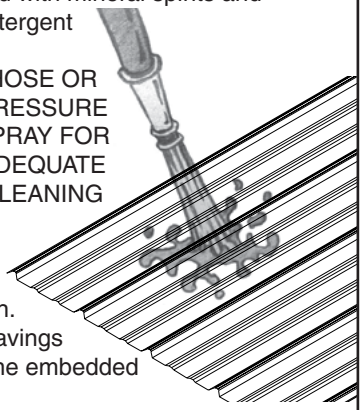
- In many cases, simply washing the building with plain water using a hose or pressure sprayer will be adequate. In areas where heavy dirt deposits dull the surface, a cloth or soft bristle brush and solution of water and detergent (1/3 cup of laundry detergent per gallon of water for example) may be used. This should be followed by and adequate rinse of water. Do not use wire brushes, abrasives, or cleaning tools which will damage the coating surface.
- Mildew may occur in areas subject to high humidity but is not normally a problem due to the high inherent mildew resistance of the baked finish that is used. To remove mildew along with the dirt, the following solution is recommended.



DO NOT USE A WIRE BRUSH

- 1/3 cup detergent (Tide® or equivalent)
- 2/3 cup trisodium phosphate (Solex® or equivalent)
- 1 quart of 5% sodium hypochlorite solution Clorox® or equivalent)
- 3 quarts of water

- Strong solvents and abrasive type cleaners should be avoided. Most organic solvents are flammable and toxic and must be handled accordingly. When using a solvent, consult maintenance professionals and label instructions for proper handling and disposal of washings. If required, a mild solvent such as mineral spirits can be used or remove caulking compounds, oil, grease, tars, wax, and similar substances. Use a cloth dampened with mineral spirits and apply only to areas which are contaminated. Follow up the use of this mild solvent with detergent cleaning and rinsing.



HOSE OR PRESSURE SPRAY FOR ADEQUATE CLEANING

4. Working With Metal

- Cutting and Drilling -
  - Never cut panels with a abrasive blade or saws. Panel damage will occur and hasten the corrosive process and will void your warranty. The red hot shards will damage the 40 year paint finish. For exposed fastener panels a full width shears is recommended and is available from All American Steel for rent. Standing seam panels should be cut with hand shears or a power nibbler.
  - Metal debris from cutting and drilling processes should be removed during installation. If not removed metal filings will red rust on the surface of the panels and trim. Hot shavings should be prevented from coming into contact with painted surfaces; they may become embedded into the painted surface.

5. Panel Traits

- Metal panels and trim are exposed to daily cycles of temperature changes from ambient temperatures and exposure to sunlight. Temperature fluctuations cause metal components to expand and contract. Allowances should be made for the expansion and contraction of panels and trim. Restriction of expansion and contraction can produce oil-canning in panel/trim surfaces and cause failures at faster locations.

Thermal Expansion/Contraction for Steel Roof Panels at 180° F Differential

Distance from fixed point	Nom. Expansion
10 feet	1/8" (0.145")
20 feet	5/16" (0.289")
30 feet	7/16" (0.434")
40 feet	9/16" (0.579")
50 feet	3/4" (0.724")

Distance from fixed point	Nom. Expansion
60 feet	7/8" (0.868")
70 feet	1" (01.013")
80 feet	1-3/16" (1.158")
90 feet	1-5/16" (1.302")
100 feet	1-7/16" (1.447")

Coefficient of expansion = 0.0000067 in/in/F Thermal Expansion/Contraction of Steel Panels

5. Panel Traits (Continued)

- Standing seam panels that require clips like Concord should be installed with a "fixed" end and a "free" end. This manner allows for expansion and contraction to be controlled uniformly at one end of the roof. This manual follows the "architectural" or "steep slope" installation method which applies a points of fixity at the high end of the panels (i.e. ridge, hip, high wall, and peak). Expansion and contraction is accommodated at the low end of panels (i.e. eaves and valleys).

6. Oil Canning

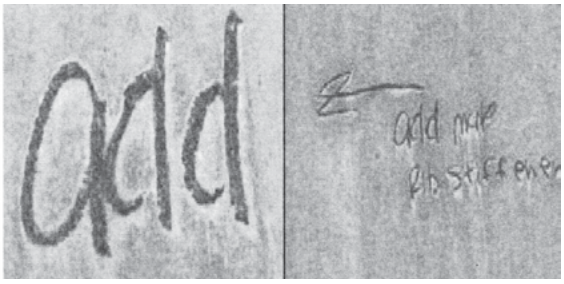
- Oil canning is inherent in all metal roofing from all manufacturers and is not covered by any warranty. It is not cause for rejection. Unless specific tolerances have been incorporated into the contract documents, accepted both end user and All American Steel and if reasonable precautions have been taken, oil canning is not grounds for panel rejection.
- Through the course of a day, depending on the time of the year, deflection (oil canning) of the panels can be exacerbated for a short time and then not appear for the balance of the day.
- To lessen oil canning we recommend going to a crinkle finish with striations. Besides adding to the beauty of your roof the suns rays are refracted and the noticeability of oil canning is dramatically reduced.
- Substructure must be even plane to within 1/4: in 20 feet from eave to ridge to avoid panel distortion.

7. Dissimilar Metals

- When different metals are in contact with each other an electro chemical reaction takes place which adds to corrosion and to the break down of metals. This process is known as galvanic reaction; the result of dissimilar metals in contact with each other.
- Water run off from copper coming from plumbing pipes, electrical or air conditioning units will cause roof corrosion. Copper and steel do not get along. Roof failure can occur in just a few short years.

8. Corrosion

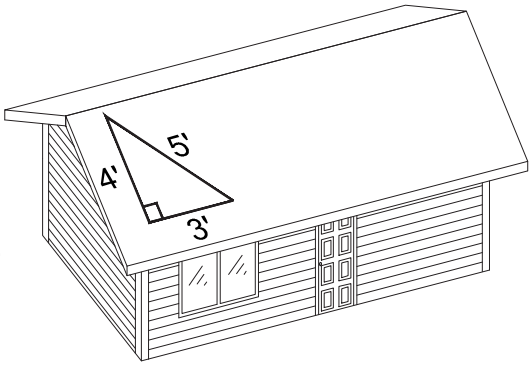
- Treated lumber in contact with metal roof panels used to support air conditioning units or other equipment will cause corrosion of steel roof panels.
- Use a felt marker on panels during constructions not pencils. Pencils contain graphite and graphite is corrosive to steel panels.
- Some silicone caulks are corrosive to steel. If the tube does not specifically say “for use on steel” do not use it. As a general rule if the silicone caulk has a strong odor, it is corrosive to metal.
- Brass and lead are corrosive to steel panels.



Corrosion Caused by Graphite Pencil

9. Installation

- It has been shown that the use of electric impact drivers substantially increases the probability of improper placement of screws.
- It is not recommended to touch up minor paint scratches, even though All American Steel carries touch up kits. Weather XL and Kynar 500 performance cannot be duplicated with field applications. The newly applied paint will fade faster than the factory finish and eventually will be more pronounced than the original scratch.
- Use butyl sealants for metal. The sealant should be applied concealed. Exposure to sunlight will breakdown butyl.
- Use high temperature synthetic roof felt and high temperature ice and water shield over roof sheathing. Temperatures between metal roofing and roof decks can exceed 200° F.
- Lower roof pitches have greater wind uplift than steeper pitched roofs.
- Use only stainless steel fastening screws to fasten roof panels and trim.
- To begin installing roof panels place an alignment line along the eave. This line must be parallel to the eave of the roof. To check the roof for squareness measure 3' along the eave and measure 4' up the gable. If the roof is square the angle should measure 5'. If it is not snap a vertical line that would complete the 3' x 4' x 5' triangle. (See illustration) For greater accuracy use a 6' x 8' x 10' triangle. Any out of square conditions up to 3" can be covered by the gable trim. It is important to measure the roof from gable to gable. Proper placement of panels will allow the panel ribs on each side to be covered by the gable trim while creating a symmetrical appearance on the roof.



4 GENERAL INFORMATION

10. Steel Substrate Information

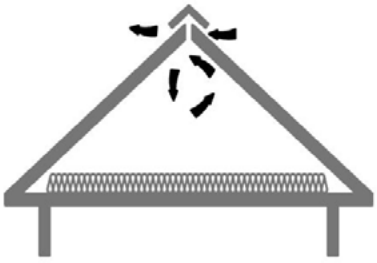
- Galvalume
  - Galvalume is a hot-dip process in aluminum, zinc and silicon (AZ55). 55% aluminum, 43.5% zinc, 1.5% silicon by weight. 80% aluminum, 19% zinc, 1% silicon by volume.
  - Zinc bonds with steel to create a barrier to corrosion caused by moisture. Aluminum is a metal that naturally resists corrosion and reflects heat. Silicon enhances the adhesion of the coating.
  - Galvalume under normal environmental conditions is at least 2-4 times as resistant to corrosion compare to galvanized and in some tests outperformed galvanized by a factor of 9.
  - Galvalume carries a 25 year 6 month warranty from the steel mill on rust penetration. Galvanized substrate does not carry this warranty.

.• Galvanized
  - Galvanized is a hot-dip process in zinc.
  - Galvanized coating is measured in ounces per 100 square feet. Common coatings are G60, G90 and G100.
  - G100 has 100 oz. of zinc per 100 square feet. The 100 oz. is measured based on both sides so each side, in this case, would have 50 oz. of zinc.
  - A chemical bond occurs between the zinc and the carbon sheet steel.
  - The greater the amount of zinc, the greater the protection against corrosion.
  - Galvanized panels perform better in animal containment buildings than galvalume but still are not warrantied.
  - The zinc in both substrates, galvalume and galvanized, actually sacrifices itself to protect the underlying steel from rust when panel damage occurs. Since galvanized has more zinc this phenomenon is more pronounced in galvanized panels initially. After 10 years this action seems to equalize between the two.

11. Design Information

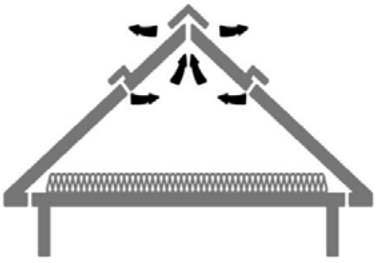
- Ventilation
  - For single-family residential applications, FHA guidelines recommend the 1/300 rule: 1 square foot of net free vent area for every 300 square feet of attic floor space. Net free vent area includes exhaust and intake venting. It is recommended to use a ratio of 60% intake venting and 40% for exhaust venting. Some building codes may require the 1/150 rule. Always check with local building code for exact requirements
  - No attic vents should be installed between the intake and exhaust vents. This approach will "short circuit" the vent path between intake and exhaust vents leaving attic portions unvented.
  - Ridge ventilation is the ideal method for venting a metal roof system.

IMPROPER



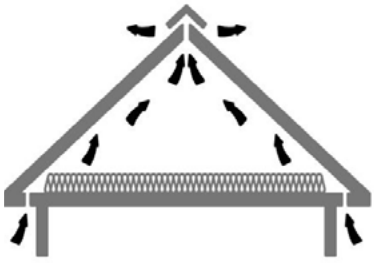
Improper Venting - Ridge Only
Lack of under eave intake greatly decreases the effectiveness of exhaust venting

IMPROPER



Improper Venting - "Short Circuit"
The use of mid-roof vents with ridge vents creates a "short circuit" of proper air flow

PROPER



Ideal Venting Method
Under Eave Intake + Ridge Exhaust Vent
(60% soffit intake + 40% ridge exhaust)

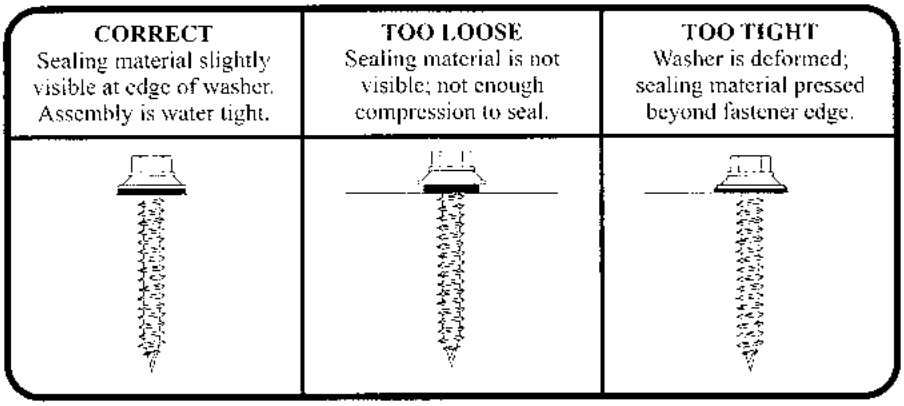
12. Snow-Guards

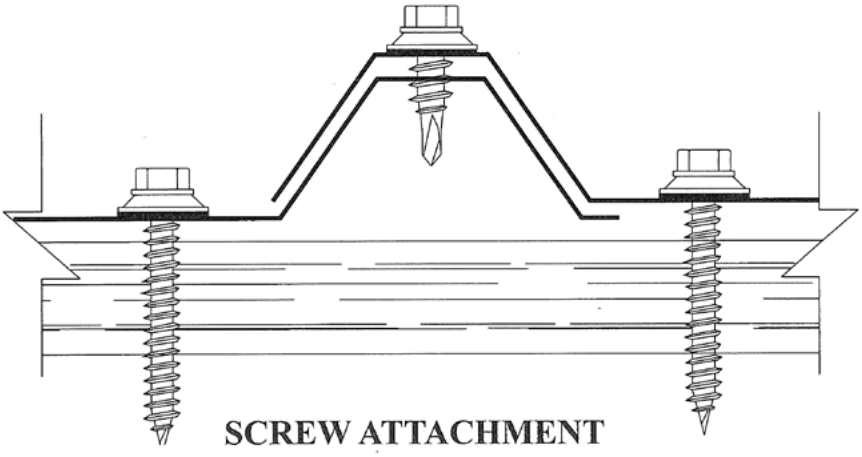
- Snow-guard is a generic term used for any device or system that functions to retard or restrain sliding snow.
  - Snow-guards restrain the snowpack by utilizing the compressive strength of the snow immediately adjacent to the roof surface, thereby resisting the vector force of snow for a specific tributary area of the roof.
  - Due to the many varied properties involved with snowpack, no snow-guard or system can assure 100% effectiveness.
  - Snow-guard can mitigate most of the dangerous effects of sliding snow and greatly reduce the risk of a roof-top avalanche.
- All American Steel recommends the use of S-5 Snow-guards which mechanically are fastened to roof decks. (See an All American Steel Representative for advice) All American Steel discourages the use of adhesive applied and plastic constructed snow-guards because they have been found not to have the same lifespan as the metal roofs they are applied to.

FASTENER INSTALLATION 5

SCREWS TO WOOD

All American Steel recommends painted screws by East Coast with a south drilling point and flat neoprene washer. The correct screw gun is also important to the proper installation. A tool with the appropriate speed and torque setting (as recommended by the fastener manufacturer) will help prevent fastener thread strip-out and possible damage to the panel or it's coating. Never use impact drill. Studies have shown that impact drills dramatically increase the probability of improper screw installation.





SCREW ATTACHMENT

SEATING THE WASHER - Apply sufficient torque to seat the washer - do not overdrive the fastener.

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.

SCREWS PER SQUARE - Typically 40 screws should be used per square for 2' wide panels and 80 screws should be used per square for 3' wide panels. This number assumes purlins or girts at 24" on center. Different spacing would require different amounts. 250 screws per bag.

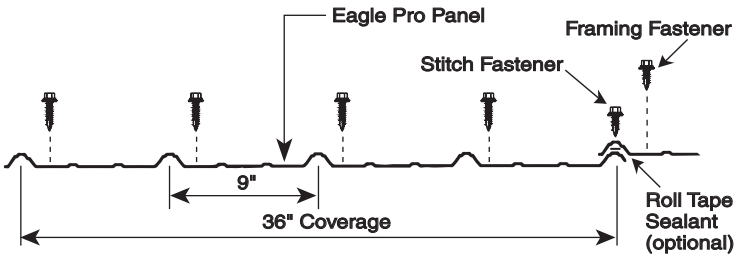
CORRECT DRILL USE - Do not use impact mode or hammer drills to seat screws. Studies have shown the use of hammer actuated drills significantly increases improper screw placement leading to pre-mature roof failure.

6 FRAMING & STITCH FASTENER PATTERNS

EAGLE PRO

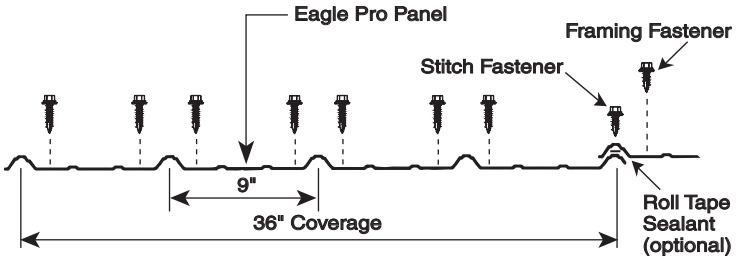
PATTERN #1

Where to use: Field of Panel



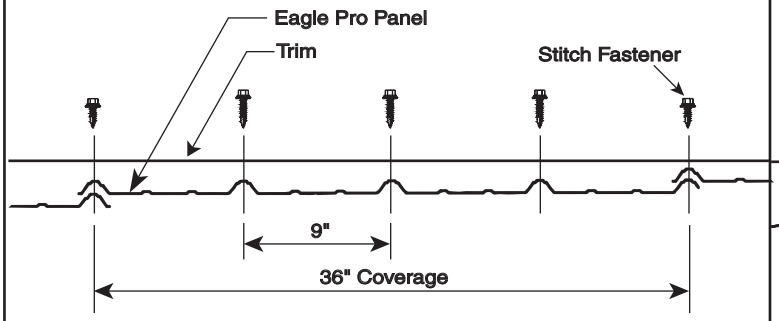
PATTERN #2

Where to use: End of Panel, Eave and Ridge, Lap and Base.
Screw 1-1/2" on each side of major ribs.



PATTERN #3

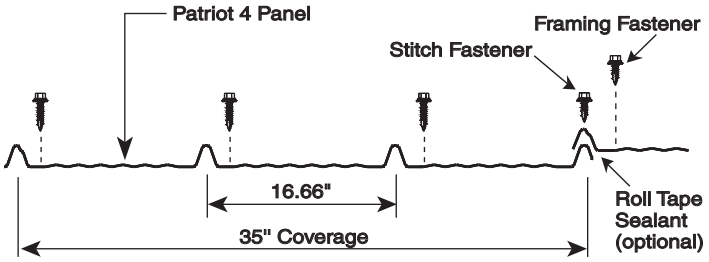
Where to use: Stitch Location



PATRIOT 4

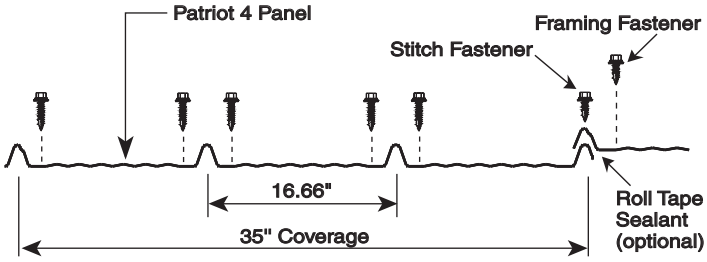
PATTERN #1

Where to use: Field of Panel



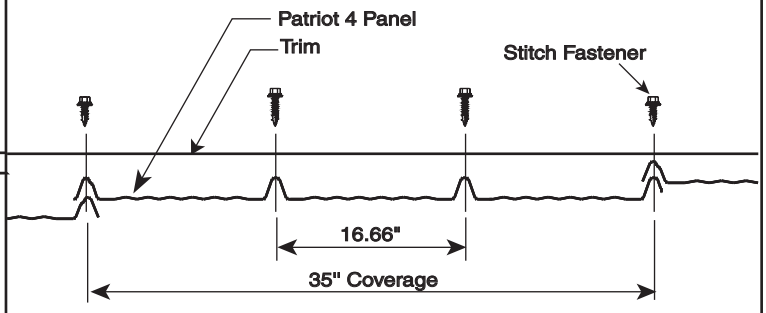
PATTERN #2

Where to use: End of Panel, Eave and Ridge, Lap and Base.
Screw 1-1/2" on each side of major ribs.



PATTERN #3

Where to use: Stitch Location



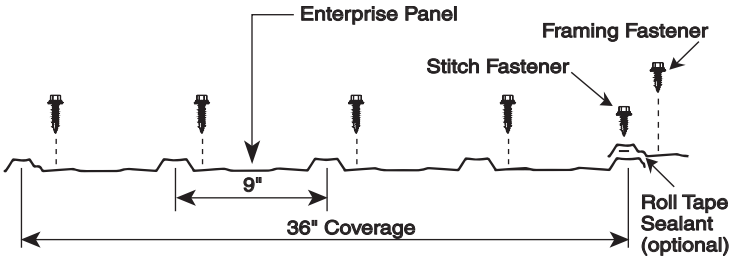
NOTE: TAPE SEALANT IS OPTIONAL.

FRAMING & STITCH FASTENER PATTERNS

ENTERPRISE

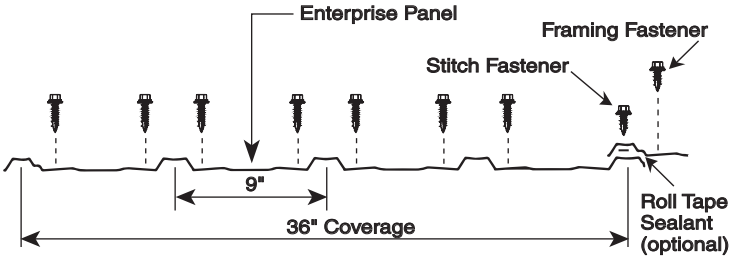
PATTERN #1

Where to use: Field of Panel



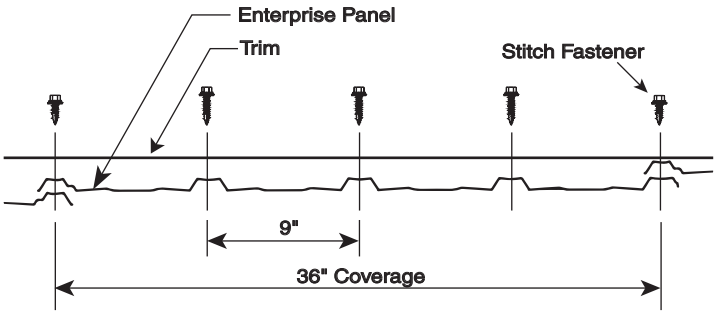
PATTERN #2

Where to use: End of Panel, Eave and Ridge, Lap and Base. Screw 1-1/2" on each side of major ribs.



PATTERN #3

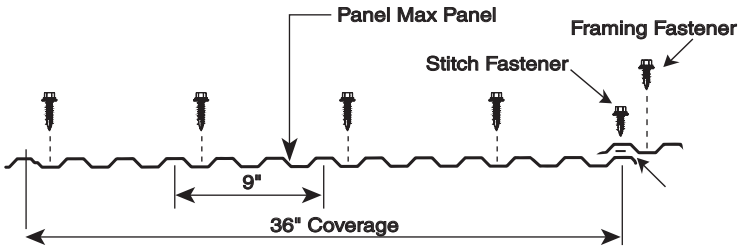
Where to use: Stitch Location



PANEL MAX

PATTERN #1

Where to use: Field of Panel



PATTERN #2

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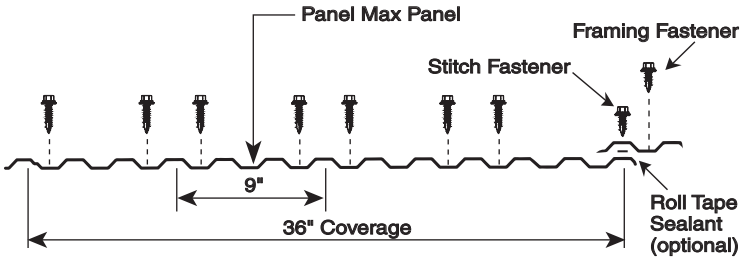

PATTERN #3

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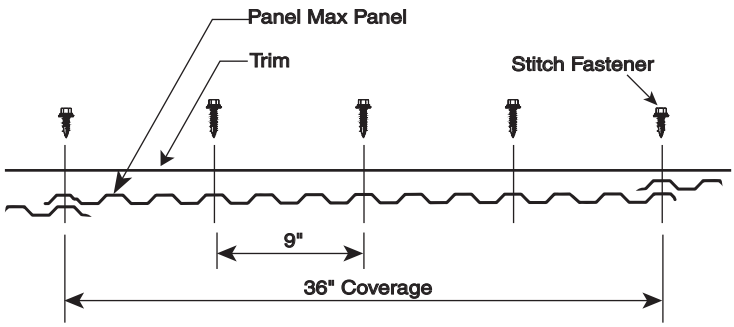


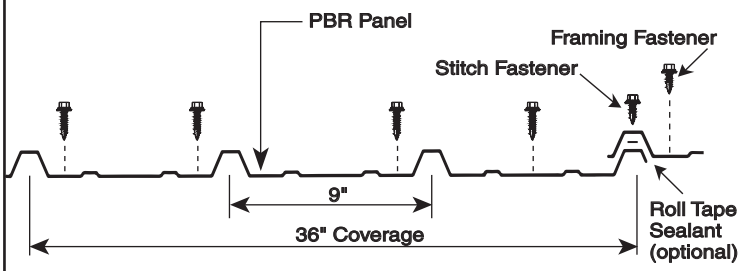
NOTE: TAPE SEALANT IS OPTIONAL.

8 FRAMING & STITCH FASTENER PATTERNS

PBR PANELS

PATTERN #1

Where to use: Field of Panel



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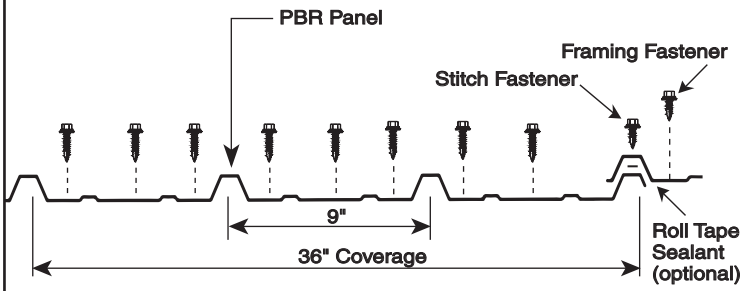
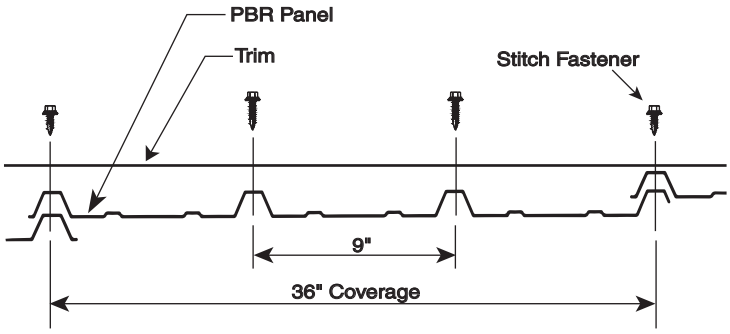


PATTERN #3

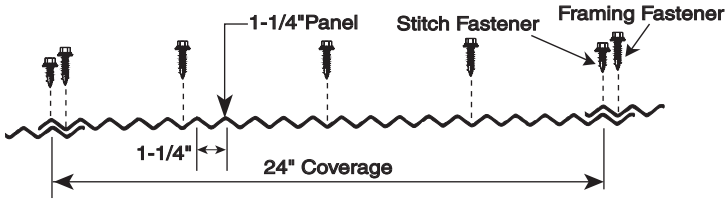
Where to use: Stitch Location

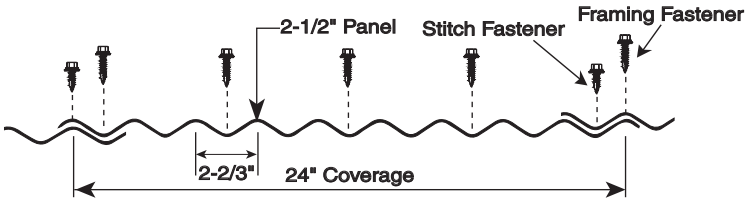


CORRUGATED 1-1/4" & 2-1/2" GALVANIZED ONLY

PATTERN #1

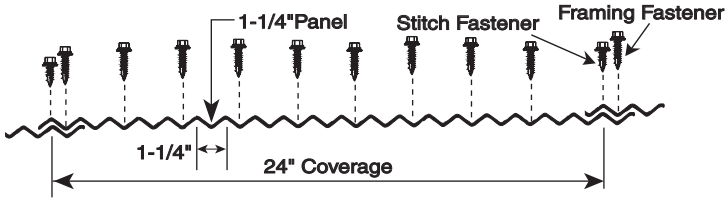
Where to use: Field of Panel

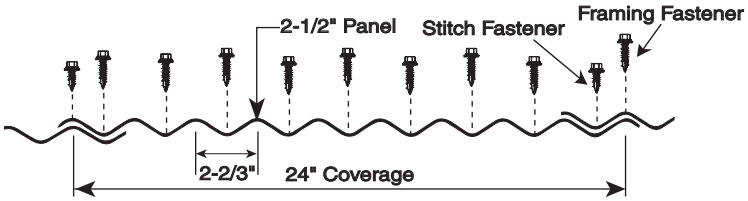




PATTERN #2

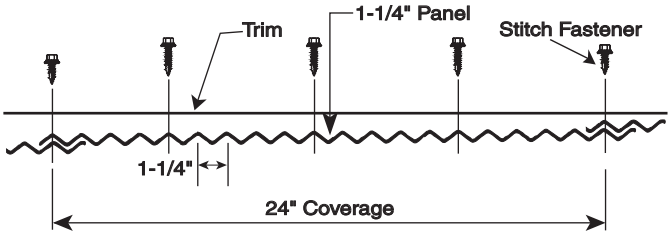
Where to use: End of Panel, Eave and Ridge, Lap and Base.
Screw 1-1/2" on each side of major ribs.

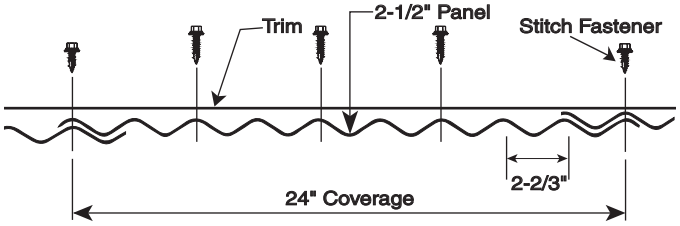




PATTERN #3

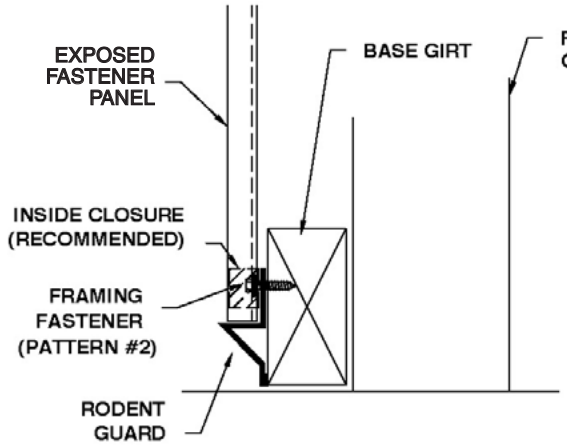
Where to use: Stitch Location

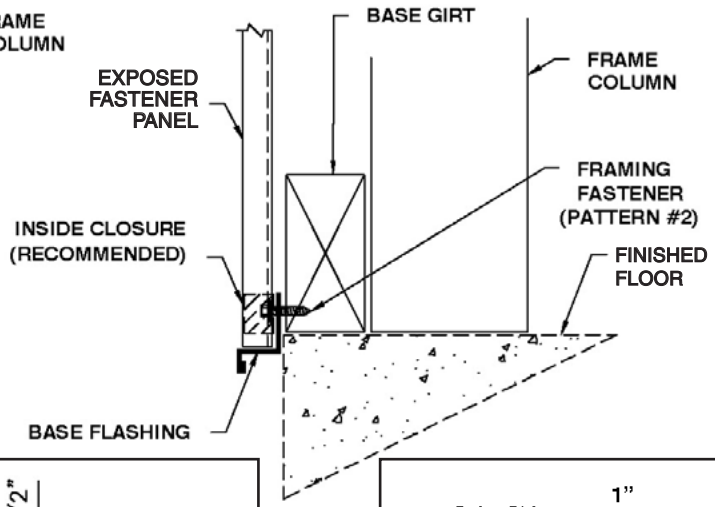




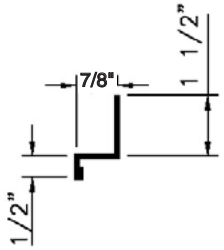
NOTE: TAPE SEALANT IS OPTIONAL.

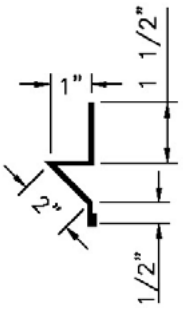
BASE TRIM DETAIL 9



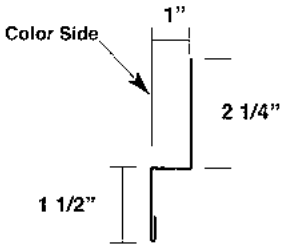


BASE FLASHING-1" #02





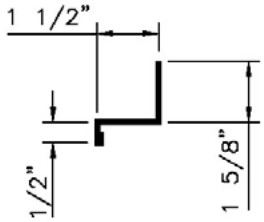
RODENT GUARD #05

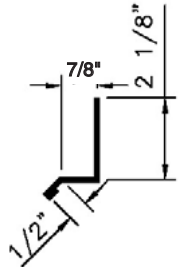


BASE TRIM OR ZEE FLASHING
ITEM# 9071001-21

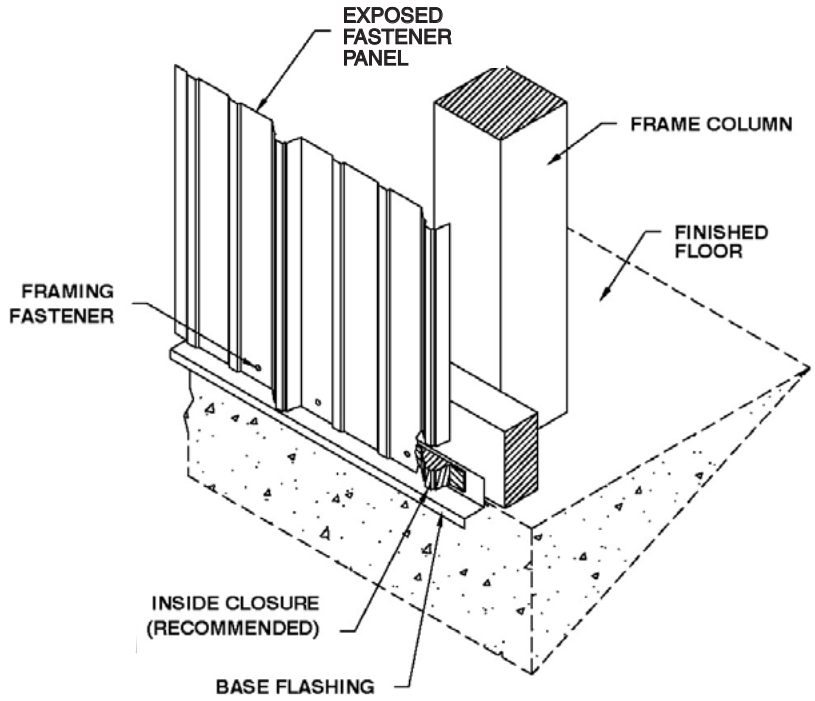
ALTERNATE OPTION

BASE FLASHING 1.5" #04

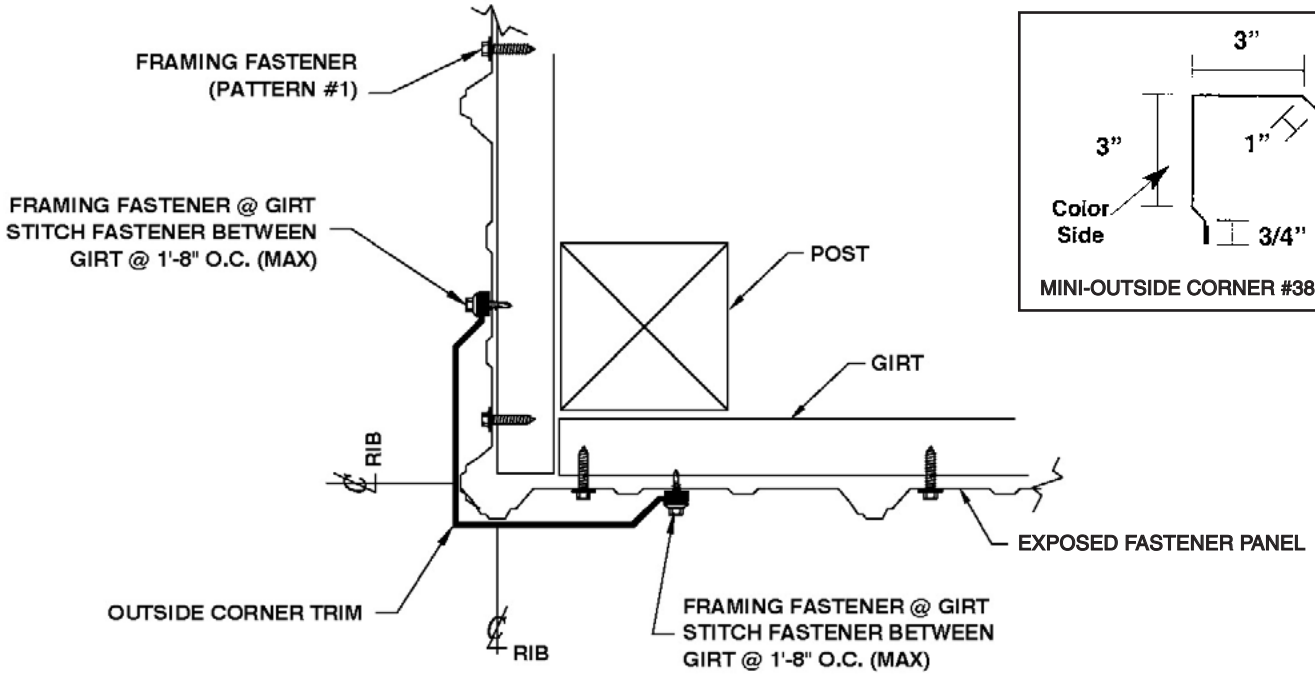


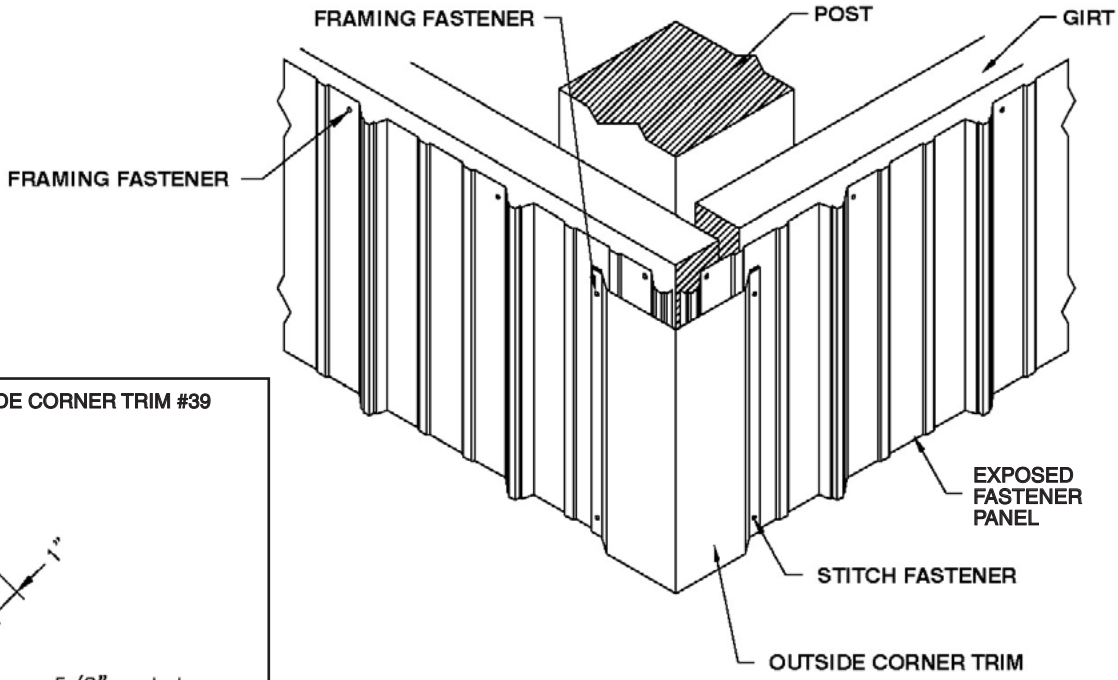


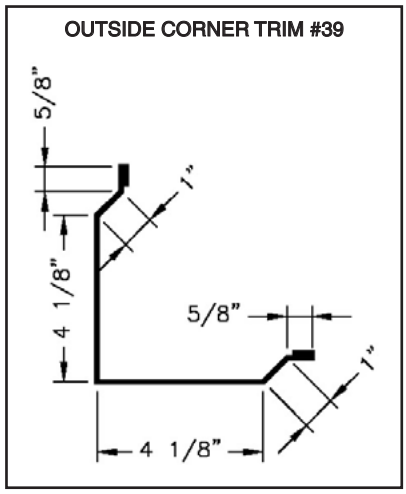
BASE AND DRIP FLASHING #01



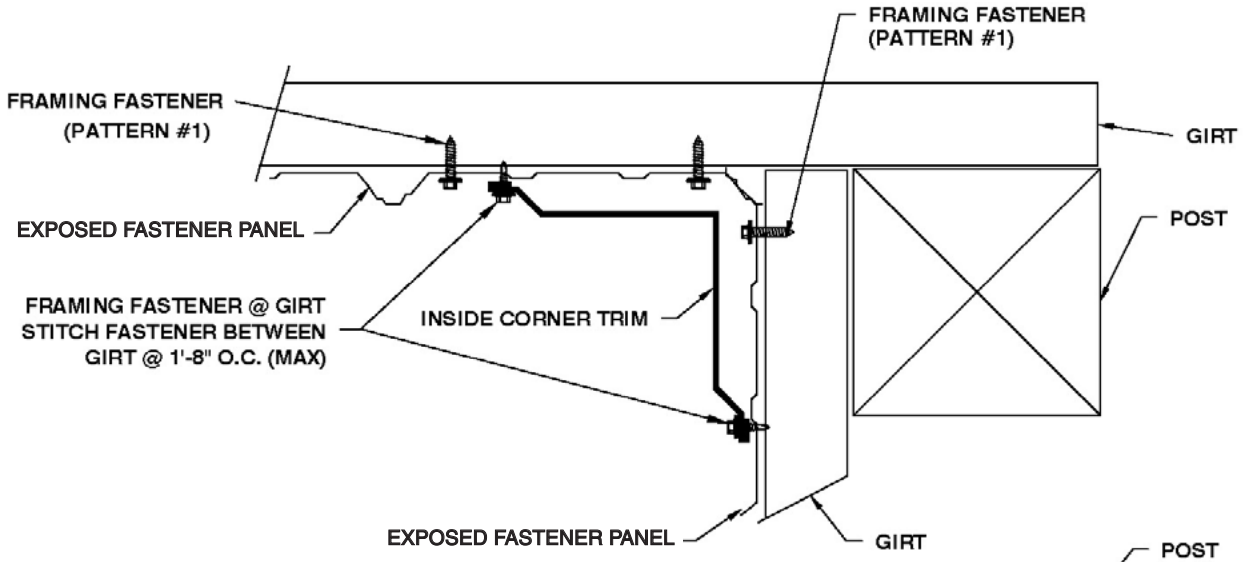
10 *OUTSIDE CORNER DETAIL*

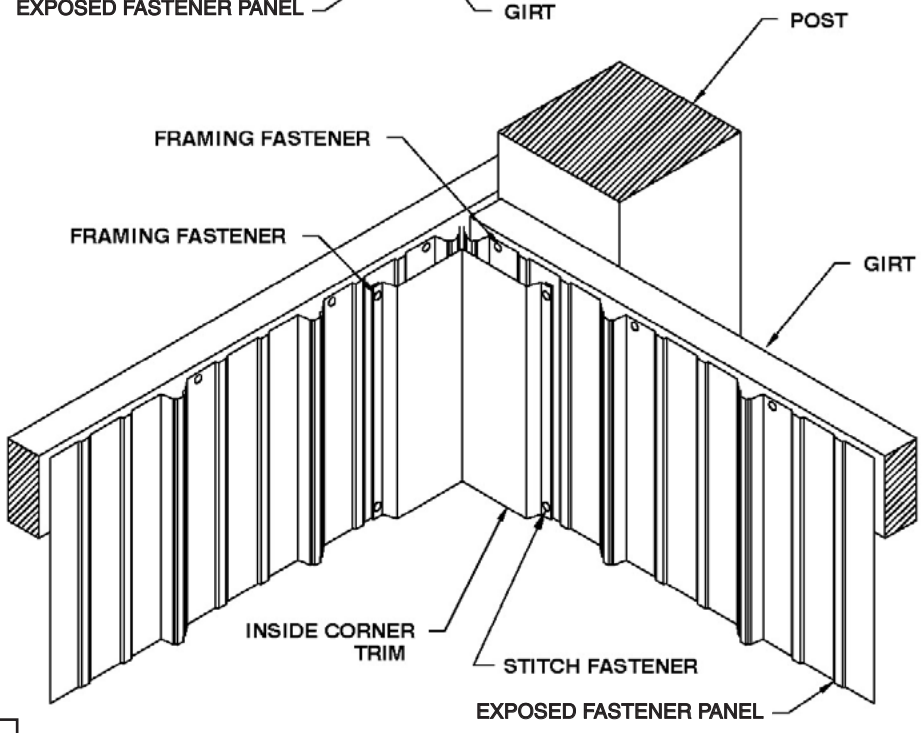


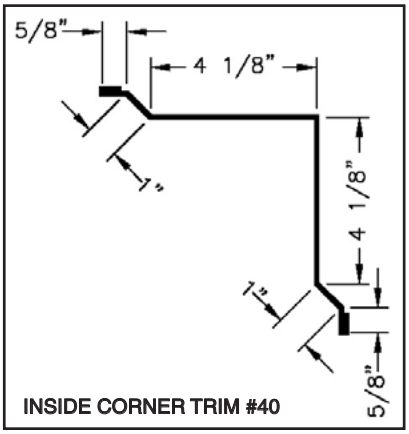




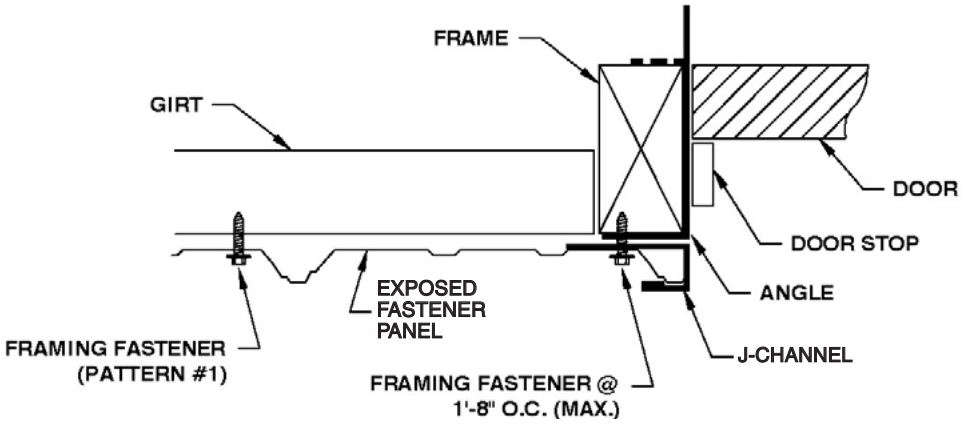
INSIDE CORNER DETAIL 11

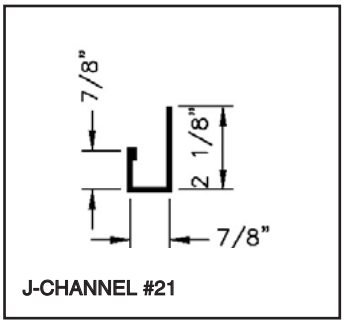


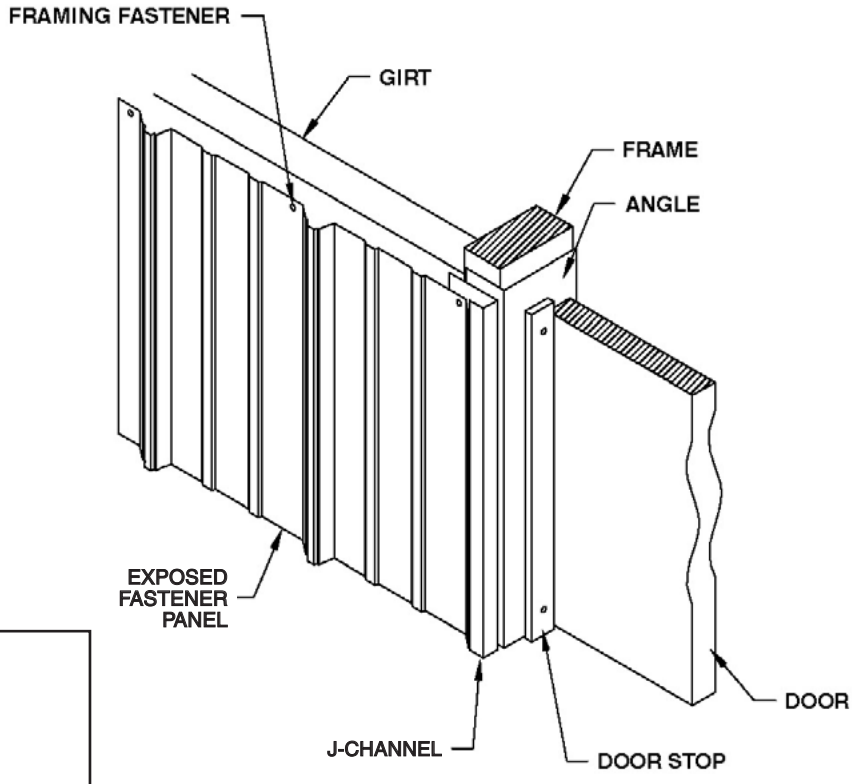


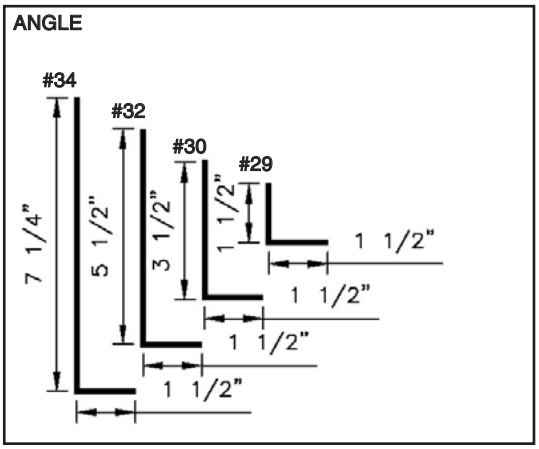


12 WINDOW & DOOR JAMB DETAIL

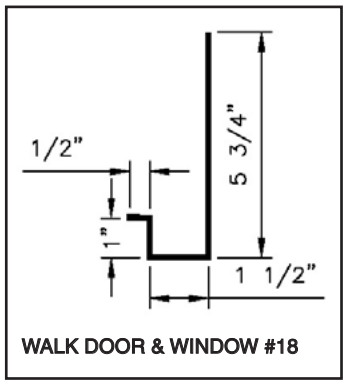




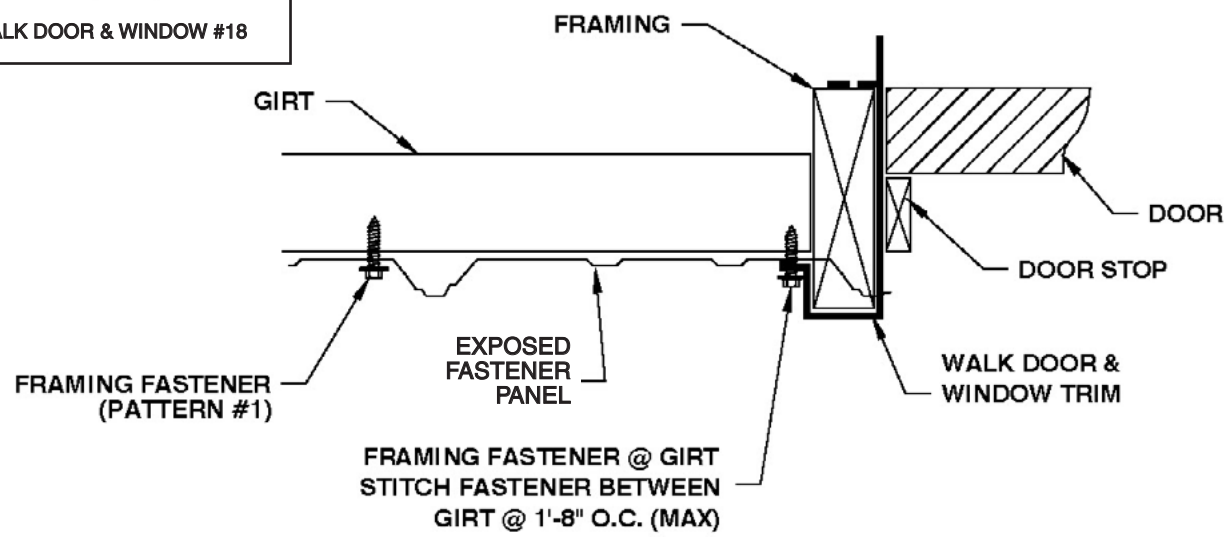


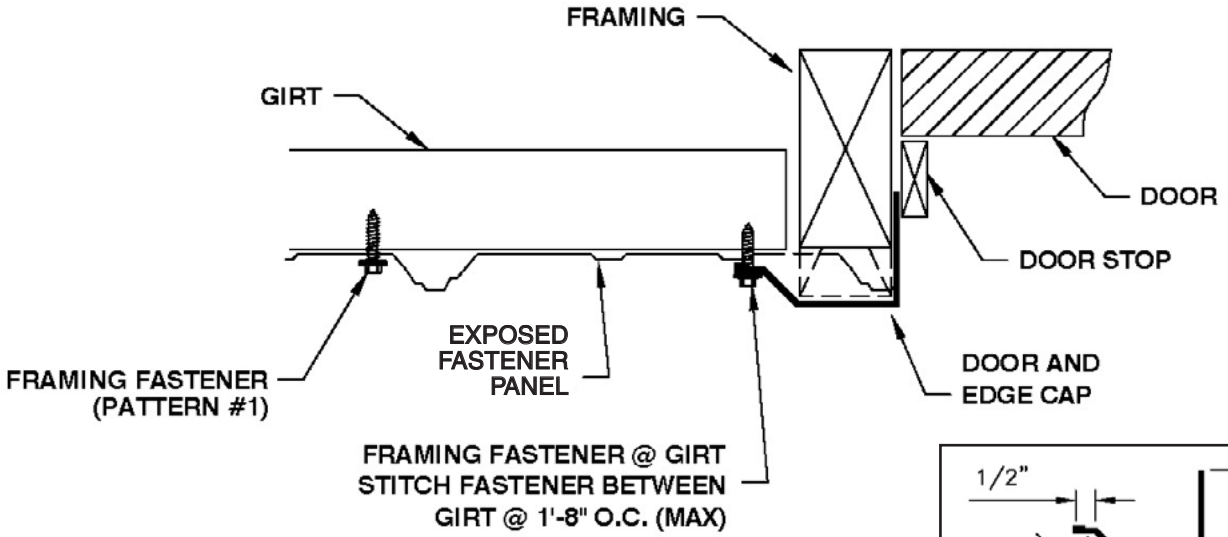


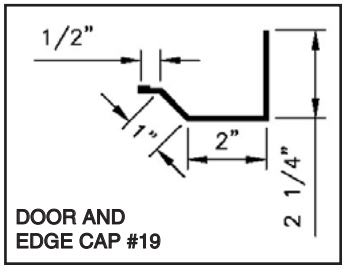
WINDOW & DOOR JAMB DETAIL



WALK DOOR & WINDOW #18

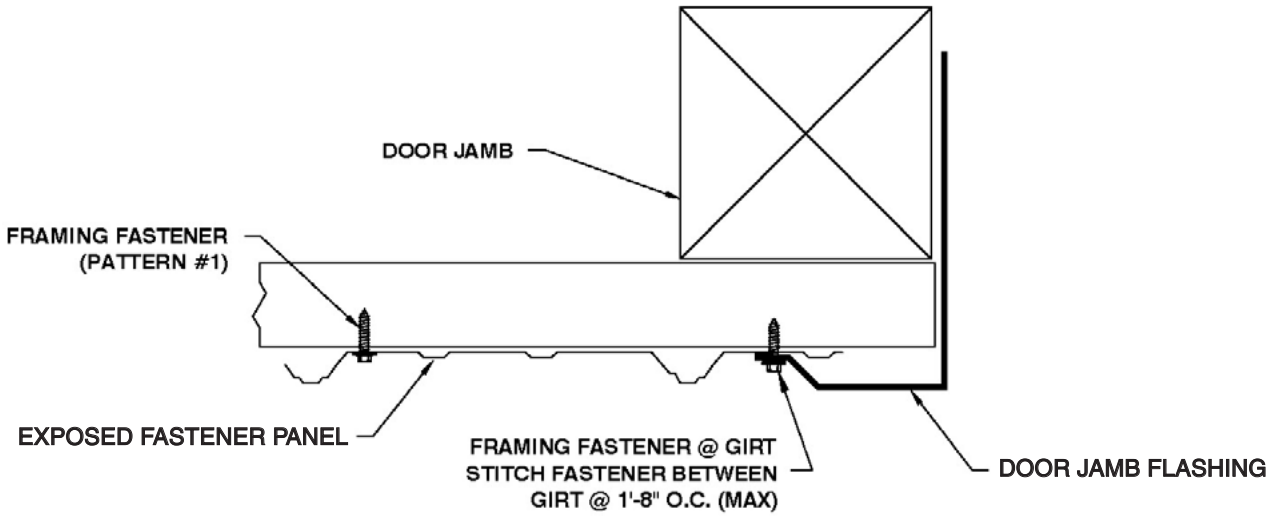


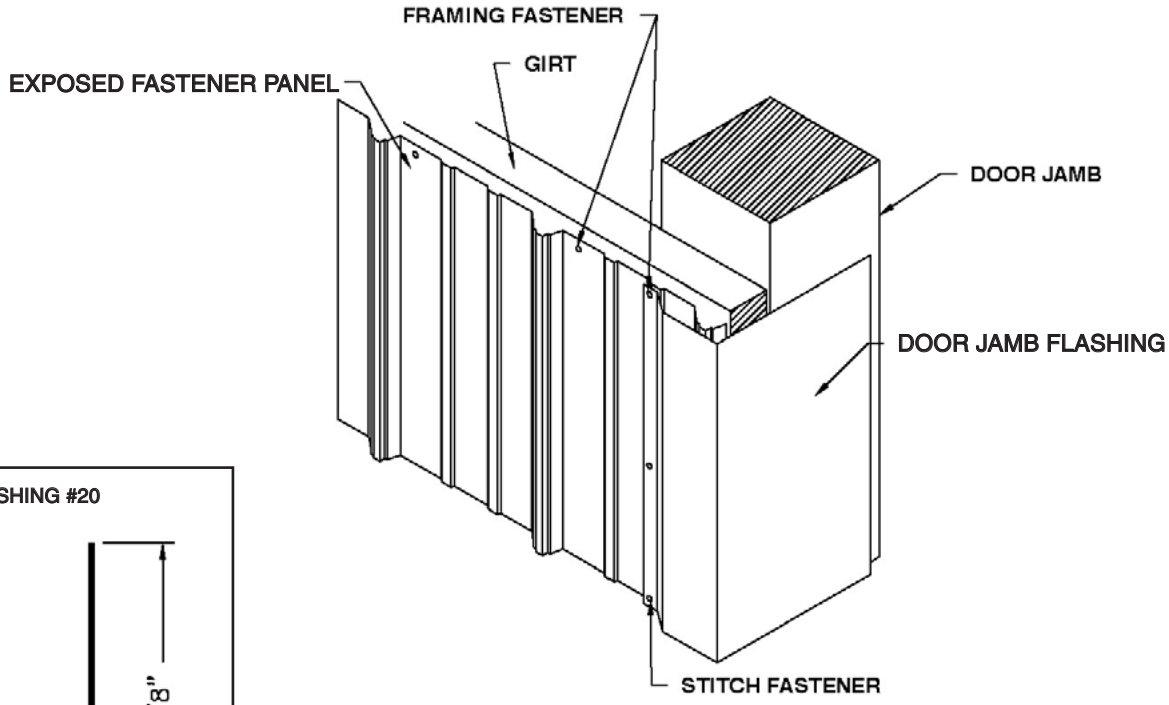




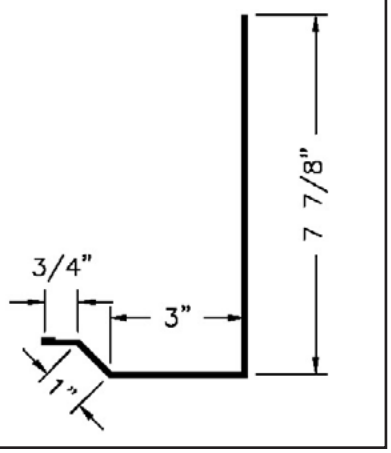
DOOR AND EDGE CAP #19

14 DOOR JAMB DETAIL

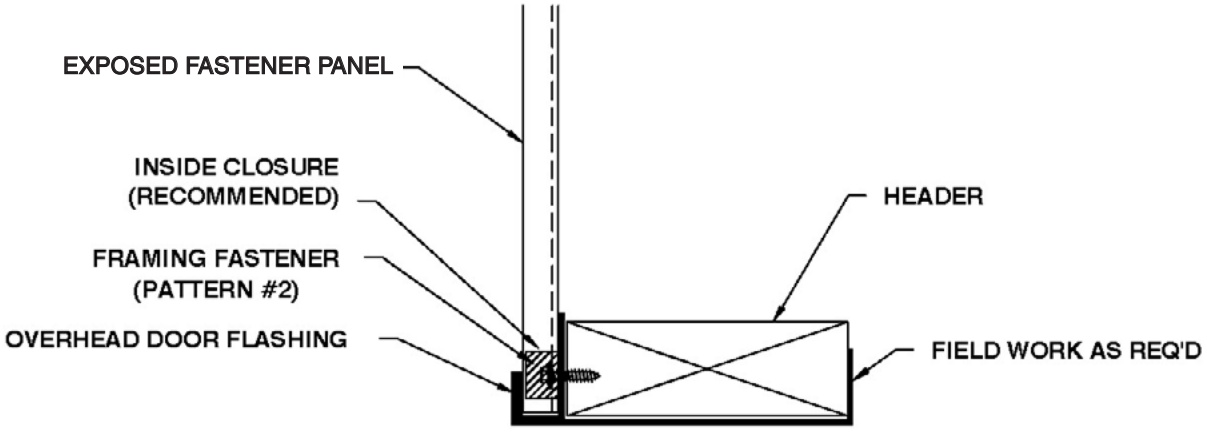




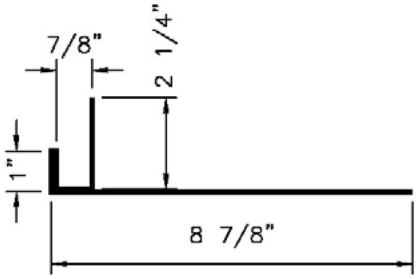
DOOR JAMB FLASHING #20



OVERHEAD DOOR FLASHING DETAIL



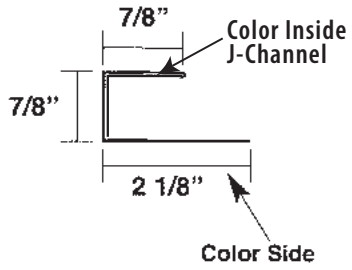
OVERHEAD DOOR FLASHING #12



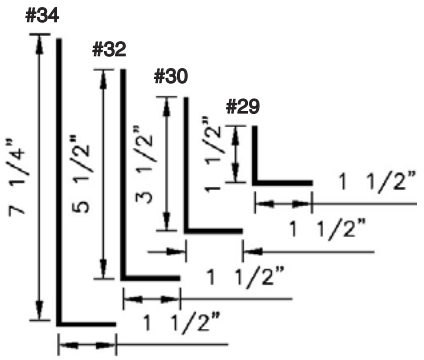
ALTERNATE OPTION

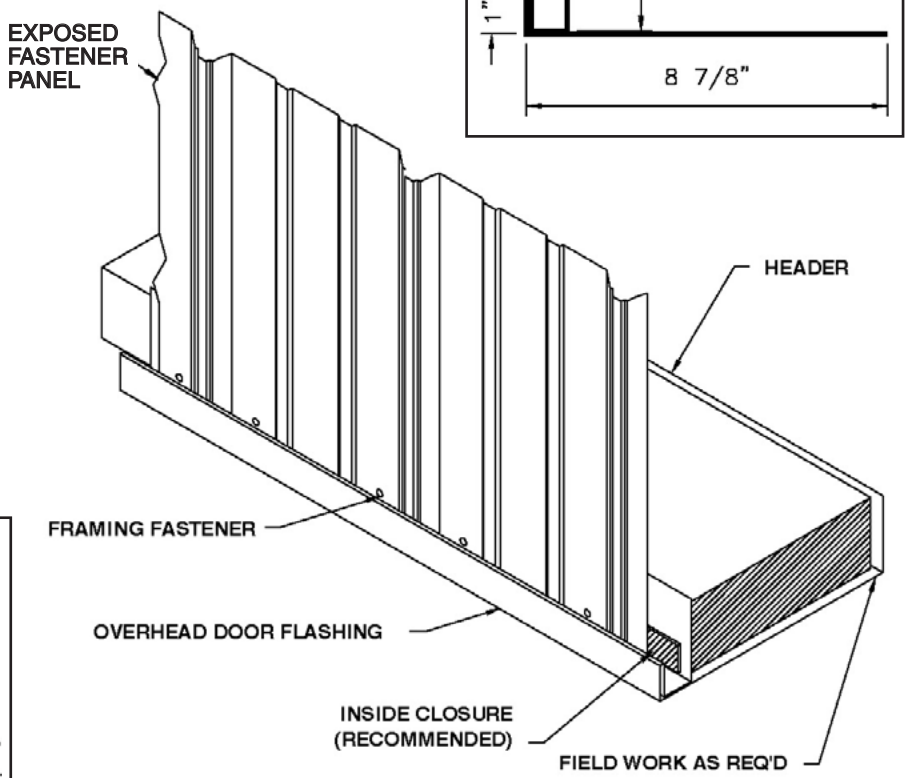
USE J-CHANNEL AND ANGLE COMBINATION.

"J" CHANNEL #21

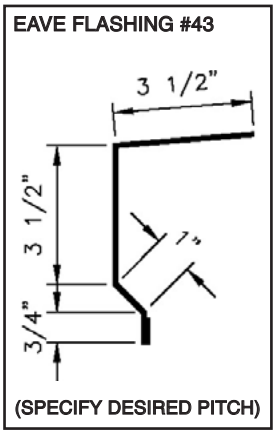


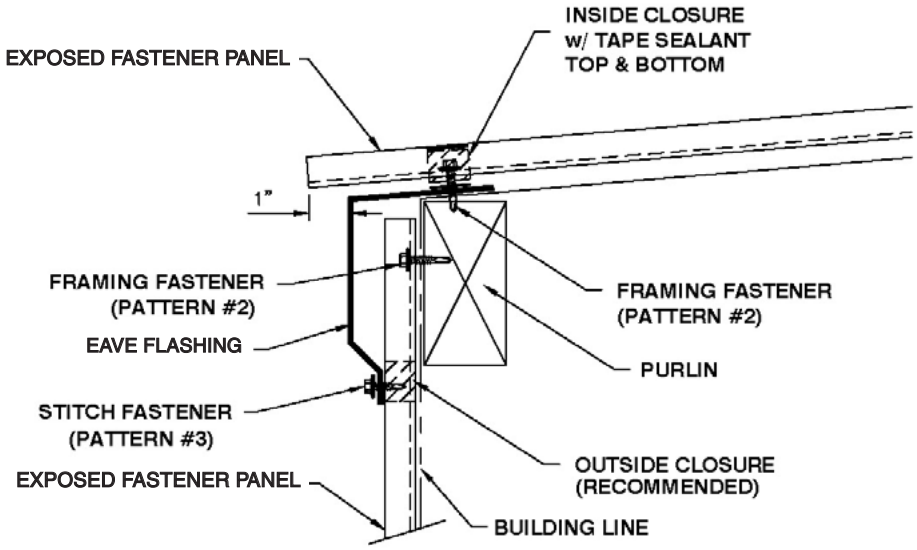
ANGLE

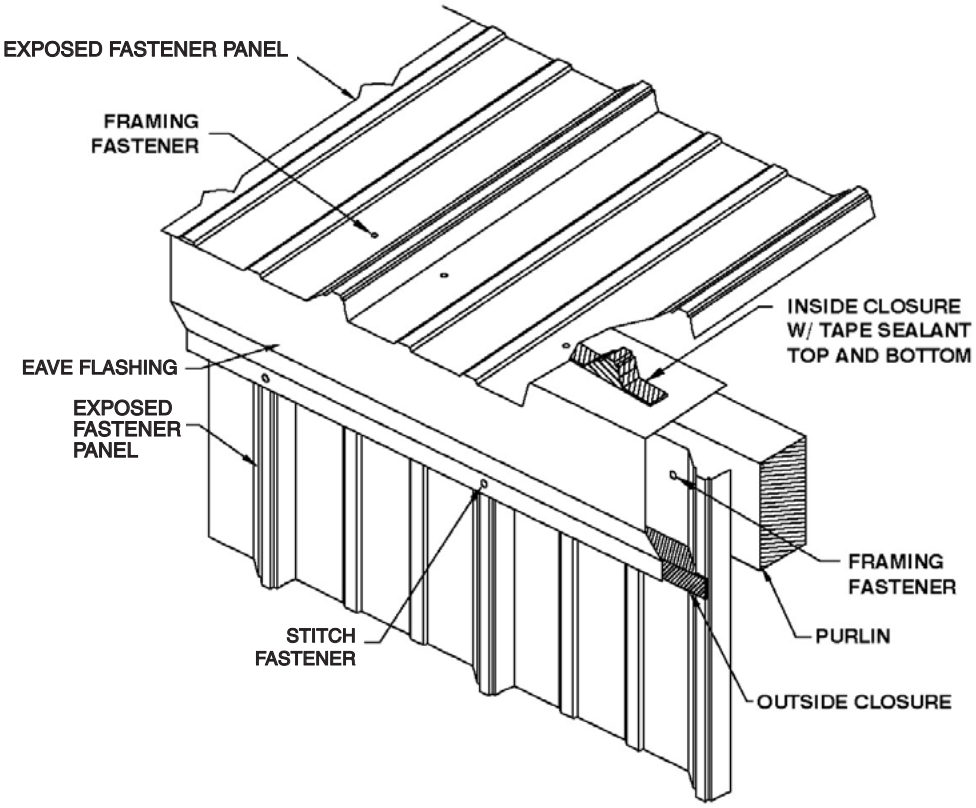




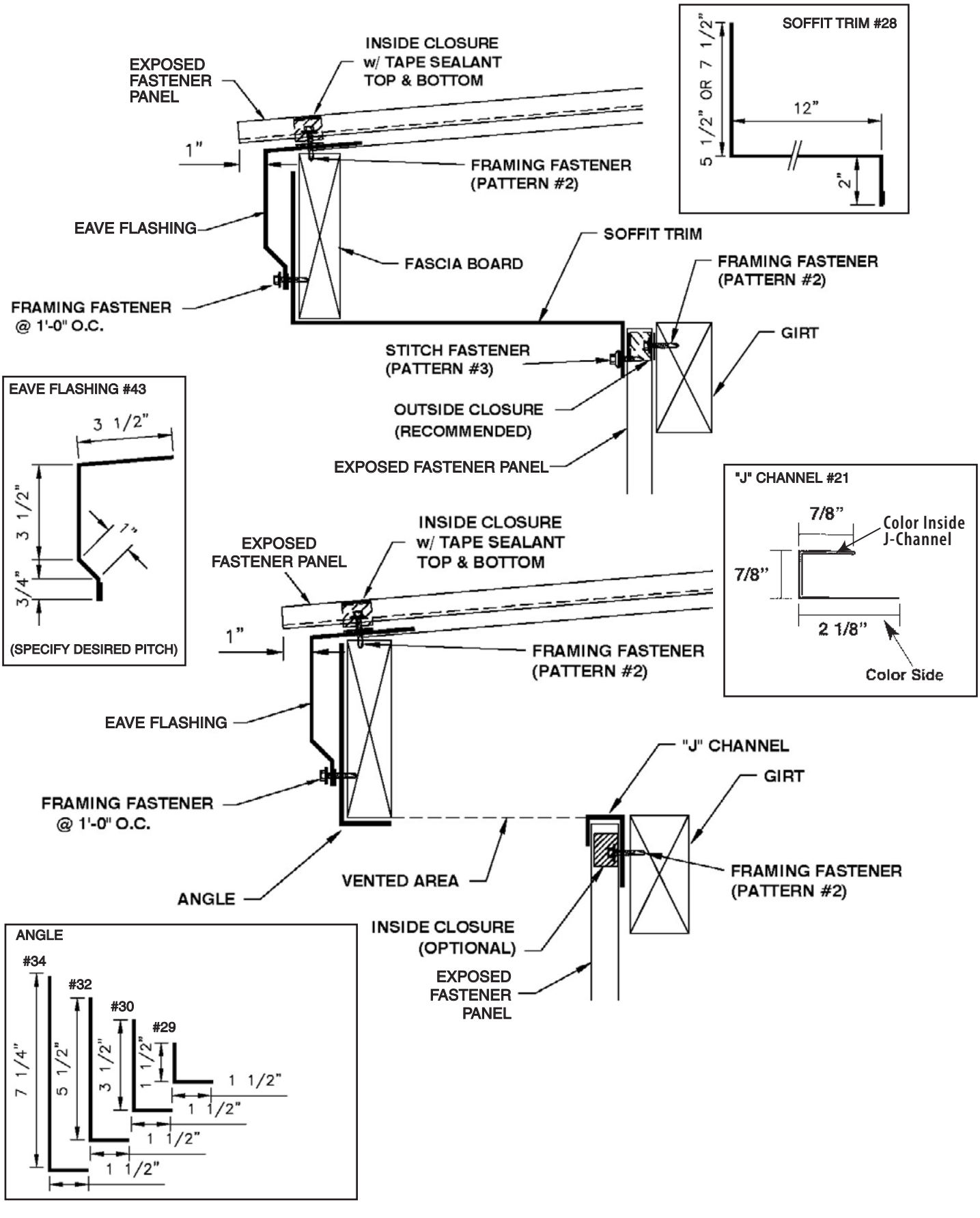
16 EAVE FLASHING DETAIL



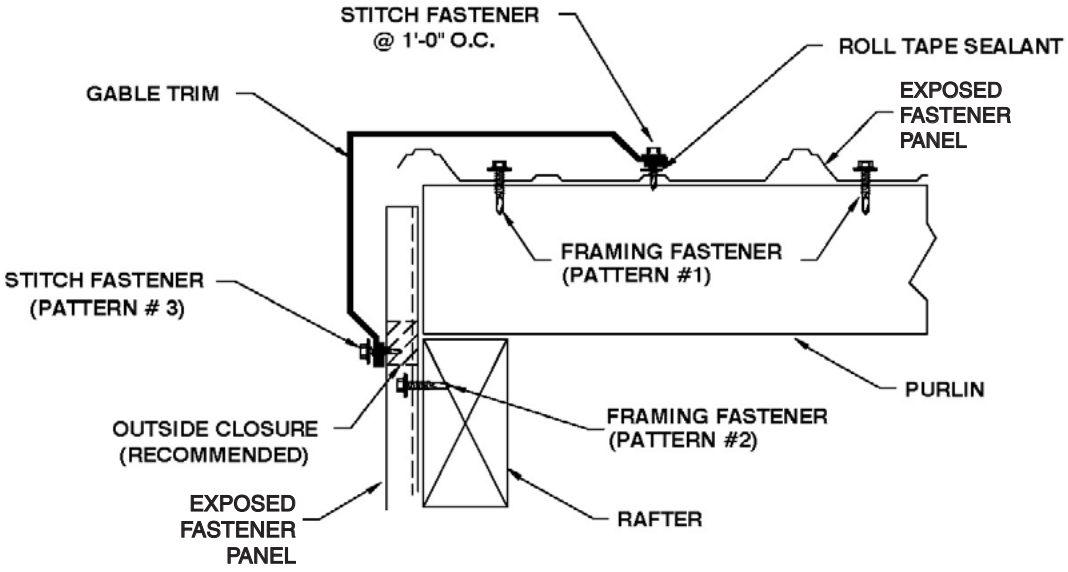


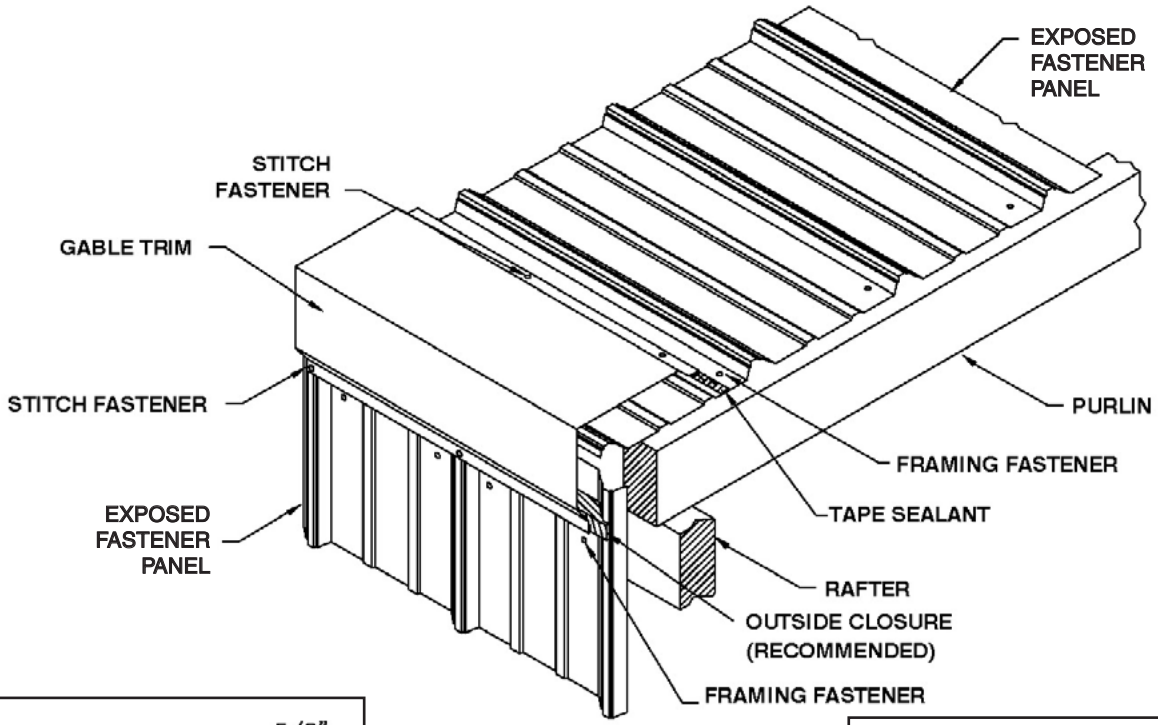


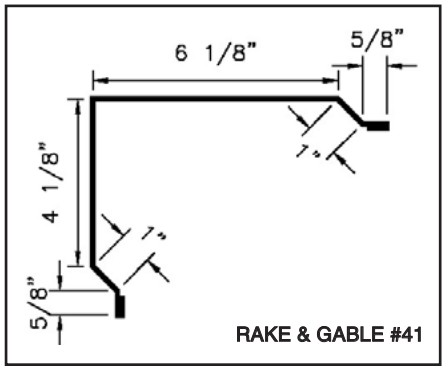
EAVE, SOFFIT, VENTED OVERHEAD DETAIL

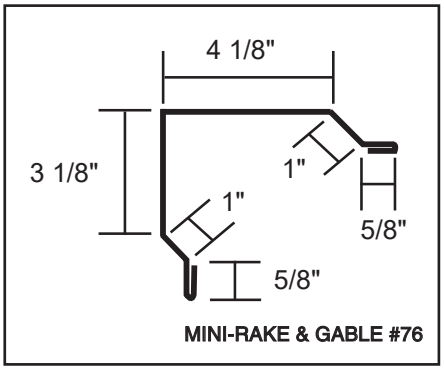


18 *RAKE AND GABLE DETAIL*

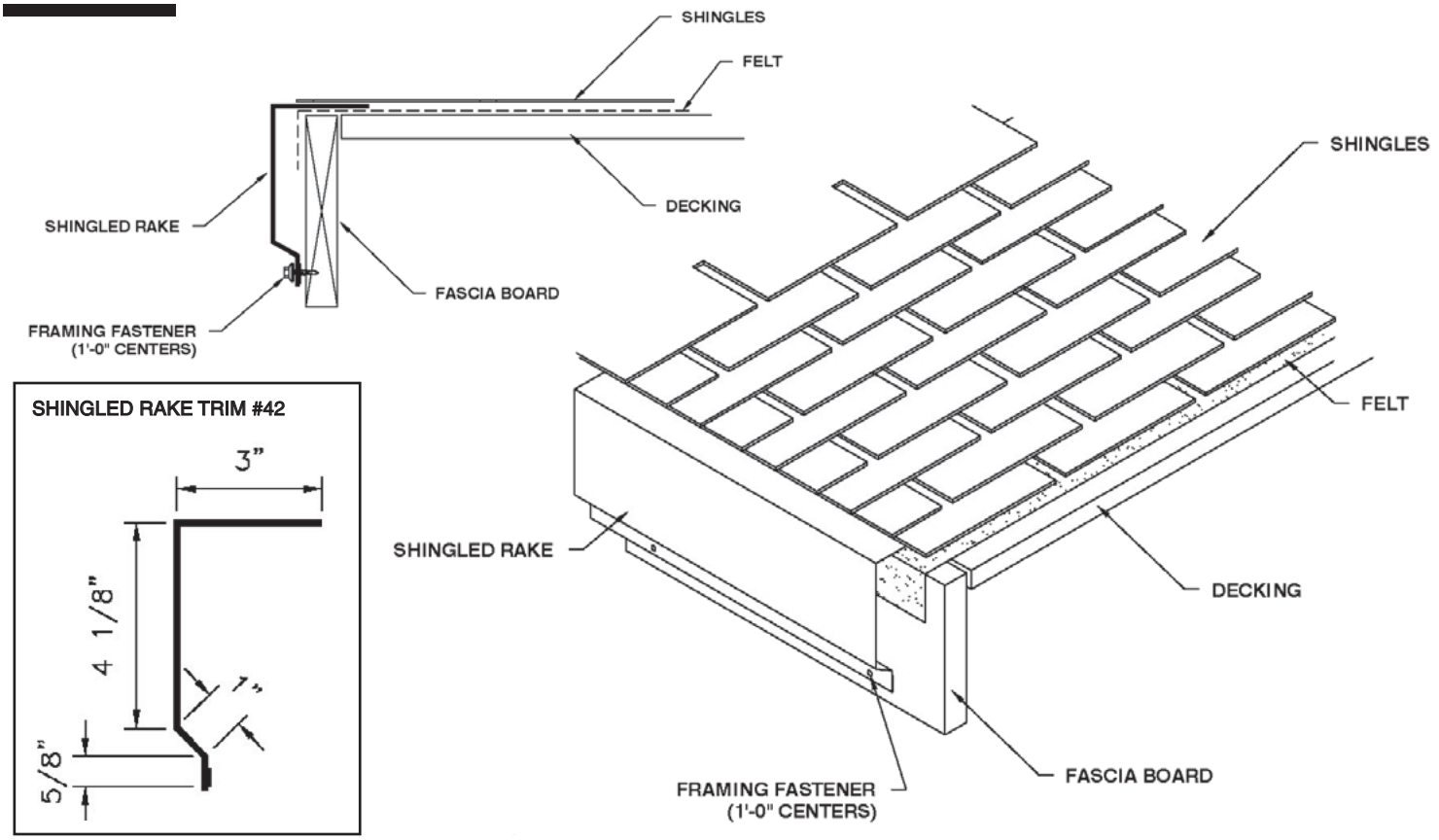




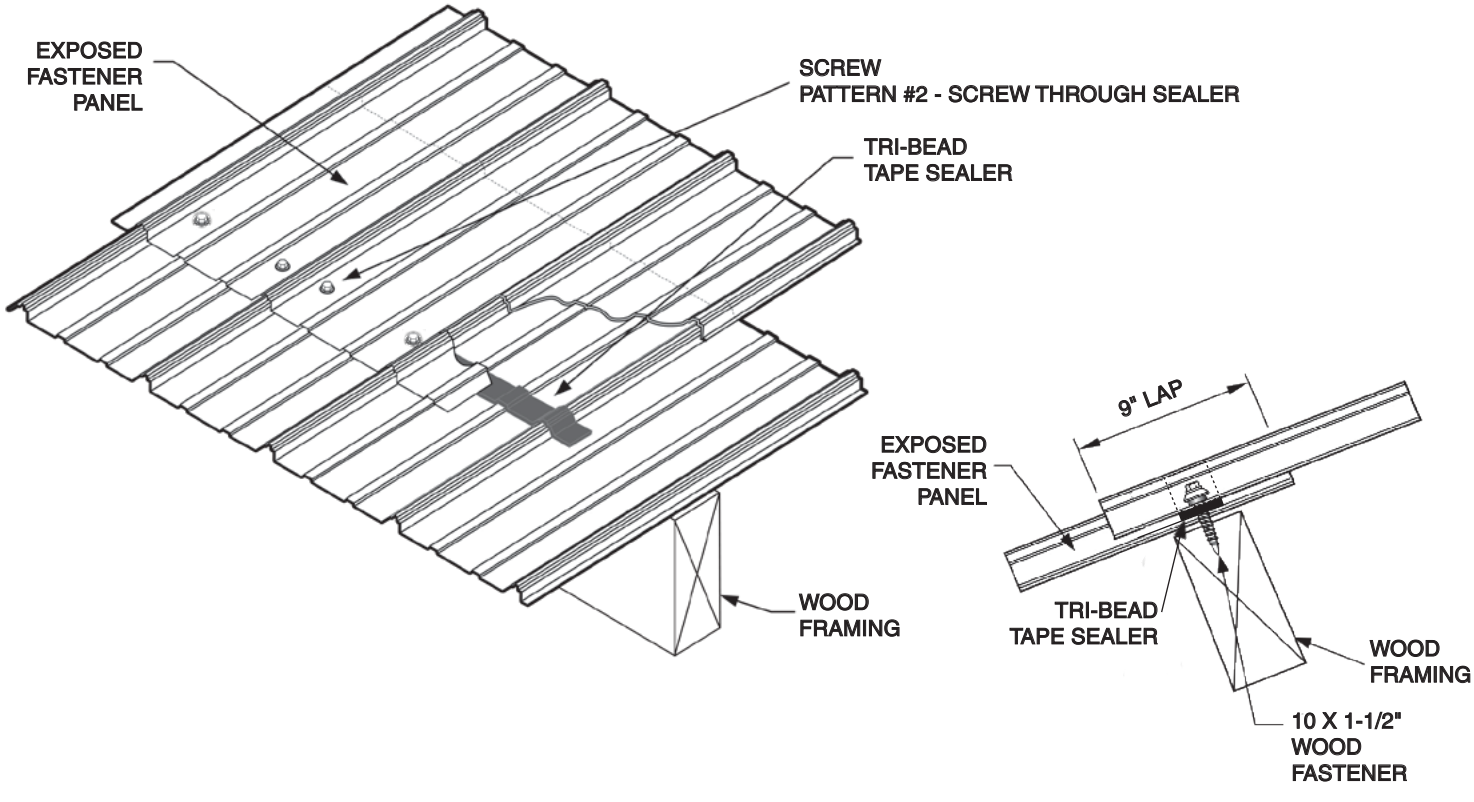




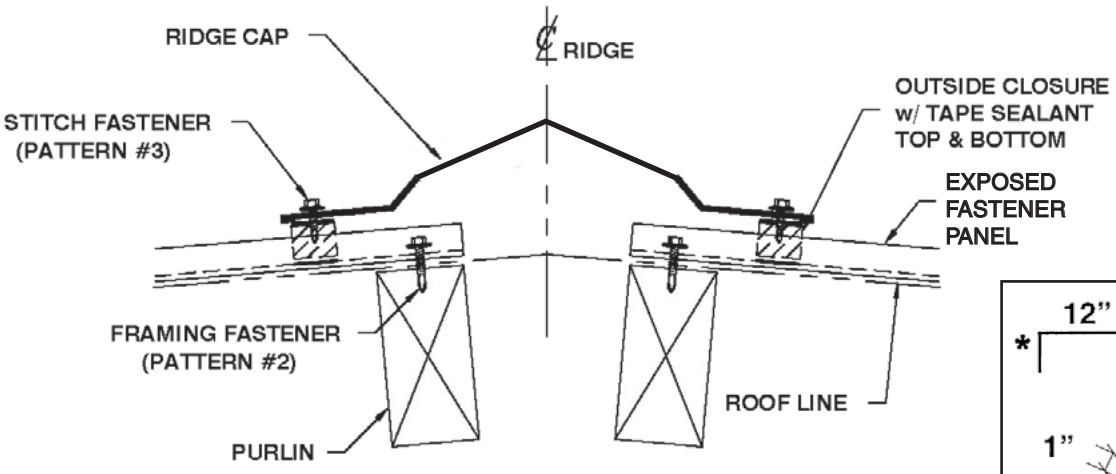
SHINGLED RAKE DETAIL 19

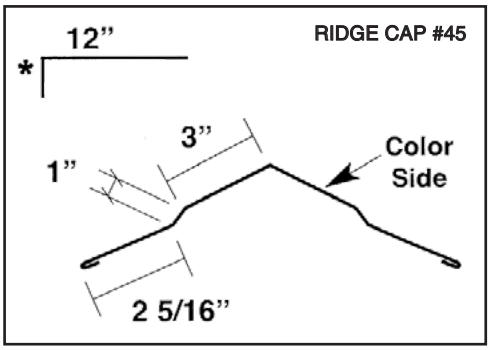


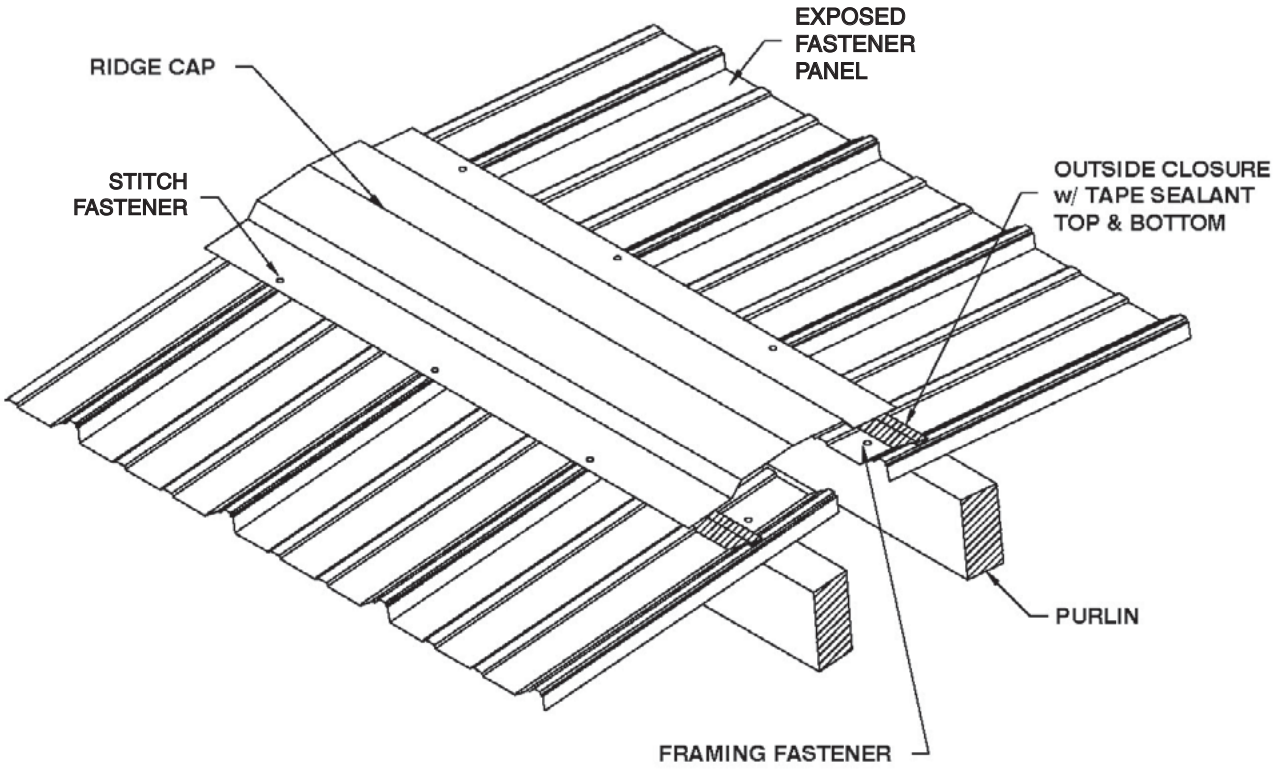
ENDLAP DETAIL

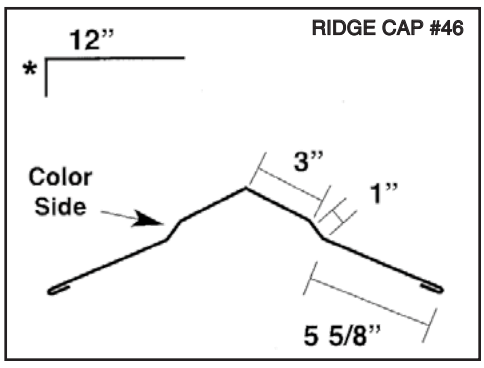


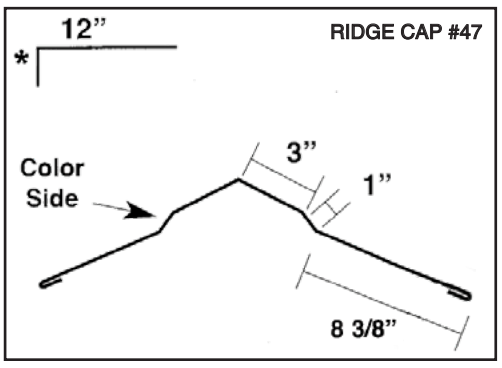
20 RIDGE DETAIL



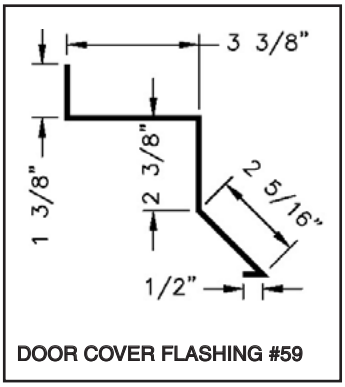




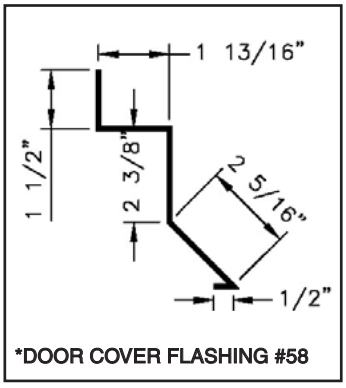




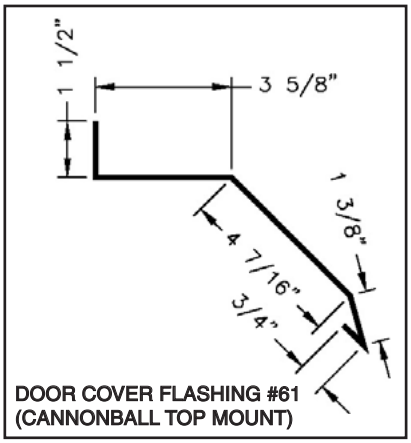
EAVE DETAIL



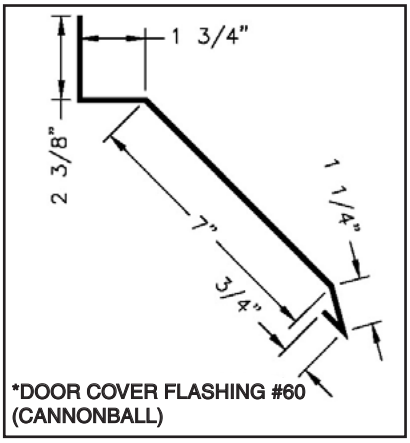
DOOR COVER FLASHING #59



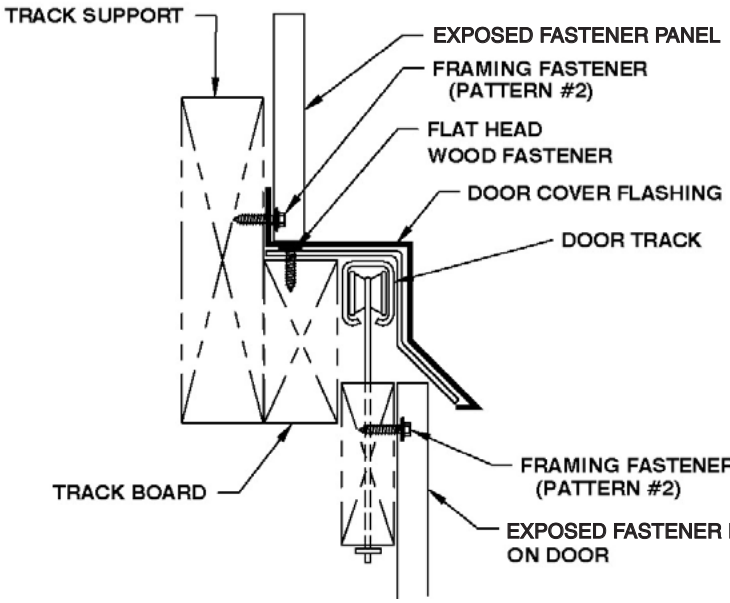
*DOOR COVER FLASHING #58



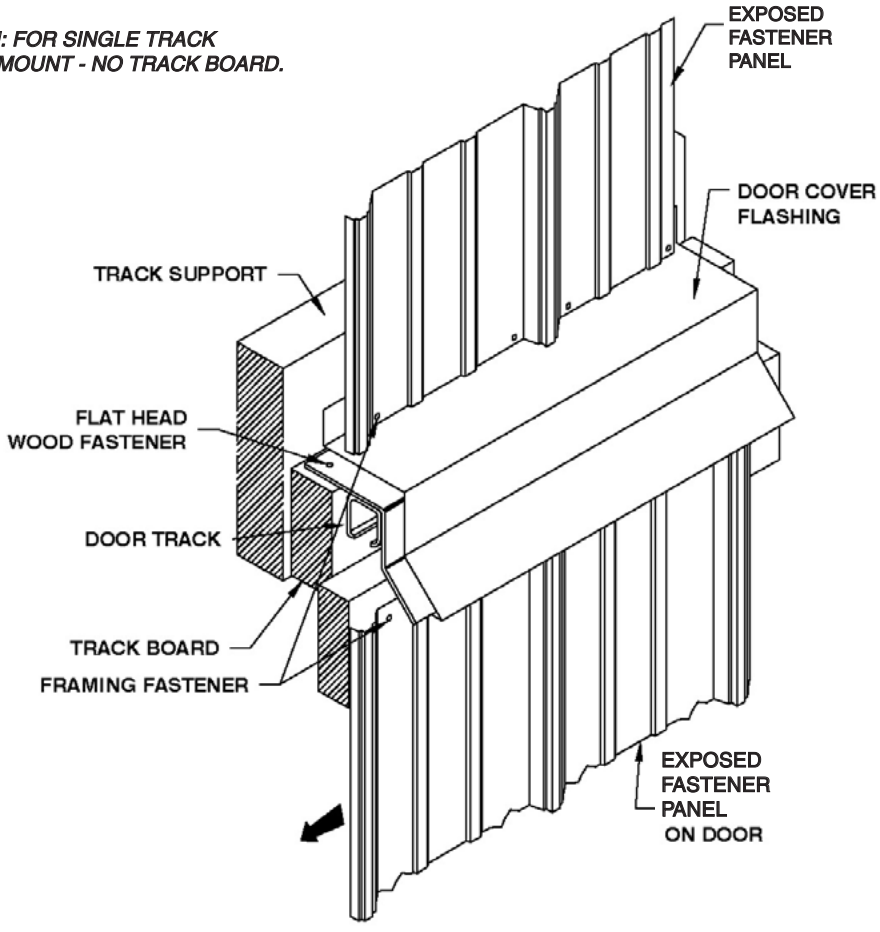
DOOR COVER FLASHING #61
(CANNONBALL TOP MOUNT)



*DOOR COVER FLASHING #60
(CANNONBALL)

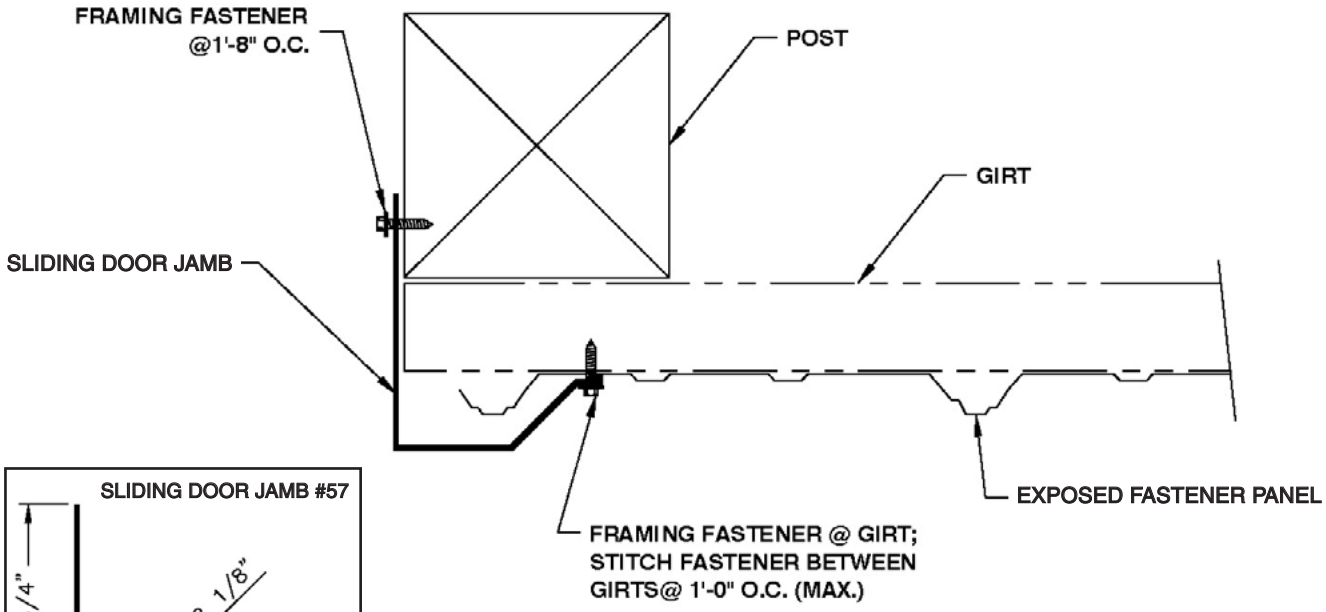


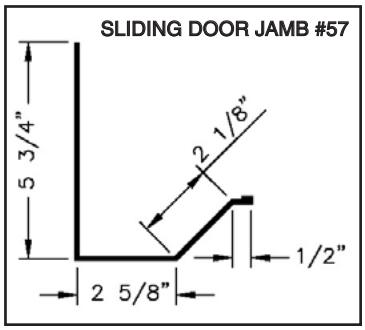
*OPTION: FOR SINGLE TRACK
DIRECT MOUNT - NO TRACK BOARD.

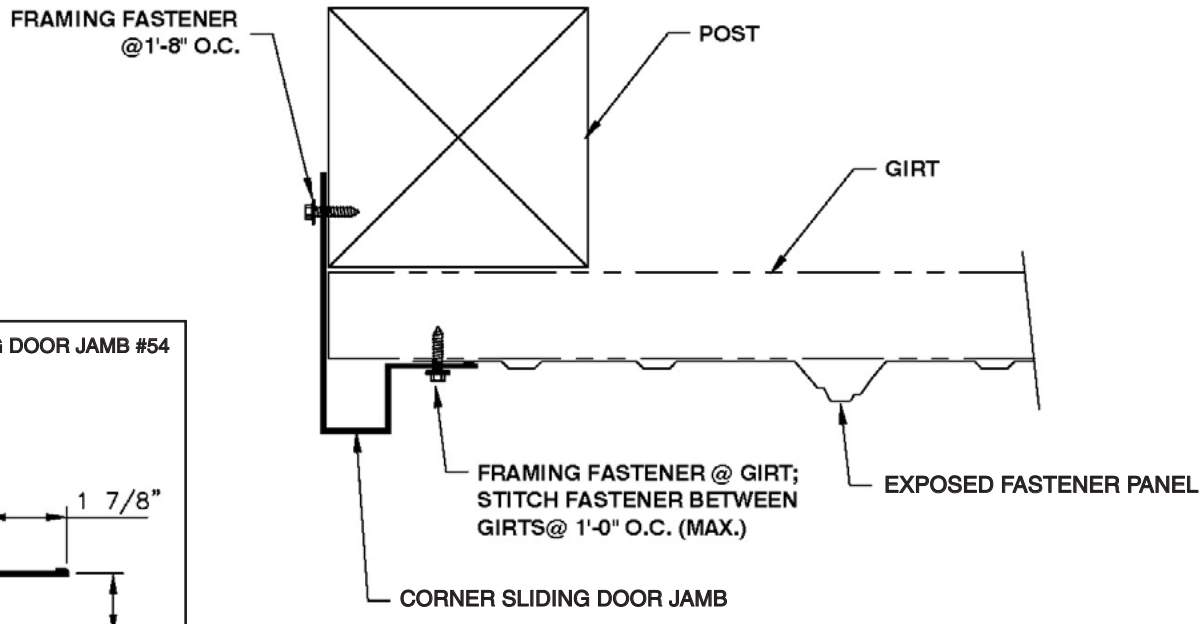


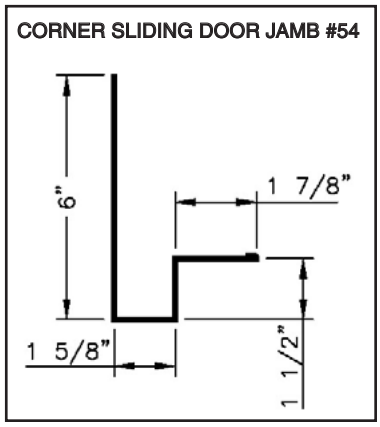
*OPTION: FOR SINGLE TRACK
DIRECT MOUNT - NO TRACK BOARD.

22 SLIDING DOOR JAMB DETAIL

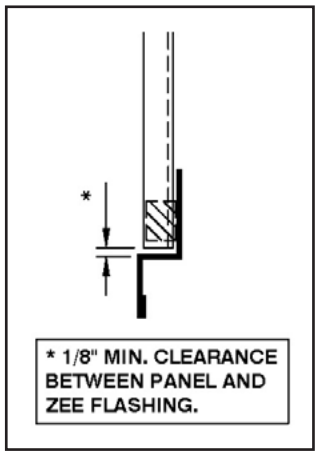


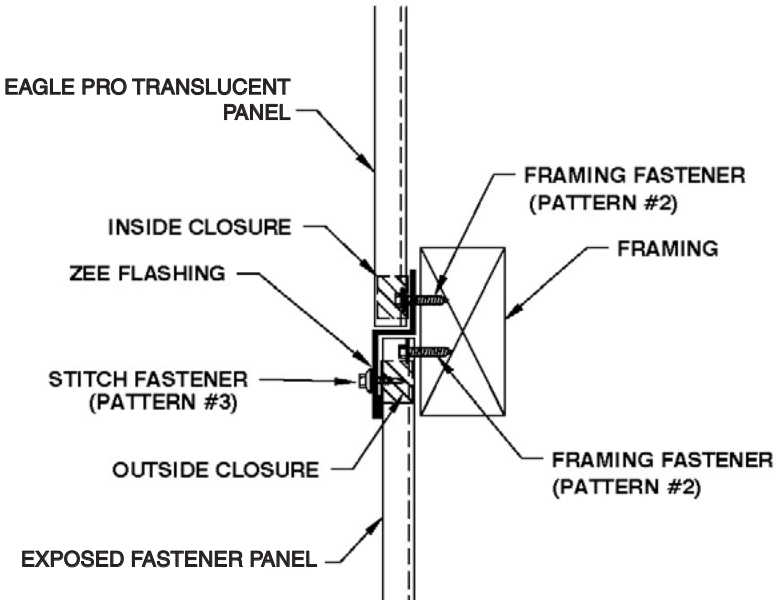


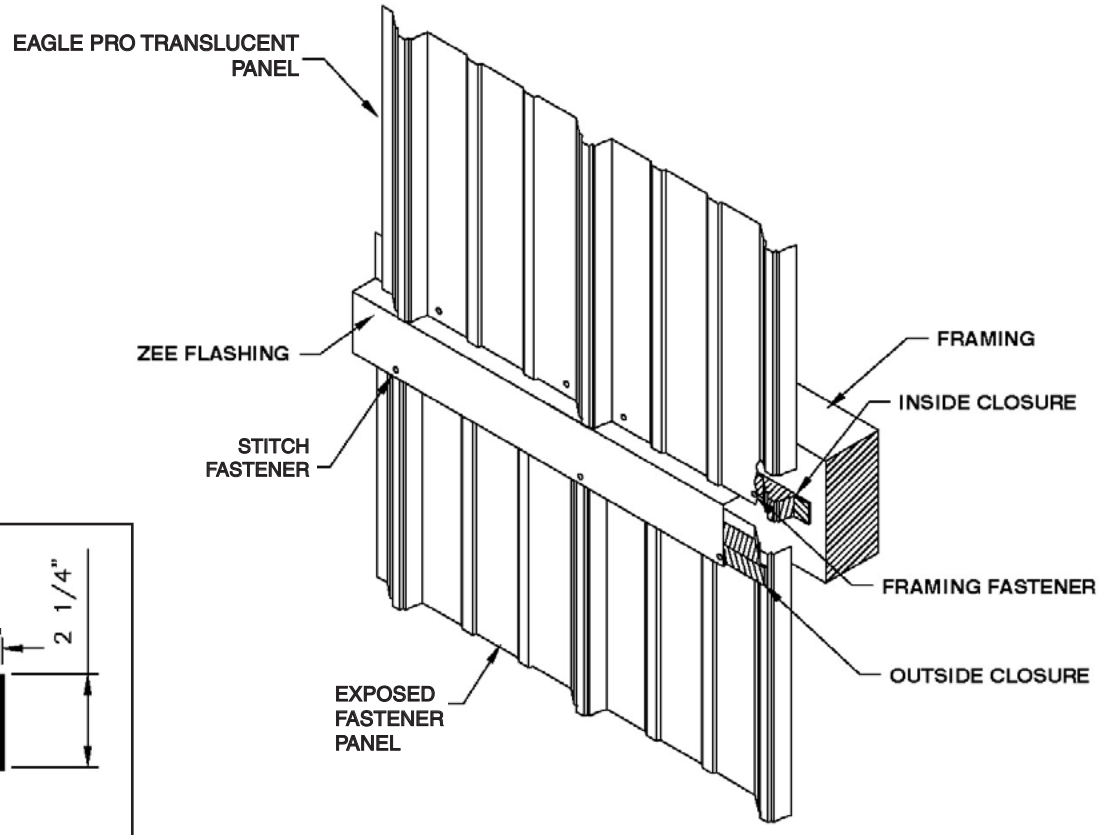


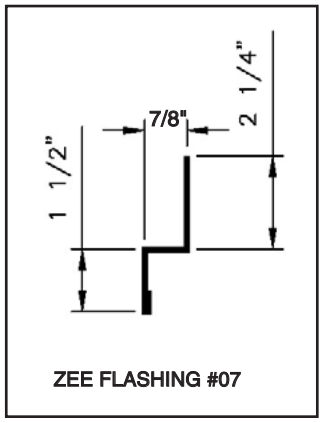


GABLE END/ ZEE FLASHING DETAIL

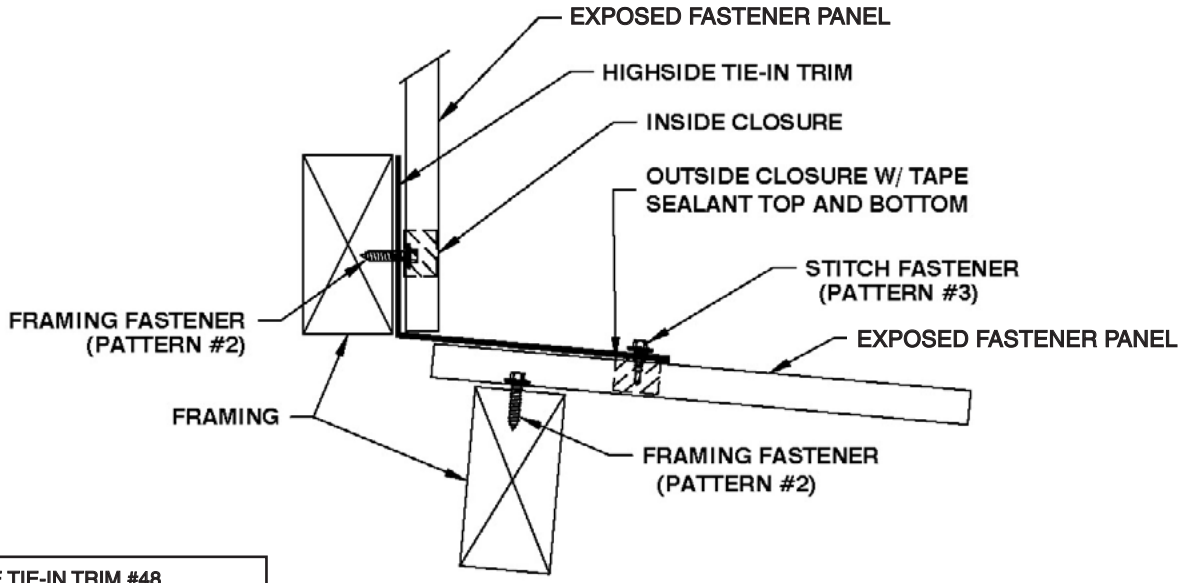


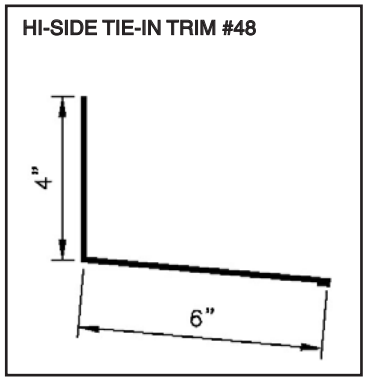


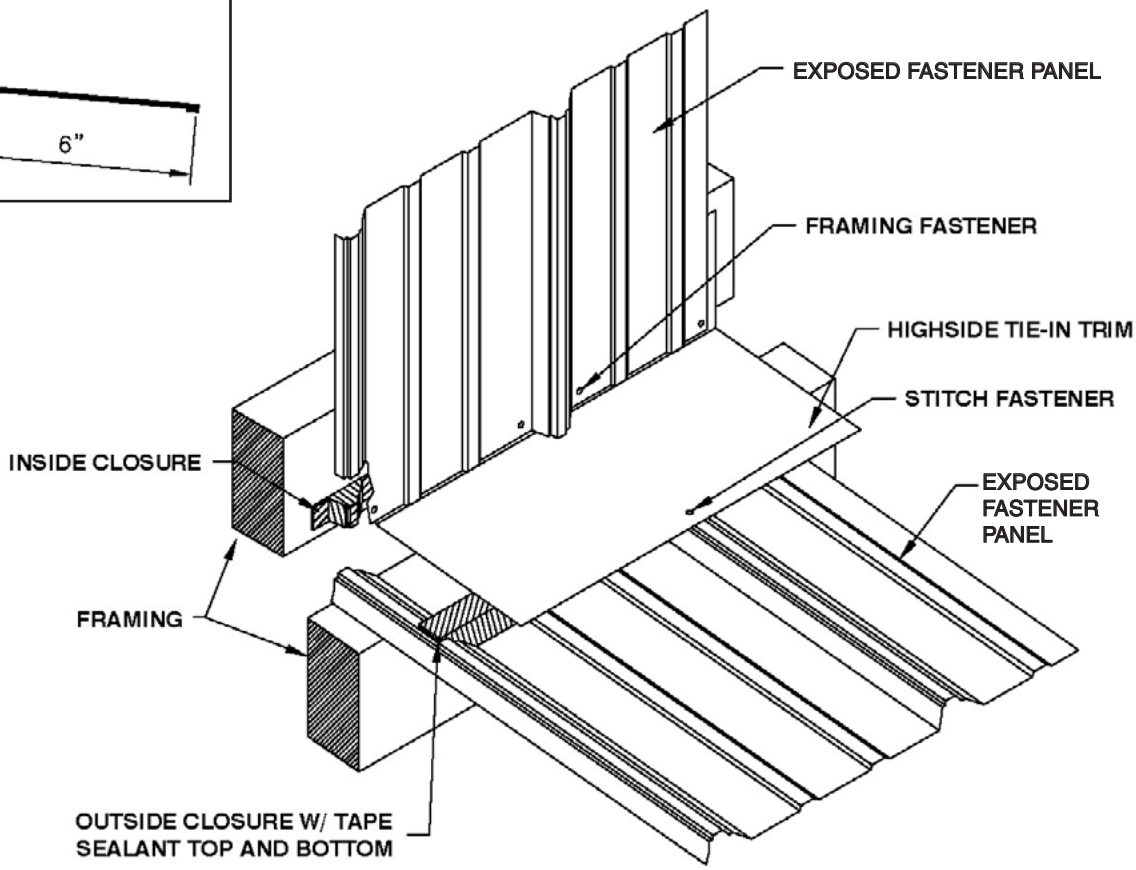




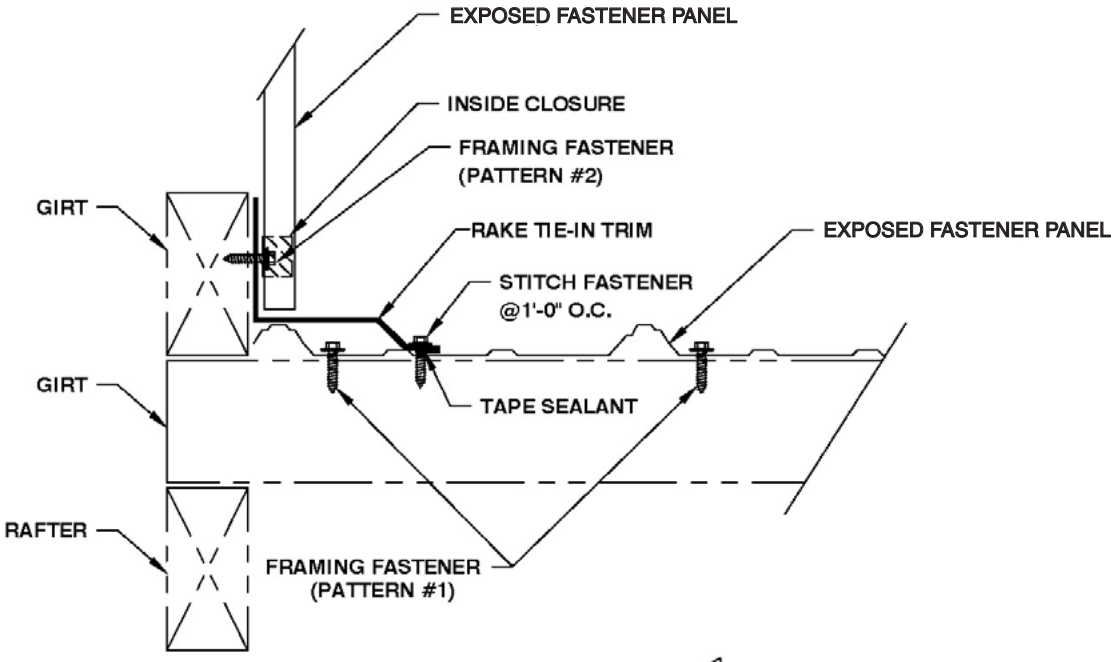
24 HI-SIDE TIE-IN DETAIL

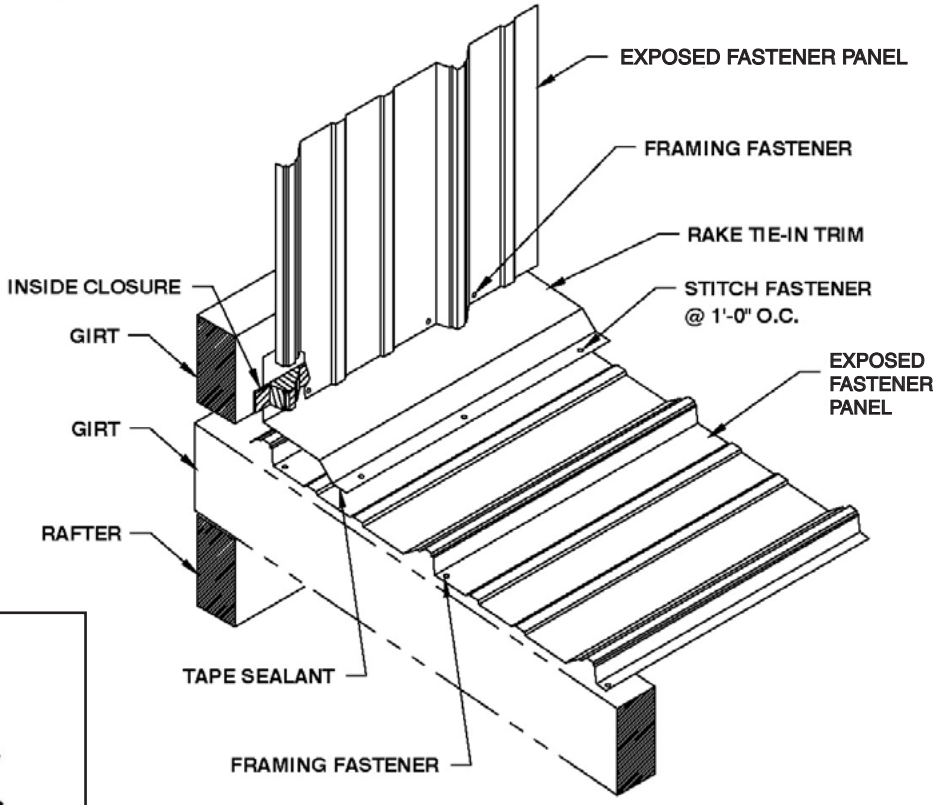


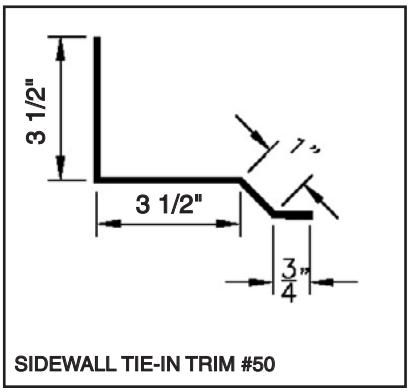




SIDEWALL TIE-IN DETAIL 25

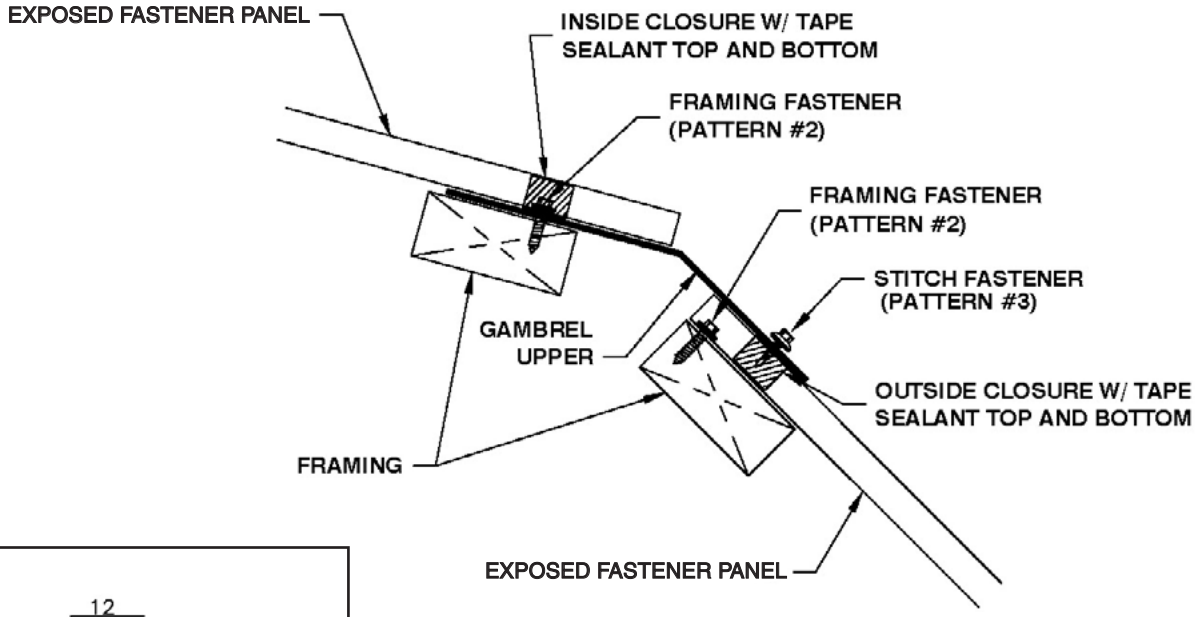


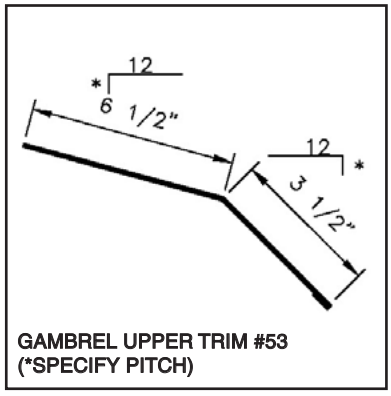




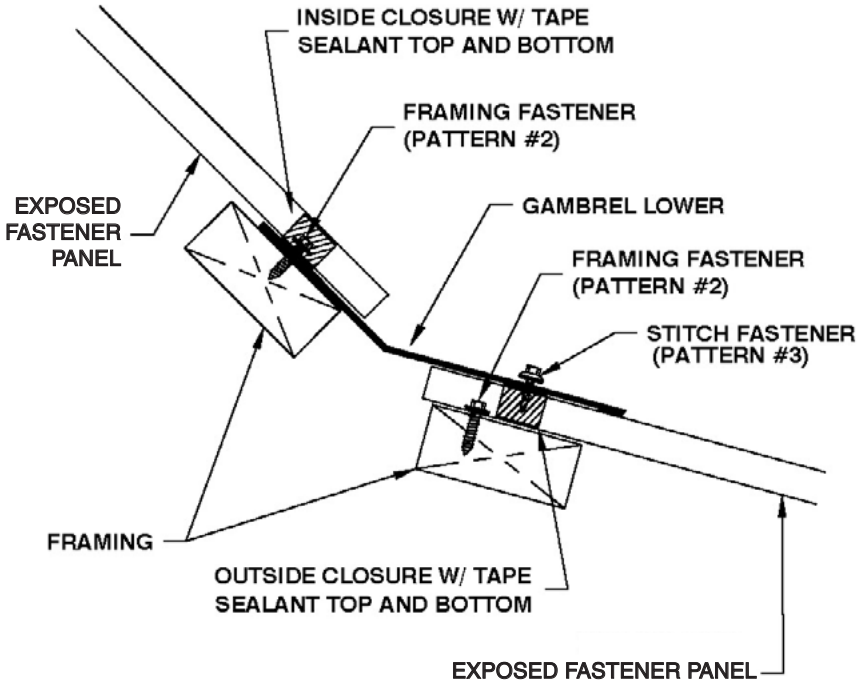
SIDEWALL TIE-IN TRIM #50

26 GAMBREL & TRANSITION DETAIL

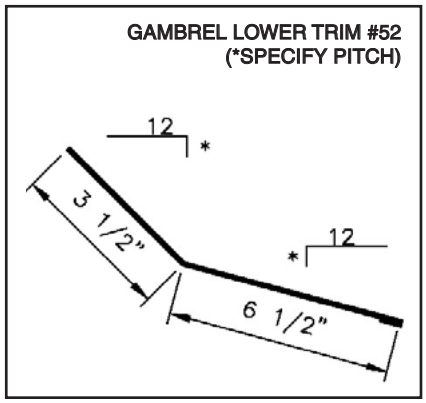




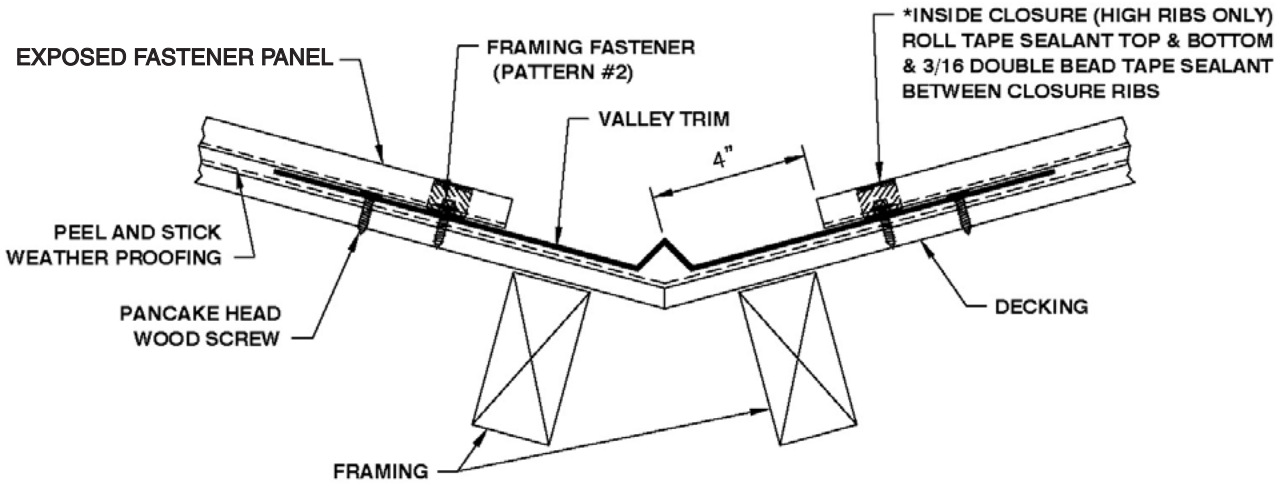
GAMBREL UPPER TRIM #53
(*SPECIFY PITCH)

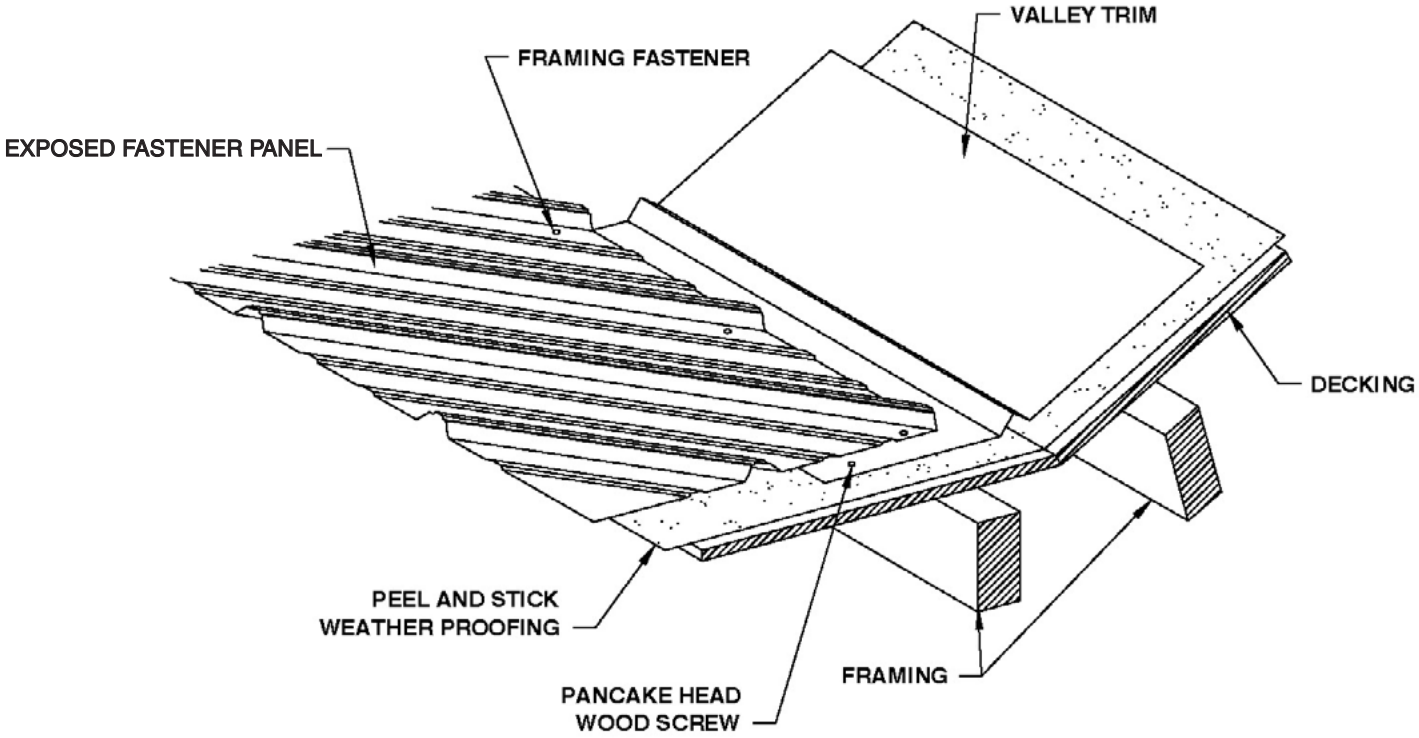


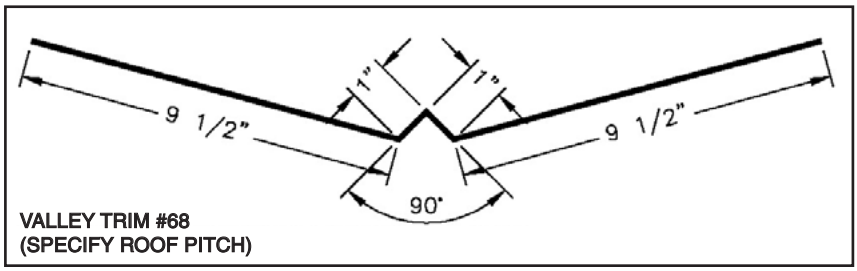
GAMBREL LOWER TRIM #52
(*SPECIFY PITCH)



VALLEY DETAIL 27







VALLEY TRIM #68
(SPECIFY ROOF PITCH)

***NOTE:** USE HIGH RIB OF CLOSURE ONLY! PLACE CLOSURE SQUARE TO PANEL RUN WITH TAPE ON TOP AND BOTTOM. RUN 3/16" DOUBLE BEAD TAPE SEALANT BETWEEN HIGH RIBS FULL LENGTH OF VALLEY.