Installing Eagle Panels

Construction Guide

EAGLE
PANEL SYSTEMS, INC.

IMPORTANT!

Engineering and building code requirements vary widely among jurisdictions. The instructions and drawings in this manual represent typical construction situations. For engineering and code requirements specific to your project, contact your local building code authority.

NOTICE

This manual is not a part of our sales agreement. EAGLE PANEL SYSTEMS MAKES NO WARRANTY OR REPRESENTATION OF ANY KIND, EXPRESSED OR IMPLIED, IN CONNECTION WITH THE INFORMATION CONTAINED IN THIS CONSTRUCTION GUIDE, AND THE BUYER AND BUILDER ASSUME ALL RISK AND LIABILITY RESULTING FROM THE USE OF THE INFORMATION CONTAINED WITHIN. Seller neither assumes nor authorizes any person to assume for the seller any other liability in connection with the use of the information herein and there are no oral agreements or warranty collateral to or affecting this disclaimer. The information contained herein shall not be construed as a recommendation for uses which will infringe on other patents or intellectual property.

HELPFUL TIPS

- Have the crane company or operator visit your building site prior to arrival to check for any unforeseen complications, in regard to site conditions.
- When attaching tongue and groove clad panels leaving 3-4 screws loose on the leading edge of the panel makes it easier to lock the T&G together with the adjoining panel. (3-4 screws on opposite side of panel need to be firmly secured)
- If screws go into structural elements with difficulty try to coat the screw with a small amount of wax or oil product to decrease resistance. (Use products sparingly so as not to stain interior areas of the product).
- Use a drywall square with 1/4" holes drilled according to screw spacing. Place the square across the screw lines of the panel and pre drill 1/4" holes to start panel-fastening screws through the OSB top skin only.
- A 4' folding square is helpful in measuring to points for valley cuts.
- The gap between the OSB skins of the panel can be filled with a flexible adhesive leveled off on top of the spline. This will seal the joint against air passage and reduce the chance of having panel joints show in the shingles.
- After all necessary items are installed fill all voids in panels, wire chases, protrusions, etc. with expanding foam.
- When using OSB/OSB panels seal interior joints of panels with a barrier tape, such as window sealing tape or other, before applying finish material. (many products are available check with you local lumber supplier)
- Using a heavier grade of roofing felt and shingles will result in a flatter roof than lighter materials with less chance of shingle ridging. Always check the manufactures warranty on fiberglass or asphalt shingles. Several manufactures offer a warranty on vented and unvented roof systems. Ice and Snow guards are always recommended. Check local building codes.
- Installation of a whole house ventilation system, such as an air exhanger is strongly recommended. This will insure fresh air in the home as well as decrease relative humidity. Maintain relative humidity between 35 – 40 percent for health and to reduce condensation problems.
- Use approved sealant around all sides of framing material placed into panels.

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INSTALLATION CHECKLIST

- ❑ **Verify that all panels and accessories are off loaded from the truck at time of delivery, checked off and delivery receipt signed by customer or customer representative and returned to driver.**
- ❑ **Final payment and signed copy of the Installation Checklist given to driver before his departure. (any discrepancies in the order should be addressed to Eagle Panel Systems, Inc. office, not to driver or field representative)**
- ❑ **Panels should be stacked on flat level surface with proper sleepers/breakers between stacks and covered from weather elements.**
- ❑ **Panels should be laid out and squared to the structure when beginning to set.**
- ❑ **All panels to be fastened with panel screws provided at 8" o.c. to all structural supports. (unless other specifications are provided)**
- ❑ **Panels should be prepped on the ground before lifting into place (lifting plates secured, screws preset into panel, ample adhesive applied to foam side of tongue). When using T&G panels with 2x splines, place sealant on both sides of spline.**
- ❑ **Verify that panel joints are tight together before securing panel. (i.e. panels can be pulled together tight by using ratcheting straps or other method) being careful not to damage the foam or lamination.**
- ❑ **All joints between panels should be filled completely with expanding foam sealant, before foam sets the OSB splines can be put into place by pushing them through the pre-routed grooves in the foam under the OSB. These splines should be screwed into place at 6" o.c. to each panel (see fastening detail, page 16).**
- ❑ **Apply approved expanding foam sealant full length of all ridges and valleys.**
- ❑ **Panels to be finished around all edges with 2x subfacia boards, foam will need to be recessed for 2x to fit flush with edges of OSB and Tongue & Groove, 2x will attach to 2x structural rafters at ends of Structural Panels.**
- ❑ **All panels must be sealed at eave and gable overhangs with approved exterior grade sealant.**

Eagle Panel Systems, Inc. does not accept returns or give credit for panels, due to deviations from approved panel plan.

Signature: _____ *Date:* _____

(signing above verifies that you have received Eagle Panel Systems Installation Manual and standard installation details.)

P.O. BOX 247 * 127 NORTH MAPLE • MULBERRY GROVE, IL • 62262
PHONE: 1-800-643-3786 • FAX: 1-618-326-8620
e-mail: eil@eaglepanelsystems.com

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Approved Sealants

Proper sealing of Eagle Panels is critical to their performance. Use of improper sealants can reduce the energy efficiency of your Eagle Panel System installation and may affect its structural performance. Always use caulks, adhesives and tapes that are intended for use with Expanded Polystyrene (EPS) and OSB. Avoid products with high silicone content because the silicone reacts with EPS. See the list of approved sealants below when choosing products that are not supplied by Eagle Panel Systems. If you use any elastomeric adhesive other than those listed below make sure they are safe for use with Expanded Polystyrene. Test on a small piece of foam board before applying to the panel to be sure it does not deteriorate the EPS core. If you have further questions about sealant use, please contact our office.

PRODUCT NAME	MANUFACTURER
QB-300	OSI
Green Series Multi-purpose adhesive	OSI
PL-300 foam board Adhesive	PL
PL-300 Low VOC	PL
Green Choice heavy Duty Adhesive	Titebond
Heavy Duty Adhesive LOW VOC	Titebond
Solvent Free Construction Adhesive IFCB5	Titebond
Handi Stick	FOMO Adhesives
Great Stuff Gaps & Cracks	Dow Chemical
Enerfoam	Dow Chemical
Enerbond	Dow Chemical
Pur Fill	Todal Products

1 General Information

About this Guide

Welcome and thank you for choosing Eagle Panel Systems for your project! We are confident you will be pleased with our products. This guide is provided to help you install Eagle Panel System products safely and efficiently. We encourage you to read this guide completely before your panels arrive at your building site. An understanding of the panel installation process will help in estimating material, labor, tool and time requirements for your job.

This guide is intended for homeowners and builders installing Eagle Panel System panel products only. It is not intended as a general guide for structural insulated panels.

Panel Uses

Eagle Panel System products are designed for use in roofs and exterior walls in both structural and non-structural applications. Eagle Panels are especially suited to log and timber frame construction where their installation procedures as well as interior finishes complement the construction methods used for log and timber walls and roof systems. **Eagle Panels are not suitable for below grade use!**

Panels are not suited for all types of construction (please contact Eagle Panel Systems for further information about specific applications.)

Panel Sizes

Panels are available in sizes ranging from 4' x 8'to 4' x 24' in 2' increments and thicknesses ranging from 4" to 10"nominal thickness.

Panel Components

The components in Eagle Panels vary with the type of panels purchased. All panel types can include some or all of the following:

- **Expanded Polystyrene (EPS) foam core**
- **7/16" OSB sheathing**
- **1/2" Drywall**
- **3/4" Eastern White Pine Tongue and Groove (T&G)**
- **2x Dimensional Framing Lumber**

Panel Types

Eagle Panels are available in a variety of configurations. **Clearspan Integrated Structural Insulated Panels (ISIP®)** are designed for use in structural applications. Unlike many SIP products, Clearspan Panels incorporate dimensional lumber framing at standard spacing. **Stress Skin Panels** consist of 2 structural skins laminated to a core of EPS foam. Stress Skin Panels do not include dimensional lumber framing. **Nailbase Panels** consist of EPS foam with OSB sheathing laminated to one side. Nailbase panels are designed for non-structural applications where superior insulating ability is desired.

Tool Requirements

Some tools may be provided with your Eagle Panel Systems package. However, you will need to provide some tools and materials. Review the tool requirements to be sure you have needed tools onsite when your shipment of panels arrives at your site.

Customer Furnished Panel Installation Tools And Labor

- Crane or Other lifting device –Used for offloading panels from flatbed tractor-trailer to staging area at site, and for lifting panels into place on the roof and or walls. (see About Cranes on page 3)
- 2 Experienced carpenters with 2 helpers usually works best with 1 carpenter and helper on the roof and 1 of each on the ground.
- Gas Powered Chain Saw (24" bar recommended for most projects)–Used in conjunction with a panel cutter plate for cutting angles, valley cuts, pitch cuts, etc.
- Screw Guns or Cordless Drills –Must be capable of turning 1/4" diameter screws into structural material, i.e.: 2x's, logs, heavy timbers, etc.
- Foam applicator gun –Supplied with expanding foam sealant as part of the roofing system from Eagle Panel Systems.
- Caulking gun –Standard caulking gun to apply adhesive or caulk to joints as specified.
- Ratchet Straps –2"-3" wide 20'–35' in length (2 minimum) used for holding panels together and in place while attaching to roof structure. (3 are supplied with the installation kit if purchased from EPS) for larger projects more may be needed for ease and speed of setting different locations of the roof simultaneously.
- Tarps –large enough to cover all panel bundles in case of inclement weather.
- Adhesive caulk/sealant based on your specific needs (calculated and supplied by owner or contractor.)
- Inexpensive metal drywall square for marking and pre-drilling pilot holes for panel screws.
- Several 1/4" drill bits for drilling pilot holes for panel screws.
- Sub-fascia boards and Valley Lumber –Lumber to be calculated and provided by owner/contractor.
- Toe boards –2x lumber that can be fastened to the panels to allow for safe walking on the panels.
- Screws –#6 or #8 x 1-1/4" coarse thread coated screws (such as ceramic or zinc coated) to attach OSB splines to panels (calculated and supplied by owner/contractor). Drywall screws are not acceptable.
- All other standard carpentry tools may apply based on site conditions.

Eagle Panel Systems Installation Kit

Unless you decline, your Eagle Panel System will include an Installation Kit that includes specialized tools for installing your panels. This kit includes:

- Panel Cutter Plate –Guide that attaches to the bar of a Chain Saw to allow for guiding of straight and angle cuts up to 75 degrees.
- Electric Foam Scoop –Electric element with adjustable depth cutting up to 5", used for cutting foam core of panels to receive sub-fascia, valley lumber, wall studs, etc.
- (4) Lifting Plates –Used to attach to panels to lift them into place. (See pg. 11 Figure 3 for placement and attachment guidelines).
- Package of Screws & Driver Bit –Used to attach lifting plates (Note: be sure not to over-torque screws).

- (3) Ratcheting straps –Used to pull panels together to ensure proper fit of the system.
- (2) 6’ lifting Straps
- (2) Lifting shackles to attach lifting plates to crane straps.

Installation Labor Requirements

Panel installation is best accomplished by a crew of four or more with at least two experienced carpenters and two helpers (this depends mainly on the complexity of your roof structure). Additional workers will speed installation. One carpenter and helper (roof personnel should be comfortable maneuvering on your size and type of roof) are stationed on the roof with proper safety equipment while the other carpenter and helper remain on the ground. The roof crew takes measurements and relays them to the ground, and receives and fastens panels. The ground crew does layout and makes any necessary cuts and prepares panels (using measurements from the roof crew) and secures them for lifting.

About Cranes

Most roof panel installations will require a lifting device. The best lifting device for Eagle Panels is a crane or large boom truck although other lifting devices such as extendable boom forklifts can be used if conditions allow. The crane size depends on the specific site and job conditions. The crane must have sufficient size and reach to lift the panels and maneuver them over the entire roof area. It is best to have the crane operator visit the site to verify distances and confirm size and accessibility for the crane. (Lifting device should be capable of lifting 5,000 lbs from truck and 1,000 lbs at the maximum extent of reach).

Fastening Panels

All Panels need to be fastened with the screws provided at all supports 8” on center or by specific details as per panel layout type and configuration. (Please refer to the construction details.) Note: Screws are easier to start into the top skin of the panel while on the ground. (see Helpful Tips section)

Panel screws should have a minimum of 2” of penetration into a structural member at all connection points.

Panels should be slightly overcut at the ridge so you can seal the ridge completely with foam sealant. Fill all voids entirely from interior edge to exterior.

When attaching panel to panel all splines should be attached with #6 or #8 1-1/4” screws or 8d common nails 6”-8”o.c. (ceramic or zinc coated screws recommended, Dry wall type screws are not acceptable).

Adhesives

Adhesive is provided in the materials from Eagle Panel (when required as part of your system for tongue and groove connection only).

T&G panels have adhesive applied to the tongue of the panel to help minimize the effects of expanding and contracting of the T&G.

You may elect to use construction adhesive or other approved sealant (see pg. VIII Approved Sealant List) at the joints of the panels between the outer OSB sheathing, either to fill voids or as added air infiltration protection.

Sealant

THIS IS THE MOST IMPORTANT STEP IN INSTALLING AN EFFICIENT ROOF SYSTEM.

Expanding Foam sealant and applicator are provided by EPS as part of your system

All connection joints, including ridges, valleys and other panel connection areas of the panel system must be sealed by filling the entire void between the panels, with expanding foam sealant provided with your system.

Seal the panels at all wall lines and ridge at interior and exterior sides with a quality grade of exterior caulk (calculated and supplied by owner/contractor), see detail drawing on page 13.

IMPORTANT!

Foam sealant has a very high expansion rate and should not be used in areas subject to warping or bowing, i.e. windows and door frames, etc.

Vapor Barriers and Ventilation Requirements

Vapor or moisture barriers are required under all roofing materials, (refer to the manufactures recommendations when installing roofing material). Ice and water shield should be installed around perimeter of the roof system.

- Vapor Barriers for wall systems are not required for their use as an air infiltration or thermal barrier, however they are highly recommended for the moisture resistance protection and ability to limit mold growth. You may also use 30 lb. builders felt.

Ventilation of panels systems is not required because of the closed nature of the system. There is no atmosphere inside the panels to vent, however you may need to vent the actual roofing material especially if it is metal roofing (refer to manufactures recommendations). With asphalt/fiberglass roofing materials you may want to check their warranty on products applied to Structural Insulated Panels. For products which carry full warranty you may contact our office for further information.

Preparing For Delivery

Site Requirements for Delivering Panels

- Eagle Panel Systems, must have accurate directions to your jobsite prior to shipping in order to deliver your panels on schedule.
- Be sure there are no truck restrictions, i.e. length, weight, height etc.
- Please provide contact numbers of someone who will be onsite (drivers typically contact someone the day before delivering panels for confirmation and final instructions)
- Final Payment. A check for the balance of your order must be collected by the delivery driver before offloading material (unless prior arrangements have been made with Eagle Panel Systems).
- Most panel deliveries are made on full over the road semi-tractor trailers.
- Your jobsite must be accessible with ample room to maneuver the truck, including the ability to turn around or drive in and out without backing up. Final determination of accessibility is up the driver.
- Eagle Panel Systems, is not responsible if truck is not able to get into and out of the job site in a safe manner. In the event that driver deems the jobsite inaccessible, the customer is responsible for finding a place to properly offload the delivery in a timely fash-

ion and providing offloading equipment and labor.

- If you have questions as to the accessibility of your project, please contact our office personnel to help you.
- Ideal site conditions allow the truck as close to the offloading device as possible and in close proximity to staging area. (See About Cranes on page 3.) Panel stacks are 5,000 lbs. or less depending on the size of the panels.
- Panels are loaded on the truck for best fit, not in any specified order as to how they are installed on the structure.
- Check that all of the items to be supplied by Eagle Panel Systems, are offloaded from the truck and sign the drivers load sheet.
- Check for Damage of material, note on drivers paper work and call office personnel with any discrepancies or problems. Eagle Panel Systems is not responsible for damage to panels during offloading, storage or erections of the panels.
- Sign the Driver's invoice and the Installation Checklist on pg. VII unless you have a field training rep on site during installation. Your rep will explain in detail and have you sign the checklist.
- Designate a staging area. Stack panels as close as possible to the construction area to reduce handling. When stacking panel bundles refer to your panel plan to locate bundles where they will be most accessible. Stacking panel bundles over two high is not recommended.

Limited Access Sites

We have delivered panels to job sites all over the country. With a little planning your delivery can be successful too! Here are a few suggestions on how to get panels into your job if you have limited access.

First check what type of truck or truck/trailer can get into the jobsite

Identify an area as close to the site as possible where you can park the semi-tractor and trailer to off load.

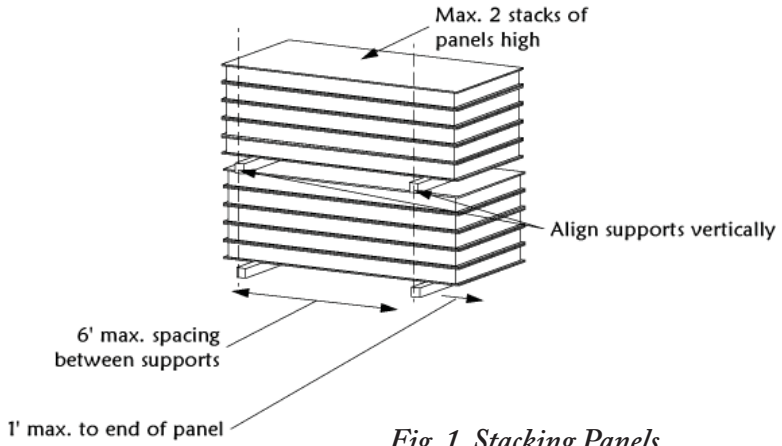


Fig. 1 Stacking Panels

Use crane or fork lift to off load onto smaller truck or truck/trailer

You must allow more time for delivery and offloading of panels. Excessive off loading time may incur additional charges.

Eagle Panel Systems must be notified in advance if this process is necessary to allow for proper truck scheduling.

Storage and Protection

Panel need to be supported every 6 to 8 feet under their entire width. When stacking multiple bundles place supports directly above one another.

Panels must be stacked as level as possible when offloaded.

Panels need to be covered with heavy tarps to protect them in case of inclement weather, (tarps are to be supplied by owner/contractor).

Pre-Delivery Checklist

- ❑ Delivery directions with jobsite contact phone number sent to Eagle Panel Systems (at least two weeks prior to scheduled delivery date.) This information is filled out from the Acknowledgement Package you received.
- ❑ Truck access verified (ability to either turn around or drive through without backing up a full-sized tractor trailer --approximately 80 feet)
- ❑ No bridge restrictions or limiting curves
- ❑ Accessible alternate staging area if jobsite is not accessible
- ❑ Road surface suitable for all-weather access.
- ❑ Offloading equipment (crane or forklift) scheduled
- ❑ Offlloading labor scheduled
- ❑ Heavy plastic sheeting or tarps sufficient to cover panels completely
- ❑ 2x or 4x dunnage to stack panels level above ground
- ❑ Payment for balance of order made out to Eagle Panel Systems

Post-Delivery Checklist

- ❑ Panels stacked well above ground, level and no more than two bundles high
- ❑ Panels positioned as close as possible to their installed position
- ❑ Panels protected from weather by tarps
- ❑ Payment for balance of order given to delivery driver
- ❑ Panel stacks arranged with first panels to be installed in most accessible location
- ❑ Panel stacks clear of area where crane needs to set-up.
- ❑ Panel order inventoried against order and delivery list
- ❑ Damaged panels or shortages noted on paperwork
- ❑ Contact Eagle Panels directly about shortages or damage

2 Installation Basics

Before You Begin Installing Panels

- Verify that logs and framing are to plan dimensions
- Log and timber installations require that all logs or timbers in the roof system be in place with any beveled members cut to the right pitch
- Verify the desired overhang dimesnions with plans and panel layout
- Make sure all bracing is in place.
- If possible start installation immediately following your delivery. This will allow your field representative to advise you in getting started.

Work Flow

An organized workflow is essential to achieving a safe, efficient and quality installation of your Eagle Panel System assembly. Planning your work before you begin will save time and money, especially when using expensive rental equipment such as a crane or boom truck.

Good workflow begins by staging panels efficiently. During delivery take special care to stack panels as close as possible to their final destination. Stack panels so that those needed first are most accessible. Be sure not to stack panels where the crane or boom truck may need to set up. If you use straps to unload panel stacks, be sure to place 2x blocks where straps cross the spline recesses at the edge of panels to prevent them from crushing the OSB, T&G or drywall skin.

The ideal installation crew consists of two experienced carpenters and two helpers working in pairs. One carpenter and helper works on the floor, wall or roof while the other pair works at the panel stack. The pair at the stack prepares each panel while the other pair performs the actual installation.

Steps in panel preparation:

1. Measuring and cutting panel to final dimension or shape.
2. Removing foam at panel edge to allow installing lumber splines, subfascia, etc.
3. Attaching lifting brackets to panel and connecting to crane or hoist
4. Where possible, pre-applying fasteners, sealants and splines
5. Attach toeboards for safer and easier movement on the roof

Completing as much preparation as possible at the panel stack reduces the tools and time required in the actual installation area. This is especially important when working on steep pitches or at some distance from the panel stack.

Determine a panel installation order before you start setting panels. Generally, wall panels can be installed beginning in one corner and working around the building in a clockwise or counterclockwise direction. Start by attaching end stud on panel C1. Attach a stud to the side of panel C1 (This will become the end stud of panel C2.

Stand C1 slide it into position and plumb. Stand C2 and slide it into the corner so that the extended outer skin covers the end stud of C1. Plumb and fasten the panels together through the outer skin. When installing spline lumber across panels make sure spline joints are at least 2' from panel joints.

On roof assemblies start at one end of the roof as usually noted on your panel layout. On dormers start at the gable end and work toward the valley. In most cases the order of panel installation will be noted on your panel layout.

As you work, be watchful for "panel creep," the tendency for panel runs to "grow" in length as a result of failing to draw them together uniformly or from expansion and contraction of panel skins due to changing temperatures. Be sure to maintain a 1/8" separation between OSB skins to allow for expansion.

Safety First!

- •STAY CLEAR of panels being lifted into place.
- •WEAR appropriate footwear for working on roof and use proper footing supports.
- •WEAR a safety harness and tie line when on the roof.
- •WEAR appropriate protective clothing and safety glasses when using a chainsaw.
- •DO NOT allow panels to fly flat.
- •DO NOT attempt to set panels in high or gusty winds or rain.
- •DO NOT release lifting straps until panel is securely attached to the roof.
- •DO NOT allow foam burner near flammable objects unless completely cool.
- •DO NOT over torque lifting plate fasteners.

3 Installing Roof Panels

Preparing the Roof Structure for Panels

- Start square, plumb and level. Correcting for out-of-square conditions or deviations from construction documents is time consuming and may incur additional material or labor costs.
- Maintain straight ridgelines. This is especially important when using Clearspan T&G panels to insure that joints stay square and straight.
- Maintain straight panel runs. Use a string line to be sure panel-bearing surfaces of purlins or rafters are within +\-1/8" of a straight line. Panels are very flat and will not bend or bow enough to compensate for deviations.
- Verify measurements. Check gable ends to make sure they are of the same length. A center of gable wall reference line transferred to the ridge is the best way to check this. Find the shortest point and adjust the others to it.

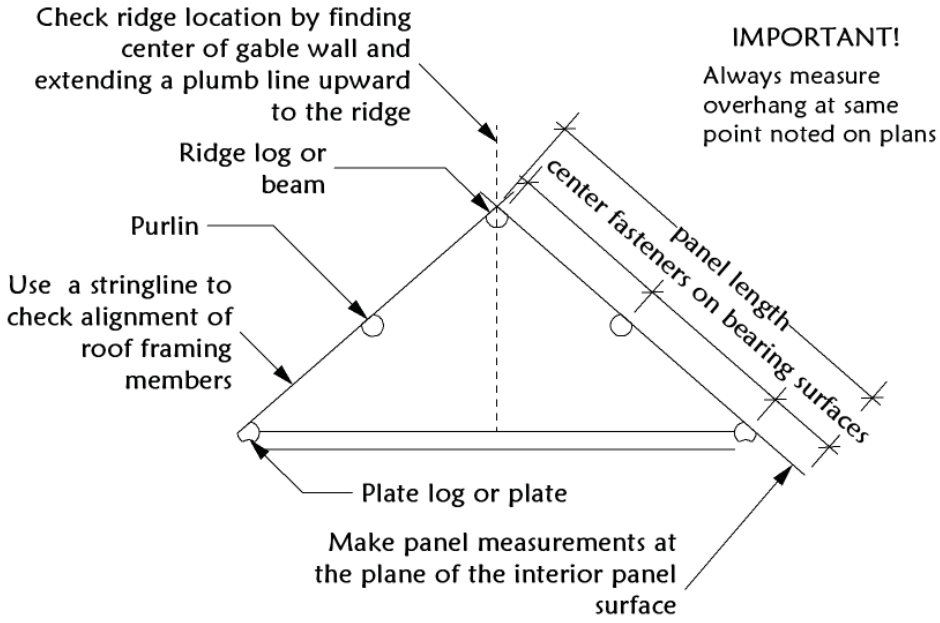


Fig.2 Layout Tips

- Determine the overall length of panels. by locating the center of purlin(s) and wall plates relative to the ridge. All measurements should be made at the interior surface plane of the panel. Mark these on the edges of the lower (interior) panel skin. Transfer measurements to the upper skin using the appropriate pitch or angle and mark the upper skin for cutting. Cut from the upper (exterior) skin to maintain clean edges at the interior skin.
- Determine gable overhang. Panels are 48" +\-wide. Clearspan T&G panels are oriented to place the groove facing right when facing toward the ridge. To allow a ½" overage measure 47 ½" in from the end of the ridge, add to this the width of the tongue and mark. (This prevents the mark from being hidden by the tongue after the panel is placed.) Continue down the ridge placing alignment marks at this distance
- After laying out the ridge transfer measurements to the plate. Use the largest extrapolation possible of a 3/4/5 triangle to insure squareness.

Basic Steps

1. Determine a starting point. It is generally best to start at the end of the structure furthest from the crane and work towards it.
2. Work from one end of the ridge to the other following panel layout.
3. Transfer overall length measurements to the interior face of the panel.(This is the T&G side for Clear span T&G panels.) It's not necessary to flip the panels over to do this. Almost all cuts are done with the interior surface down. Use a square to transfer points to the top surface and use a drywall square to mark across the top skin. Be sure to account for the additional length of the upper surface when preparing to cut the ridge edge of the panel.
4. Cut panel to length. Use a sharp chainsaw equipped with the saw plate provided in the installation kit. (At least a 3hp saw works best with an 18"to 24"bar depending on thickness of panel.) Cut T&G panels with saw teeth going into the wood to avoid splintering and tearout. If you will be cutting the ridge plumb, be sure to account for the additional length of the upper surface when measuring panel length.

IMPORTANT!

Before cutting structural panels check the cut line and remove any of the short screws or nails that were used during the manufacturing process to hold the lumber in place. (verify accuracy of factory made ridge cut before setting panel.)

Preparing Panels for Lifting

Making Ridge Cuts

1. Mark the pitch on the edge of the panel that will form the ridge using a framing square. From the upper pitch mark square across the upper surface of the panel with a drywall square. Use the pitch mark on the lower edge as a reference to measure the length of the panel. It is best to slightly over cut the pitch to create a gap where ridge panels meet. Filling this gap with expanding foam will seal the ridge tightly.
2. Mark centerlines for purlins and ridge on the lower surface of panel. Use a square to transfer measurements to the upper surface. While the panel is on the ground drive panel screws along centerlines, using a drywall type T-square for measurements. Drive so that the screw points reach the inside of the interior skin. Make sure they are in straight. Refer to details for screw spacing. If you are using structural panels you may have to adjust spacing slightly to avoid embedded lumber.

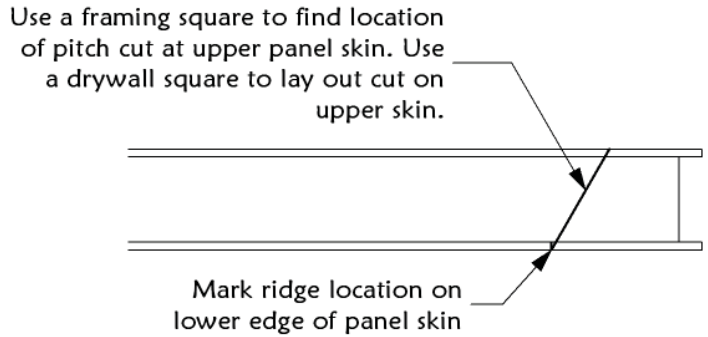


Fig. 3 Making Ridge Cuts

3. Mortise edges that will receive 2x sub-fascia. After cutting the end of the panel use the foam cutter to cut a mortise in the foam. Set the burner for 1- 1/2" to allow for a 2x to fit the mortise. For structural panels cut the ends of embedded lumber by plunging a reciprocating saw blade through a hole drilled in the side of the 2x once the foam has been mortised.
4. Mortise gable ends for 2x sub-fascia. Orient Clearspan T&G panels so the tongue faces the gable end and remove the tongue so it will not interfere with fascia. Sub-fascia for gable rakes is best installed on the ground, but eave sub-fascia must be installed after panels are set because sub-fascia boards extend across several panels. Sub-fascia joints should be offset from panel seams)
5. Install lifting plates. Mark the center of the panel by measuring the top skin. Install lifting plates slightly toward the ridge side of the center mark (3" +/-) using the supplied screws. At minimum screws should be put in every other hole of the lifting plate (do not over torque screws) with more for larger heavier panels or in slightly windy conditions. (The screws are intended to be reused so make sure the roof crew saves them each time.) Move the plates forward for steeper roofs and closer to the center for lesser pitches. The goal is to fly the panels in at approximately the roof pitch or slightly greater (ridge higher). Use 2 lifting straps per panel attaching them to structural 2x's if available.

WARNING!

Never allow people beneath panels as they are being raised and set in position

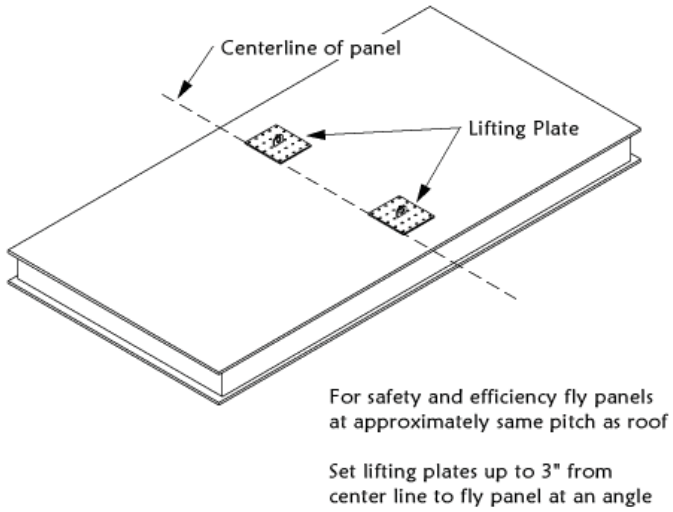


Fig. 4 Lifting Panels

Installing the First Panel

1. Attach lifting straps to panel and crane. Connect the lifting straps (provided by owner/contractor) to the shackles and lifting plates included in the install kit (if purchased) and hook to the lifting device (crane etc.). We recommend the use of a guideline attached to the panel.
2. Slowly lift panel off of the stack. Guide the panel only by its bottom. Holding from the top and letting go will cause the panel to swing unnecessarily (DO NOT FLY FLAT).
3. Guide the panel to the roof (it works best to keep the ball slightly towards the ridge letting the panel "hang" in place) and place it so that you can see your starting mark. Align the panel to the ridge mark and secure only the inside panel screw.

4. Finish squaring and secure. Use the extrapolated 3/4/5 method to finish squaring the panel and secure it using the other screws. It is best to leave the screws along the inside edge loose so that the next panel will fit better. Most panels have a slight crown to them and it is best to let them come together before tightening.
5. Don't detach the panel from the lifting device until it is well secured. When the panel is secure unscrew the lifting plates and fly them back to the ground.

DO NOT ATTEMPT TO SET PANELS IN HIGH WINDS!

Setting the Next Panel

1. Prepare the second panel while the first panel is being installed. While the first panel is being installed repeat the procedure used to prepare the first panel. Be sure to mortise any edges that receive sub-fascia.
2. (Clear span T&G panels) Lay a bead of the provided glue on foam side of the tongue that will lock the new panel to the previous one. Apply the glue to the back side of the tongue whenever possible to avoid the risk of squeeze-out onto the exposed surface of the T&G.
3. Lift the panel using the same procedure using steps 1-5under "Installing the First Panel."
4. When the panel is close to position set one of the supplied ratchet straps in position, hooked under the outer OSB skin. The ratchet strap(s) help to bring the panels together so that the T&G will interlock properly. Put some tension on the strap and check the relative length of the two panels. It is always best to leave the new panel slightly higher than the other because it is easier to move a panel down than up.
5. Use ratchet strap(s) to tighten panel joint. Sight into the joint between the panels from above to see how well the T&G is lining

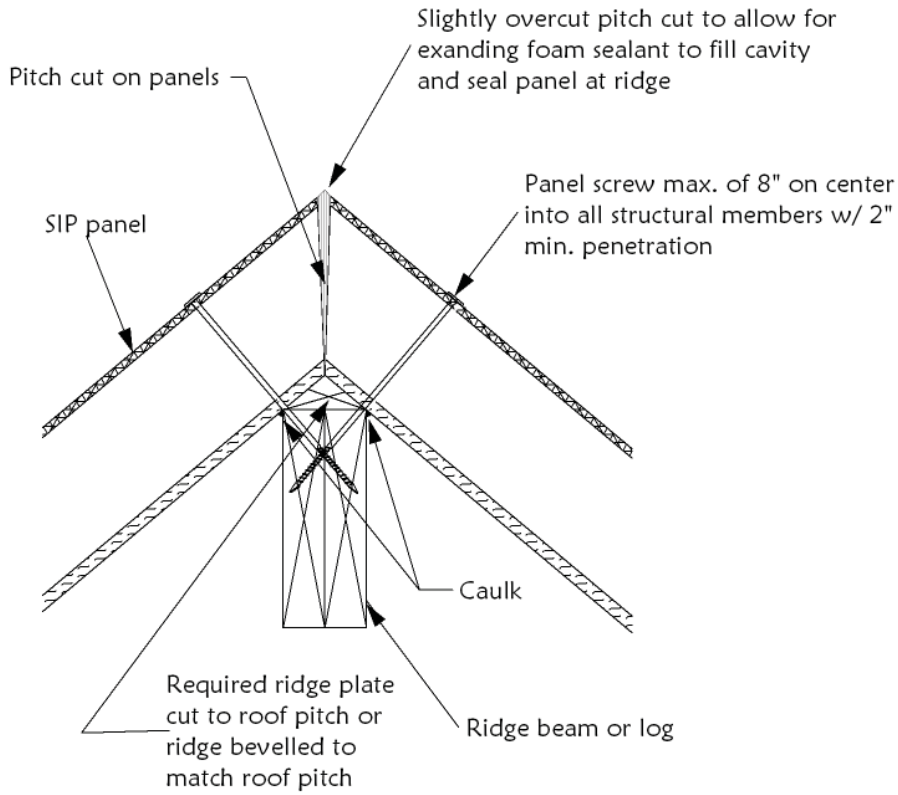


Fig. 5 Connecting Panels at Ridge

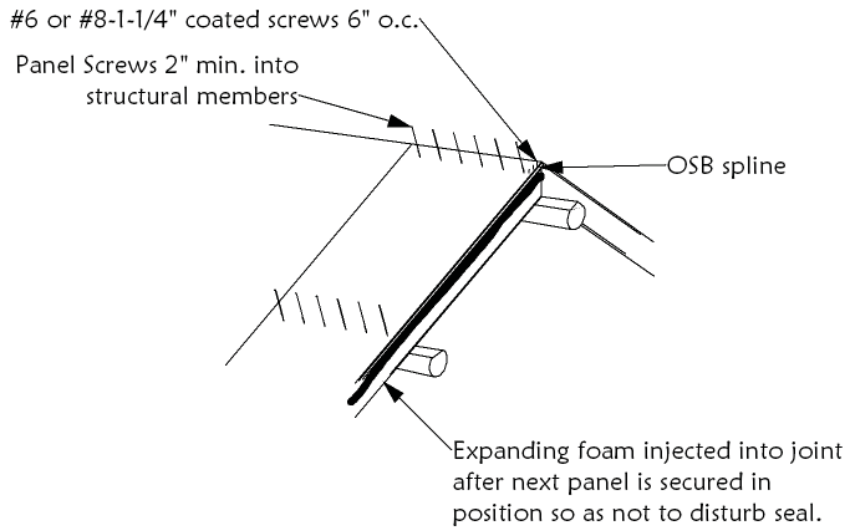


Fig. 6 Attaching Roof Panels to Purlins

up. It is also helpful to have someone underneath check whether the new panel sits higher or lower than the previous panel. After getting T&G aligned properly and started, check the end alignment and adjust accordingly. Tighten the strap(s) to draw panels together until the joint is tight. Fasten outer screws first to help draw panels together.

6. Drive panel screws without damaging OSB skin and then detach the lifting device
7. Apply foam to seal panel joint. Use the supplied canister and foam gun to seal panel joint. Insert the foam gun nozzle into the joint between the panels. Fill the entire joint from the bottom skin to the foam rout (the lower keyway routed into the foam). Try to avoid getting foam into the upper rout because it may interfere with installing the spline.

IMPORTANT!

Foam seals are very important to the integrity of the roof system. While foam and splines can be applied after all panels are set, application works best and chances of missing a joint are reduced if sealing and splining are done immediately after each panel joint is completed.

8. Install splines. Splines should only be installed after the joint is properly foamed and before foam fully hardens. Shove supplied OSB splines either down or up fully into the upper rout in the panel joint. Use #6 or #8 1 ¼" screws on 6"-8" centers to fasten the splines. (Drywall type screws are not acceptable)

End of the Run

1. Use the procedures described above to lay out the last panel of the run. In addition to cutting to length, it may be necessary to rip the last panel to required width. To assure a straight cut for long rips guide the saw plate using a straight 2x screwed to the panel as a straightedge. Mortise as necessary for 2x sub fascia.
2. Install as for previous panels.

FASTENING T&G PANELS

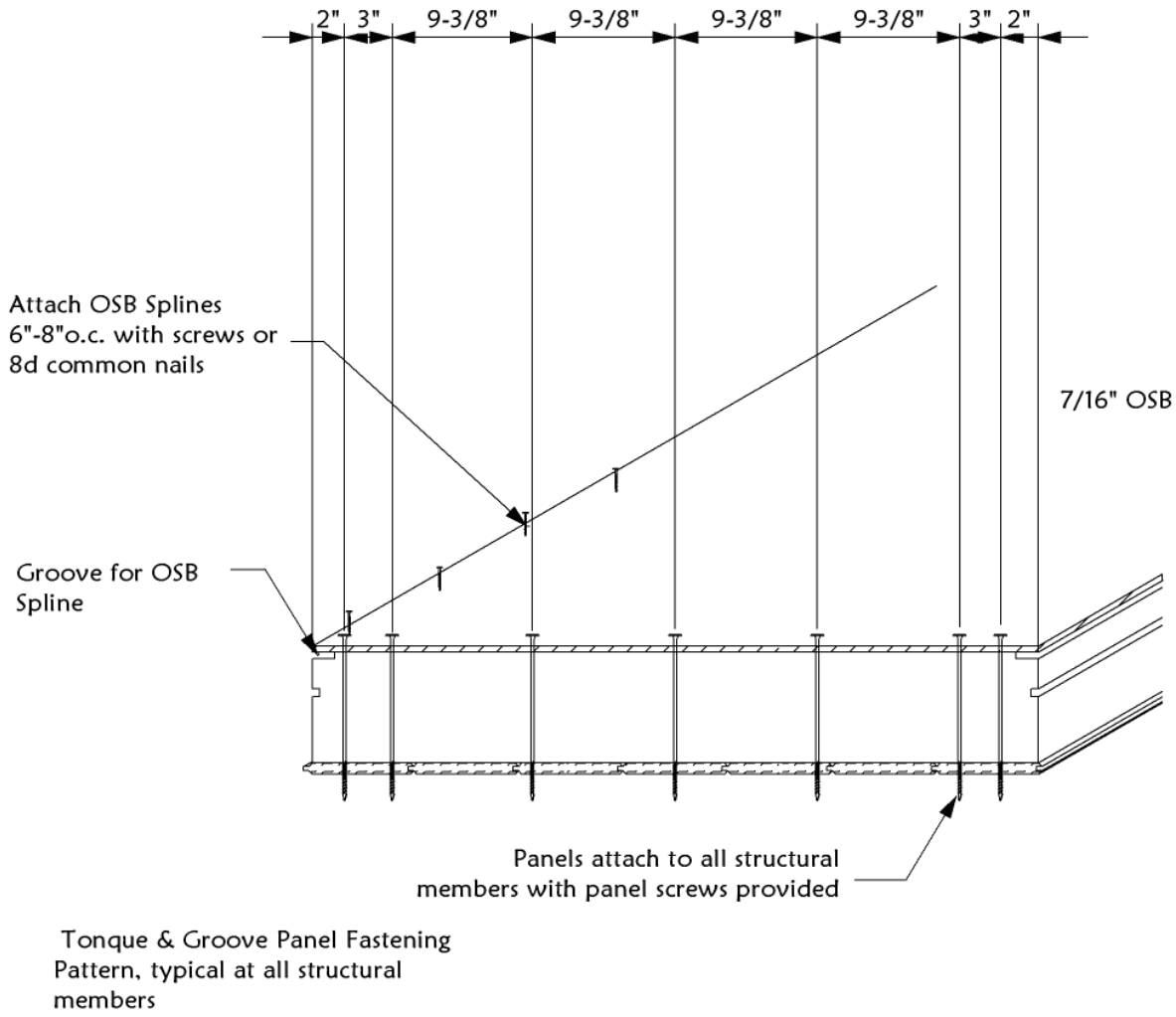


Fig. 7 Fastening T&G Panels

FASTENING ROOF TO WALLS

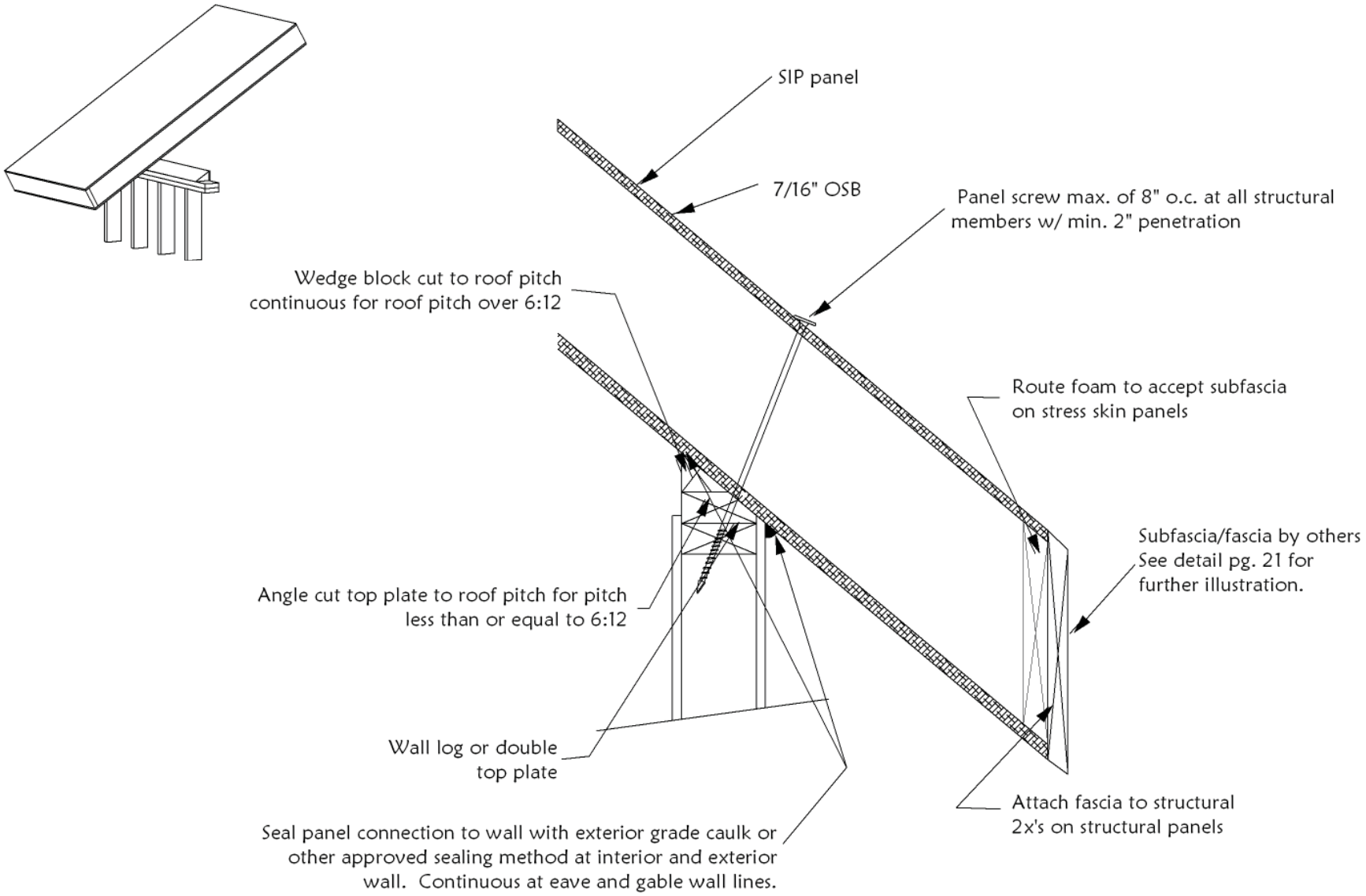
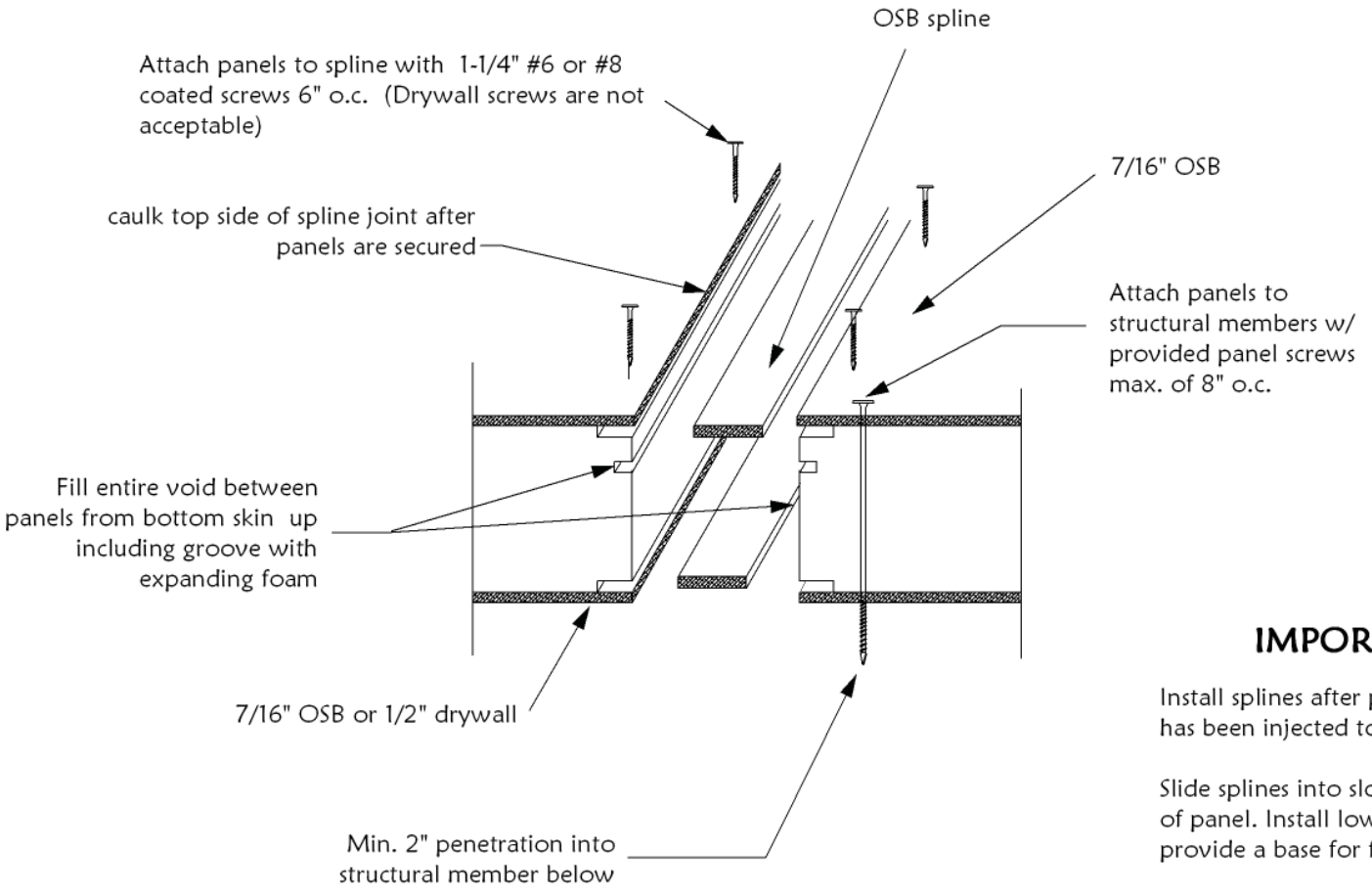


Fig. 8 Attaching Roof Panels to Walls

DOUBLE SPLINE CONNECTION



IMPORTANT!

Install splines after panel is set and foam has been injected to fill void

Slide splines into slots from top or bottom of panel. Install lower spline first to provide a base for foam.

Spline must be installed on both sides of panel and attached in place before foam hardens fully

Fig. 9 Joining Double Spline Panels

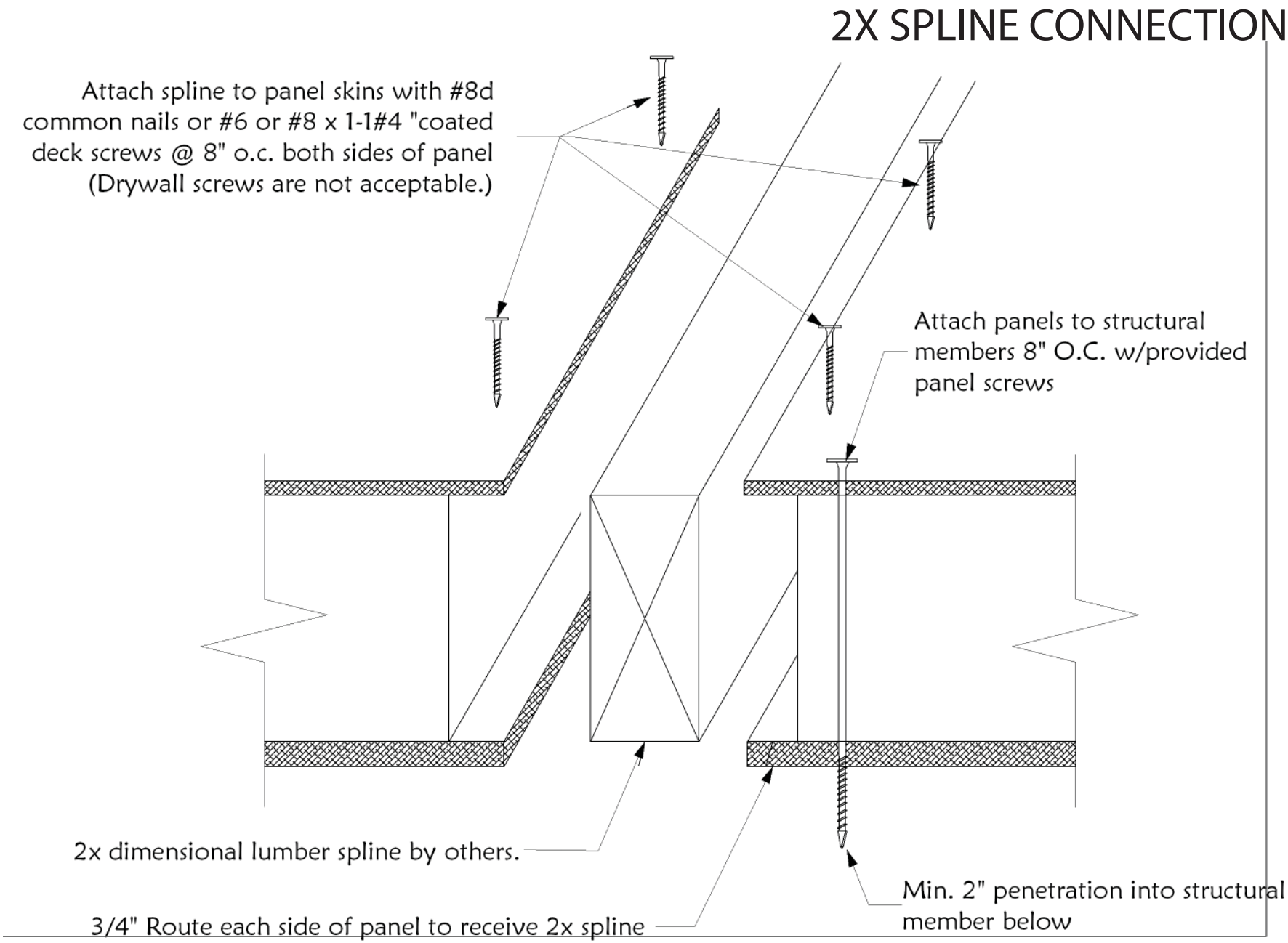


Fig. 10 Joining Double Spline Panels

JOINING T&G PANELS

IMPORTANT!

Install spline after panel has been set and expanding foam is injected to fill void. (Splines can be pushed into slots from top or bottom of panel)

Spline must be installed and attached in place before foam hardens fully.

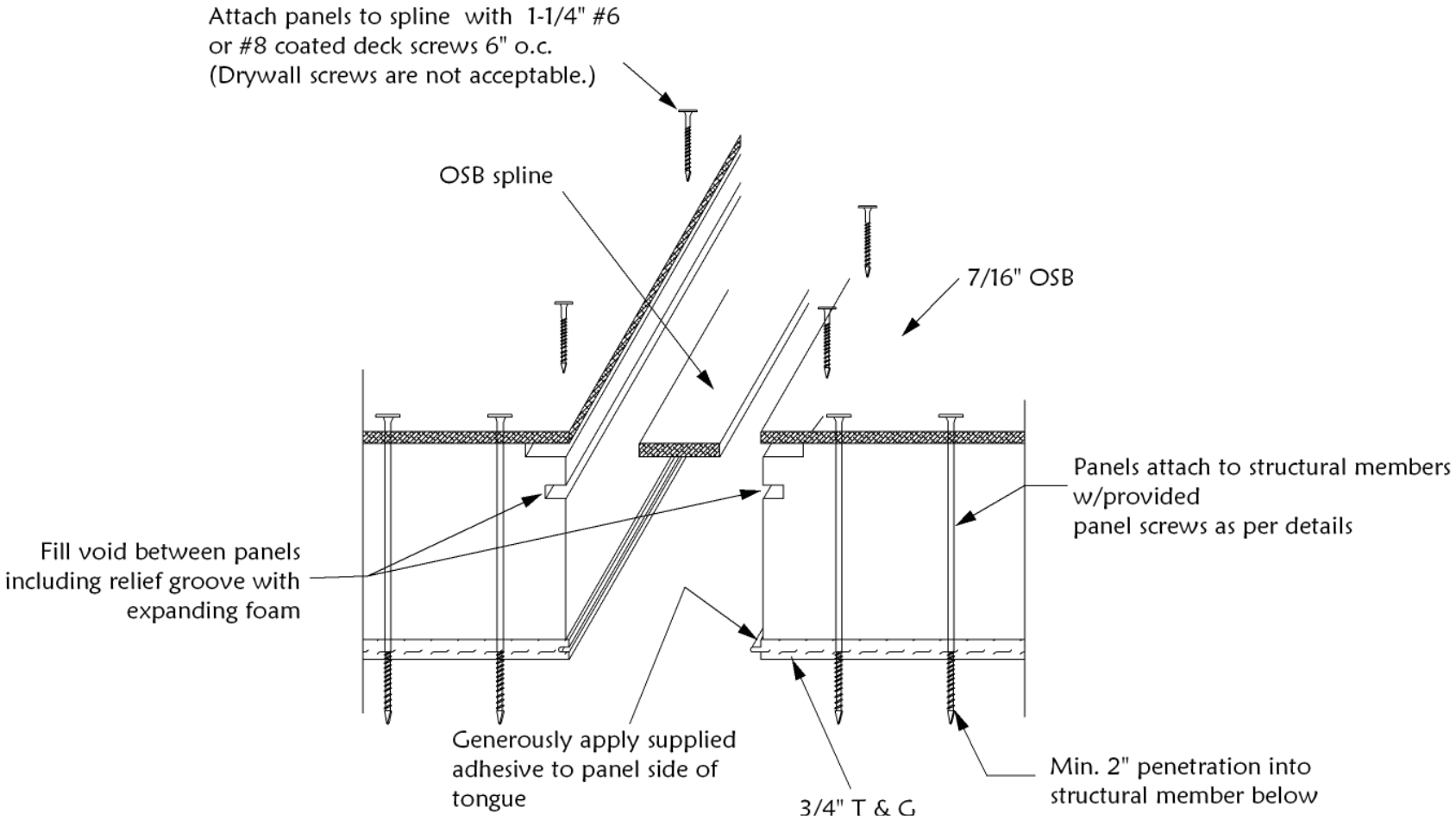


Fig. 11 Joining Double Spline Panels

Hips and Valleys

Hips and valleys require additional layout measurements and complex compound angle cuts. Verify all measurements and angles before cutting panels. Use the Valley Angle Table on page 20 as a guide to determine proper angle cuts for various pitches.

Valleys

1. Placement of a string line in the finish plane of the valley will help get the proper lengths and angles in the valley. Measure from the last straight panel using a 4'measuring device until it contacts the string and mark the bottom side of the panel in two places this will give the angle of the valley. Measure from the top down and take that measurement and the overall length of the panel.
2. Transfer the marks to the outer edge of the lower skin from the two measurements from the roof. (Be sure you are marking the angle on the proper side of the panel, with the panel inner face down, so the T&G is in the right direction). Then transfer the mark to the top skin of the panel. Using those marks establish the finish plane diagonal on the top skin with a chalk line.
3. Set the saw plate at the proper angle using the hip/valley angle setting on a speed square for the proper roof pitch. However it is our experience that you want to decrease that angle by about 4 degrees. Also for mating unequal pitches take the difference of the angle for the steeper pitch and the lesser pitch and divide by 2, then subtract 2. This allows the top skins to line up at the same level. **IF YOU ARE UNSURE MAKE UP A FEW TEMPLATES OUT OF 2X MATERIAL UNTIL YOU FEEL YOU HAVE IT RIGHT.**
4. Orient the saw so the chain is feeding into the finish wood and the bevel is cutting back into the top skin leaving the bottom skin long. Make sure that there is a mark on the bottom skin of the panel that corresponds with the field measurement taken. Line up the saw and cut into the panel until contact is made with this point. Square the saw plate to the chalk line and make a pencil mark on the plate that you can use to follow the chalk line. Because the saw creates a lot of dust be sure to keep the line clear so that it can be followed accurately. (**Always check structural panels for factory set screws in the lumber.**) We have found that this method is as exact and much less work than flipping the panels to cut the bottom skin. Do not cut with the T&G side up.
5. Inserting lumber in the valleys of the panels. For stress skins simply mortise the foam with the cutter, however for structural panels it is necessary to rout out the two rafter ends visible. This can be done by mortising out the foam with the cutter for the appropriate depth of the valley lumber, then plunge cutting through the side of the 2x and cutting up to the top and down to the bottom being careful not to cut the bottom or top skin. Install one side of the valley completely before installing the valley framing. It works well to bevel the outer valley member to accept the other valley panel.
6. Sealing the joint of the valley panel with the supplied foam sealant.(It may be necessary to drill some holes in the top skins to completely seal the joint.) **IT IS VERY IMPORTANT TO SEAL THE VALLEY JOINT COMPLETELY.**
7. Seal exterior of joint with caulk or roof sealant to help prevent air infiltration.

VALLEY CONNECTION DETAILS

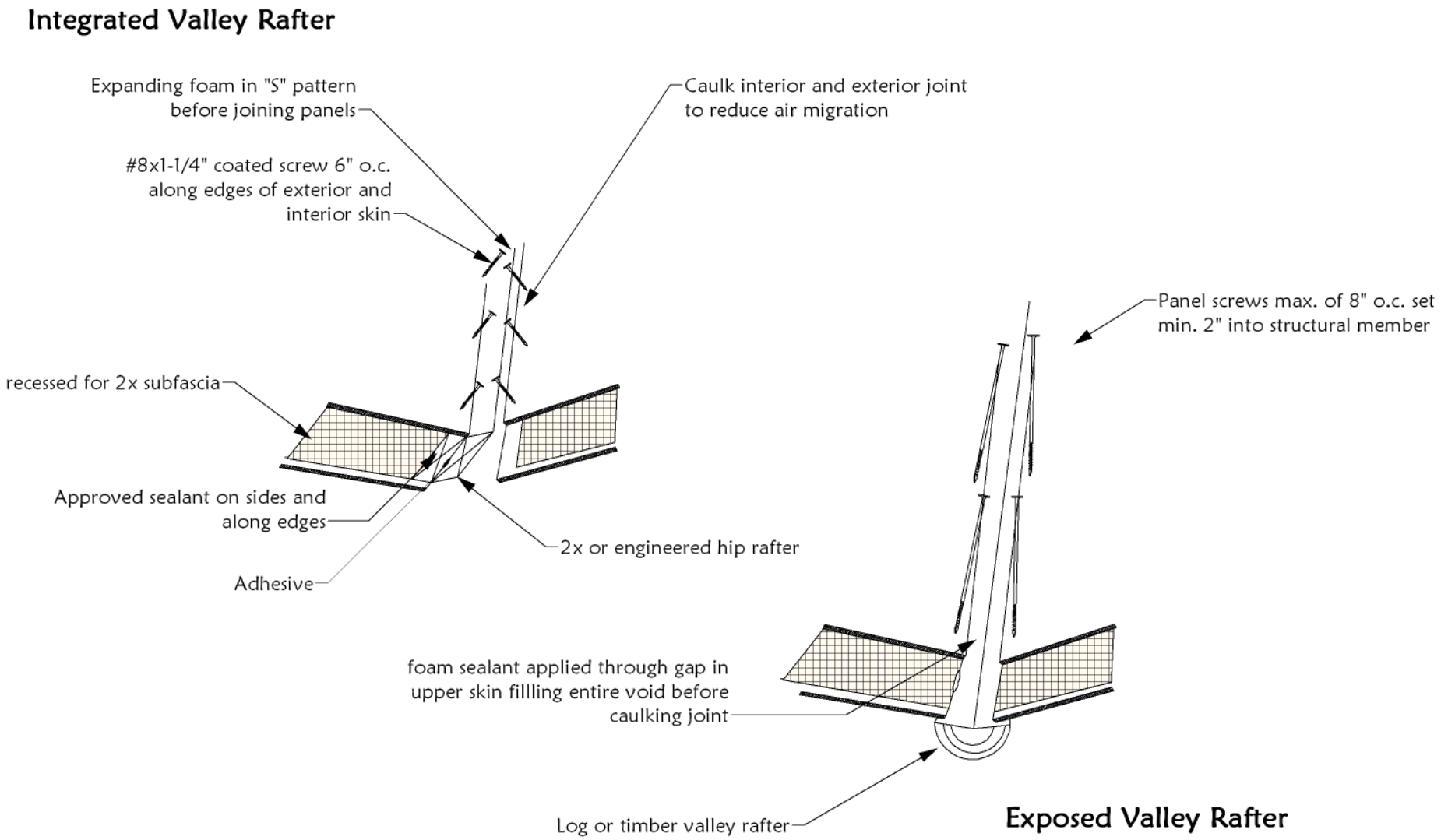


Fig. 12 Installing Valley Rafters

HIP CONNECTION DETAILS

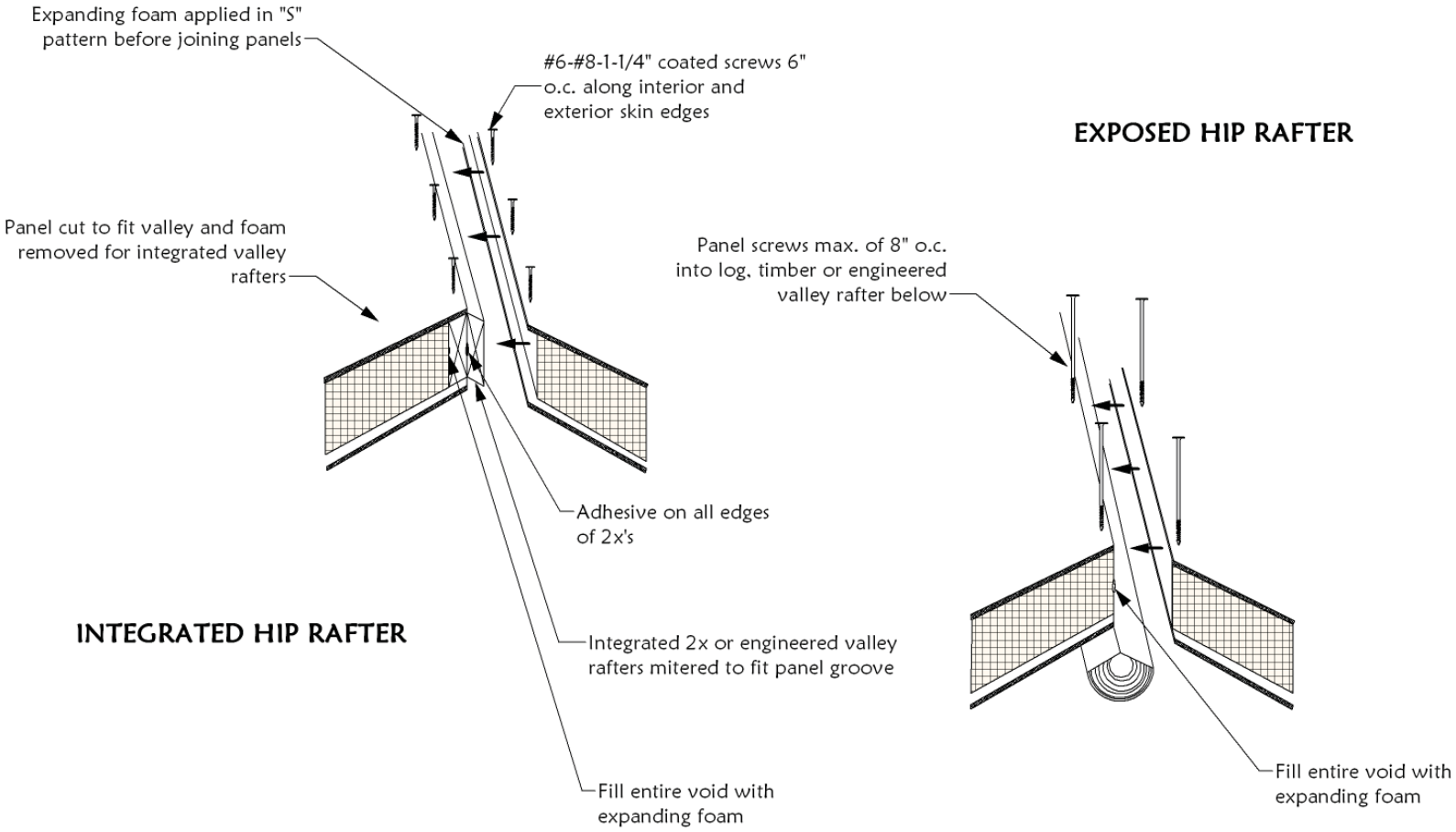


Fig. 13 Installing Hip Rafters

Valley Rafter Angles

Using Valley Rafter Table

Use the Valley Rafter Table to determine cutting angles for valley rafters and panels. Locate the main pitch along the horizontal axis and look down the column until it intersects the row of the secondary pitch shown on the vertical axis. Mark panels or rafters at the angle shown to create the valley.

Pitch		3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
	Degree	9.88	12.92	18.78	18.43	20.87	23.09	25.10	26.92	28.54	30.00	31.30	32.47	33.52	34.45	35.29	36.04	36.72	37.33	37.88	38.37	38.83	39.23
3	9.88	9.88	11.40	14.33	14.15	15.37	16.48	17.49	18.40	19.21	19.94	20.59	21.17	21.70	22.16	22.58	22.96	23.30	23.60	23.88	24.12	24.35	24.55
4	12.92	11.40	12.92	15.85	15.68	16.90	18.01	19.01	19.92	20.73	21.46	22.11	22.70	23.22	23.69	24.10	24.48	24.82	25.12	25.40	25.65	25.87	26.08
5	15.78	12.83	14.35	17.28	17.11	18.33	19.44	20.44	21.35	22.16	22.89	23.54	24.13	24.65	25.12	25.53	25.91	26.25	26.55	26.83	27.08	27.30	27.51
6	18.43	14.15	15.68	18.61	18.43	19.65	20.76	21.77	22.68	23.49	24.22	24.87	25.45	25.98	26.44	26.86	27.24	27.58	27.88	28.15	28.40	28.63	28.83
7	20.87	15.37	16.90	19.83	19.65	20.87	21.98	22.99	23.89	24.71	25.44	26.09	26.67	27.19	27.66	28.08	28.46	28.79	29.10	29.37	29.62	29.85	30.05
8	23.09	16.48	18.01	20.94	20.76	21.98	23.09	24.10	25.00	25.82	26.55	27.20	27.78	28.30	28.77	29.19	29.57	29.90	30.21	30.48	30.73	30.96	31.16
9	25.10	17.49	19.01	21.94	21.77	22.99	24.10	25.10	26.01	26.82	27.55	28.20	28.79	29.31	29.78	30.20	30.57	30.91	31.21	31.49	31.74	31.96	32.17
10	26.92	18.40	19.92	22.85	22.68	23.89	25.00	26.01	26.92	27.73	28.46	29.11	29.69	30.22	30.68	31.10	31.48	31.82	32.12	32.40	32.64	32.87	33.07
11	28.54	19.21	20.73	23.66	23.49	24.71	25.82	26.82	27.73	28.54	29.27	29.92	30.51	31.03	31.50	31.92	32.29	32.63	32.93	33.21	33.46	33.68	33.89
12	30.00	19.94	21.46	24.39	24.22	25.44	26.55	27.55	28.46	29.27	30.00	30.65	31.24	31.76	32.22	32.64	33.02	33.36	33.66	33.94	34.19	34.41	34.62
13	31.30	20.59	22.11	25.04	24.87	26.09	27.20	28.20	29.11	29.92	30.65	31.30	31.89	32.41	32.88	33.30	33.67	34.01	34.31	34.59	34.84	35.06	35.27
14	32.47	21.17	22.70	25.63	25.45	26.67	27.78	28.79	29.69	30.51	31.24	31.89	32.47	32.99	33.46	33.88	34.26	34.59	34.90	35.17	35.42	35.65	35.85
15	33.52	21.70	23.22	26.15	25.98	27.19	28.30	29.31	30.22	31.03	31.76	32.41	32.99	33.52	33.98	34.40	34.78	35.12	35.42	35.70	35.94	36.17	36.37
16	34.45	22.16	23.69	26.62	26.44	27.66	28.77	29.78	30.68	31.50	32.22	32.88	33.46	33.98	34.45	34.87	35.24	35.58	35.89	36.16	36.41	36.64	36.84
17	35.29	22.58	24.10	27.03	26.86	28.08	29.19	30.20	31.10	31.92	32.64	33.30	33.88	34.40	34.87	35.29	35.66	36.00	36.31	36.58	36.83	37.06	37.26
18	36.04	22.96	24.48	27.41	27.24	28.46	29.57	30.57	31.48	32.29	33.02	33.67	34.26	34.78	35.24	35.66	36.04	36.38	36.68	36.96	37.21	37.43	37.64
19	36.72	23.30	24.82	27.75	27.58	28.79	29.90	30.91	31.82	32.63	33.36	34.01	34.59	35.12	35.58	36.00	36.38	36.72	37.02	37.30	37.54	37.77	37.97
20	37.33	23.60	25.12	28.05	27.88	29.10	30.21	31.21	32.12	32.93	33.66	34.31	34.90	35.42	35.89	36.31	36.68	37.02	37.33	37.60	37.85	38.08	38.28
21	37.88	23.88	25.40	28.33	28.15	29.37	30.48	31.49	32.40	33.21	33.94	34.59	35.17	35.70	36.16	36.58	36.96	37.30	37.60	37.88	38.12	38.35	38.55
22	38.37	24.12	25.65	28.58	28.40	29.62	30.73	31.74	32.64	33.46	34.19	34.84	35.42	35.94	36.41	36.83	37.21	37.54	37.85	38.12	38.37	38.60	38.80
23	38.83	24.35	25.87	28.80	28.63	29.85	30.96	31.96	32.87	33.68	34.41	35.06	35.65	36.17	36.64	37.06	37.43	37.77	38.08	38.35	38.60	38.83	39.03
24	39.23	24.55	26.08	29.01	28.83	30.05	31.16	32.17	33.07	33.89	34.62	35.27	35.85	36.37	36.84	37.26	37.64	37.97	38.28	38.55	38.80	39.03	39.23

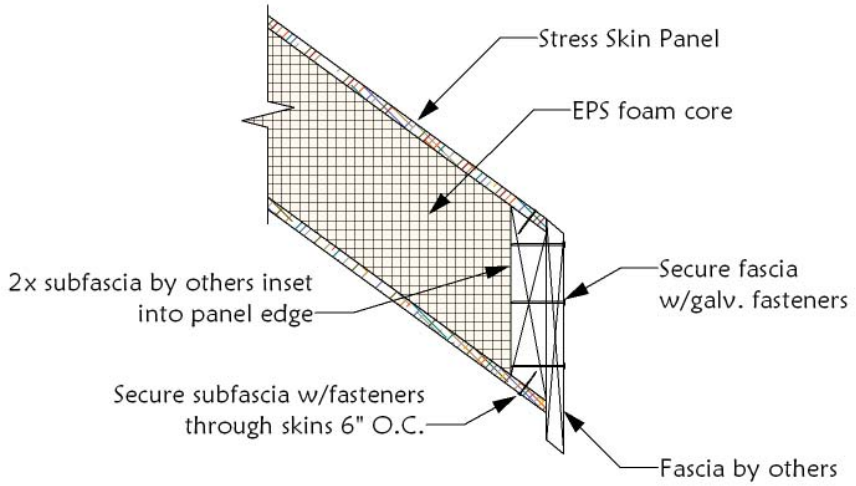
Fig. 14 Valley Rafter Table

Installing Fascia and Trim

Install gable end sub-fascia when the panel is on the ground whenever possible

1. Sub-fascia for the rake of the roof varies with the type of panel you purchased. Stress skin panels will require cutting out the foam to accept 2x subfascia, (use the electric foam burner available in the installation kit) Structural panels will require plunge cutting out the integrated 2 x's and then cutting out the foam or attach directly to the 2x's at the end of the ISIP.
2. These are put in to attach your desired fascia (we found that most need to use a two board fascia with a small quarter round at the edge of the panel to fascia)
3. When sub fascia is installed along the narrow axis of the panels, joints of the subfascia need to span multiple panels and break at or near the center of a panel to provide added strength by tying panels together.
4. Install flashings as required by building codes or plans.

Stress Skin Panel



Integrated Structural Panel

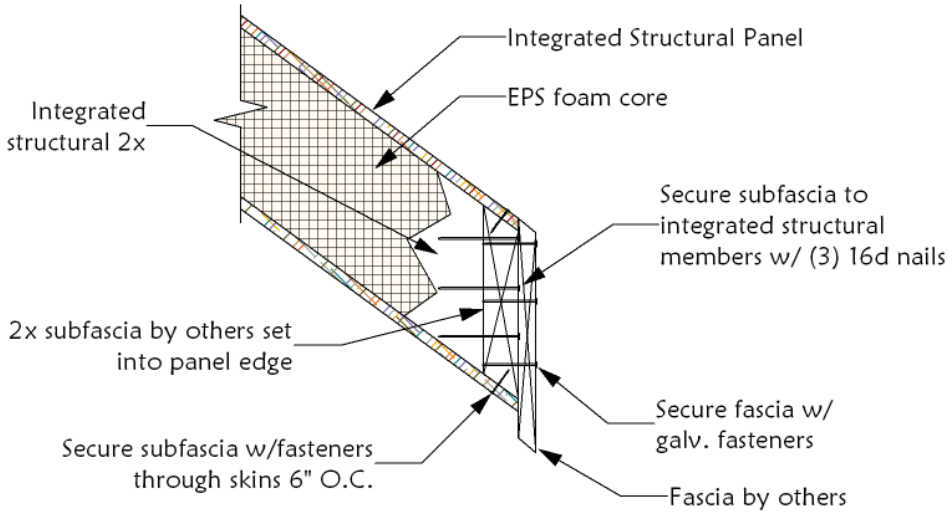


Fig. 15 Attaching Fascia

CONNECTING PANELS AT A BUILT-UP RIDGE

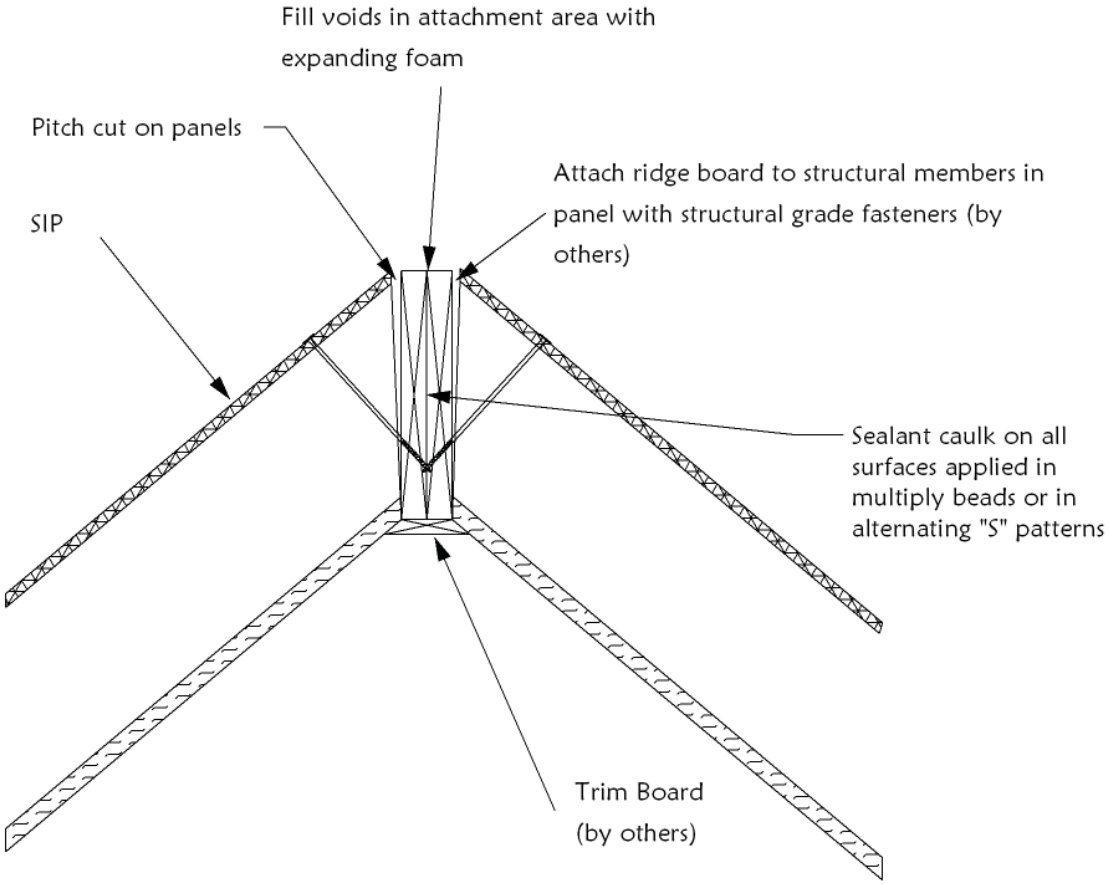


Fig. 16 Attaching Panels at a Built-Up Ridge

FIELD-FABRICATING A ROOF OVERHANG

(Note: Special panels are required for this type of assembly. Discuss this with your Eagle Panel representative)

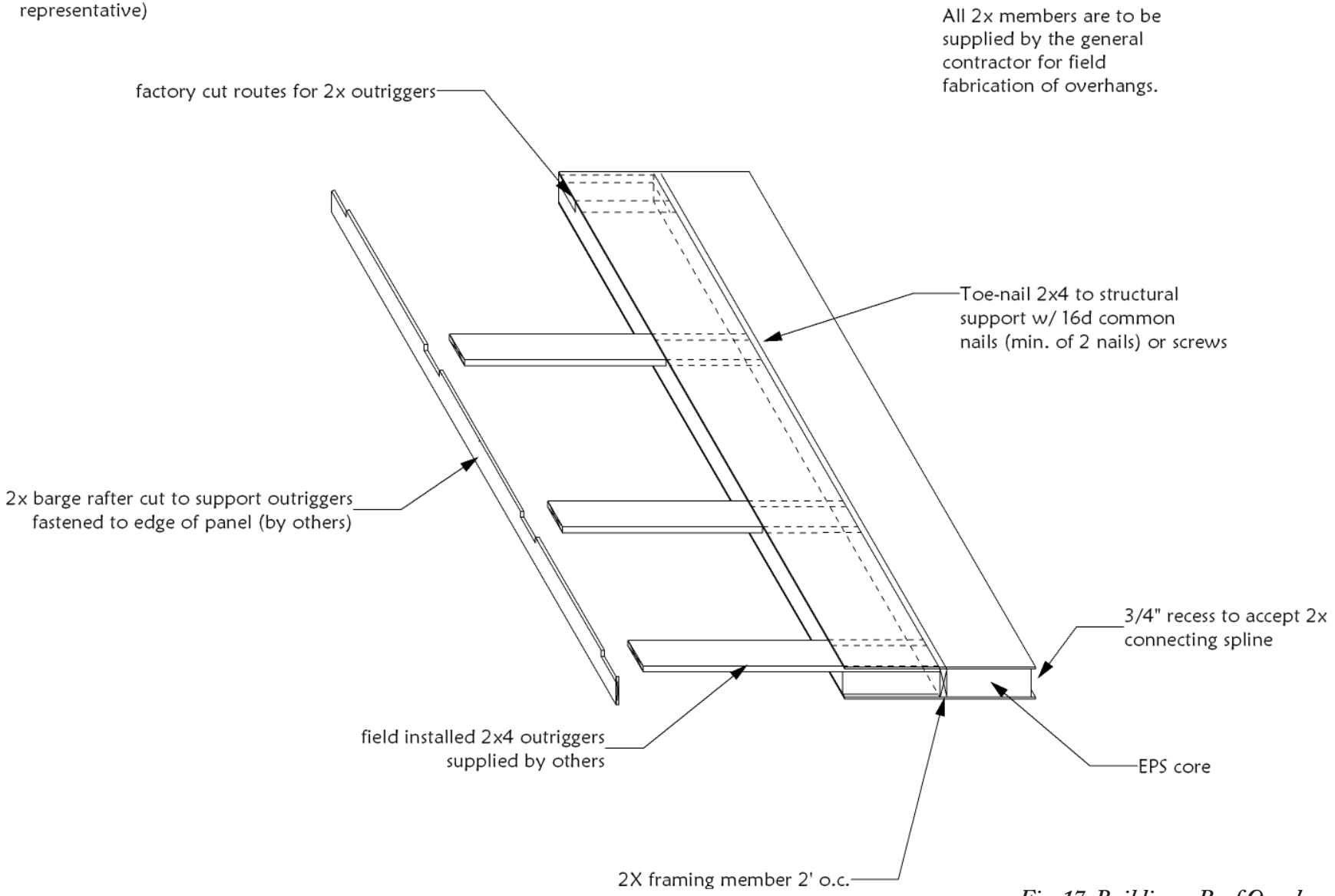


Fig. 17. Building a Roof Overhang

EXTENDED RAFTER PANELS

NOTE: Special panels are required for this type of assembly. Discuss this with your Eagle Panel representative.

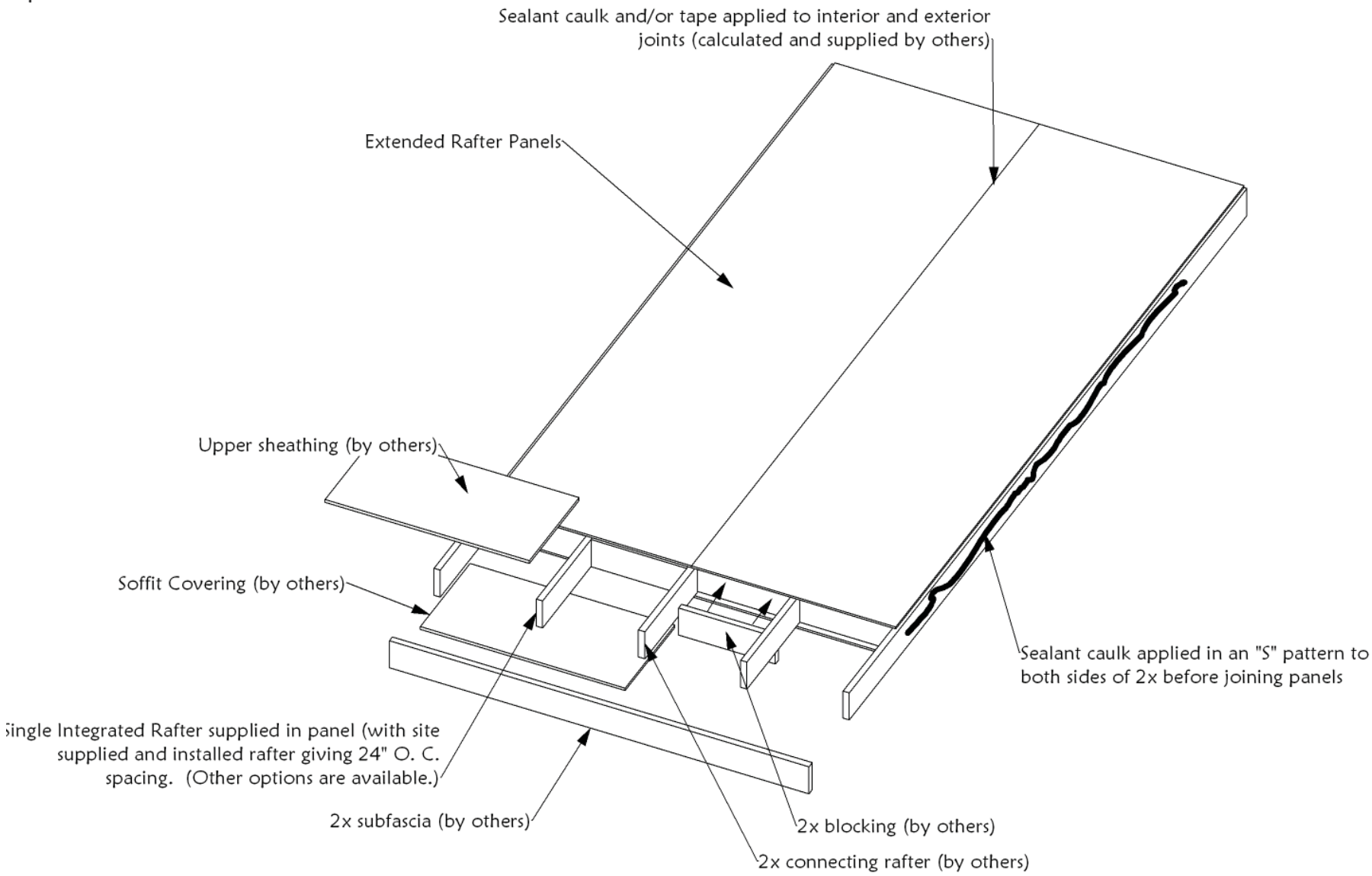


Fig. 18 Working with Extended Rafter Panels

ATTACHING DORMERS

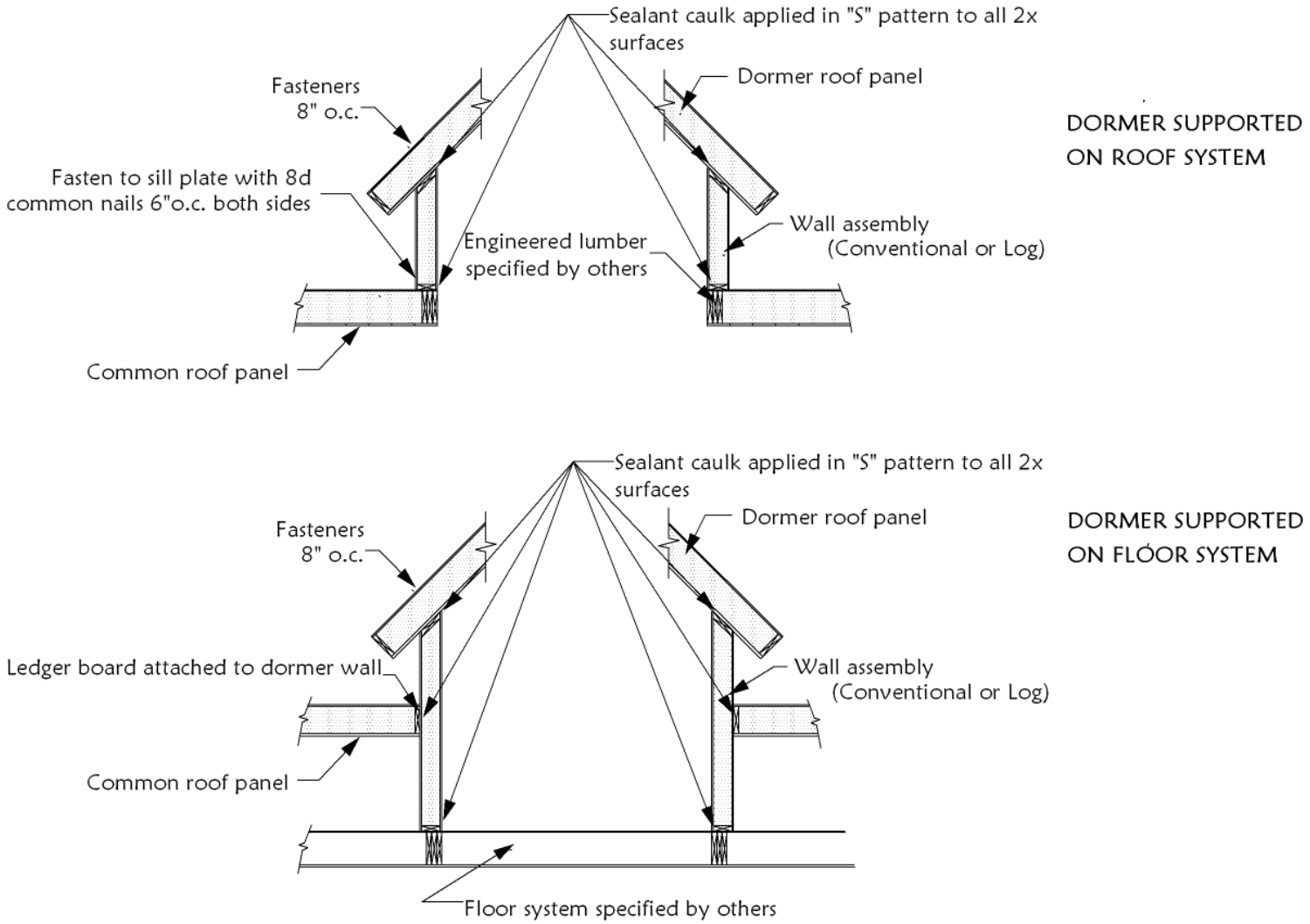


Fig. 19 Installing Dormers

4 Installing Wall Panels

Typical Wall Panel Installation

1. Start by reviewing the panel layout sent by Eagle Panel Systems, Inc.
2. The floor system should be square and level.
3. Seal and install sole plates. Mark window and door locations on plates.
4. Start in one corner and continue down one wall leaving a 1/8" expansion gap between OSB skins of adjacent panels.
5. Use "J" panels at the edges of windows and doors.
6. Fill in under windows with "KW" panels
7. Brace panels at window and doors until all panels are set.
8. As you install, seal panels to sole plate and connecting 2x4's with approved sealant. See pg. 29 Figure 20.
9. Secure panels as shown in illustrations. Panels are typically secured with 8d nails or screws 6"to 8"on center into the floor plates and studs. (Be sure to plumb and level each corner and all panels as you set them) Toenail studs into sole plate at panel joints and 2x's within the panel to plate from interior and exterior sides of sheathing material
10. Install the top plate so that joints between adjoining plates occur over a panel center stud. Avoid aligning plate joints with panel joints.
11. Gable end panels are set using the same procedure used for wall panels.

Sole and Top Plates

1. Install sole plates leaving a 7/16" gap between the outer edge of the plate and the edge of the subfloor so that the outer panel skin will be flush with the bandboard.
2. Seal plate to the subfloor using an approved sealant and nail with 16d nails or approved screws to floor joists.
3. Make sure plates are laid straight and square.
4. Lay out window and doors on top of plate
5. Leave 7/16 inch gap between plates at corner to allow C1 panel to slide into C2 (See pg.30)
6. Install top plates so that joints are over studs in the center of the panel
7. Install double top plates so that joints are not aligned.

Corners

1. First install a stud in panel "C1" as per corner panel detail Studs should be flush with the foam core at top and bottom leaving a recess of 1 ½" at top an bottom to accommodate plates..

2. Set the "C1"panel plumb and level and brace temporarily.
3. Set a "C2" panel on the plate of the intersecting wall. DO NOT nail until the whole corner is set.
4. Plumb and level for a final time, fasten panel and brace corner.

Window and Door Openings

1. Window and door framing is similar to standard construction with a header stud and cripple on the sides of the window. Areas under windows are filled using "KW" panels. Construct headers filling the center gap with foam. For 2x6 wall construction you will need 2 ½"of foam between header boards; for 2x4 walls ½"foam will help create a thermal break in the header.
2. KW panels have no studs so they can easily be cut to any length. Cut the "KW" panel to fit under the window. Insert cripple studs into routed grooves or side mortises. Use the electric burner to remove foam as necessary.
3. Install sill board in top route.
4. Foam or seal all field joints generously.

Wiring and Plumbing

1. Wiring is accomplished using the vertical wire chases cut under the interior skin of the panel. (Wire chases are located 1' from edges of 4x panels.)
2. For ease of wiring mark wire chase locations and pre drill the sole plate and subfloor while setting panels. Mark chase locations on the subfloor inside the walls so you can find them easily later.
3. When ready to wire, locate wire chases and cut interior skin for electrical boxes in appropriate locations.
4. Feed wire through pre drilled hole and mount electrical box (remodel boxes with external flanges for mounting are commonly used)
5. Plumbing in exterior walls is rarely recommended, but can be accomplished similarly to electrical wiring. (Check local code requirements.)

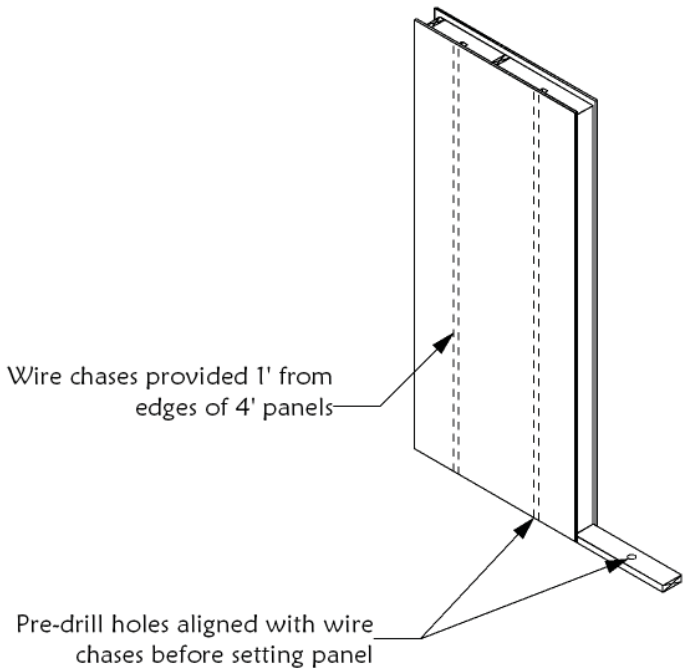
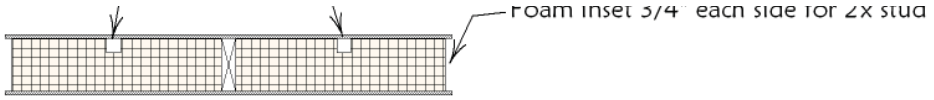


Figure 20 Wire Chases

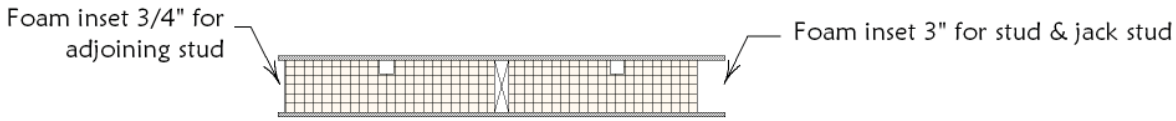
WALL PANEL TYPES

A



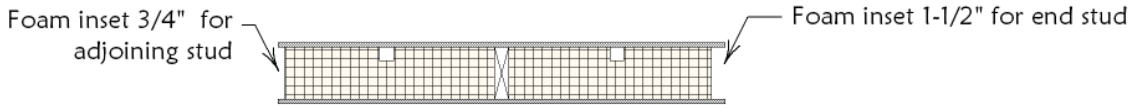
Standard "A" Wall Panel

J



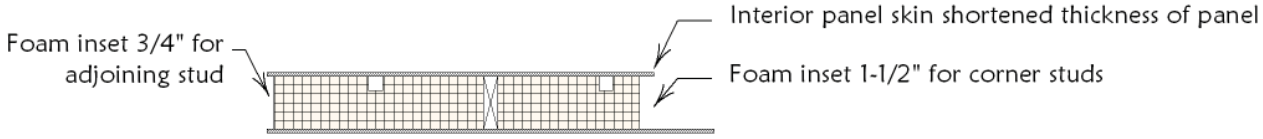
Door/Window Standard "J" Jack Panel

C1



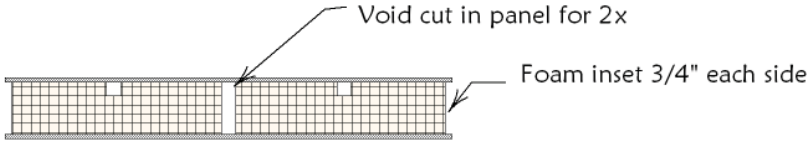
Standard "C1" Corner Panel

C2



Standard "C2" Corner Panel

KW

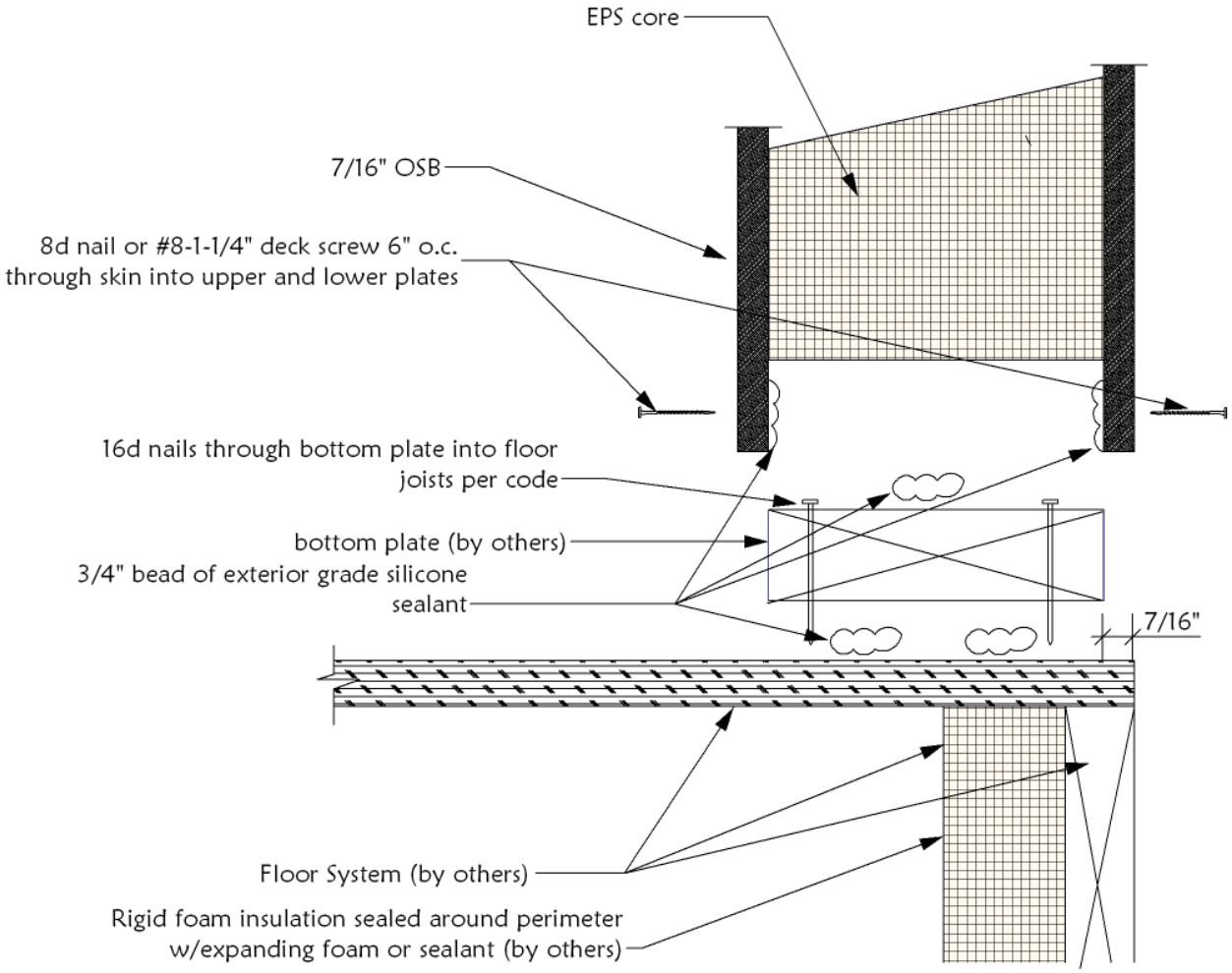


Standard "KW" Fill In Wall Panel

NOTE: All panels are shown as supplied by factory. All wall panels have 1-1/2" recess in foam top & bottom to accept standard 2x plates. Both skins to be attached to connecting 2x and bottom plate 6"-8" o.c. with 8d common nails or 1-1/4" screws. All 2x's to be fastened to top and bottom plates.

Fig. 21 Wall Panel Types

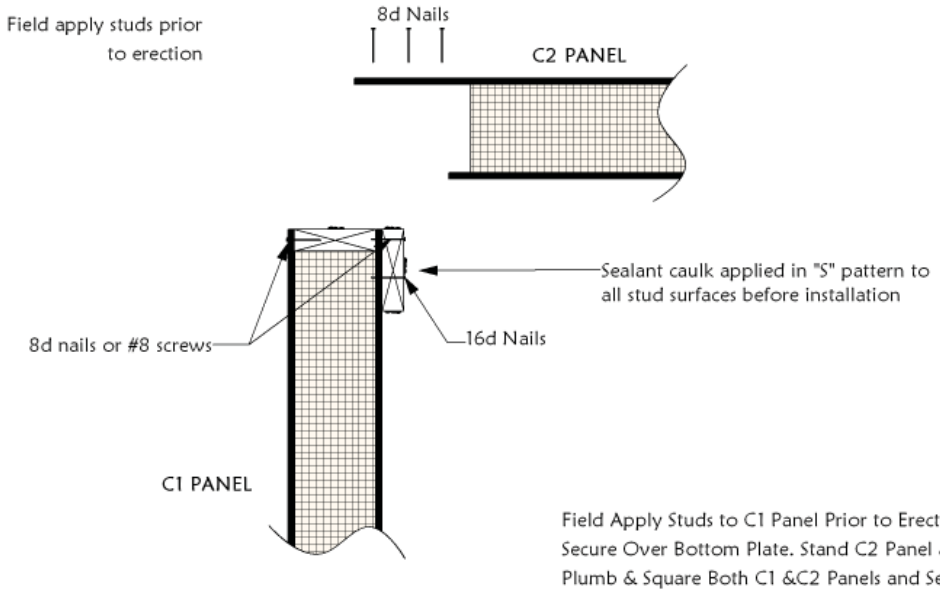
WALL TO FLOOR CONNECTION



Square floor system and mark outer edge of 2x bottom plate 7/16" from edge of floor system, apply two 3/4" beads of exterior grade sealant to sub floor, nail or screw bottom plate to floor securely, Apply 3/4" bead of sealant to top of 2x before placing panel over 2x Plumb and brace panel and attach to bottom plate. Sealant caulk must be compatible with expanded polystyrene (EPS) (See Approved Sealant List pg. VII)

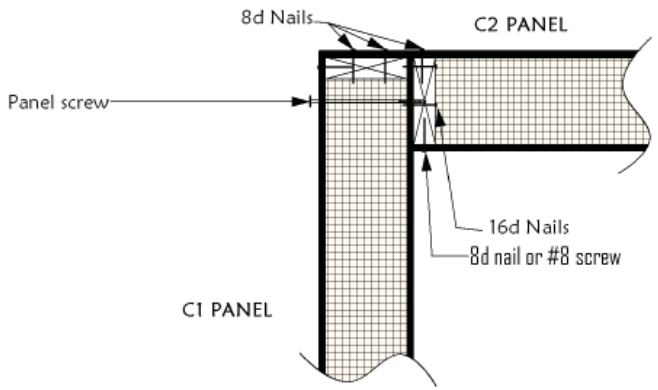
Fig. 22 Attaching Wall Panels to Floor

TYPICAL CORNER CONNECTION



Setting Corner Panels

Position and level C1 panel first. Secure at sill plate with fasteners. Set C2 panel in position and level. Move top of panel C1 in or out of C2 pocket to plumb. Fasten through interior and exterior skin of C2 into studs attached to side and end of C1 Panel



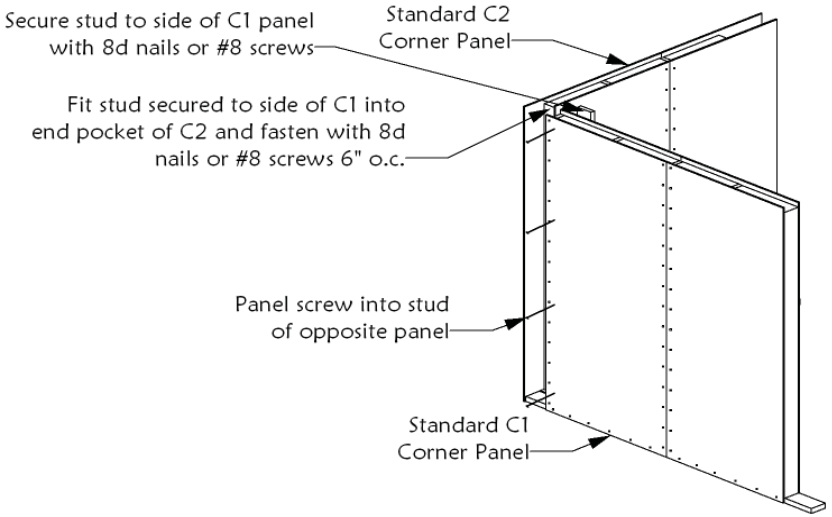
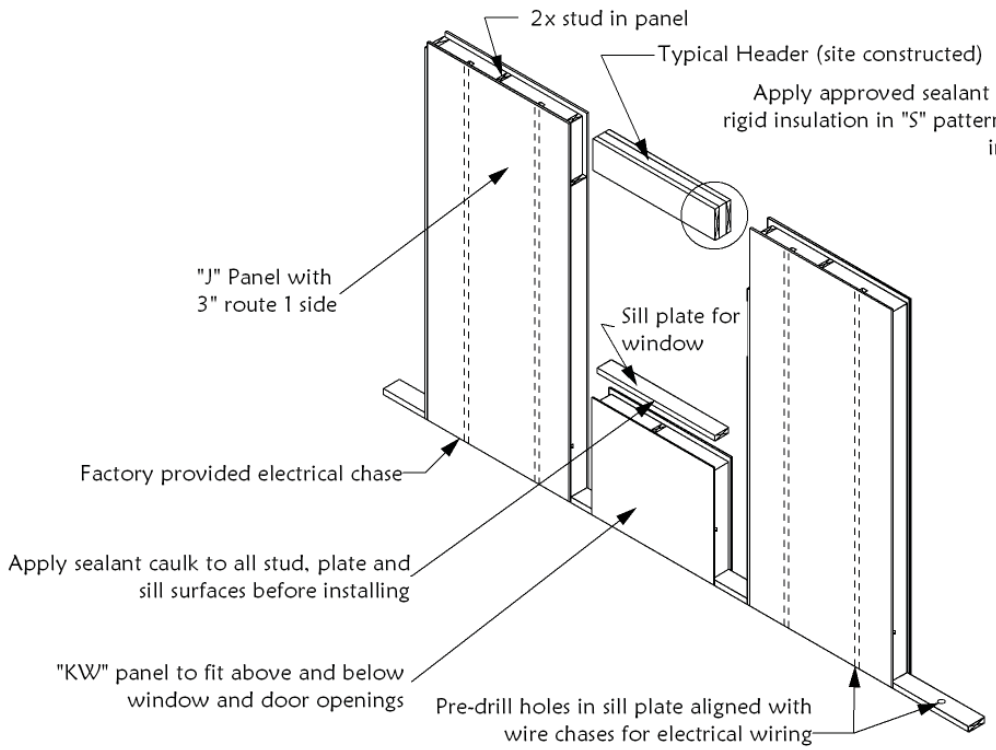
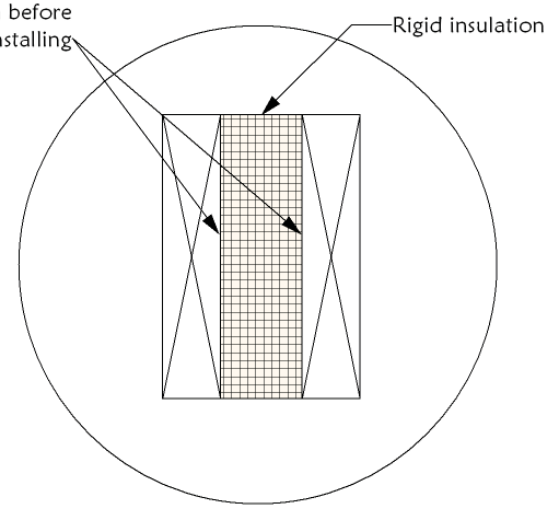


Fig. 23 Typical Corner Attachment

WINDOW AND DOOR OPENINGS





TYPICAL SITE-BUILT HEADER
(materials by others)

IMPORTANT!

Window rough openings by others (all material for headers, connecting studs, sills, etc. calculated and supplied by others)

Locate and Drill Electrical chases through plate and subfloor

Attach all panels to sill and connecting plates 6"-8" o.c. with 8d common nails or coated screws.

For best thermal performance use flexible sealant caulk at all panel joints, and insulate between headers with expanded polystrene (provided by others)

Fig. 24 Creating Window and Door Openings

Eagle Panel Systems Inc., 127 North Maple Street ¤ Mulberry Grove, IL 62262 ¤ (800) 643•3786, fax (618) 326•8620 ¤ www.eaglepanelsystems.com

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