urban Industries, Inc.

P.O. Box 27 Galion, Ohio 44833 419-468-3578 www.urbanindustries.com

Structural Insulated Panel Installation Guidelines

SIPs are simple to use. You can order pre-cut panels that arrive on site ready to set in place. Stand them up, fasten them properly, seal all joints, and in a few days your new project is ready for finish work. To help you get the most satisfaction from your SIP experience, the Structural Insulated Panel Association (SIPA) has put together these Installation Guidelines so you'll get the best performance from your SIPs.

These Guidelines are generic in nature and are not project-specific or all encompassing. Technical drawings for your structure should be properly prepared and engineered by a qualified design professional in accordance with local code requirements.

Contents:

- **Delivery and Site Management**
- **Preparing for Construction**
- **Installing Wall Panels**
- **Installing Roof Panels**
- **Wiring**
- **Finishing Details**

Delivery and Site Management

SIPs are often delivered via tractor and full-length trailer. The off-loading of the panels is the responsibility of the owner / contractor. When notified of the shipment of the delivery, the SIP installer should be available and prepared for the arrival of the truck.

Set aside a level spot to store panels. Try to organize you panel delivery for efficiency – store panels from the first floor separate from panels for the second floor, and so on. Stack panels so that you can read the identifying marks or labels and find each piece when you need it.

Once panels are unloaded, use blocking to keep panels elevated above standing water or contact with the ground. Lay panels flat on stickers, no closer than three inches to the ground. Give the panels plenty of support, and don't let them sag – for 8-foot panels, two stickers are enough, but for 12 to 16-foot panels, use three stickers. For longer panels, don't go more than 6 or 8 feet between stickers.

Panels are rated for exterior exposure during construction but keep them dry when stored on site. Cover them with a loose tarp or sheep of poly. Keep OSB spline material and 2nd top plate material dry and flat. Dimensional lumber to be used for sills, plates, and splines should also be kept flat and dry. If necessary, store construction sealant and expanding foam in a heated enclosure to keep it above the minimum storage and working temperature.

Preparing for Construction

TECHNICAL DRAWINGS

Become familiar with the panel layout and technical drawings. Panel drawings are used to present the four aspects of the panel system: the individual panels, their dimensions, how they fit into the scheme of the building, and connection and installation details. Technical drawings should be properly prepared and engineered by a qualified Design Professional.

SPECIAL TOOLS

Cutting and installing SIPs requires special tools. Cutting of most SIPs (depending on panel thickness) can be accomplished with either a 7-1/4” circular saw by cutting from both sides (finish cutting of the foam core with a hand saw), a 16” circular saw (with carbide-tip blade), or a special bar and chain attachment for a 7-1/4” circular saw.

Routing (removal of the foam core) of SIPs is required for installation of key splines, 2x inlet nailers, plates, headers, etc. The routing of the panels may be accomplished in one of two ways: either with a hot wire cutting tool, or with a mechanical panel router.

When using a hot wire cutting tool, it should be passed along the EPS core at a slow and consistent speed to ensure an accurate cut. When routing inside corners such as a rough opening, a small hand saw and knife may be used to square and remove the foam that the router bit or hot knife cannot reach. This squaring of the inside corners ensures that the nailers and plates fit properly.

Installing Wall Panels

To begin the installation process, determine which corner to use as a starting point. Find the first of two panels that make up this corner. Next, install the corner stud into the end of this first corner panel. Then, find the adjacent corner panel and install the corner stud in the appropriate end of this panel as well. Use construction sealant as noted on the drawing and nail the end studs into position. Continue installing wall panels by following construction details and working in sequence around the building. Install splines and lumber before standing wall panels to save time and for ease of installation.

When appropriate, measure to locate the vertical electrical chase locations on the bottom plate and, with a spade bit, drill wire chase size holes. To double check that the panel you are working with is oriented correctly, make sure that the horizontal wire chases are located at the bottom of the panel when installed.

Use sealant on all panel connection as outlined in your connection details page of your plans. Make sure to double check the fastener schedule for all fastener spacing. If any fastener is missed during the installation process, make sure to go back and complete all fastening requirements.

Wall Installation Do's and Don'ts

DO: Study the installation drawings before setting panels.
DO: Set panels in order. Mark out your wall plates to show where panel edges fall. When setting walls and roofs, it's a good idea to start in corners or valleys and work out – that way, you won't "box yourself into a corner".
DO: Always follow the manufacturer's recommendations for sealing joints properly. Seal joints as you work. Panel joints must be thoroughly sealed to ensure there is no air infiltration from the outside or exfiltration for the inside.
DON'T: Be afraid to field-trim panels for an exact fit. If field-cutting of panels is necessary, it can be done using tools commonly available to the builder. A circular saw, reciprocating saw, and hand saws can perform all cuts required in an installation. Contact your supplier when in doubt.
DO: Install plumbing in interior walls. Furr out interior section for pipes if necessary.

Installing Roof Panels

When installing roof panels, it will benefit the installer to do as much prep work as possible while the panels are still on the ground. Installing lumber and splines to the panels while on the ground will make for a more efficient time-savings. When applicable, multiple panels can be assembled on the ground together and lifted as an assembly.

The most common method of lifting roof panels is to use lifting plates. The lifting plate is a steel plate that is anchored to the outside face of the OSB with multiple screws. Follow the manufacturer's recommended rigging instructions. Always use at least two points for lifting. Install two lifting plates approximately 6" O.C., closer to the top of the SIP. This will ensure that the panel is hung at an angle that matches the roof slope. If necessary, relocate the lifting plates to better match the roof slope.

As with all panel joints, liberal amounts of sealant must be applied between all mating panel edges. It is best to do this from the exterior of roof panels to avoid sealant dripping from the ceiling. As with wall panels, the excess sealant should be scraped off the panels when the roof finishing material is applied. Proper sealing prevents the air leakage that can cause long-term problems with the integrity of the panels, not to mention loss of efficiency of the panel system.

Construction details provided with each job show hoe to best seal the SIP assembly.

After roof panels are installed, make sure that all panels are fastened to the beams, trusses, and bearing wall of the structure. When the roof panels are completely installed, fastened, and any gaps are filled with expanding foam sealant, vapor tape and roofing should be applied as soon as possible to a clean and dry surface. It is a good idea, and strongly recommended, to apply roofing underlayment onto the roof panels the same day the panels are installed.

It is a best practice to follow the installation guidelines for the roofing and siding material used in the structure. Roof systems should only be applied if the materials are clean and dry as typically stated in the manufacturer's installation guide.

Electrical

In the wall panels, horizontal chases are included at the 16" level (for outlets) and at the 44" level (for switches and counter height outlets). Vertical chases, which are located at 4' O.C., allow wire to run vertically through the wall panels to access switch locations and at other locations as needed to provide vertical wiring options for the electrician. The SIP manufacturer typically installs wire chases per this standard, but wire chases can be installed to exactly match an electrical plan. If required, custom wire chase placement should be specified when panel layout drawings are made.

A little forethought toward the design of the electrical system can save a lot of time and aggravation. Generally all, or most all, wiring can be accomplished after panel installation, provided that access to the electrical chase is established during installation. It is recommended that an electrician be on site during the panel installation to ensure that there is adequate access for the required wiring.

Finishing Details

HOUSEWRAP

Exterior cladding shall include a primary and secondary weather resistive system, e.g., drainage plane. Underlayment is required, e.g., common building paper, non-perforated housewrap.

SIDING AND EXTERIOR FINISHES

SIPs are durable, but they aren't designed to get wet. Your house needs exterior finishes that protect the structure from water.

Virtually any type of siding may be applied to the exterior surface of a wall SIP. Some common materials include a variety of vinyl siding, aluminum siding, cementitious and wood sidings. Exterior finishes should always be installed in accordance with the manufacturer's recommended installation instructions and/or acceptable building practices. When installing exterior finishes, it is required to first apply a layer of housewrap or felt paper over the SHIPs to protect them from moisture and/or water damage. The use of flashing and waterproof membranes is recommended in water leak-prone areas for added protection.

ROOFING MATERIALS

Housewrap or a lightweight felt product under the finished roofing materials allows moisture to pass through its membrane while blocking the flow of rainwater and/or condensed moisture. The covering also offers temporary protection of the roof surfaces and does not have to be removed before applying shingles. Finished roofing material can include heavyweight asphalt or composite shingles, metal, wood, or slate. Always install roofing materials according to accepted methods and in accordance with the manufacturer's recommendations.

INTERIOR COMFORT

SIP houses are airtight, so they let you control the indoor environment. A modern ventilation system will let you have fresh air when, how, and where you need it.

A HVAC system must be designed to (1) provide proper ventilation due to the inherent airtightness of the structure; (2) be properly sized to account for the inherent energy efficiency of the structure.

FINISHING DETAILS DO'S AND DON'TS

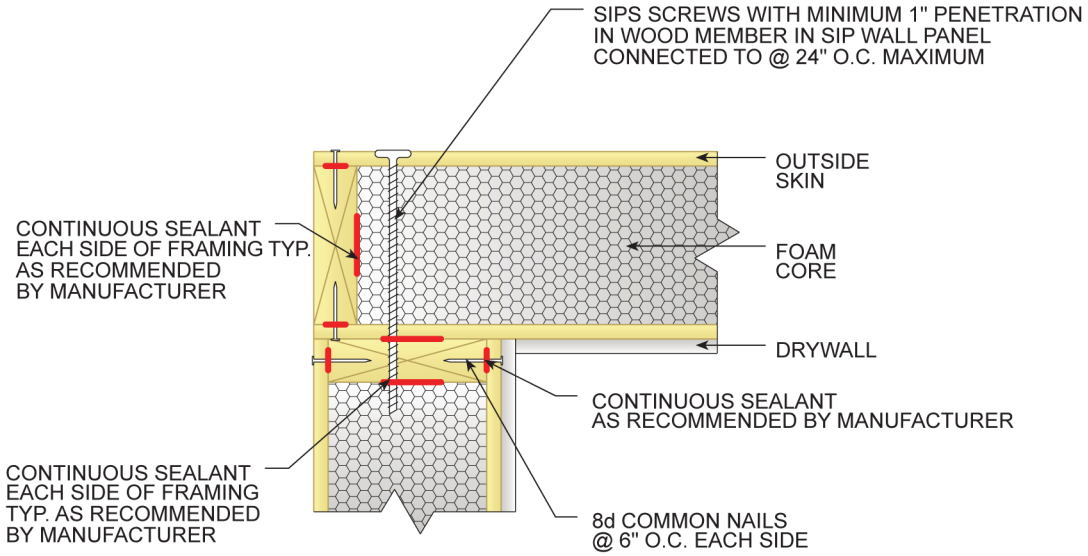
DO: Use proper underlayment for roofing and siding. SIP walls are airtight without housewrap, but they do need a drainage plane material (either housewrap or asphalt paper works well).
DO: Flash all penetrations. Most windows will eventually leak some water at the windowsill; install flashing under and around windows and doors to direct water away from the wall structure. Hose bibs, dryer vents, exterior lights, and the like must also be flashed, as should roof penetrations such as plumbing stacks, chimneys, and skylights.
DO: Install standard deterrents to resist termites and carpenter ants such as insect clips and flashing.
DO: Provide adequate ventilation to maintain indoor air quality.
DO: Provide a mechanical ventilation system. Passive air infiltration will not be enough to provide indoor air quality. In cold climates, use a heat recovery ventilator; you'll save energy, and the incoming air will be tempered for comfort. In hot, humid climates, an energy recovery ventilator is best: these systems take humidity out of the incoming air and transfer it to the exhaust stream, reducing the load on your air conditioner and improving your comfort. Consult with your mechanical contactor for what is best for your project.
DO: Control indoor humidity. High humidity levels can be unhealthy and can damage your building. Set your ventilation system to keep indoor humidity around 40 percent. Install exhaust fans in kitchens, bathrooms, and laundry rooms to expel moist air as needed. Moisture intrusion through slabs, crawlspaces, and basements can be significant, so make sure your foundation has good drainage and provides for control of moisture vapor.

SIP Construction Details

1. Wall-to-Wall Panel Connections, Corner Wall Connection
2. Foundation Connections, Detail A
3. Foundation Connections, Detail B
4. Foundation Connections, Detail C
5. Roof-to-Roof Panel Connections, Foam Ridge Cap Detail
6. Roof-to-Roof Panel Connections, Beveled SIP Ridge Detail
7. Roof-to-Wall Panel Connections, Beveled SIP Wall
8. Roof-to-Wall Panel Connections, Wedge Infill Piece
9. Roof-to-Roof Panel Connections, Ridge Detail at Cantilever
10. Second Floor Connections Details, Hanging Floor
11. Second Floor Connections Details, Rim Board
12. Eaves Detailing, Eaves Detail A
13. Eaves Detailing, Eaves Detail B
14. Eaves Detailing, Eaves Detail C
15. Eaves Detailing, Eaves Detail D
16. Eaves Detailing, Eaves Detail E
17. Wall-to-Wall Vertical Panel Connections, Surface Spline for Vertical Splice
18. Door and Window Framing
19. Wall-to-Wall Vertical Panel Connections, Dimensional Lumber Spline
20. Roof-to-Roof Panel Connections, Valley Detail
21. Wall-to-Wall Vertical Panel Connections, Block Spline

SIP CONSTRUCTION DETAILS

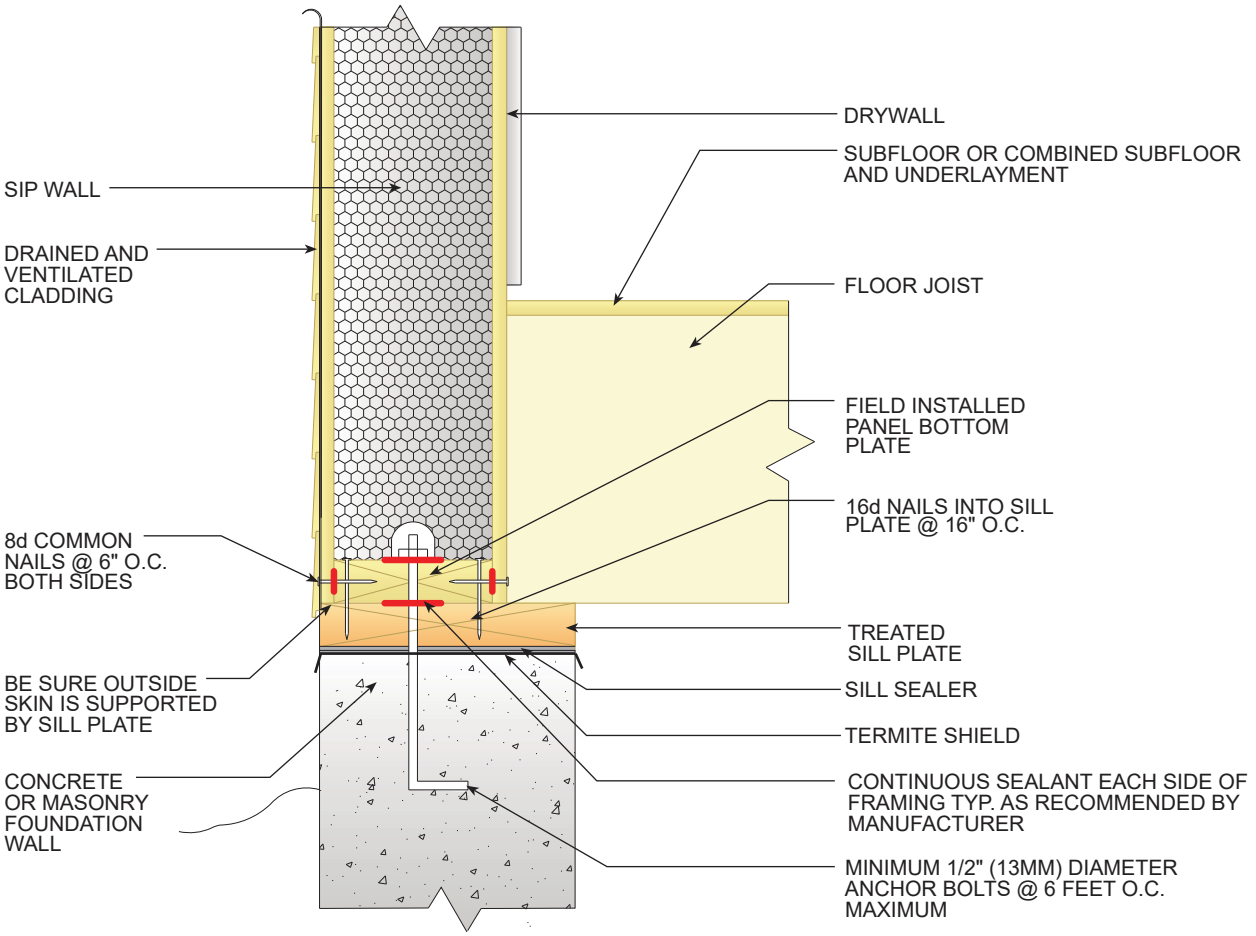
These are conceptual drawings only intended for general reference. You should always have your plans approved by an engineer to meet your local building code.



WALL-TO-WALL PANEL CONNECTIONS

CORNER WALL CONNECTION

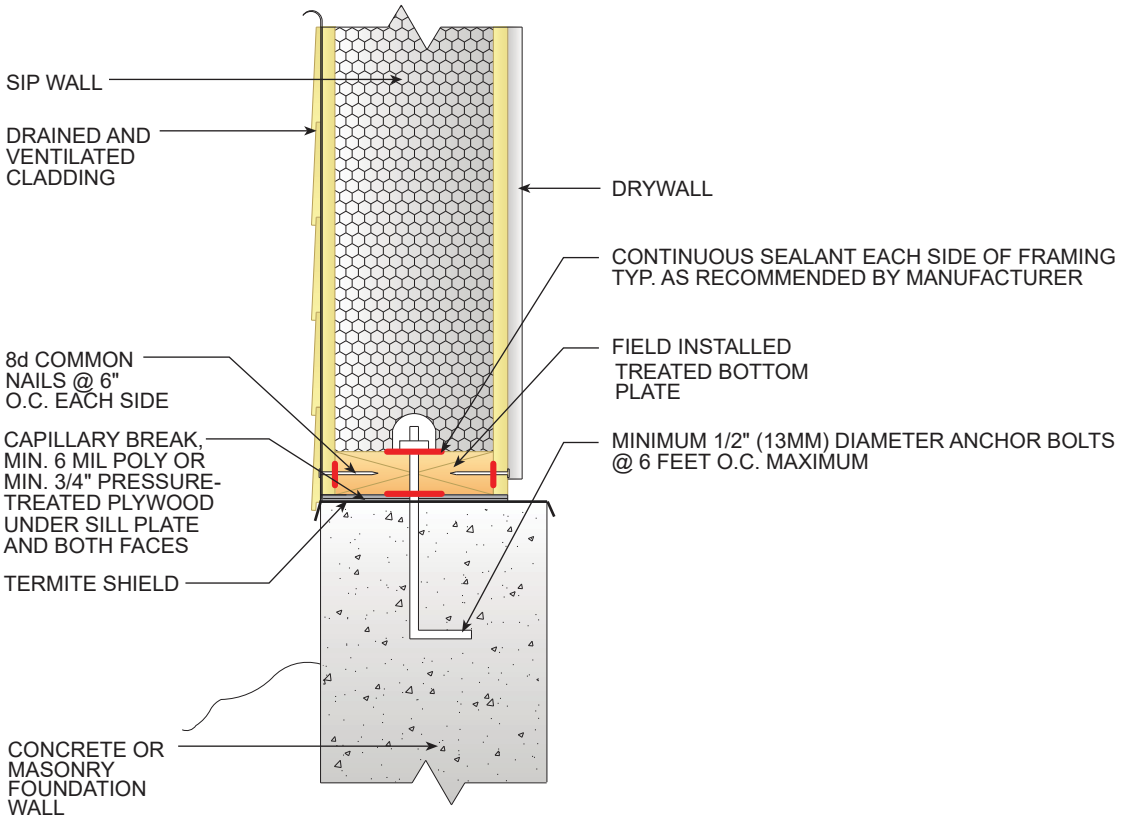
Fig. 1



FOUNDATION CONNECTIONS

FOUNDATION CONNECTION DETAIL A

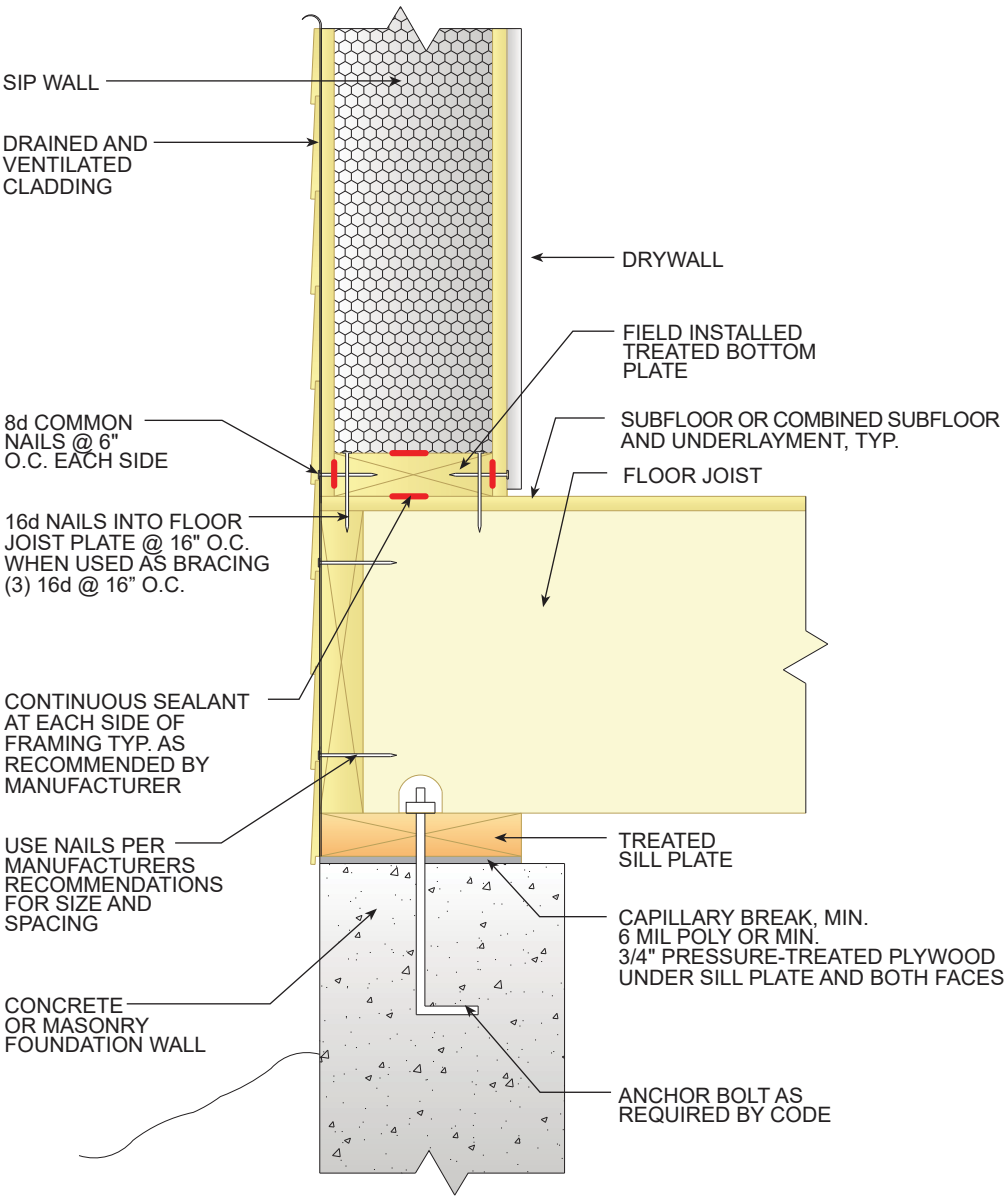
Fig. 2



FOUNDATION CONNECTIONS

FOUNDATION CONNECTION DETAIL B

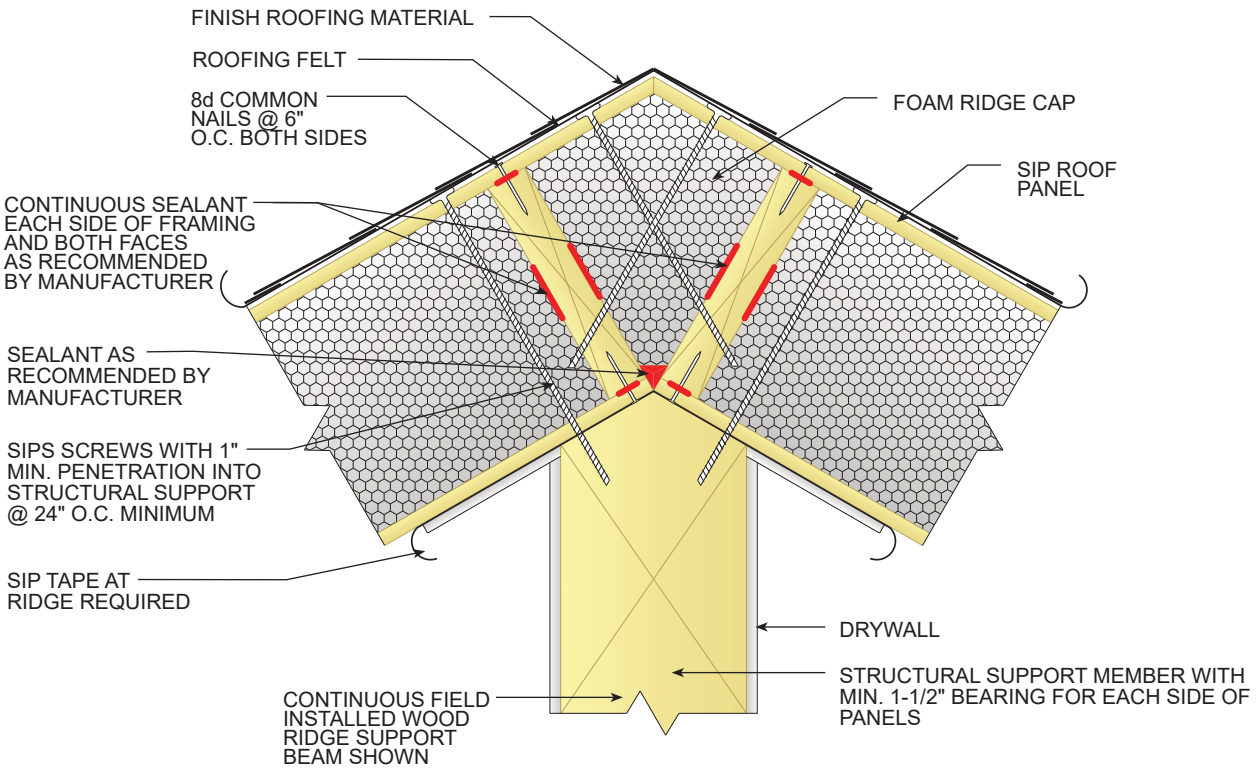
Fig. 3



FOUNDATION CONNECTIONS

FOUNDATION CONNECTION DETAIL C

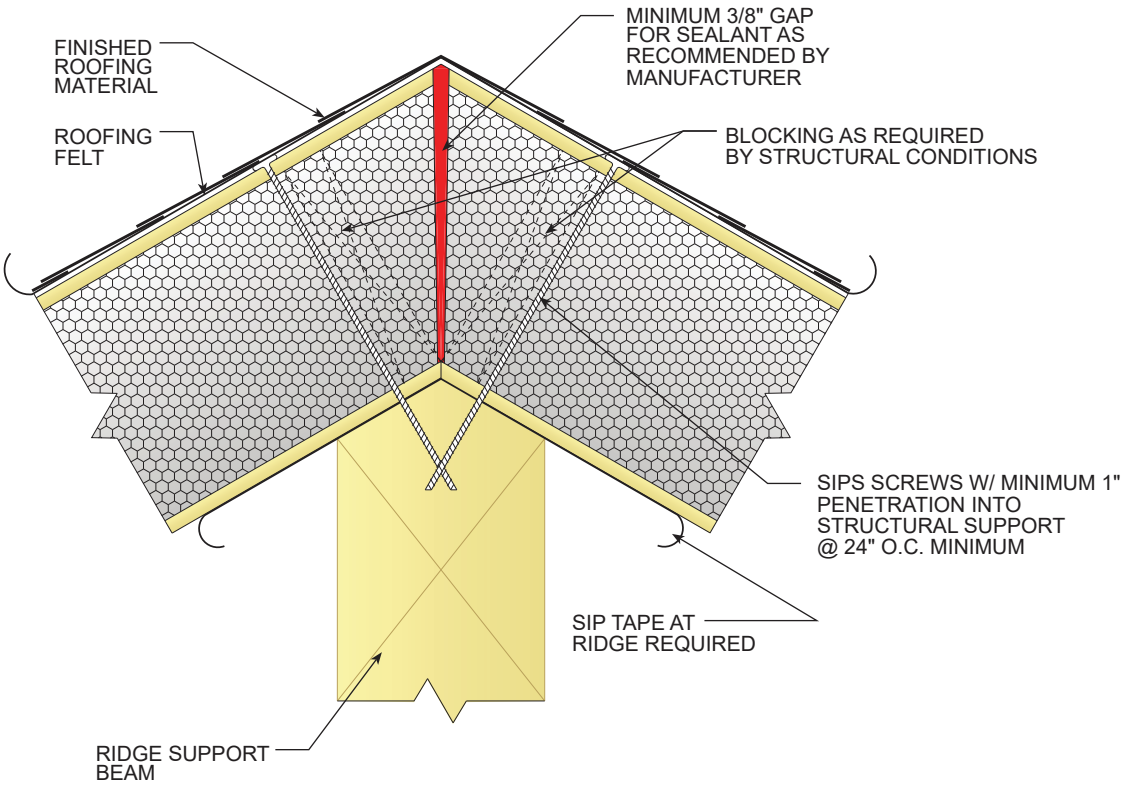
Fig. 4



ROOF-TO-ROOF PANEL CONNECTIONS

FOAM RIDGE CAP DETAIL

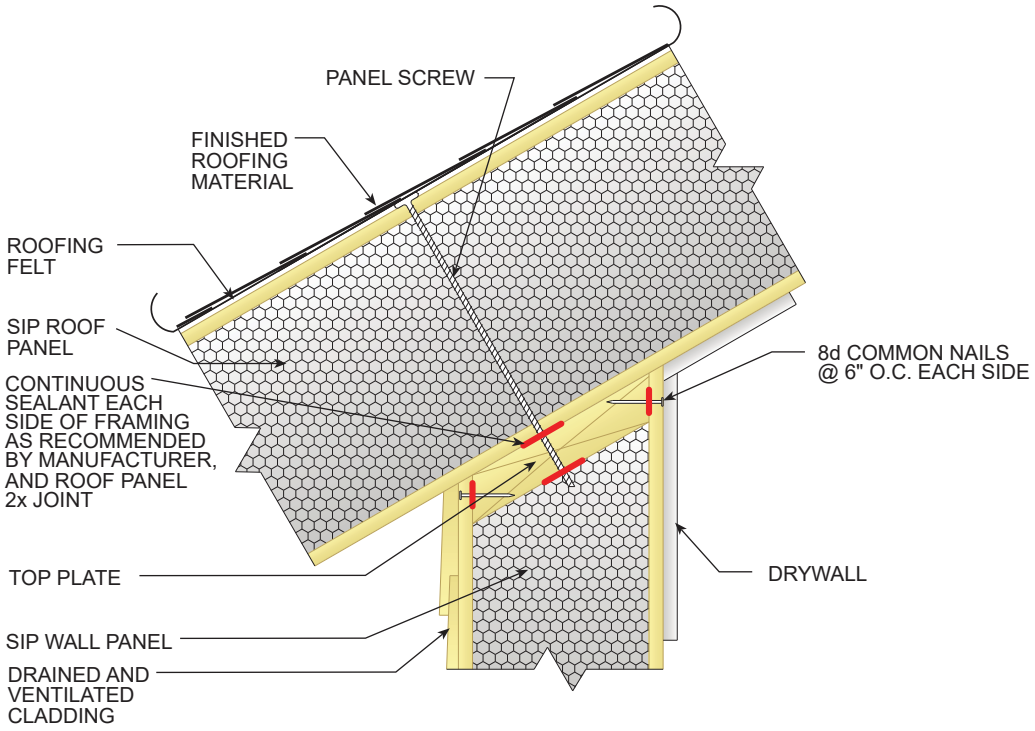
Fig. 5



ROOF-TO-ROOF PANEL CONNECTIONS

BEVELED SIP RIDGE DETAIL

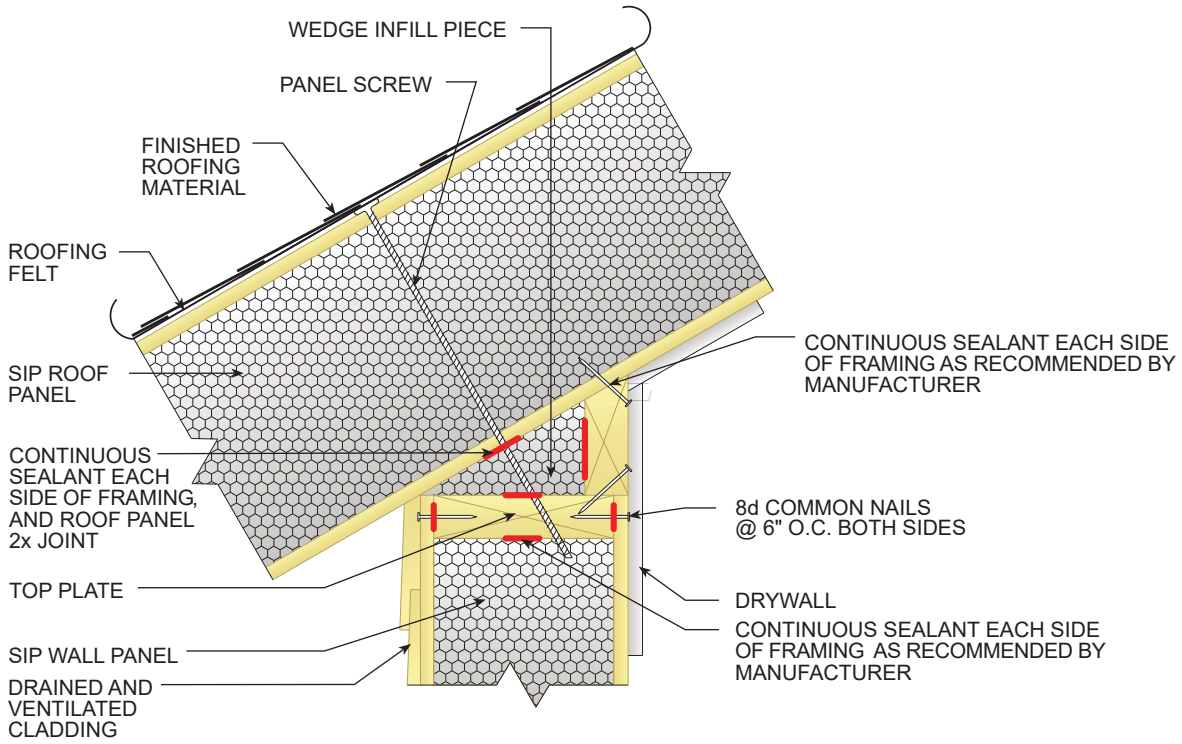
Fig. 6



ROOF-TO-WALL PANEL CONNECTIONS

BEVELED SIP WALL

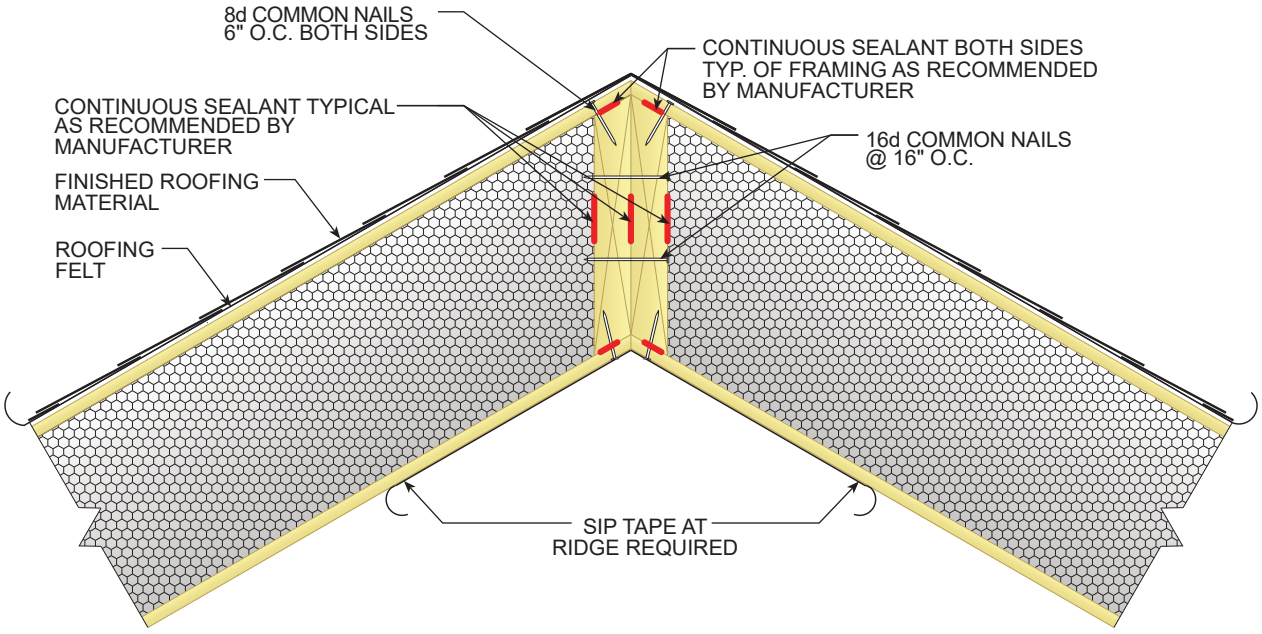
Fig. 7



ROOF-TO-WALL PANEL CONNECTIONS

WEDGE INFILL PIECE

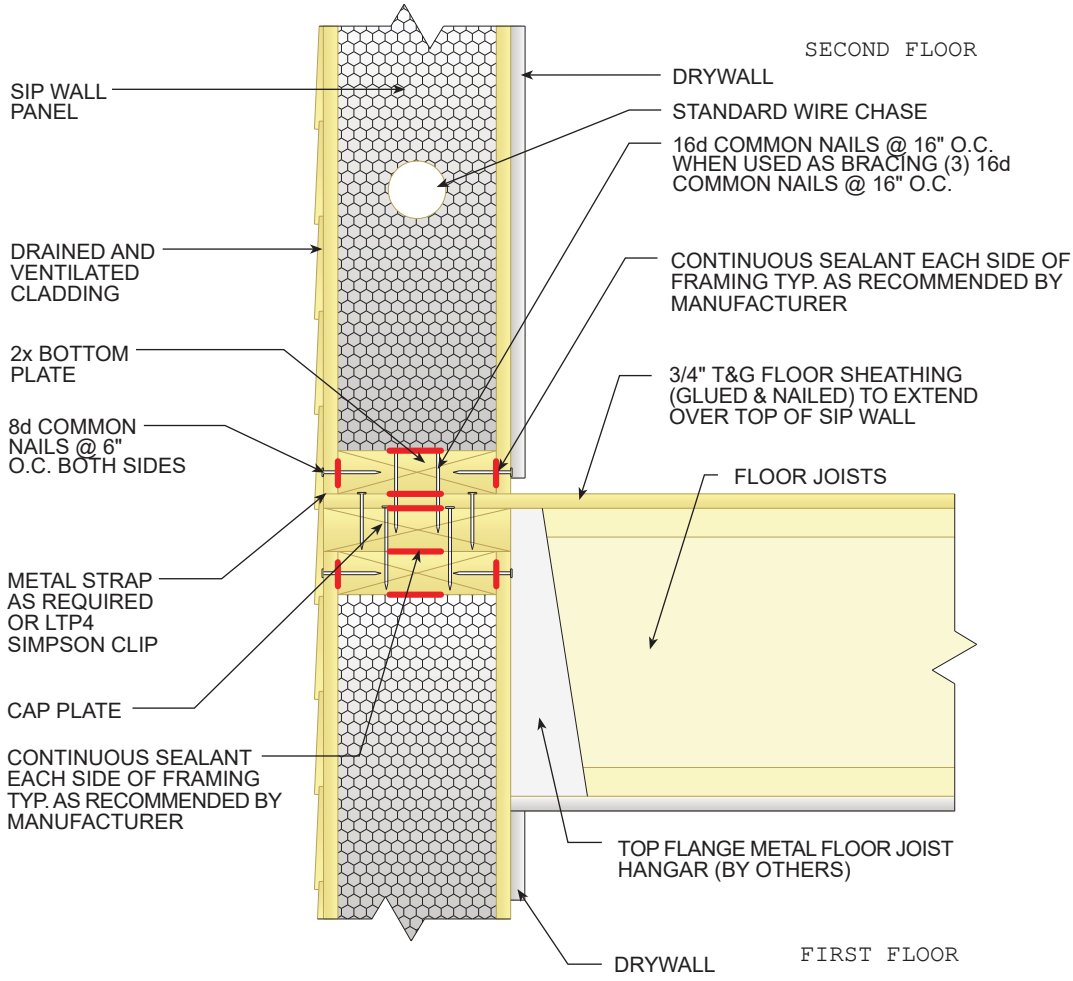
Fig. 8



ROOF-TO-ROOF PANEL CONNECTIONS

RIDGE DETAIL AT CANTILEVER (LIMIT 2' OVERHANG)

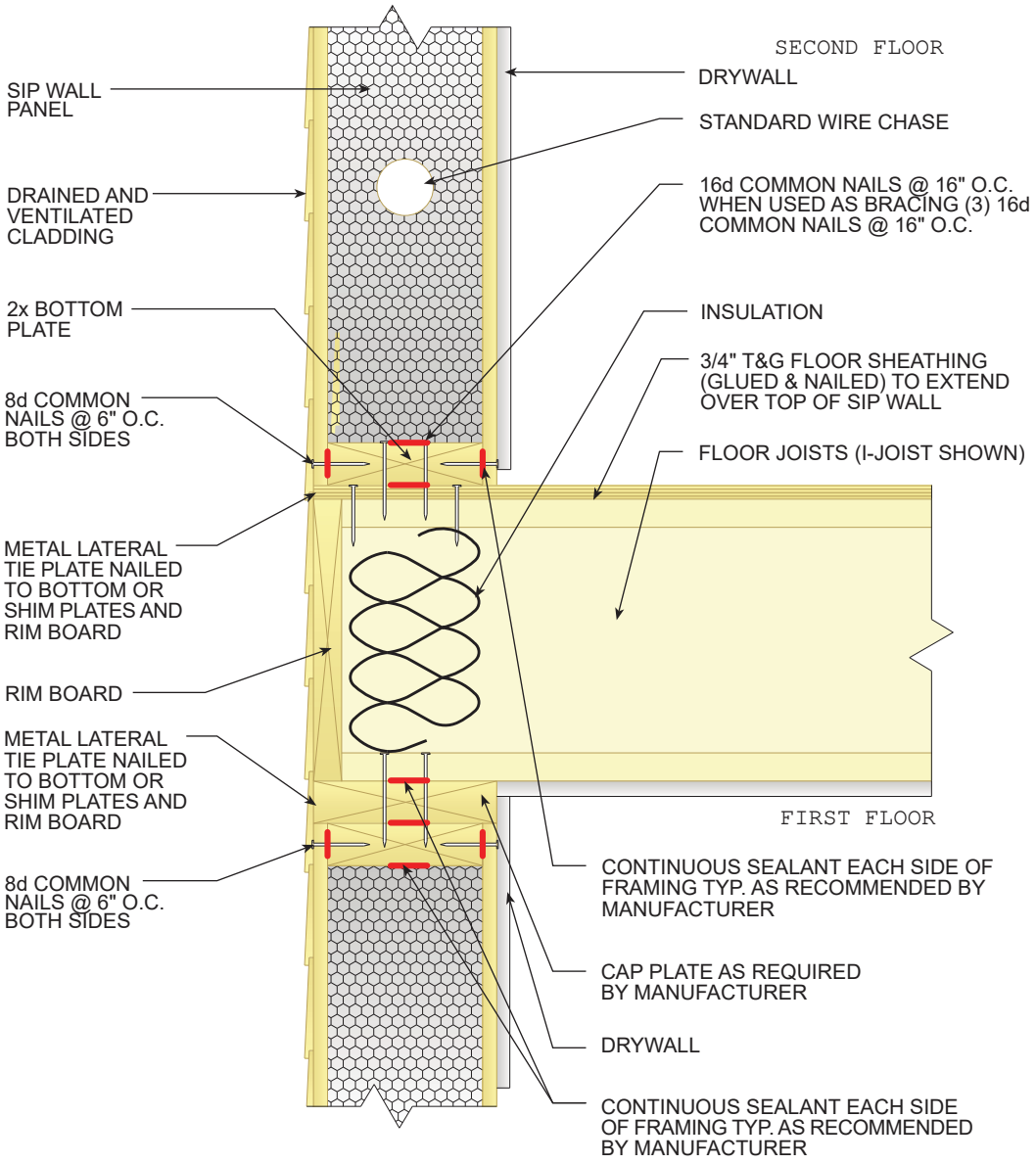
Fig. 9



2ND FLOOR CONNECTION DETAILS

HANGING FLOOR

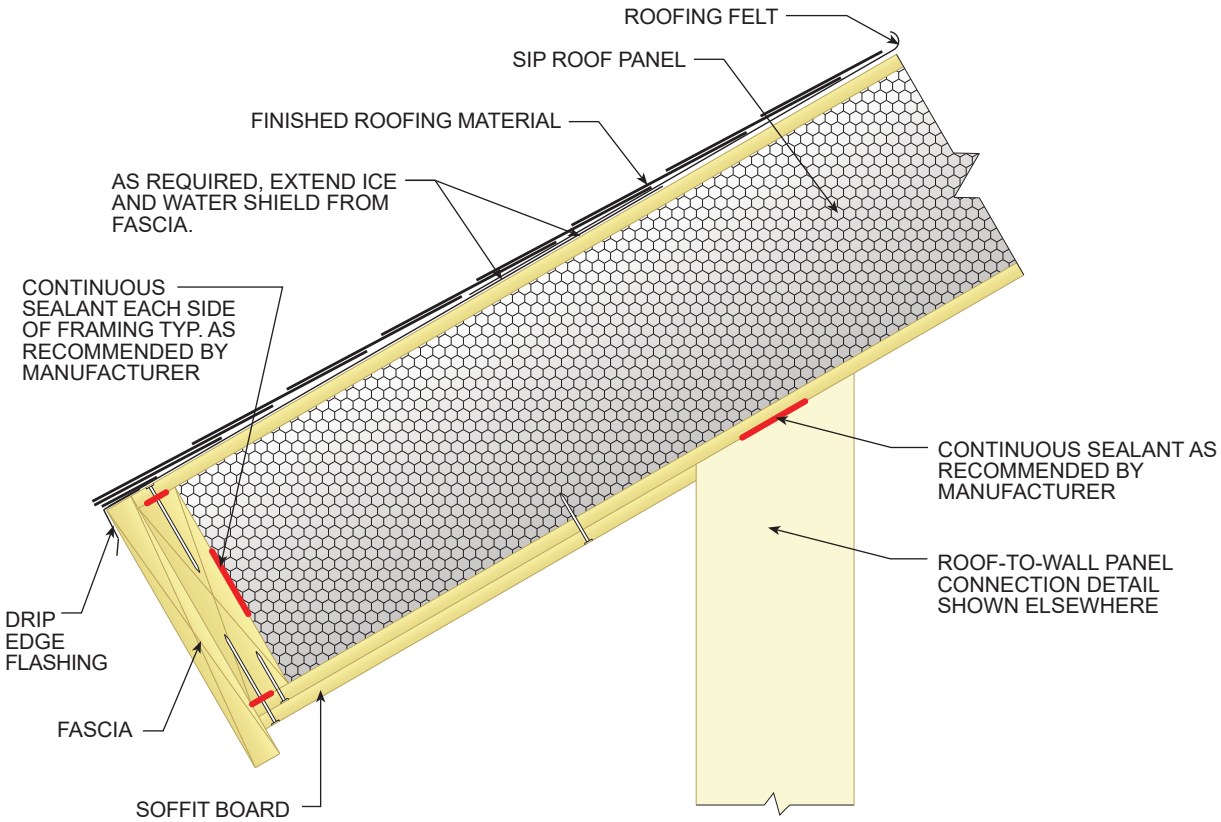
Fig. 10



2ND FLOOR CONNECTION DETAILS

RIM BOARD

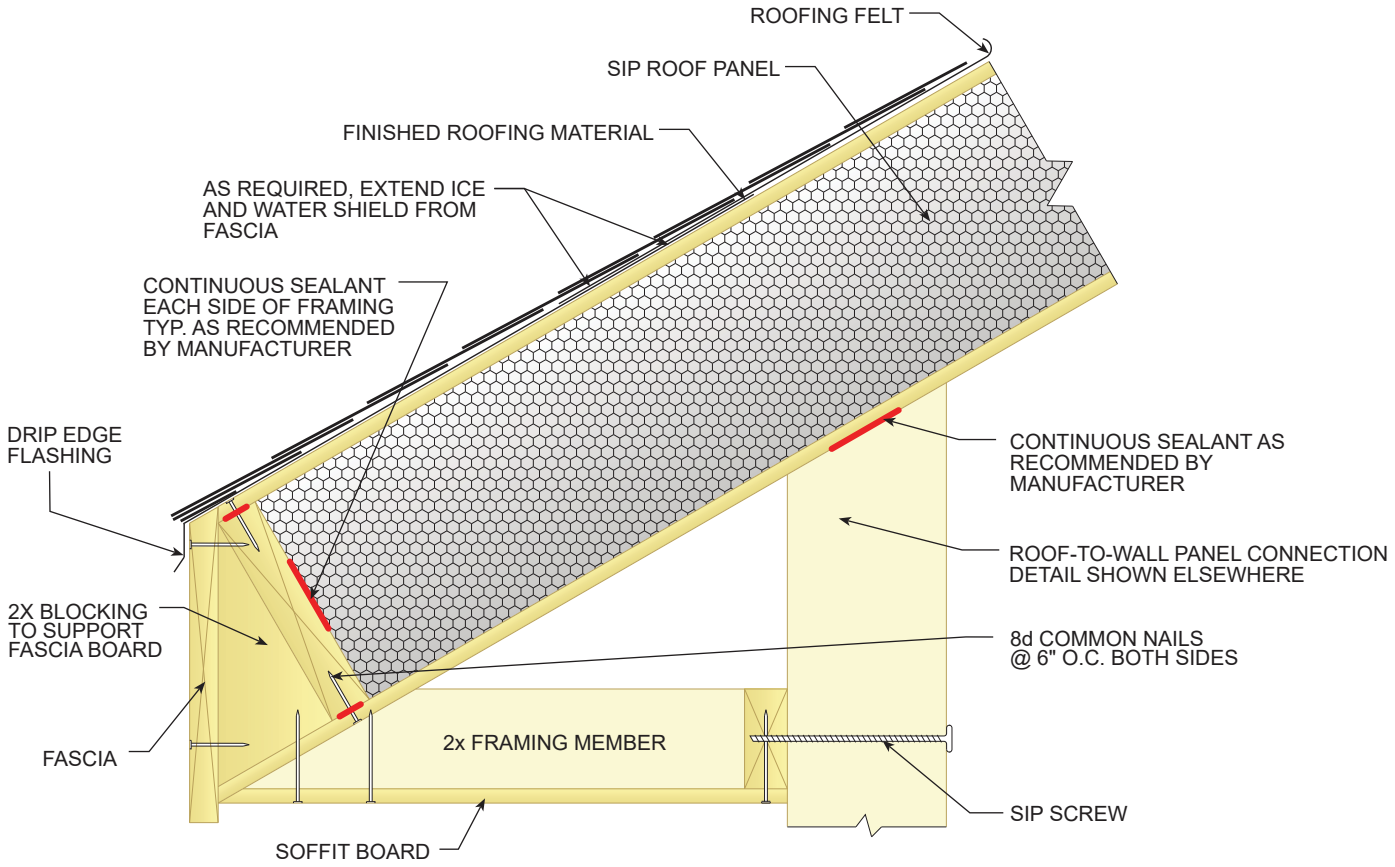
Fig. 11



EAVES DETAILING

EAVES DETAIL A

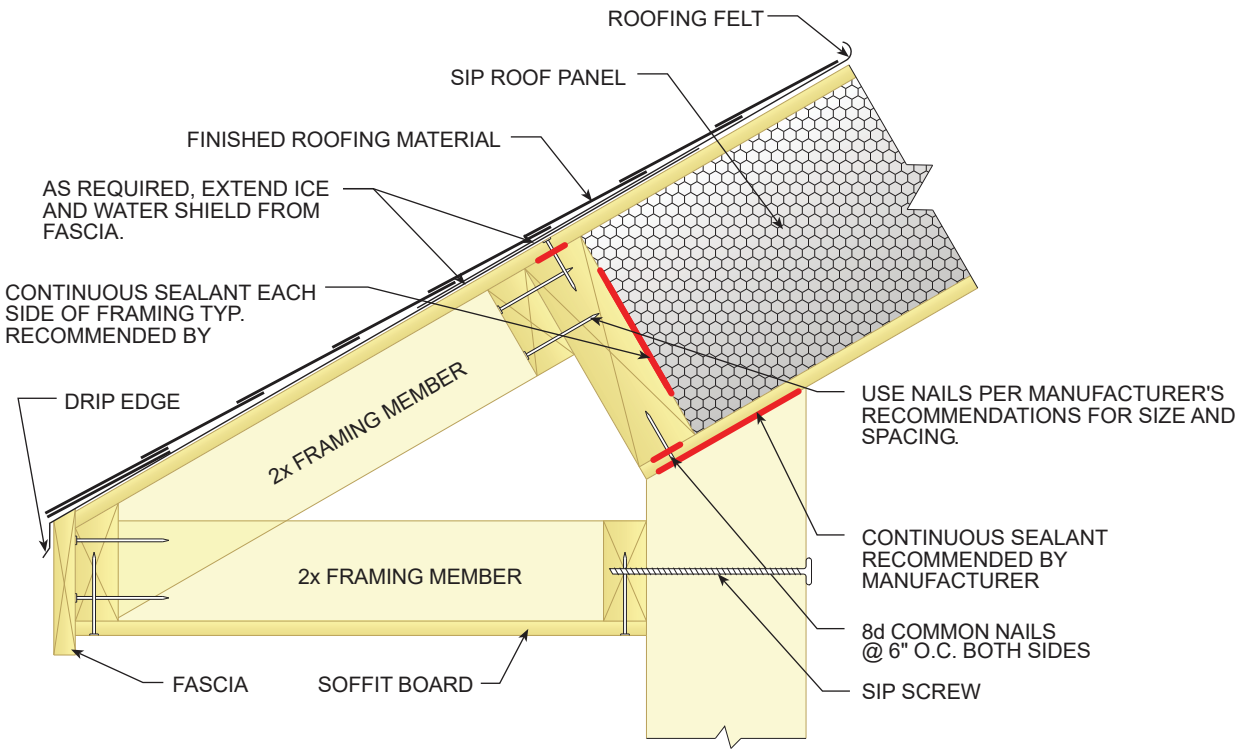
Fig. 12



EAVES DETAILING

EAVES DETAIL B

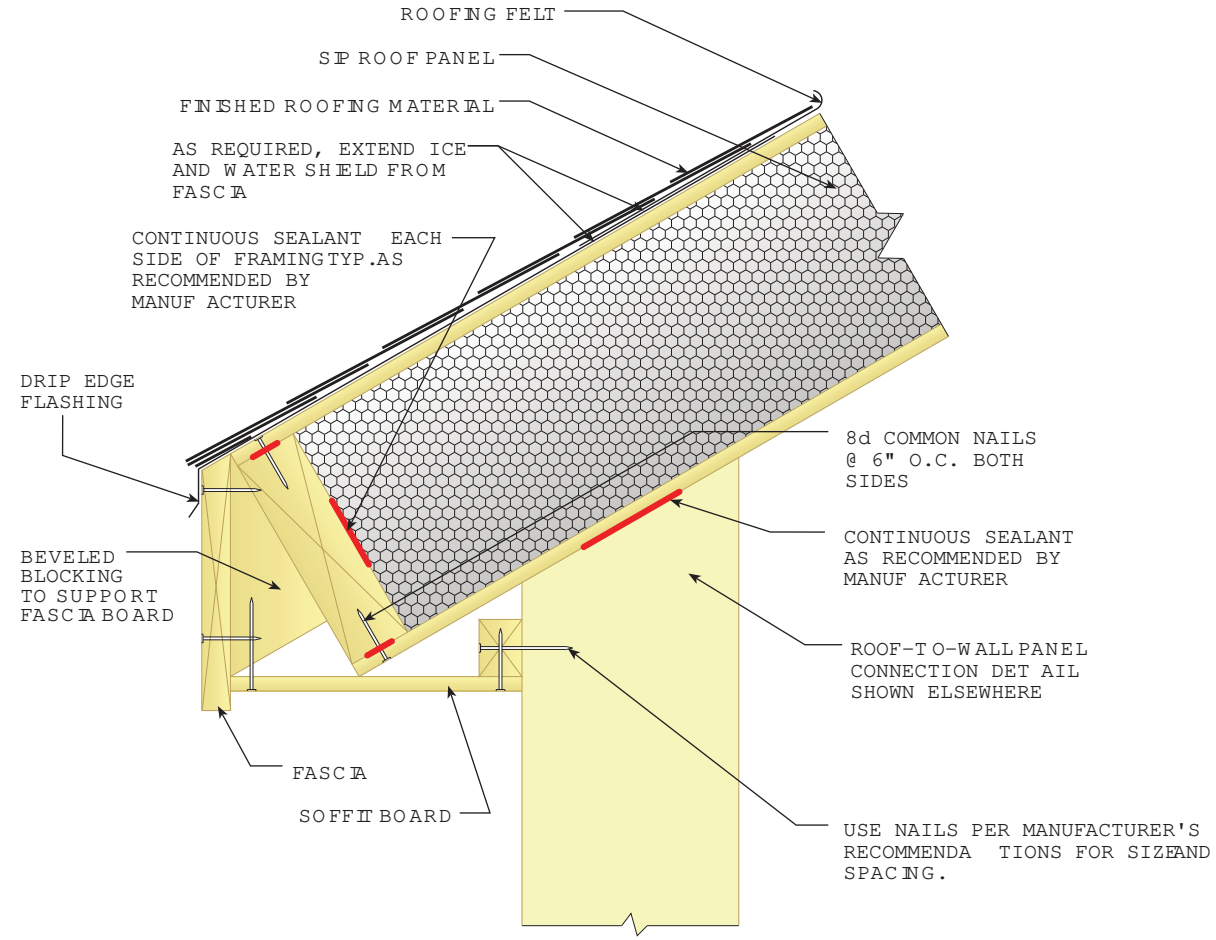
Fig. 13



EAVES DETAILING

EAVES DETAIL C

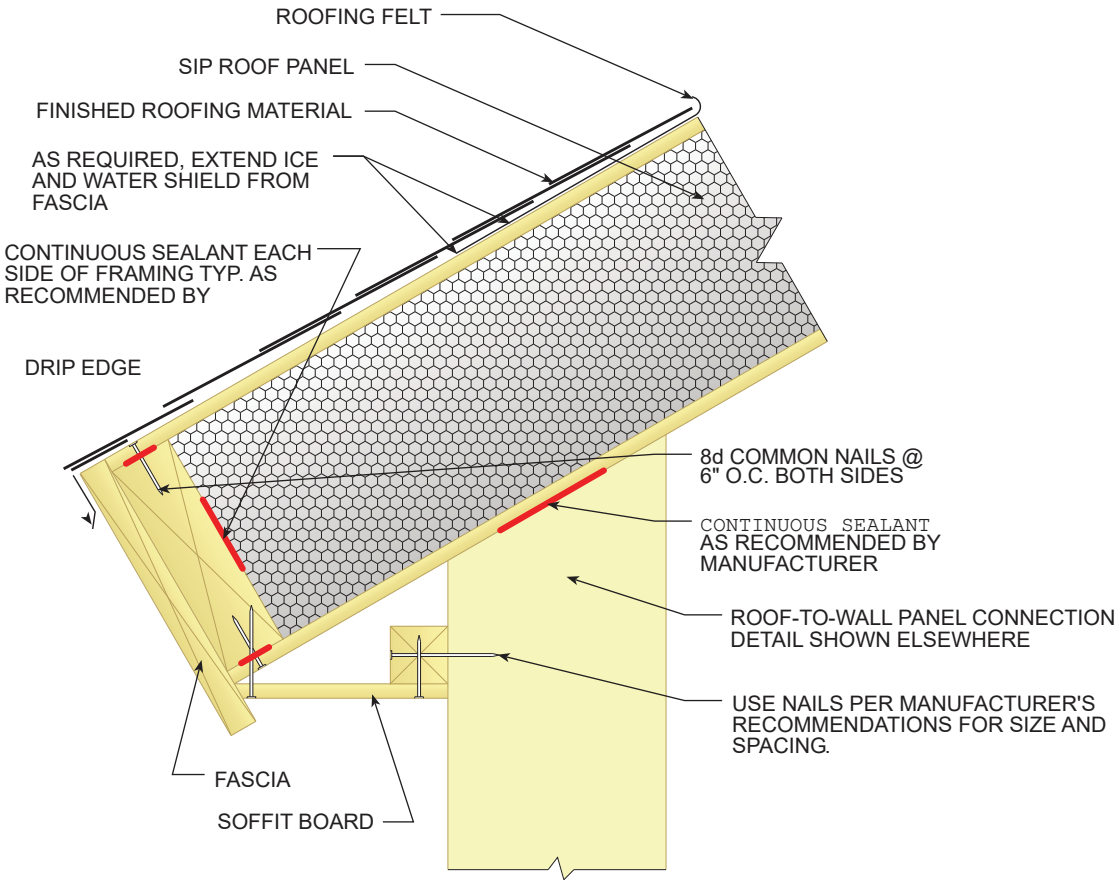
Fig. 14



EAVES DETAILING

EAVES DETAILD

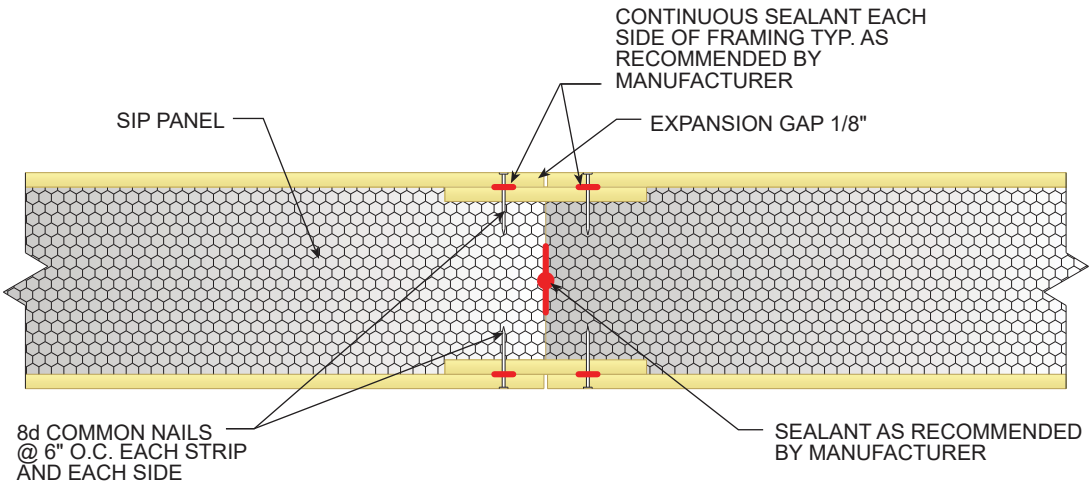
Fig. 51

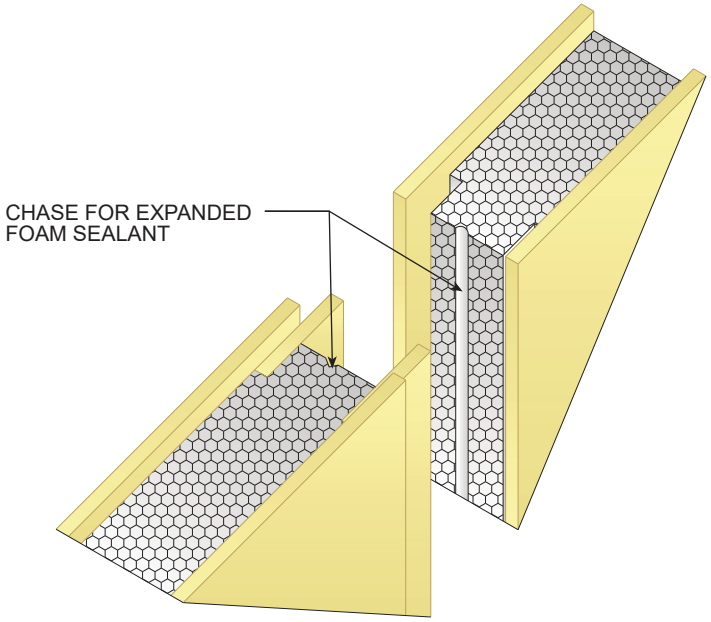


EAVES DETAILING

EAVES DETAIL E

Fig. 16

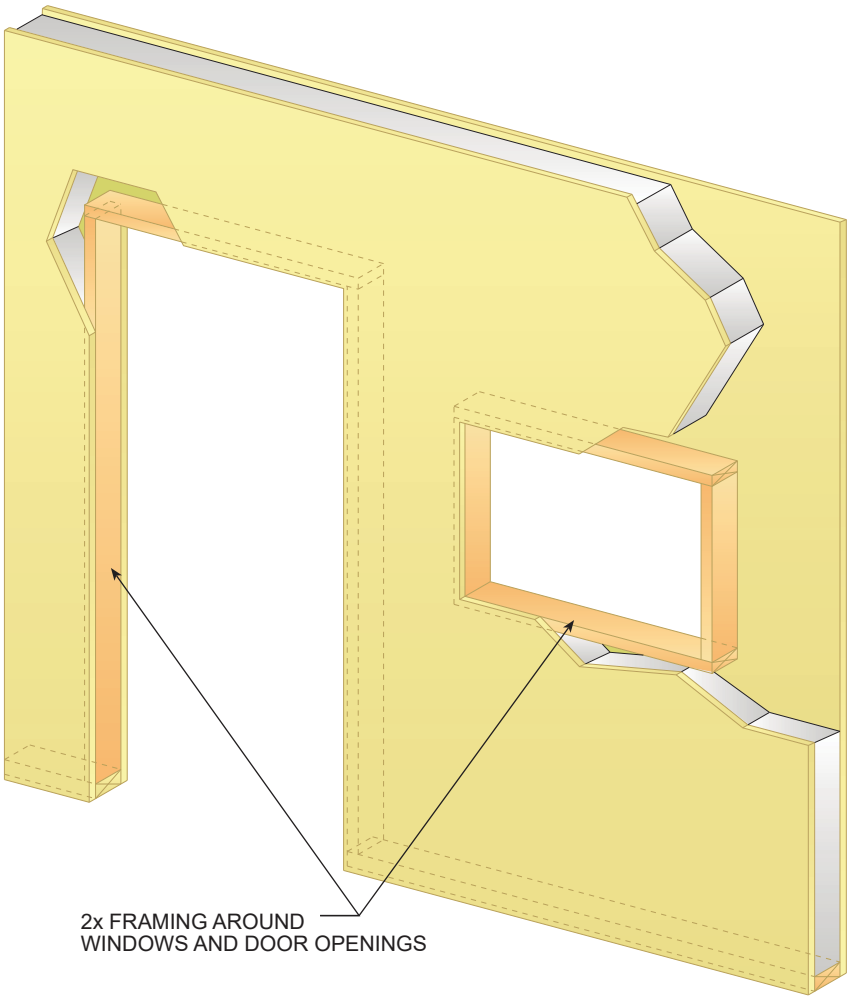




WALL-TO-WALL VERTICAL PANEL CONNECTIONS

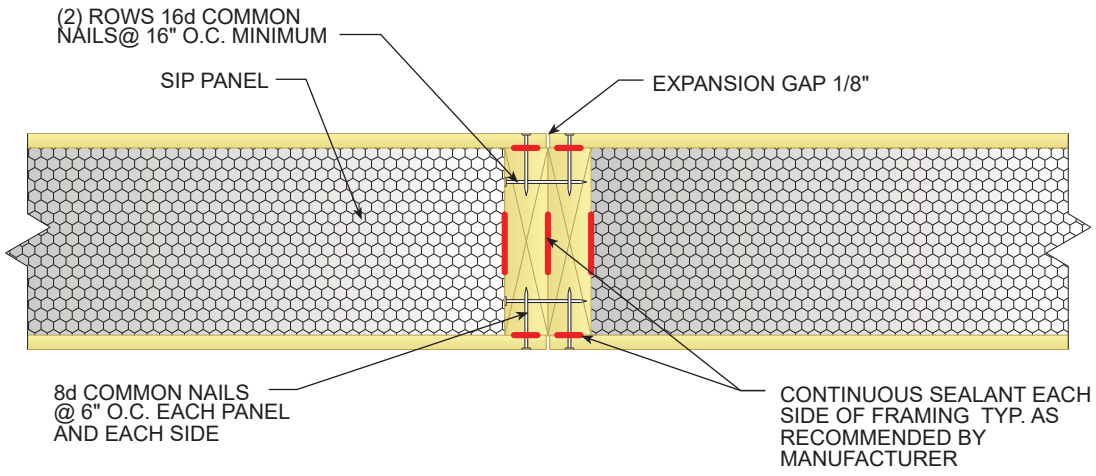
SURFACE SPLINE FOR VERTICAL SPLICE

Fig. 17



DOOR AND WINDOW FRAMING

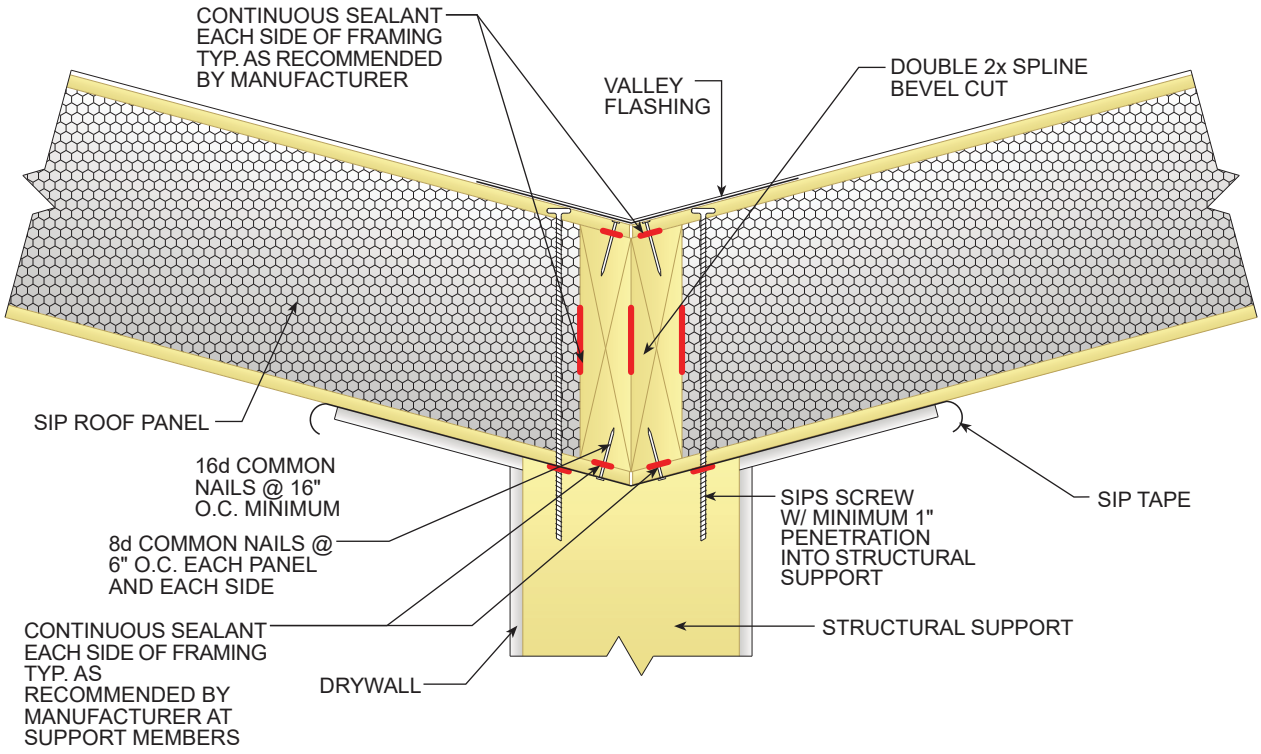
Fig. 18



WALL-TO-WALL VERTICAL PANEL CONNECTIONS

DIMENSIONAL LUMBER SPLINE

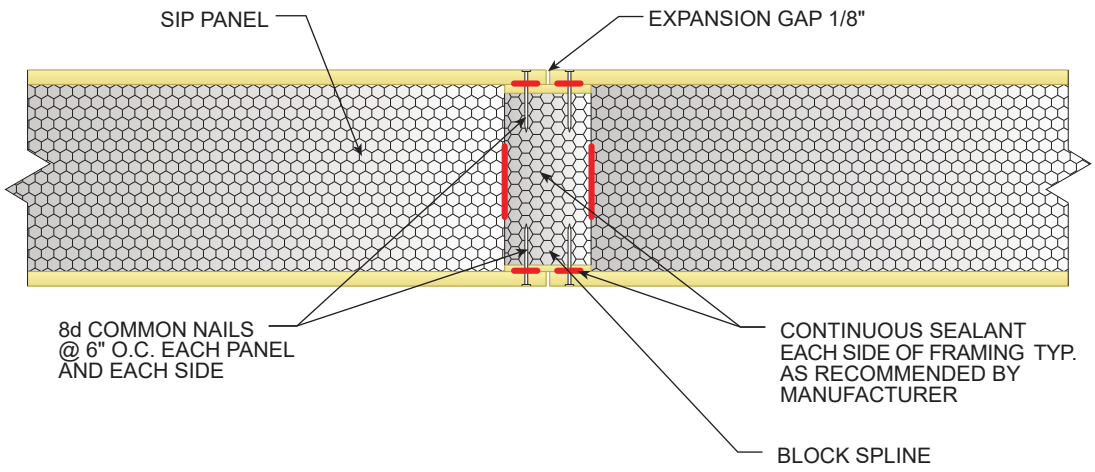
Fig. 19



ROOF-TO-ROOF PANEL CONNECTIONS

VALLEY DETAIL

Fig. 20



WALL-TO-WALL VERTICAL PANEL CONNECTIONS

BLOCK SPLINE

Fig. 21