



CONSTRUCTION GUIDE

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NOTE: Enercept Product Bulletins (refer to Enercept website for bulletin updates)
supercede drawings, procedures, and requirements shown in this Guide as applicable.



This construction guide will provide direction in the installation of your Enercept panel project. Please thoroughly read and become familiar with this guide before beginning. The energy efficiency, strength and construction techniques of this building system are a result of extensive engineering, design testing and experience. These qualities can only be assured by adherence to the procedures set forth in this guide.

Before starting work on your project, we recommend that you contact your local insurance agent to provide you with the proper coverage in all phases of construction and building management.

Above all, we want your business and are confident you will appreciate our product and doing business with us.

APPROVALS

Approvals:	Enercept	Insulation Materials:	
	FHA	FHA	IBC
	ESR #1780	IRC	BOCA
	ENR012012-21	HUD	SBCC

Sheathing:	HUD/FHA
	IRC
	B.O.C.A.
	S.B.C.C.
	C.A.B.O.

NOTICE

The information and data contained in this construction guide have been certified by registered licensed professional engineers and is believed to be reliable. This guide is not a part of our sales agreement.

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SECTION 1

GENERAL INFORMATION



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GENERAL CONSTRUCTION PROCEDURES

1. Handling / Panel Storage: Do not lift or carry panels by the top skin recesses (panel edges). Stack panels on an elevated, level, well drained area on blocks (dunnage) spaced 6' or less and protect from the elements with tarps or similar protective coverings. The OSB sheathing and connection members of the panels are wood products and may swell after exposure to moisture.
2. You must inventory panels, plate material, beams, connectors, sealants or any other supplied materials upon delivery.
3. Like most construction materials, Enercept panels are combustible and should not be exposed to flame or other ignition sources.
4. Review all panel layouts, section / details and construction guide before starting construction. Project specifics, panel layouts, sections, and electrical supercede the Enercept construction guide.
5. Footing / Slab / Floor System: Must be LEVEL and SQUARE before the sill plate is fastened down. Squareness and proper alignment of the sill plates are critical to the Enercept System. (See foundation, basement and wall sections.) Double check foundation or floor system dimensions.
6. All straps and hold downs must be installed as specified.
7. Follow all recommended nail, connector and screw spacings.
8. Drill matching access holes in sill and top plates that align with the vertical electrical chases in panels.
9. Builder must continually check to make sure that all centerline dimensions are maintained. (See basement and wall sections & notes on management of growth.)
10. Enercept will not be responsible for on-site alterations or modifications to the panels as manufactured unless: (A) illustrated in the Enercept Construction Guide, or (B) approved in advance by authorized Enercept personnel. (CALL BEFORE YOU CUT).
11. Adequate wind bracing must be used during construction.
12. Seal all penetrations in the panels after plumbing and electrical are in place with expanding foam sealant, including electrical, plumbing and HVAC.

GENERAL CONSTRUCTION PROCEDURES

13. Before backfilling basement / foundation panels, the floor system, framing anchors, joist / truss blocking and any shear walls that are required must be installed. Follow backfill guidelines (see basement section).
14. Use only sealants and sill sealer approved for use with expanded polystyrene foam (EPS). Panel joints must be sealed to prevent air infiltration / exfiltration.
15. Seam tape is normally applied to interior panel seams only (typically the warm side of the panel). Alternatively, 6 mil poly may be used in lieu of seam tape.
16. Wall and roof panels must be completely dry before covering with house wraps, building paper, and roofing materials.
17. All over-framed areas must be ventilated.
18. Please make SAFETY your first and foremost consideration.

IMPORTANT!

Your Enercept home has been designed to be very air tight. We highly recommend that you work with a heating, ventilation, and air conditioning (HVAC) professional to design a ventilation system that will insure indoor air quality and moisture/humidity control. Seam tape or a 6-mil interior vapor barrier as outlined later, should be installed to protect panels from exposure to indoor moisture and humidity. Failure to control indoor humidity may cause moisture damage to your panels. Air-to-air heat exchangers / ventilators are commonly used in Enercept structures.

MATERIALS LIST

The following items are included in the standard Enercept System package (Wall & Structural Roof panels).

1. 2x sill plate (treated if required)
2. Wall panels with pre-cut door/window R.O.'s
3. 16" horizontal electrical chases / 44" chases at kitchen & bath
4. Vertical electrical chases (door / windows)
5. Gable panels / gabled wall panels
6. 2x single top plate and 1 1/8" cap plate
7. Center ridge / valley beams (optional)
8. Roof panels
9. Wall & roof connectors (as required)
 - A. "T" connectors / beam brackets
 - B. Framing anchors
 - C. SIP screws
10. Wall to roof EPS wedge
11. Wall to roof wood support block
12. 1 1/2" or 3/4" OSB strips (window trim)
13. Sealant / sill sealer
14. Expanding foam sealant & cleaner (optional)

GENERAL INFORMATION

Window / Door jamb sizes (using 1/2" drywall): 4" wall panels - 4 15/16", 6" wall panels - 6 15/16", 8" wall panels - 8 11/16", 6" basement panels - 7", 8" basement panels - 8 3/4".

Enercept prohibits the use of recessed lighting or heating panels in all panels.

All flame sources, i.e. fireplace, furnace, water heater, etc., require a supply of external combustion air.

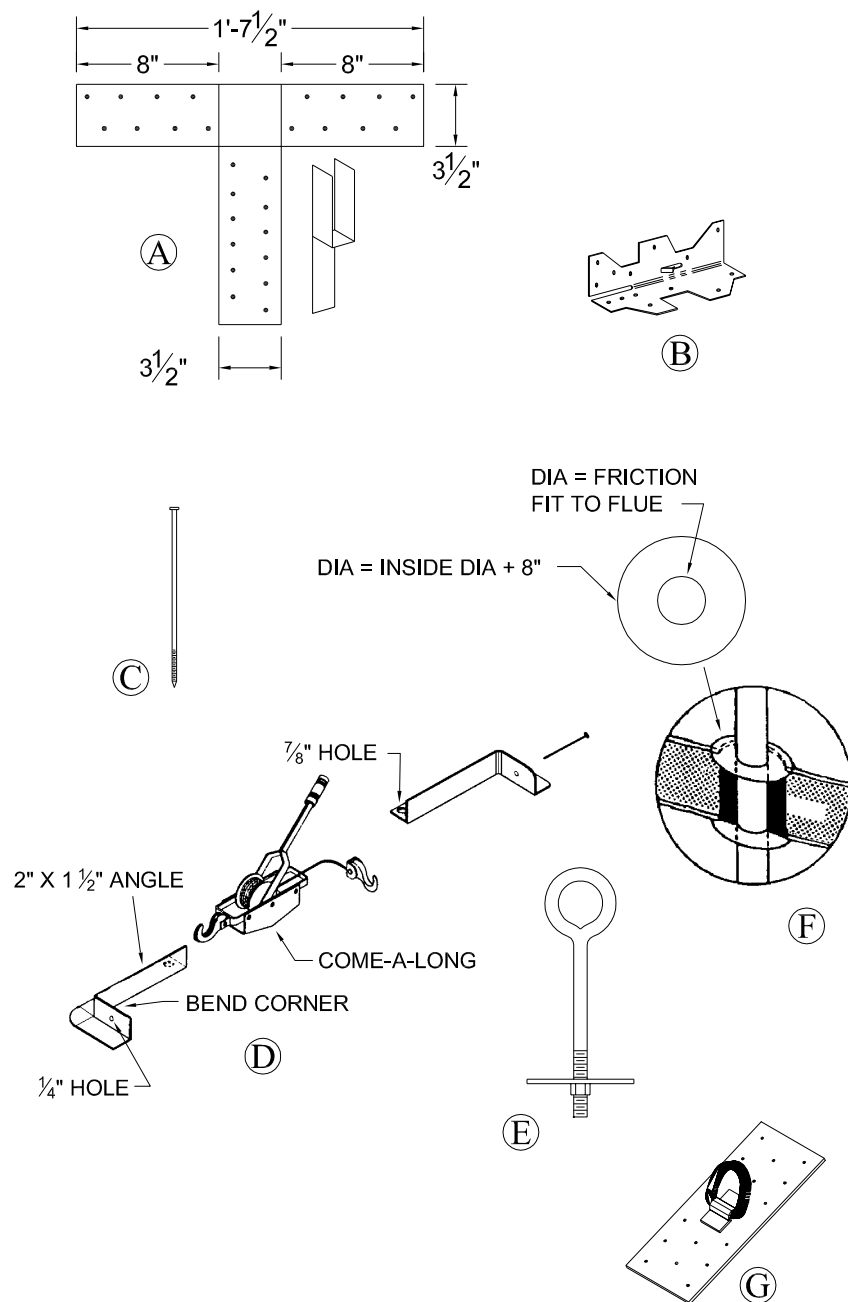
Copper shingles / copper roof coverings should not be applied directly to Enercept roof panels.

TOOLS REQUIRED

- | | |
|---------------------|-----------------------------|
| 1. Hammer | 9. 1" Wood bit |
| 2. Tape measure | 10. Circular saw |
| 3. 3'-4' Level | 11. Small flat pry bars |
| 4. Hand saw | 12. Ladder(s) |
| 5. Caulking gun-Qt. | 13. Stringline |
| 6. Square | 14. Pipe clamps |
| 7. Electric drill | 15. Come-a-long |
| 8. Ratchet straps | 16. Panel lifting equipment |

FASTENERS REQUIRED

1. 8d - Stainless Steel (304) nails (Bsmt. / Fdn.)
Int. & Ext.
 2. 16d - Stainless Steel (304) nails (Bsmt. / Fdn.)
Int. & Ext.
 3. 8d
 4. 16d
 5. 3" Drywall screws (interior wall attachment)
- * **Enercept does not recommend the use of staples for fastening panels.**
- * **Use Stainless Steel (304) or hot dipped galvanized nails for interior basement panels.**



ENERCEPT PANEL CONNECTORS, STRAPS, TIES & SCREWS

A. **"T" Connector**

Secures center beam to gable wall beam support post. (26ga)

B. **Framing Anchor**

Ties floor system to basement / foundation panel top plates & is used around basement windows.
(Simpson A35 or USP MPA1 connector)

C. **Structural Insulated Panel (SIP) Screw**

Features pancake head, comes in 3 1/2"-18" lengths. Fastening pattern is depicted on panel layout.

D. **Come-A-Long w/ "L" Brackets (contractor supplied)**

Apparatus to assist in pulling panels together.

E. **Roof Eyebolt (contractor supplied)**

3/4" x 16" eyebolt w/ 3/4" nut & 6" x 1/4" steel plate for lifting roof panels into position. Insert eyebolt through panel and secure with 6" plate & nut, lift into place. Seal hole with expanded foam sealant. Use 1 for 4' wide panels & 2 for 8' wide panels.

F. **Chimney Collars (required) (contractor supplied)**

Effectively positions chimney the proper distance from panel opening, creating a 3" cavity for installation of high temperature insulation, i.e. vermiculite, rock wool, etc.

G. **Lifting Plates (contractor supplied) for lifting roof panels**

Attach (2) lifting plates per 4' wide panel and (4) lifting plates per 8' wide panel.

FINISHING YOUR ENERCEPT STRUCTURE

Roof panels must be completely dry before covering with roofing materials, to prevent ridging.

Termites / Carpenter Ants - If you are building in an area that has problems with these insects, you should contact a local expert for their recommendations on long term control methods (before completing exterior finish).

The exterior side of the wall panels must have a weather-resistant exterior wall envelope consisting of flashing, a water-resistive barrier (Tyvek®, TYPAR®, Barricade®, etc.) and an approved wall covering material (siding, brick, etc.).

Lap siding is to be nailed on 12" center to center spacings using 6d galvanized ring - shank nails or per the siding manufacturer's recommendation.

When applying brick (use of brick ledge recommended), stucco, Dryvit, or any EFIS system to your Enercept structure, building codes call for (2) layers of Class D building paper, or (1) layer of No. 30 Roofing Felt or equivalent. Panels should also have an additional drainage plane.

Use 3" screws and adhesive to fasten all interior partition walls to wall & roof panels.

After installation of doors and windows, use expanding foam sealant to insulate the spaces between the rough opening and the door or window, carefully following the directions on the canister.

Install the seam tape or 6 mil plastic vapor barrier / seam tape over the inside (or the "warm side" in southern climates) of the exterior wall and roof panels before installing drywall or other interior coverings to protect panels from indoor humidity and potential moisture damage.

You may apply drywall to the walls and roof of the Enercept home after electrical and plumbing rough-in is complete and before constructing interior non-support walls. This reduces waste and speeds up drywall application.

FINISHING YOUR ENERCEPT STRUCTURE

Use 1 ¼" drywall screws for application of drywall. Enercept panel seams and drywall seams must be staggered at a minimum of 1'-0".

Seal all penetrations in the panels with expanding foam sealant, including electrical, plumbing and HVAC.

Use all weather flashing around all windows, doors, skylights, plumbing stacks, chimneys, exterior lights / outdoor fixtures, air exchanger & exterior dryer vents. (Not supplied by Enercept.)

MATERIAL WEIGHTS

Panel Weights (Approximate)	
Panel Size	Lbs / Square Ft
4" with 2x connector	3.22
6" with Thermal Post connector	4.03
8" with 2x connector	4.05
10" with 2x connector	4.5
12" with 2x connector	4.78

Doug Fir Glulam Beam Weights	
Size	Weight / Lineal Ft
3 1/8 x 6	4.5
3 1/8 x 7 1/2	5.6
3 1/8 x 10 1/2	7.8
3 1/8 x 12	8.9
3 1/8 x 13 1/2	10.0
3 1/8 x 15	11.1
3 1/8 x 16 1/2	12.2
5 1/8 x 6	7.3
5 1/8 x 7 1/2	9.1
5 1/8 x 10 1/2	12.8
5 1/8 x 12	14.6
5 1/8 x 13 1/2	16.4
5 1/8 x 15	18.3
5 1/8 x 16 1/2	20.1
5 1/8 x 18	21.9
5 1/8 x 19 1/2	23.7
5 1/8 x 21	25.6
5 1/8 x 22 1/2	27.4
5 1/8 x 24	29.2
5 1/8 x 27	32.9
5 1/8 x 30	36.5
6 3/4 x 12	19.2
6 3/4 x 13 1/2	21.6
6 3/4 x 15	24.0
6 3/4 x 16 1/2	26.5
6 3/4 x 18	28.9
6 3/4 x 19 1/2	31.3
6 3/4 x 21	33.7
6 3/4 x 24	38.5
6 3/4 x 27	43.3
6 3/4 x 30	48.1

Southern Yellow Pine Glulam Beam Weights	
Size	Weight / Lineal Ft
3 1/8 x 3 1/8	2.3
3 1/8 x 5 1/2	4.1
3 1/8 x 6 7/8	5.1
3 1/8 x 9 5/8	7.1
3 1/8 x 11	8.2
3 1/8 x 12 3/8	9.2
3 1/8 x 13 3/4	10.2
3 1/8 x 15 1/8	11.2
3 1/8 x 17 7/8	13.3
3 1/8 x 20 5/8	15.3
3 1/8 x 22	16.3
3 1/8 x 24 3/4	18.4
5 1/8 x 5 1/2	6.7
5 1/8 x 9 5/8	11.7
5 1/8 x 11	13.4
5 1/8 x 12 3/8	15.1
5 1/8 x 13 3/4	16.7
5 1/8 x 15 1/8	18.4
5 1/8 x 17 7/8	21.8
5 1/8 x 20 5/8	25.1
5 1/8 x 24 3/4	30.1
6 3/4 x 6 7/8	11.0
6 3/4 x 9 5/8	15.4
6 3/4 x 11	17.6
6 3/4 x 12 3/8	19.8
6 3/4 x 13 3/4	22.0
6 3/4 x 15 1/8	24.2
6 3/4 x 17 7/8	28.7
6 3/4 x 20 5/8	33.1
6 3/4 x 24 3/4	39.7

SECTION 2

FOUNDATION PANELS



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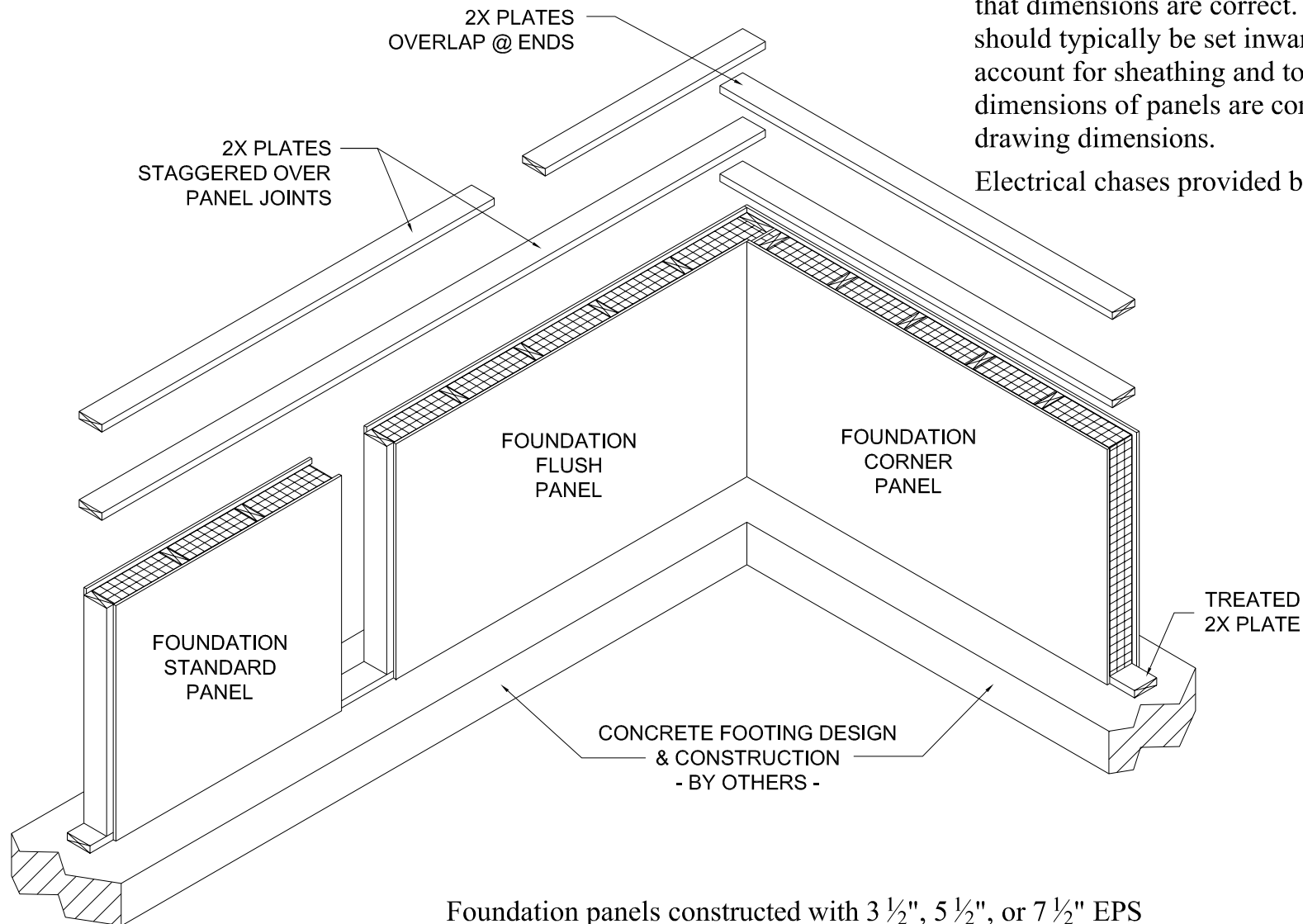
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FOUNDATION PANELS

NOTE: Verify footings are plumb, square, and that dimensions are correct. Treated sill plates should typically be set inwards by 1/2" to account for sheathing and to ensure outside dimensions of panels are consistent with drawing dimensions.

Electrical chases provided by special order only.



Foundation panels constructed with 3 1/2", 5 1/2", or 7 1/2" EPS core, 1/2" treated plywood interior and exterior sheathing with treated 2x members on 16" centers. Panel height of 4'-0 3/8" unless otherwise specified.

FOUNDATION, SLAB, BACKFILL AND WALL TREATMENT

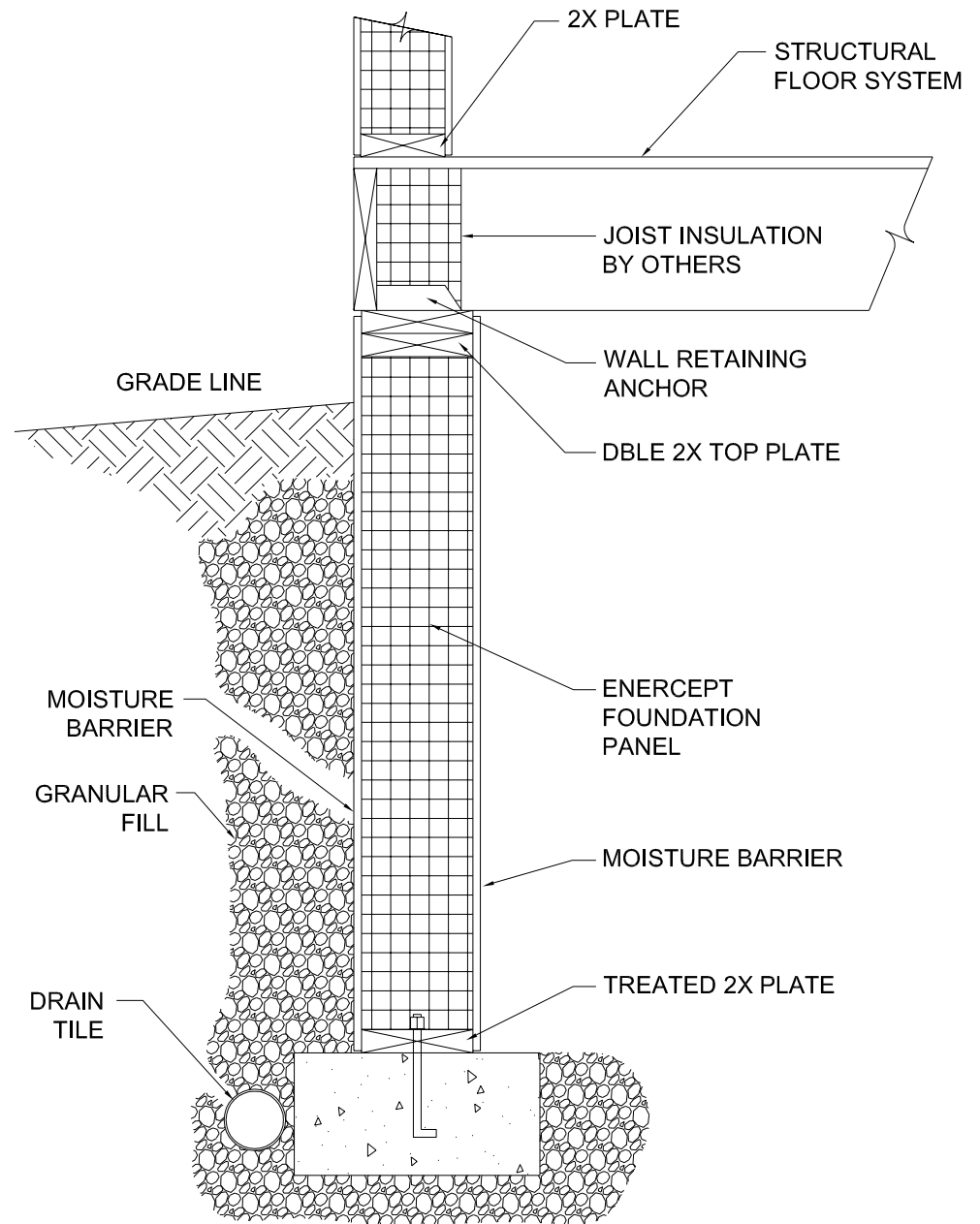
- A. Cover all exterior joints with sealant.
- B. Apply a waterproofing sealant, 6 mil. polyethylene or waterproofing membrane approved for below grade applications per code, from the footing to the top of the panel.
- C. Floor deck for the upper level must be installed before backfilling.
- D. With drain tile in place, crushed rock is used for back fill as shown.
- E. To control drainage, backfill and landscaping must be sloped away from the foundation walls.

BACKFILL TREATMENT

- A. Panels are designed for 30 pcf hydraulic pressure. Contact your building officials regarding extreme soil conditions in your area.
- B. Backfilling should be completed evenly in 1' lifts around the entire structure.
- C. Backfill depth should be consistent on the interior and exterior from the top of the foundation panel.
- D. To control drainage, backfill and landscaping must be sloped away from the foundation walls.

NOTE: FOUNDATION PANEL NAILING PATTERNS

The foundation panel nailing pattern at vertical joint should alternate with factory nailing 6" O.C. Sill & top plates should be nailed at 6" O.C. All nails should be Stainless Steel (304) nails.



SECTION 3 FLOOR PANELS

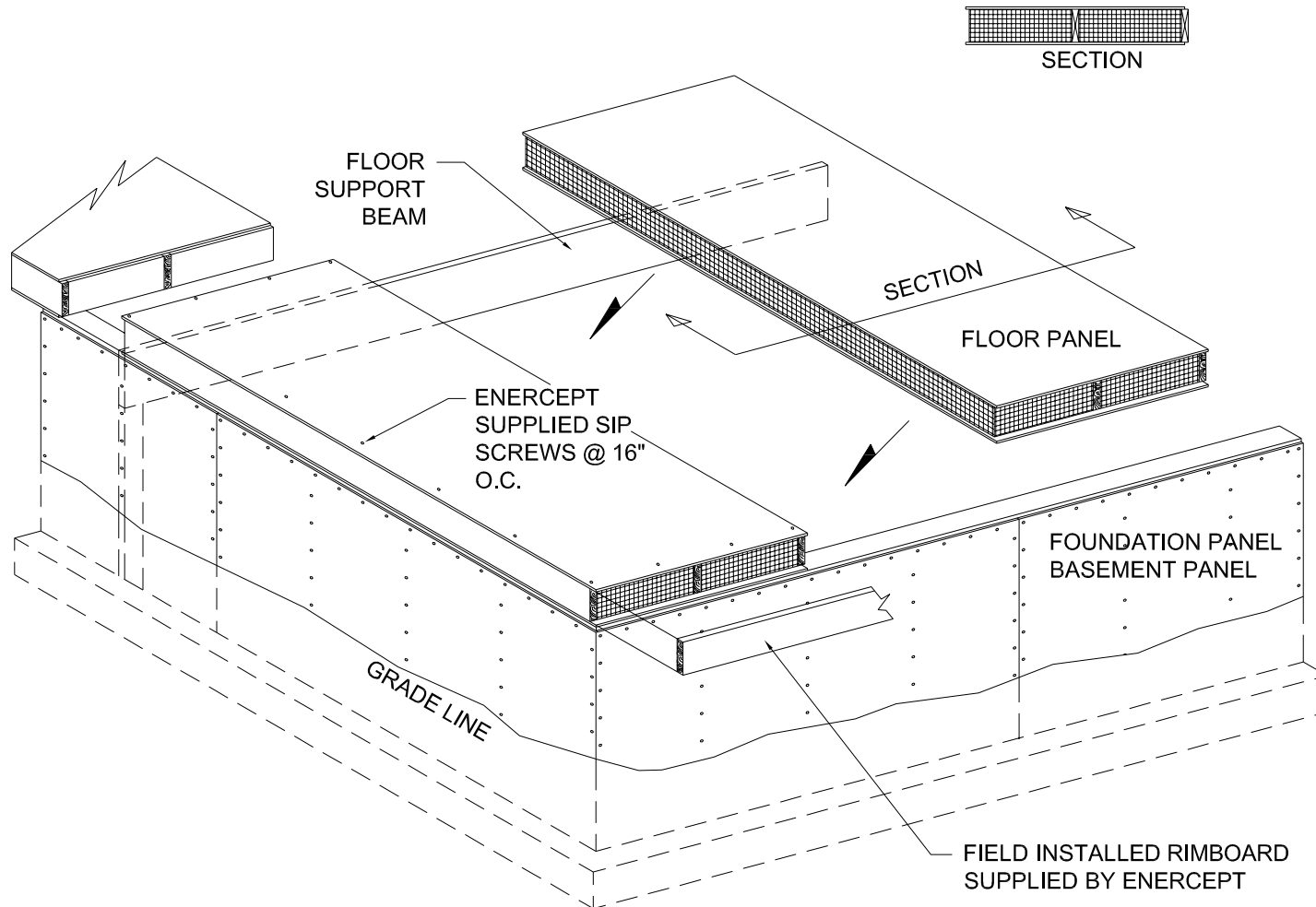


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TYPICAL FLOOR PANEL LAYOUT



FLOOR PANELS

1. Before placement of floor panels, make sure all foundation, basement or wall panels are plumb and braced against movement. Double check foundation dimensions are level and square.
2. Apply a continuous bead of sealant or sill sealer on the top plate. Use only approved sealant.
3. Set and square 1st floor panel into position, with the interior edge centered over the floor support beam, and the exterior edge flush with the outside of the wall.

NOTE: It is important that the floor panels sit square with the floor support beam and wall panels.

4. Fasten floor panels to the wall panels and floor support beam with provided screws on 16" centers. Apply sealant between each adjoining floor panel. When installing adjoining panels, allow a $\frac{1}{8}$ " gap between the sheathing.
5. Continue setting the floor panels (following steps 3 & 4) as specified on the panel layouts until finished. Nail all adjoining panel edges on both sides, using 8d nails 6" O.C.

NOTE: Enercept recommends measuring periodically for growth as panels are set in place. If panel growth is occurring, you may have to recess the foam and trim the sheathing back accordingly, to maintain intended dimensions. Failure to check growth could effect location of rough openings.

6. Apply sealant to the outside recess of the floor panel and install the factory supplied 2x / LVL faceplate, using 8d nails on 6" centers to fasten faceplate through the top sheathing layer. Use 16d nails to fasten faceplate to the panels' joists and for toenailing at the bottom of the faceplate into the plates below.
7. After floor panels are installed, they should be protected from exposure to moisture. Moisture may damage panels.
8. The floor panels are intended to have an additional layer of material, such as an underlayment, before installing finished flooring materials.

SECTION 4 BASEMENT PANELS

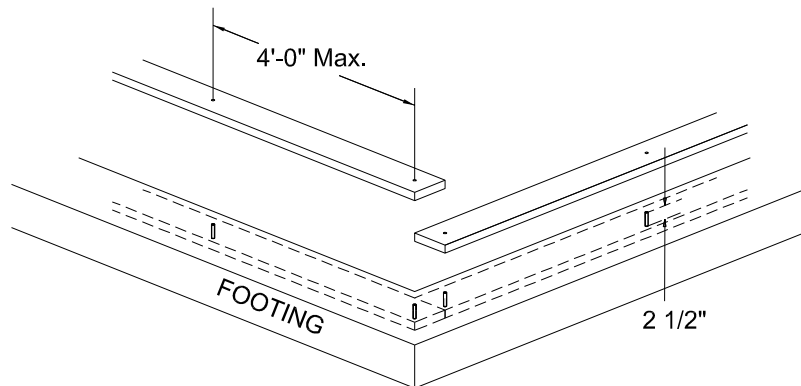


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BASEMENT FOOTINGS AND SILL PLATES



NOTE: The top of the bolts should extend a maximum of 2 1/2" above the footing.

1. Pour a concrete footing of sufficient width and thickness for soil conditions at the construction site.
NOTE: ACCURACY OF THE FOOTING IS A CRITICAL PART OF THE SYSTEM.
2. Set Anchor Bolts ($\frac{3}{8}$ " min.) in the center of the footing, spaced no more than 4' apart (Alternative approved concrete fasteners may be used.)
NOTE: The tops of the anchor bolts should extend a maximum of 2 1/2" above the footing.
3. Chalk lines for plate layout. Check for squareness, level and dimension.
NOTE: Bottom plates are typically set inwards 1/2" to account for exterior sheathing. Therefore, the outside dimension of the sill plate normally must be 1" less than the overall exterior dimension of the basement. For example, a 26 x 40 basement will have a sill plate dimension of 25'-11" x 39'-11".
4. Before drilling anchor bolt holes in the treated sill plate, check for correct width (2x6 = 5 1/2", 2x8 = 7 1/4") If oversized, rip it down to the correct size.
NOTE: It is recommended that a bead of sealant or sill sealer be applied between the sill plate and footing.
5. Sill plate MUST BE LEVEL AND SQUARE.
NOTE: DO NOT BACKFILL BEFORE READING ALL INSTRUCTIONS!!!

SETTING BASEMENT PANELS

- A. Start assembly in any corner using a flush panel (as shown).

NOTE: Set additional panels counterclockwise as viewed from the inside.

- B. Before setting panels over sill plate, an unbroken $\frac{1}{4}$ " bead of approved sealant compatible with polystyrene must be applied to the plate.
- C. Before nailing the first panel into place, level the interior surface of the panel (to be sure that it is vertically plumb).
- D. When the panel is in the proper position, nail to the sill plate, using 8d Stainless Steel (304) nails.
- E. Use Stainless Steel (304) nails for exterior nailing. Use 8d Stainless Steel (304) or hot dipped galvanized nails on interior nailing.

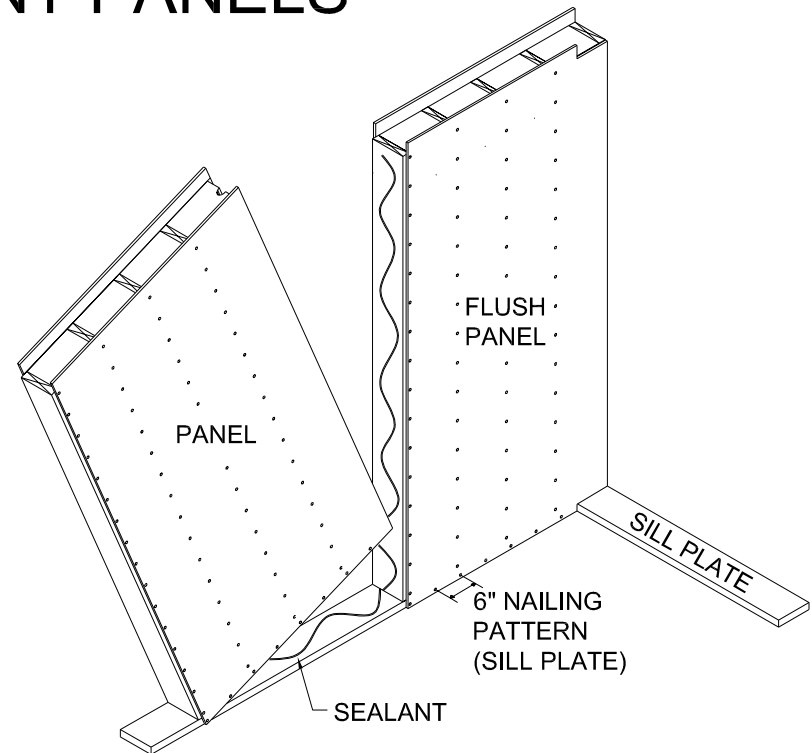
NOTE: BASEMENT PANEL NAILING PATTERNS

Nailing pattern at vertical joint should alternate with factory nailing 6" O.C. Sill & top plates should be 6" O.C. See illustration for nailing pattern and spacing.

- F. To avoid disturbing the sealant bead on the sill plate, tilt the panel back slightly on the stud and slide panels forward.
- G. Repeat the preceding steps when setting successive panels.

NOTE: PANEL GROWTH (What and Why)

Panel growth refers to the increase in length of panel walls and roofs due to the $\frac{1}{8}$ " spacing at panel joints. Growth can also occur due to changes in humidity or failure to achieve tight fit between panels. Growth can effect location of RO's and can be easily corrected if monitored.



GROWTH CORRECTION METHODS

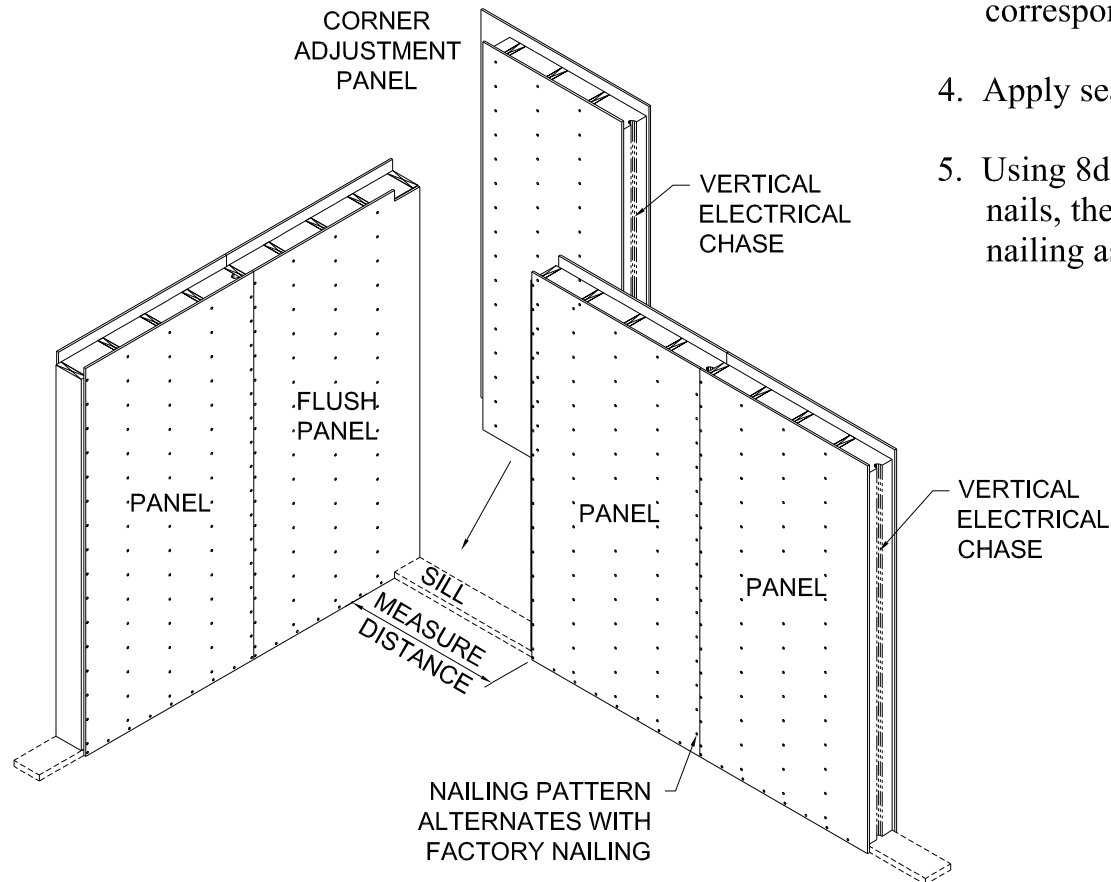
Enercept has designed each corner panel to allow the builder to easily shorten the panel by the amount of growth. It may be necessary to correct panel growth before the end of the wall to ensure that rough openings remain in the proper location. Enercept recommends measuring periodically for growth as the panels are set in place.

1. An electric foam scoop can be purchased from Enercept to cut back the foam by the amount of panel growth.
2. Use a skill saw to cut the sheathing back by the same amount.

CORNER ADJUSTMENT PANEL INSTALLATION

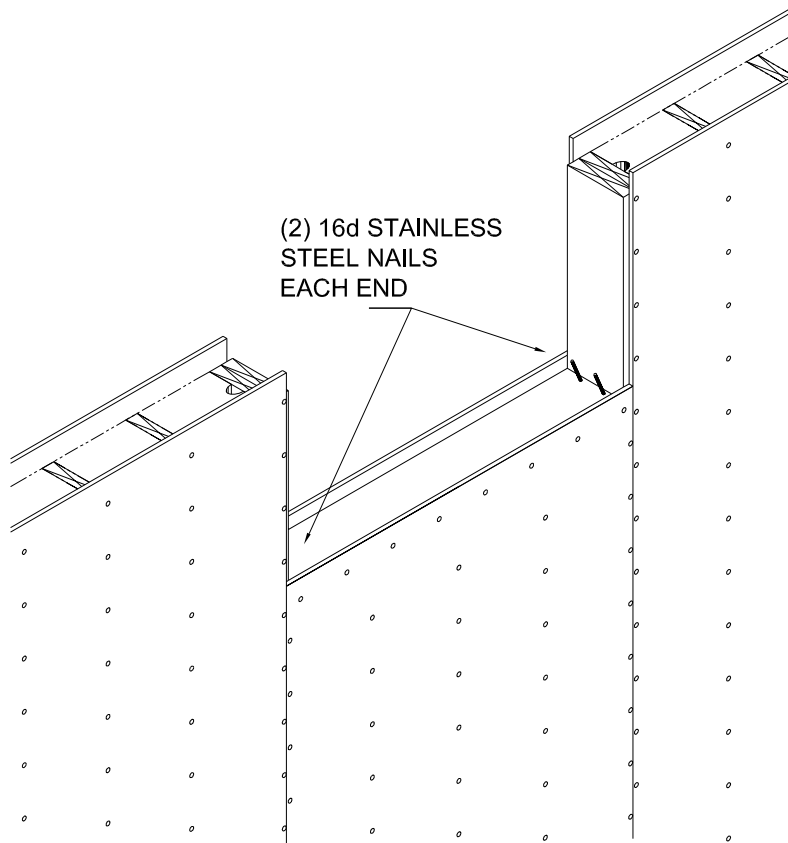
NOTE: Installation of the adjustment panel in the final corner is slightly different than the previous corners since one corner panel is already in position (the first panel that was erected).

1. Use a level and check flush panel to assure that it has remained plumb.
2. Measure the distance between the inside face of the flush panel and the leading edge of the sheathing at both the top and bottom of the last panel. Trim the interior and exterior sheathing of the corner adjustment panel as needed.
3. Trim the exposed EPS core of the adjustment panel to correspond to these dimensions.
4. Apply sealant and set panel into position.
5. Using 8d Stainless Steel (304) or hot dipped galvanized nails, the nailing pattern should alternate with the factory nailing as shown.



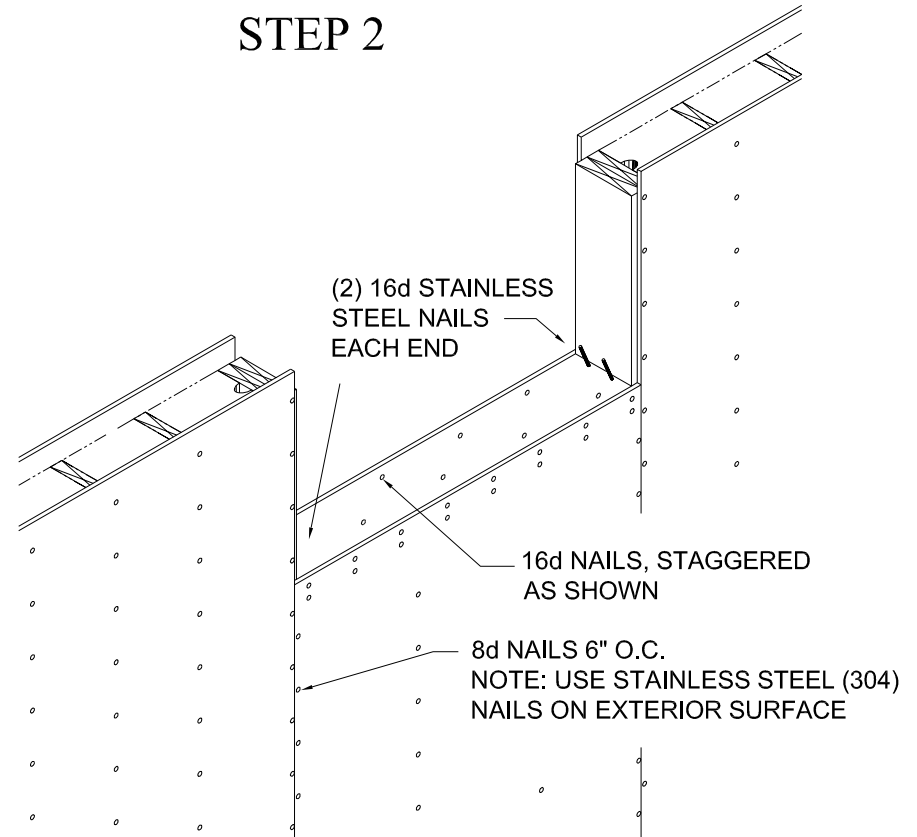
BASEMENT WINDOW INSTALLATION

STEP 1



1. Toenail the 2x8 plate in the lower window panel to the studs in the adjacent panels, using (2) 16d nails at each end.

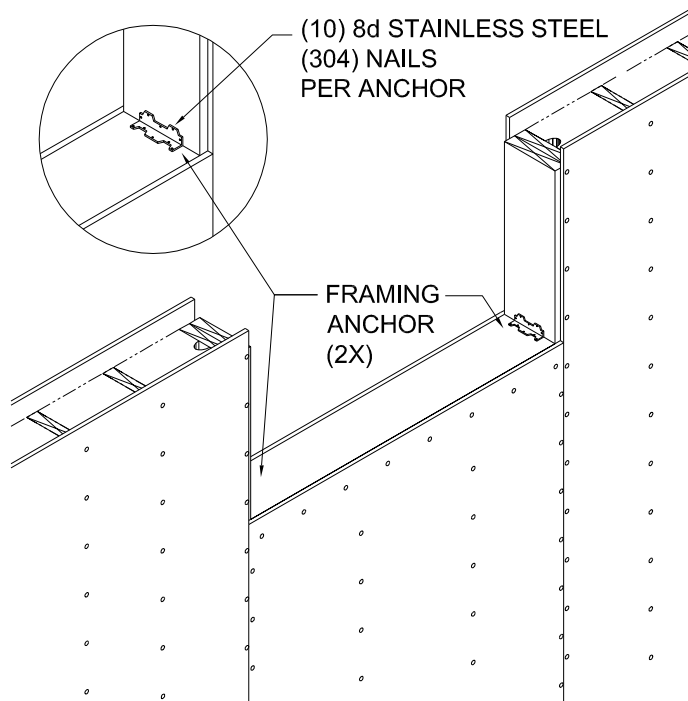
STEP 2



1. Place bead of sealant on top of the plate in the lower window panel.
2. Cut a length of treated 2x8 to install as the top plate of the lower window panel.
3. Install this plate using the nail sizes and spacing as shown in the diagram.

BASEMENT WINDOW INSTALLATION

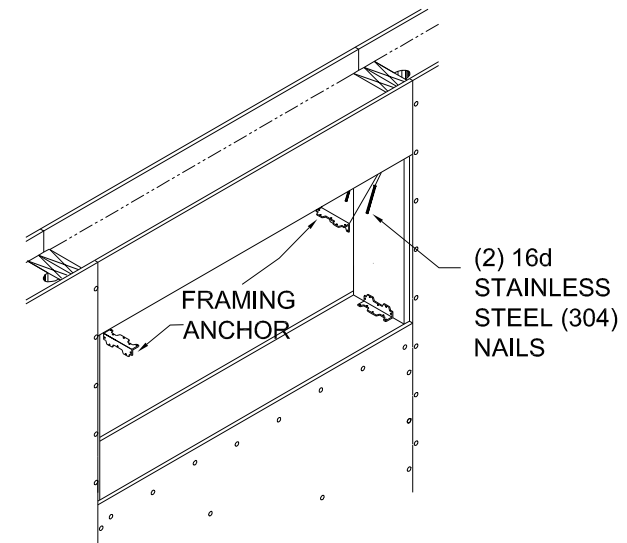
STEP 3



1. Install framing anchors in both lower corners of the window opening, using (10) 8d Stainless Steel (304) nails for each anchor.

NOTE: Anchor must be installed before window filler. Where windows will be at the extreme upper end of the panels, there is no header panel. In these cases, when the double plate will form the upper side of the rough opening, skip Step 4.

STEP 4

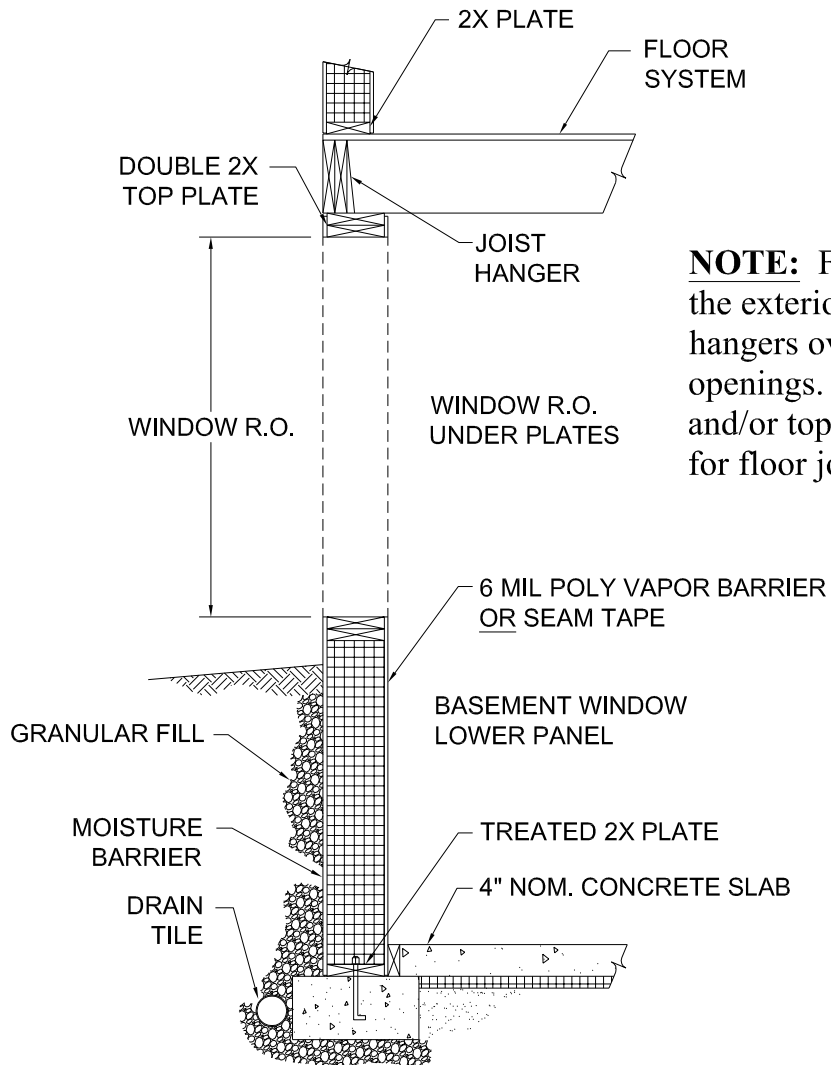


1. Slide window header panel down into position, and toenail into adjacent panels, using (2) 16d Stainless Steel (304) nails at each corner.

IMPORTANT: Confirm window rough opening size before permanently securing lintel.

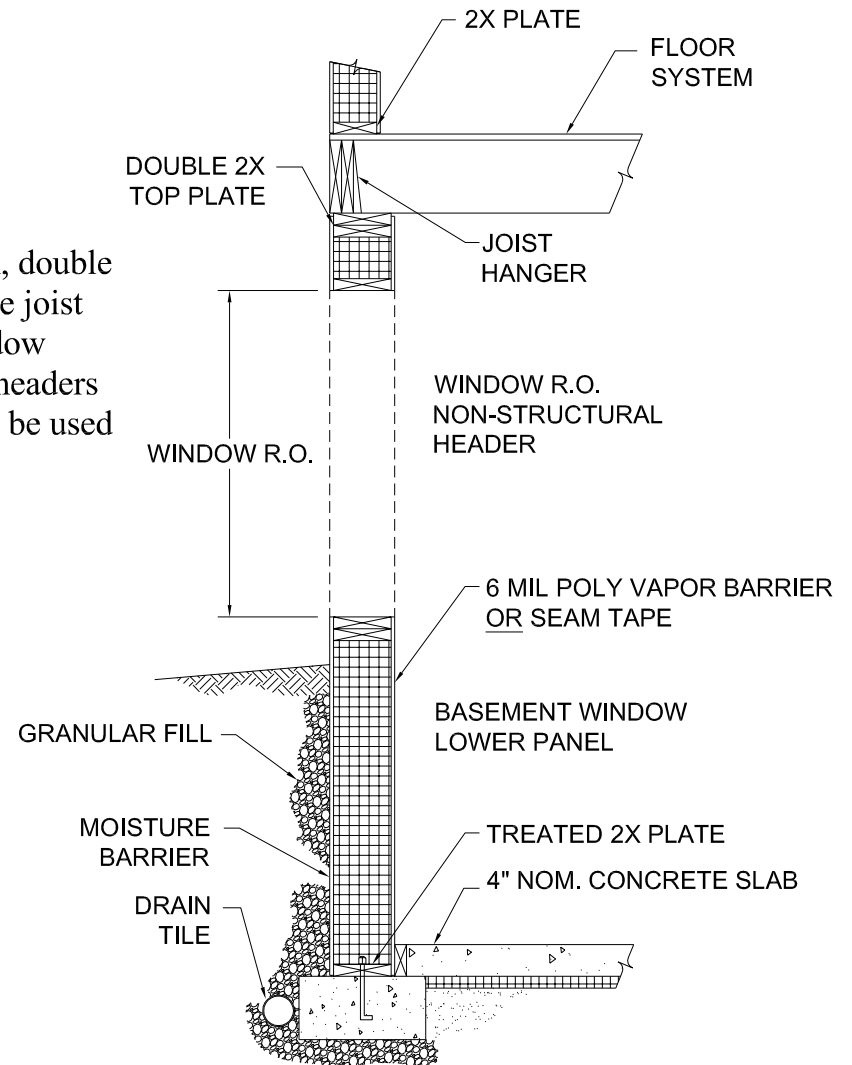
2. Install one framing anchor at each upper corner of the window opening, using (10) 8d Stainless Steel (304) nails per anchor.
3. $\frac{3}{4}$ " OSB strips are provided to fit over the connecting studs.

WINDOW -- UNDER PLATES
OPTION #1 (NO PANEL SUPPLIED)

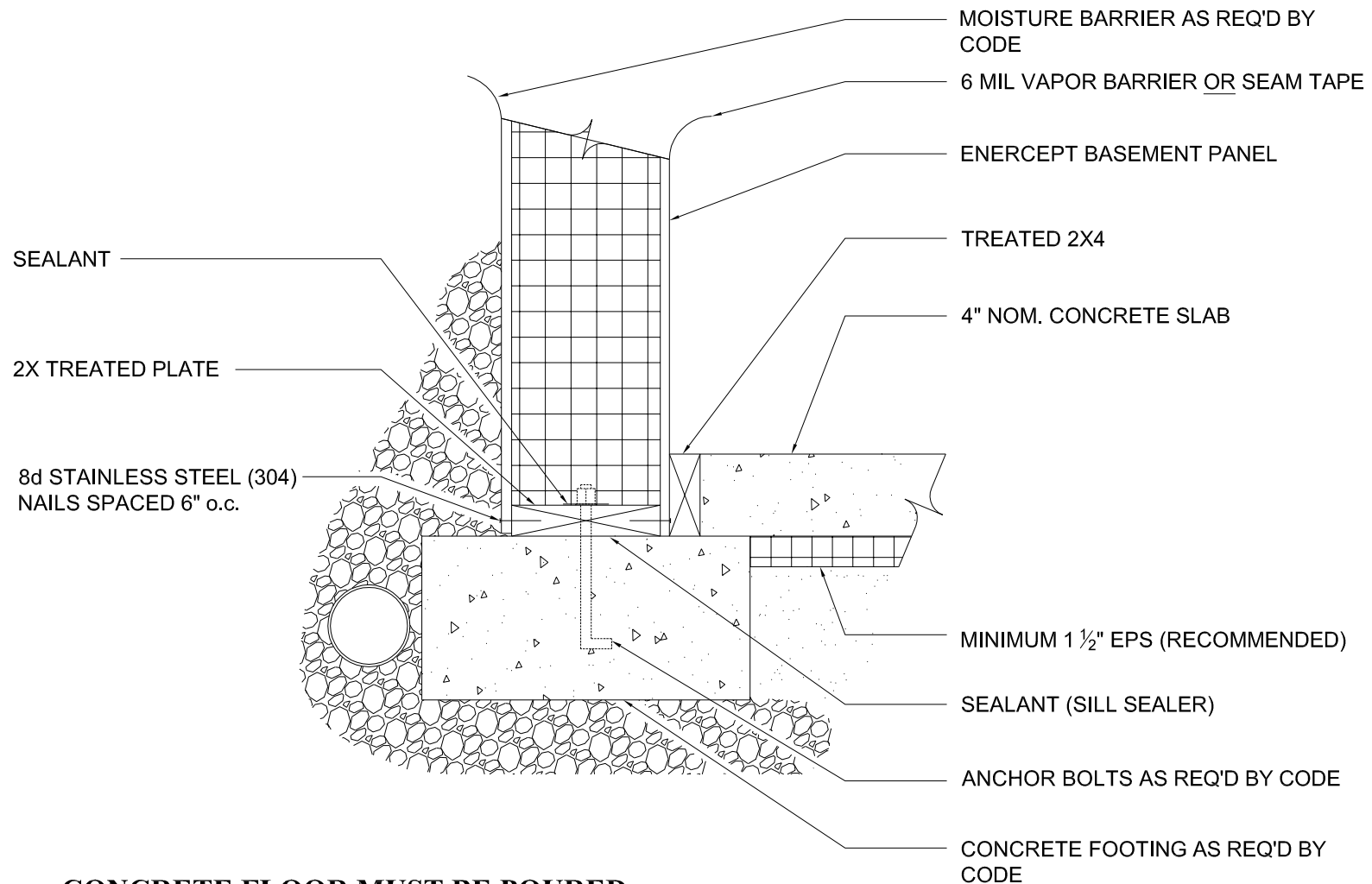


NOTE: For either option, double the exterior rim joist & use joist hangers over door & window openings. Non-structural headers and/or top plates must not be used for floor joist support.

WINDOW -- NON-STRUCTURAL HEADER
OPTION #2



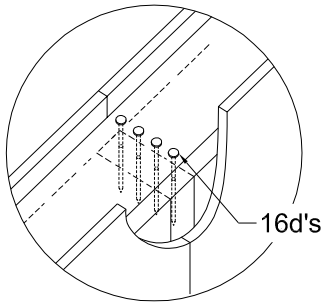
NOTE: For either option, footing size and depth to be determined by the contractor according to local building codes and job conditions. Bottom of footing must be below frost line.



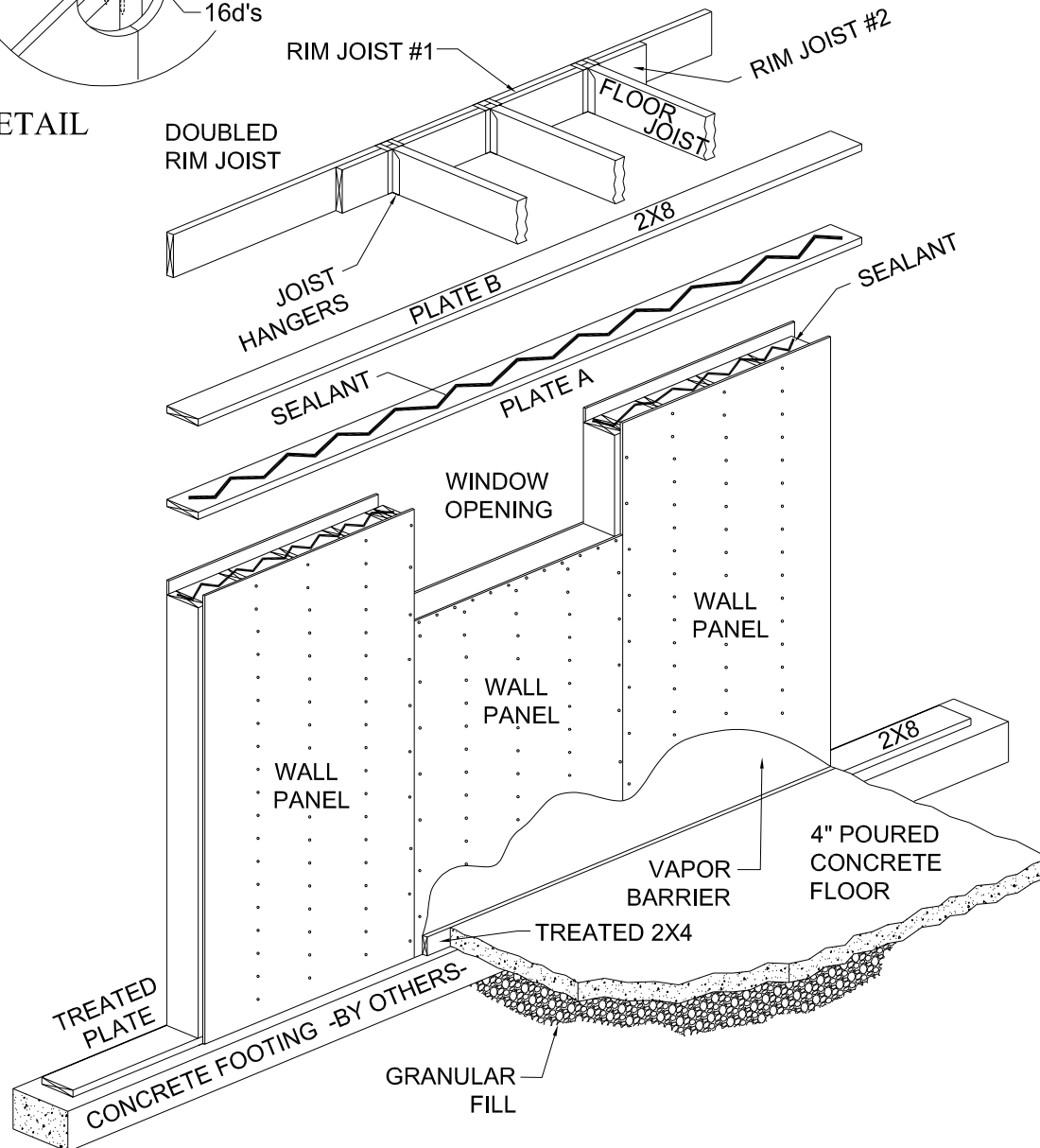
CONCRETE FLOOR MUST BE POURED BEFORE BACKFILLING

The detail shown is the recommended method of construction for locking in the bottom of the Enercept basement panels with the concrete floor. If other methods of construction are used, it is the owner's / contractor's responsibility to be sure that the bottom of the basement panel is securely connected to the concrete to resist the inward pressure of the backfill.

BASEMENT PANEL DOUBLE TOP PLATE INSTALLATION



DETAIL



1. Apply an unbroken bead of sealant along the plate channel.
2. Place the 2x8 Plate A into the channel and secure to each stud using four 16d nails (refer to detail at left).

NOTE: Drill all matching electrical holes before nailing plate into position.

3. Apply sealant to top Plate A and place Plate B into position.

NOTE: Allow a minimum joint offset of at least four feet. Do not splice over window or door lintels.

4. Secure Plate B to Plate A with (4) 16d nails on 12" staggered centers.
5. Nail top edge of sheathing to both plates using 8d nails on staggered 6" spacing on both interior and exterior edges.
6. Double rim joist or install approved headers above all door and window openings and use joist hangers for floor joist support.

NOTE: Do not butt or splice rim joists above door/window openings.

FLOOR SYSTEM INSTALLATION

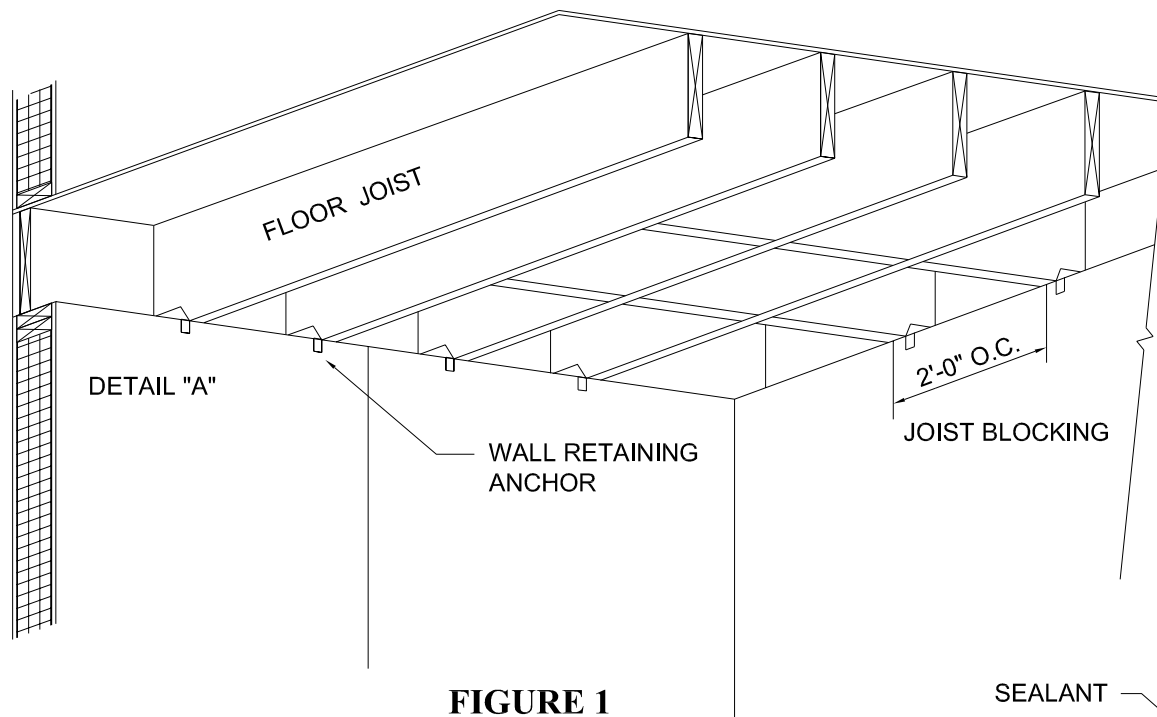
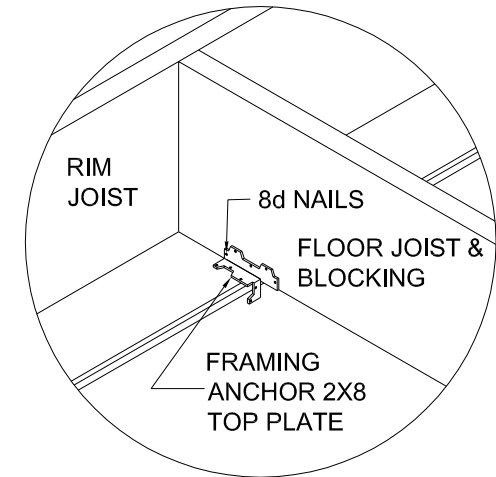
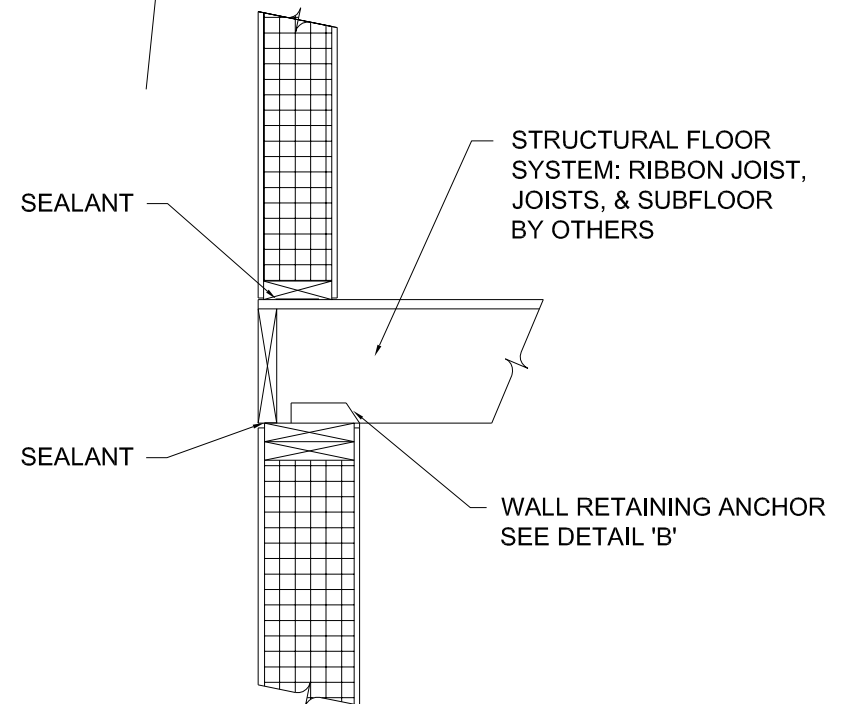


FIGURE 1



DETAIL B



DETAIL A

- A. To provide basement wall support, wall retaining anchors are to be used to tie the wall and floor systems together (Figure 1 and detail A & B) 1 anchor at each end of the joist.
- B. Install joist blocking in the outer 3 joist cavities and any shearwalls (if required) prior to backfilling (Figure 1).

BASEMENT, SLAB AND BACKFILL TREATMENT

WALL TREATMENT

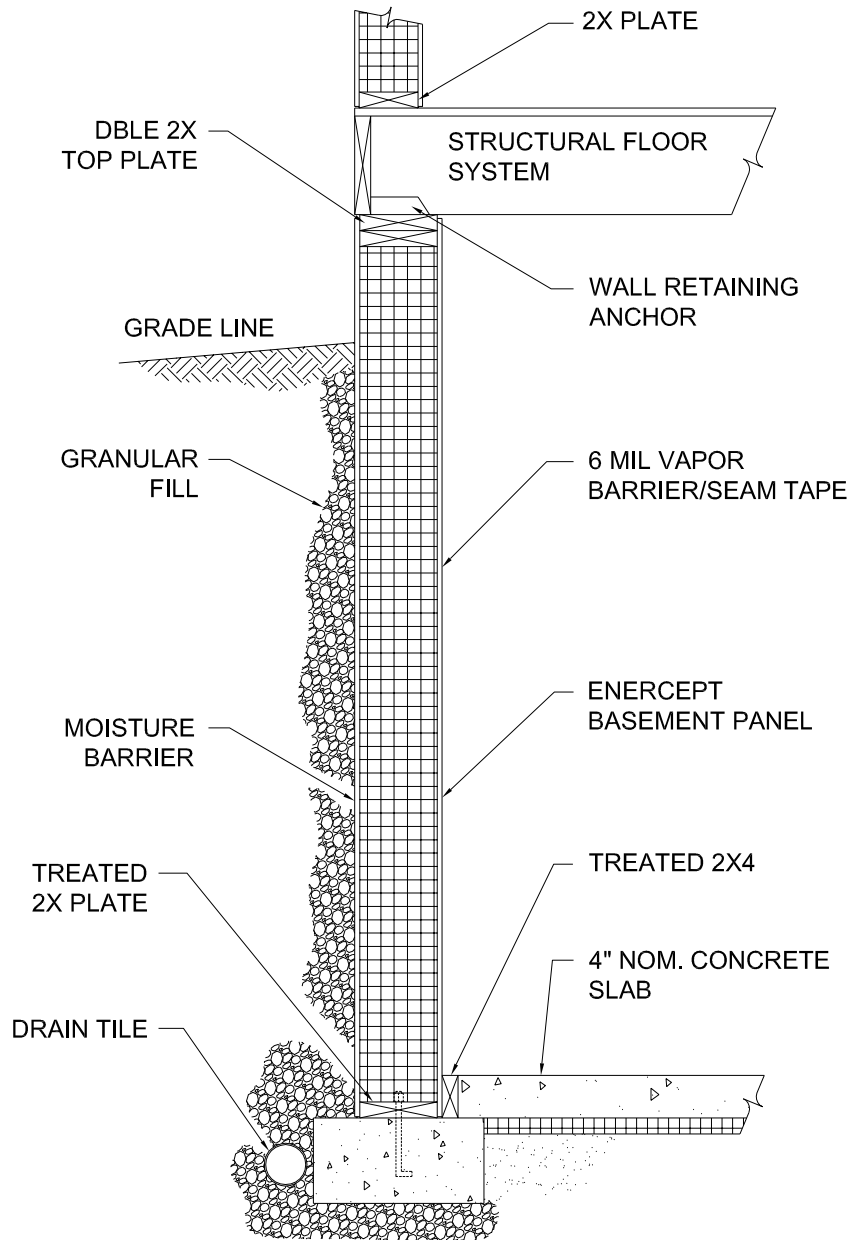
- A. Cover all exterior joints with sealant.
- B. Apply a waterproofing sealant, 6 mil. polyethylene or waterproofing membrane approved for below grade applications per code, from the footing to the top of the panel.
- C. **Floor deck, framing anchors, joist blocking and shear walls (if required) must be installed before backfilling.**
- D. With drain tile in place, crushed rock is used for backfill as shown.
- E. To control drainage, backfill and landscaping must be sloped away from the basement walls.

SLAB TREATMENT

- A. A moisture barrier is placed on a 3" porous substrata prior to placement of a minimum 1 1/2" layer of EPS insulation.
- B. The concrete slab is then poured upon this base allowing the slab to act as a heat reservoir.

BACKFILL TREATMENT

- A. Panels are designed for 30 pcf hydraulic pressure. Contact your building officials regarding extreme soil conditions in your area.
- B. **Floor system, anchors, blocking & shear walls must be installed before backfilling. Concrete floor must be poured before backfilling.**
- C. Backfilling should be completed evenly in 1' lifts around the perimeter of the structure.
- D. See chart on page 4-12 for maximum backfill depth.
- E. To control drainage, backfill and landscaping must be sloped away from the foundation walls.



BACKFILL SPECIFICATIONS

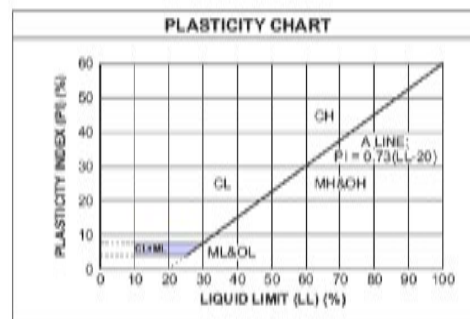
Panel Thickness	Panel Height	Max. Backfill Hgt
8" Panel	8'-0"	8'-0" (Full Backfill)
8" Panel	9'-0"	7'-3"
8" Panel	10'-0"	6'-9"
10" Panel	8'-0"	8'-0" (Full Backfill)
10" Panel	9'-0"	8'-6"
10" Panel	10'-0"	8'-0"

UNIFIED SOIL CLASSIFICATION AND SYMBOL CHART		
COARSE-GRAINED SOILS (more than 50% of material is larger than No. 200 sieve size.)		
GRAVELS More than 50% of coarse fraction larger than No. 4 sieve size	Clean Gravels (Less than 5% fines)	
	GW	Well-graded gravels, gravel-sand mixtures, little or no fines
	GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines
	Gravels with fines (More than 12% fines)	
	GM	Silty gravels, gravel-sand-silt mixtures
	GC	Clayey gravels, gravel-sand-clay mixtures
SANDS 50% or more of coarse fraction smaller than No. 4 sieve size	Clean Sands (Less than 5% fines)	
	SW	Well-graded sands, gravelly sands, little or no fines
	SP	Poorly-graded sands, gravelly sands, little or no fines
	Sands with fines (More than 12% fines)	
	SM	Silty sands, sand-silt mixtures
	SC	Clayey sands, sand-clay mixtures
FINE-GRAINED SOILS (50% or more of material is smaller than No. 200 sieve size.)		
SILTS AND CLAYS Liquid limit less than 50%	ML	Inorganic silts and very fine sands, rock flour, silty of clayey fine sands or clayey silts with slight plasticity
	CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
	OL	Organic silts and organic silty clays of low plasticity
SILTS AND CLAYS Liquid limit 50% or greater	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
	CH	Inorganic clays of high plasticity, fat clays
	OH	Organic clays of medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS	PT	Peat and other highly organic soils

LABORATORY CLASSIFICATION CRITERIA		
GW $C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_c = \frac{D_{30}}{D_{10} \times D_{60}}$ between 1 and 3		
GP Not meeting all gradation requirements for GW		
GM Atterberg limits below "A" line or P.I. less than 4		
GC Atterberg limits above "A" line with P.I. greater than 7		
SW $C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_c = \frac{D_{30}}{D_{10} \times D_{60}}$ between 1 and 3		
SP Not meeting all gradation requirements for GW		
SM Atterberg limits below "A" line or P.I. less than 4		
SC Atterberg limits above "A" line with P.I. greater than 7		

Determine percentages of sand and gravel from grain-size curve. Depending on percentage of fines (fraction smaller than No. 200 sieve size), coarse-grained soils are classified as follows:

Less than 5 percent GW, GP, SW, SP
 More than 12 percent GM, GC, SM, SC
 5 to 12 percent Borderline cases requiring dual symbols



1. Enercept 8" (10") basement panels are constructed with 7 1/4" (9 1/4") EPS core, treated 2x8 (2x10) SYP#2 studs at 12" on center, 7/16" OSB interior skin, and 1/2" treated plywood exterior skin. Total panel thickness equals 8 3/16" (10 3/16").
2. A 30 pcf / ft active soil pressure was used for the 8'-0" tall Enercept basement panel & a 60 pcf / ft at-rest soil pressure was used for the 9'-0" and 10'-0" tall Enercept basement panels per IBC 2006.
3. A vertical axial load of 2,000# plf was used when determining the above values. If the actual vertical load exceeds this value the above backfill heights do not apply.
4. The floor system shall be properly attached to the basement panel before backfilling. Backfill / consolidate in 1'-0" increments with only hand operated equipment next to basement wall.
5. See Figure 1 & Figure 2 of the following page for backfill requirements. Consult a local geotechnical engineer for recommendations and to differentiate between expansive and non-expansive soils.
6. Drain tile at base extending to sump pit/pump.
7. Slope surface (topsoil) away from the structure 6" minimum in 6'-0".

BACKFILL REQUIREMENT DETAILS

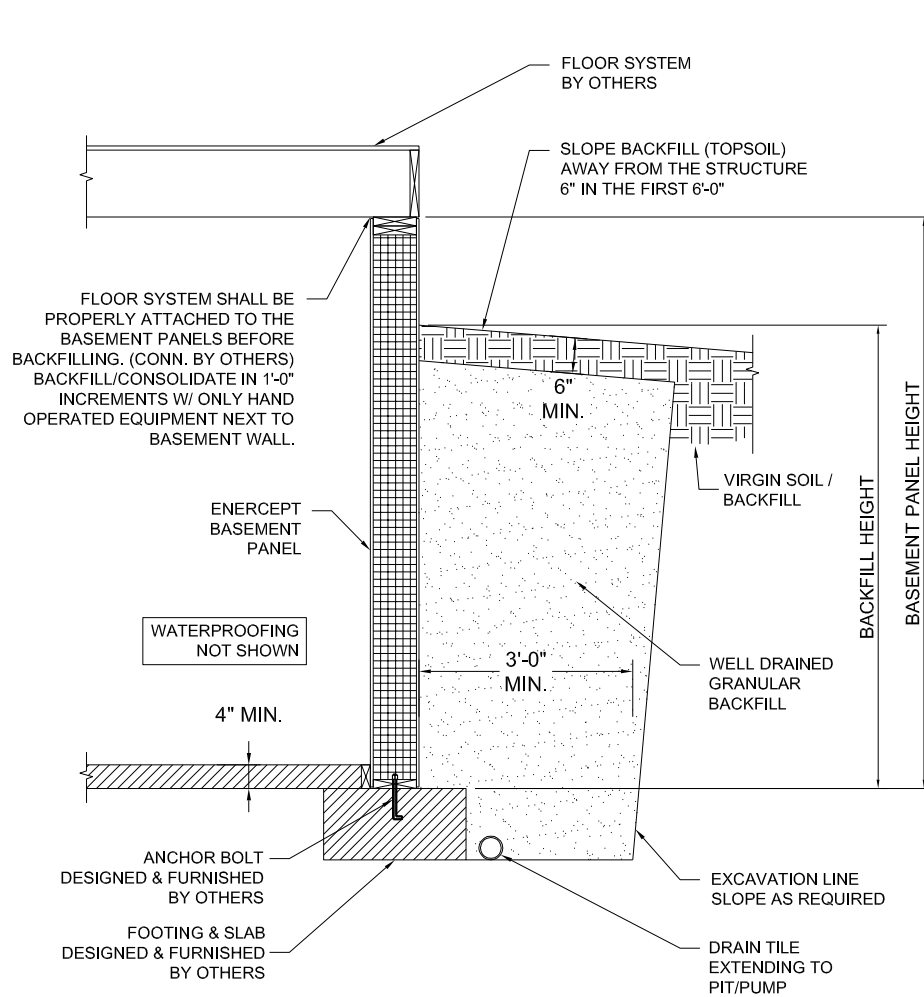


FIGURE 1: NON- EXPANSIVE SOILS

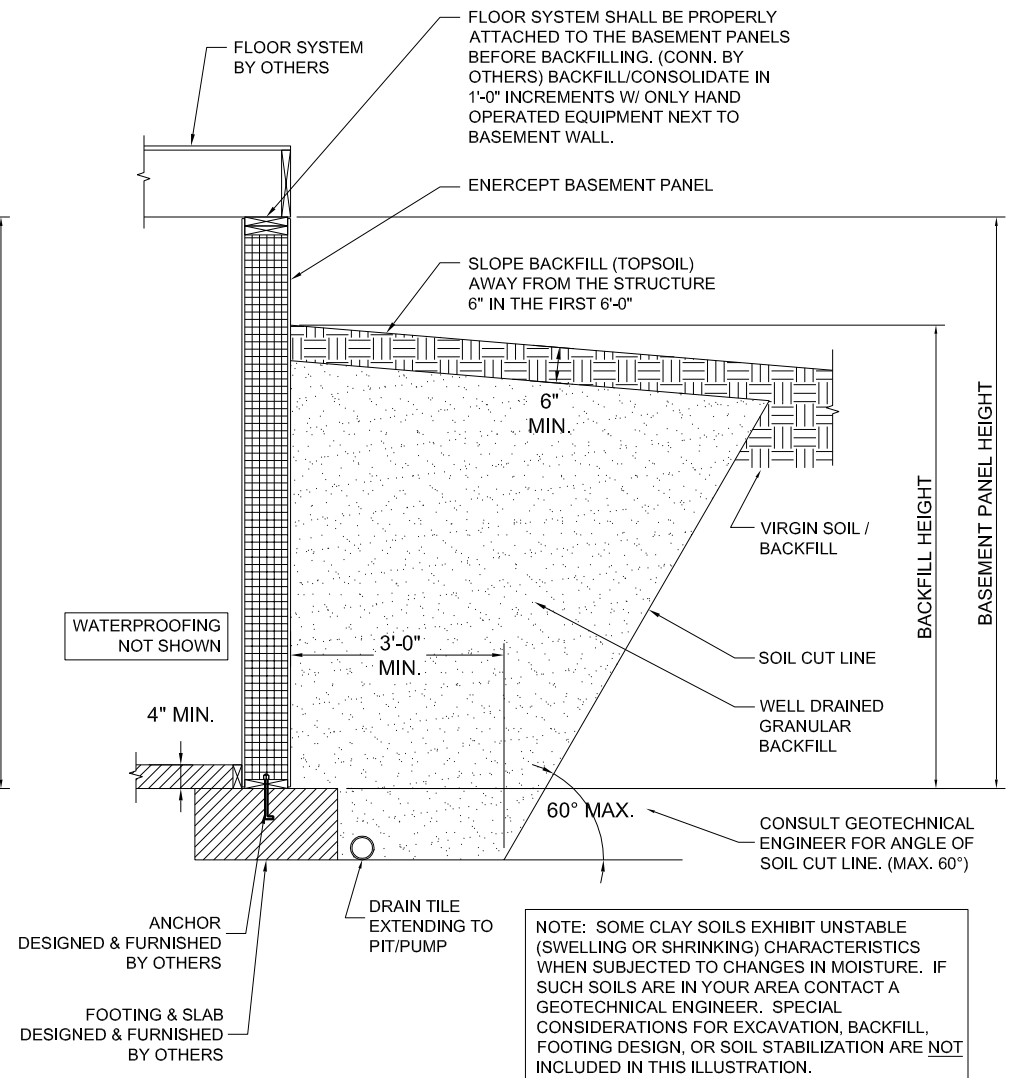


FIGURE 2: EXPANSIVE SOILS

SECTION 5 WALL PANELS



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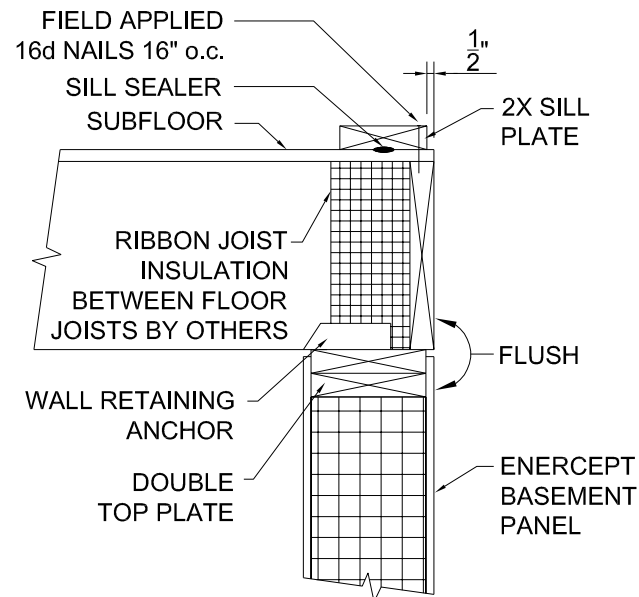
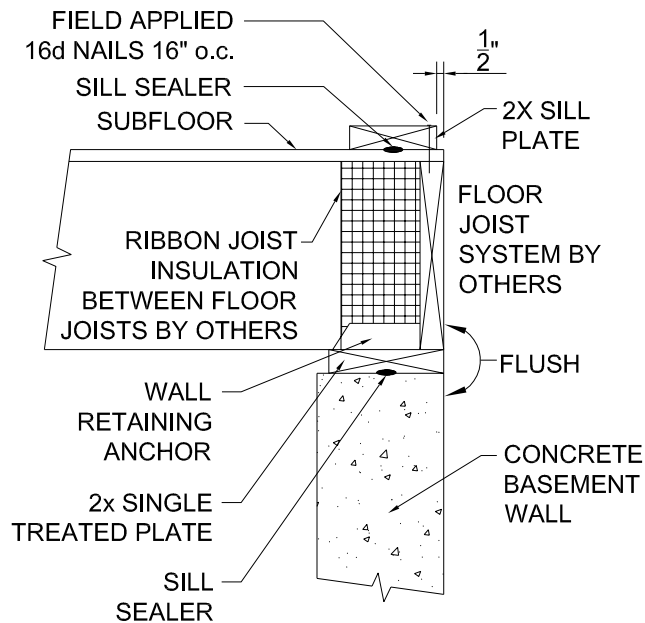
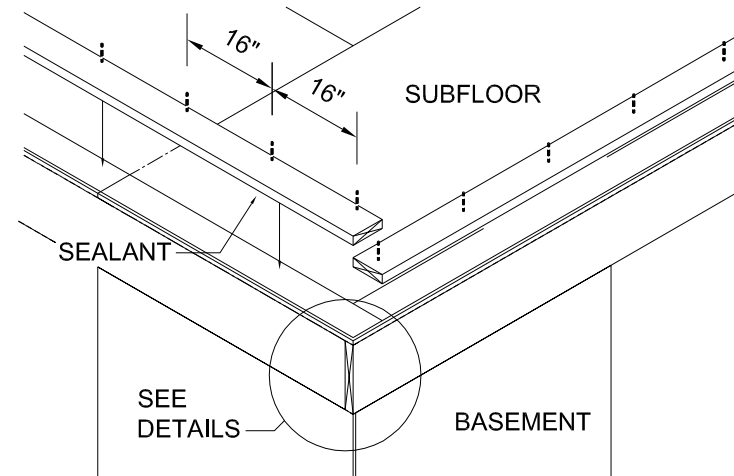
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FLOOR SYSTEM / SILL PLATE INSTALLATION & OPTIONS

SILL PLATE TO SUBFLOOR ATTACHMENT

1. The floor system must be LEVEL and SQUARE.
2. Bottom plates are typically set inwards 1/2" to account for exterior sheathing. Therefore, the outside dimension of the sill plate normally must be 1" less than the overall exterior dimension of the structure. For example, a 26' x 40' floor system will have a sill plate dimension of 25'-11" x 39'-11".
3. Chalk lines for plate layout. Check for squareness and dimension.
4. Apply sealant or sill sealer to sill plate.
5. Nail the sill plate to the subfloor using 16d nails on 16" center.
6. Repeat this procedure around the entire perimeter of the subfloor.

NOTE: Levelness, squareness and alignment of the sill plate are critical parts of the Enercept system.

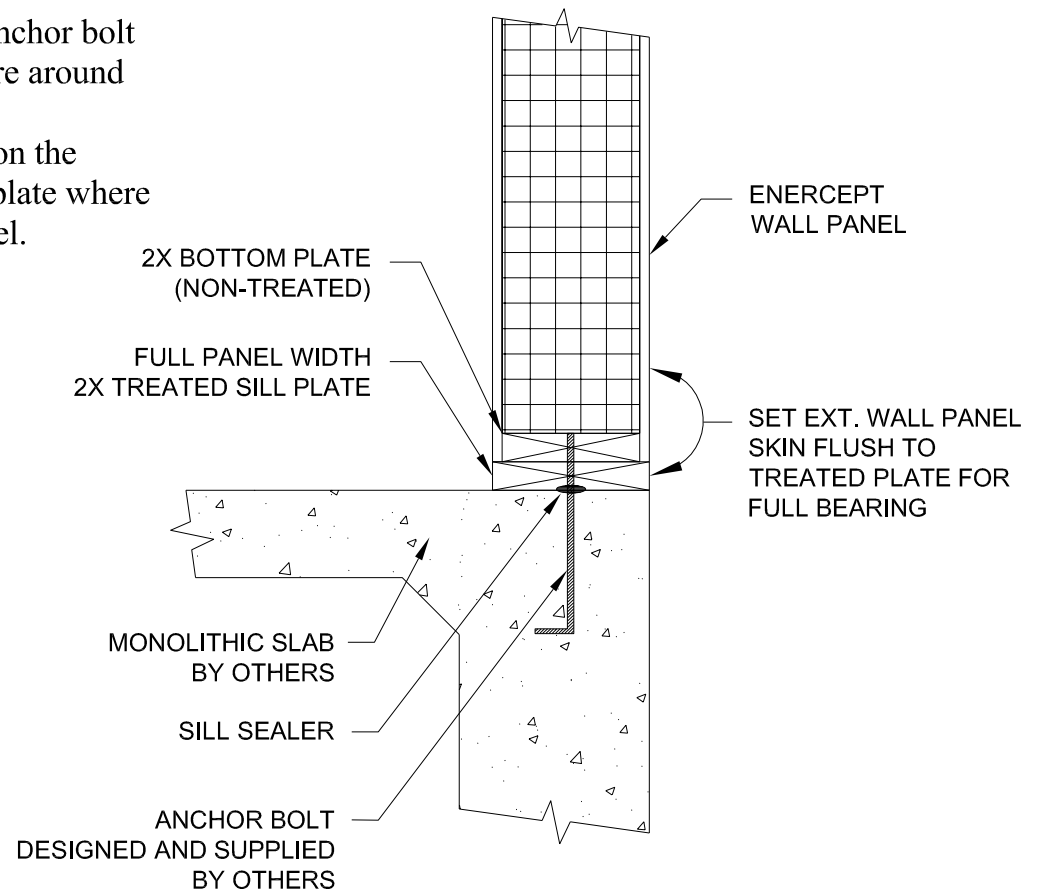


SILL PLATE INSTALLATION ON CONCRETE

SILL PLATE TO CONCRETE SLAB ATTACHMENT

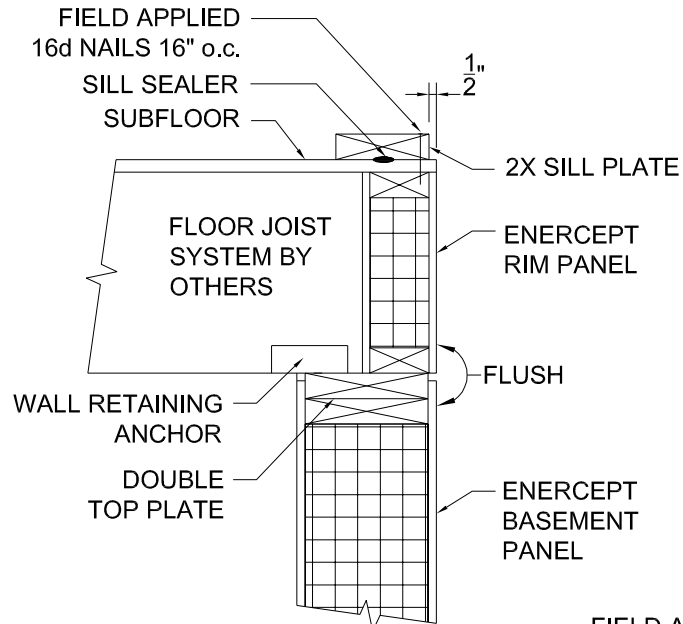
1. The slab must be LEVEL and SQUARE.
2. The outside dimension of the treated sill plate must match the overall exterior dimension of the structure.
3. Check for squareness and dimension of treated plate layout.
4. Apply sealant (sill sealer) to the treated sill plate.
5. Install the treated sill plate to the slab, fitting it over each anchor bolt (as designed and provided by others). Repeat this procedure around the entire perimeter of the slab.
6. Install the non-treated 2x bottom plate per the instructions on the previous page. Fit and fasten the anchor bolts through the plate where needed. This 2x bottom plate will be buried within the panel.

NOTE: Levelness, squareness and alignment of the sill plate are critical parts of the Enercept system.

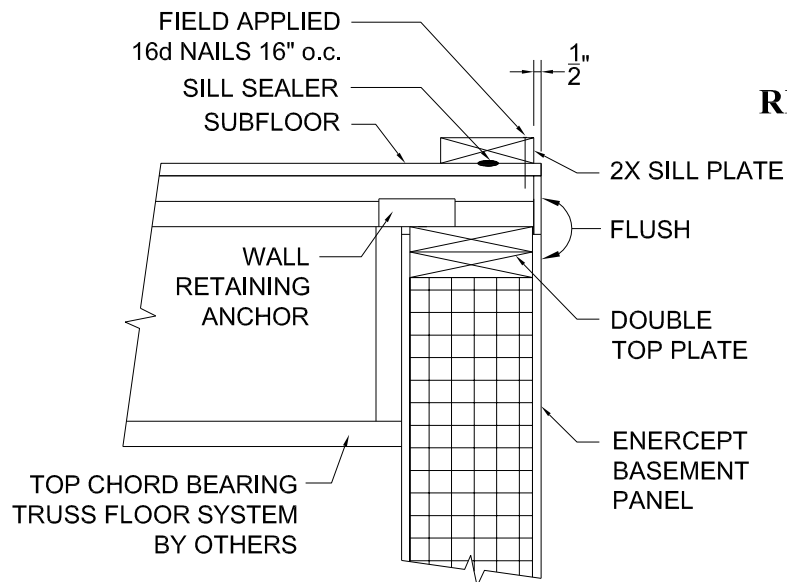


RIM JOIST / SILL PLATE INSTALLATION & OPTIONS

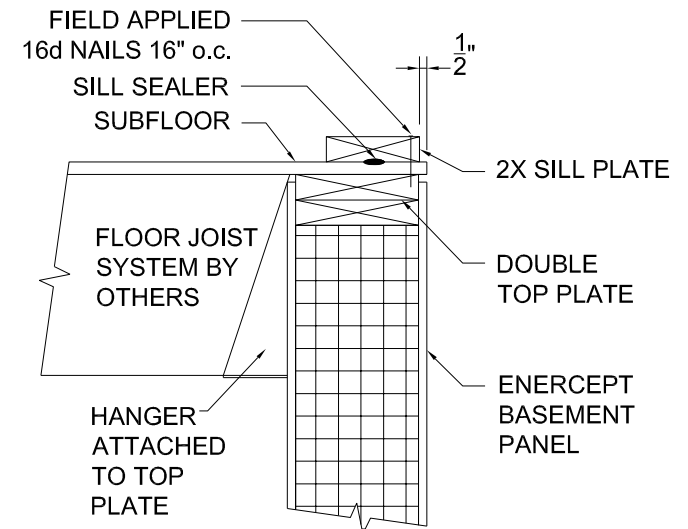
Remember to drill holes in the sill plates at wire chase locations of upper level wall panels. Drill holes at an angle where required to obtain access to wire chases for wire routing.



RIM PANEL DETAIL

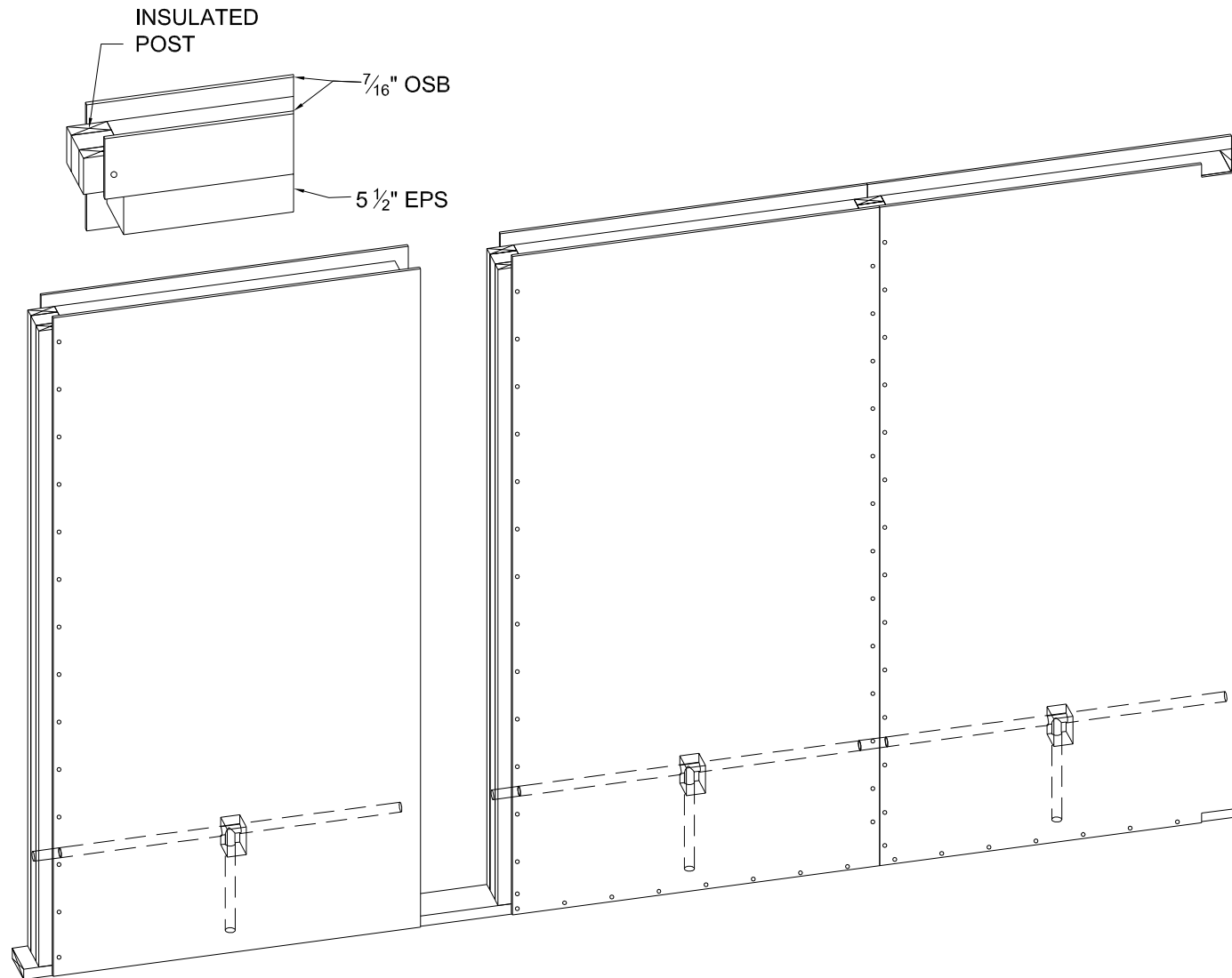


TOP CHORD BEARING TRUSS



HANGING JOISTS INSIDE PANEL

TYPICAL WALL PANEL



GENERAL CONSTRUCTION REQUIREMENTS

NOTE: All Enercept panels are generally numbered in the order of their installation. Panel numbers shown in this guide are for illustration only.

- A. Before placing panels into position over the sill plate, check the bottom of the panel for vertical wiring channels. Where channels are found, drill a matching 1" hole through the sill plate and the subfloor. See Section 11: Electrical, for more information.
- B. Before setting panels over sill plate, an unbroken $\frac{1}{4}$ " bead of approved sealant (sill sealer) compatible with polystyrene must be applied to the plate as shown.

NOTE: This bead is symbolized by the solid line.

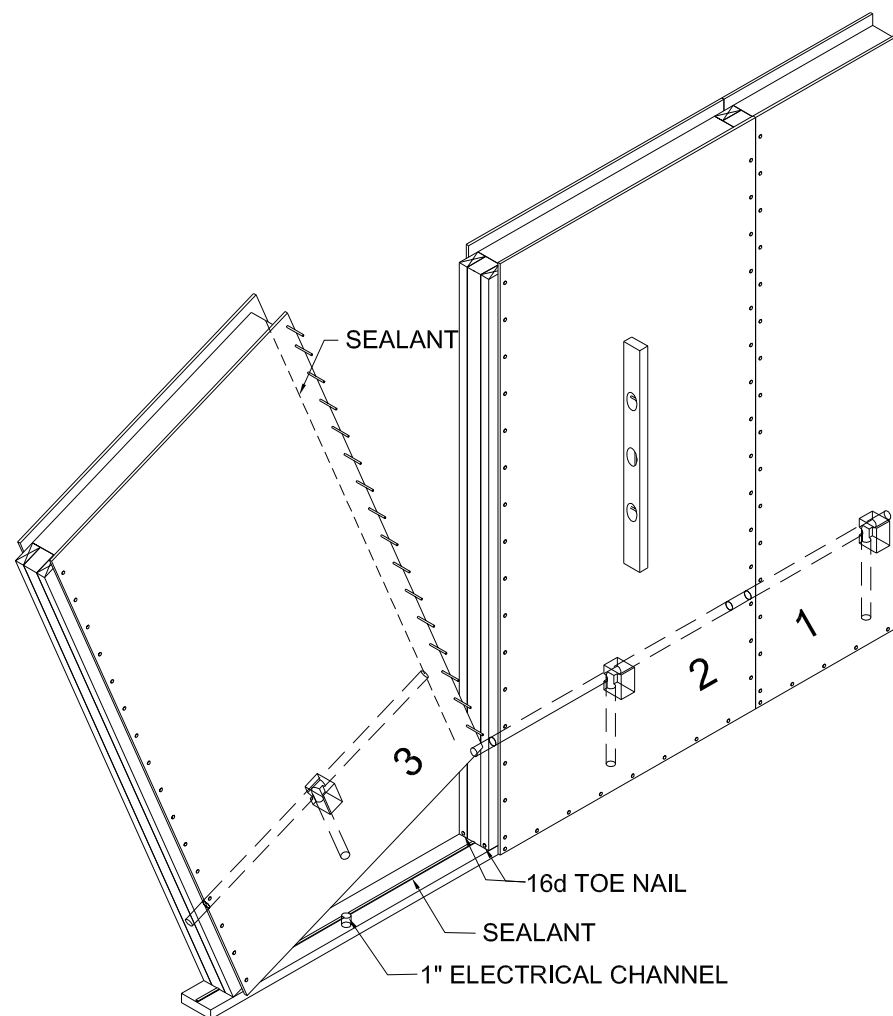
IMPORTANT: DO NOT USE SOLVENT BASE SEALANT. IT MUST BE EPS COMPATIBLE.

- C. Apply sealant to the recessed edge of the panel being installed before sitting the panel over the sill plate.
- D. To avoid disturbing the sealant bead on the sill plate, tilt the panel back slightly on the connector stud and slide forward into position

NOTE: Use a come-a-long, ratchet straps, or other mechanical means to pull panels together.

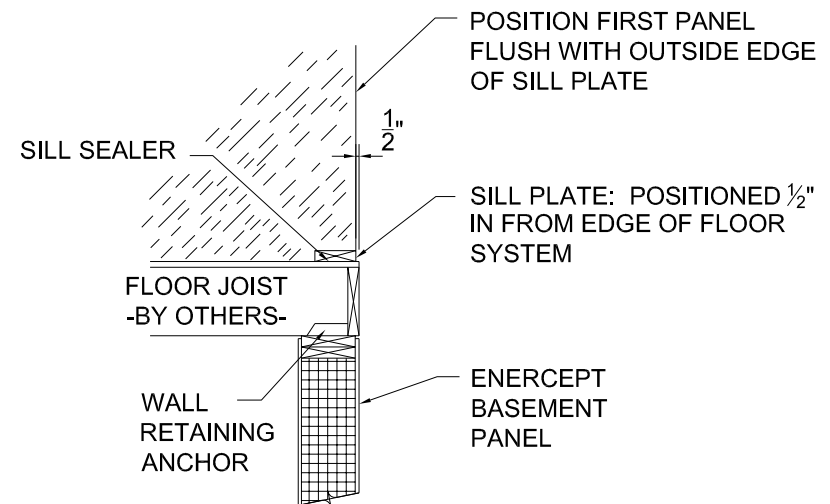
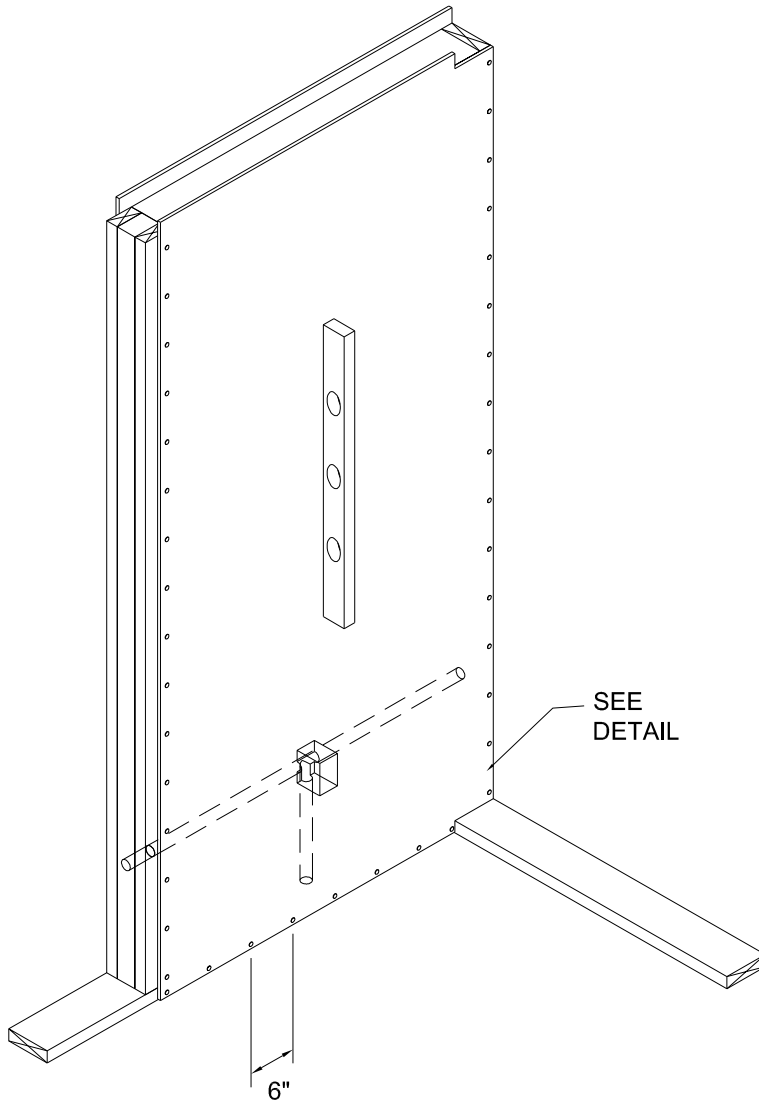
- E. When panels are properly positioned with $\frac{1}{8}$ " space ($\frac{1}{16}$ " minimum) between OSB and post is in contact with EPS and plumbed, both the interior and exterior edges must be nailed using 8d nails on 6" centers (unless noted otherwise on panel layout drawings). Toenail the bottom of the laminated post to the sill plate using 16d box nails at the position shown.

NOTE: Top of panels must be evenly aligned before nailing.



SETTING FIRST PANEL

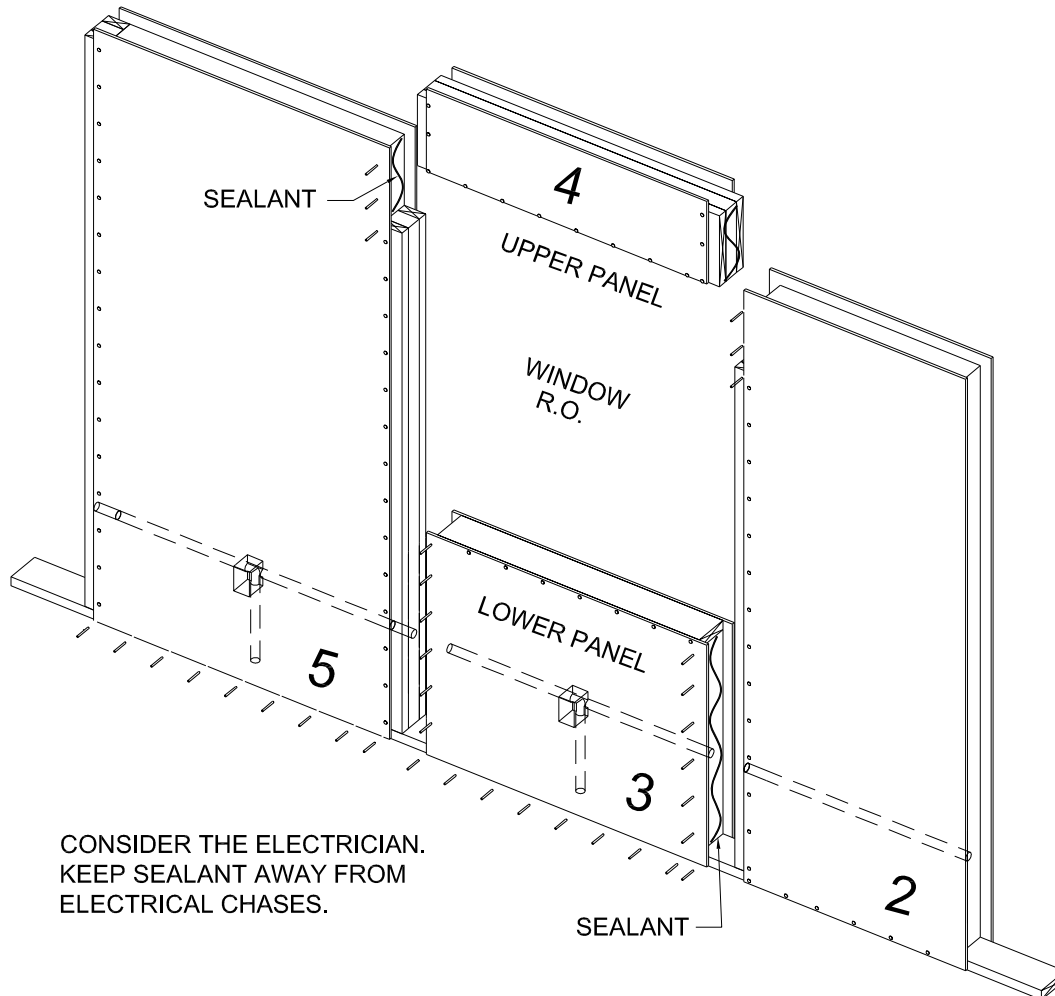
1. Important: Determine the location of the hole in the sill plate for the electrical wiring, and drill this hole.
2. Apply sealant to the sill plate and set panel #1 into position.
3. Before nailing the panel into place, level the interior surface and the leading edge of the panel to be sure it is vertically plumb.
4. When the panel is in its proper position, nail to the sill plate using 8d nails spaced 6" apart on both the interior and exterior edges.
5. Set subsequent panels in numerical order, following the layout drawing furnished with the Enercept building system.
6. Follow the general construction requirements, and repeat the preceding steps when setting successive panels.



WINDOW PANEL INSTALLATION

NOTE: Panel numbers shown are for illustration only.

NOTE: Window rough openings will typically consist of a lower panel and a header panel. In some cases, windows will be embedded within a single panel.



1. Check and drill electrical chases.
2. Apply sealant to the leading recessed area on lower panel # 3 as shown.
3. Apply sealant to the sill plate.
4. Tilt and slide panel #3 into position, plumb, and nail with 8d nails on 6" centers through both the interior and exterior edges as shown.
5. Apply sealant to the remaining end of panel # 3.
6. Apply sealant to the sill plate and place panel #5 into position, leaving a space of approximately 1" between panels #5 and # 3.
7. Apply sealant to the upper portion of panels #2 and #5.
8. Slide upper panel #4 down into position, push #5 over tightly against #3 lower and #4 upper panel.
9. Plumb panel #5 and nail into position.
10. Nail upper #4 and lower panel #3 at this time. Nail all interior and exterior edges with 8d nails on 6" centers.

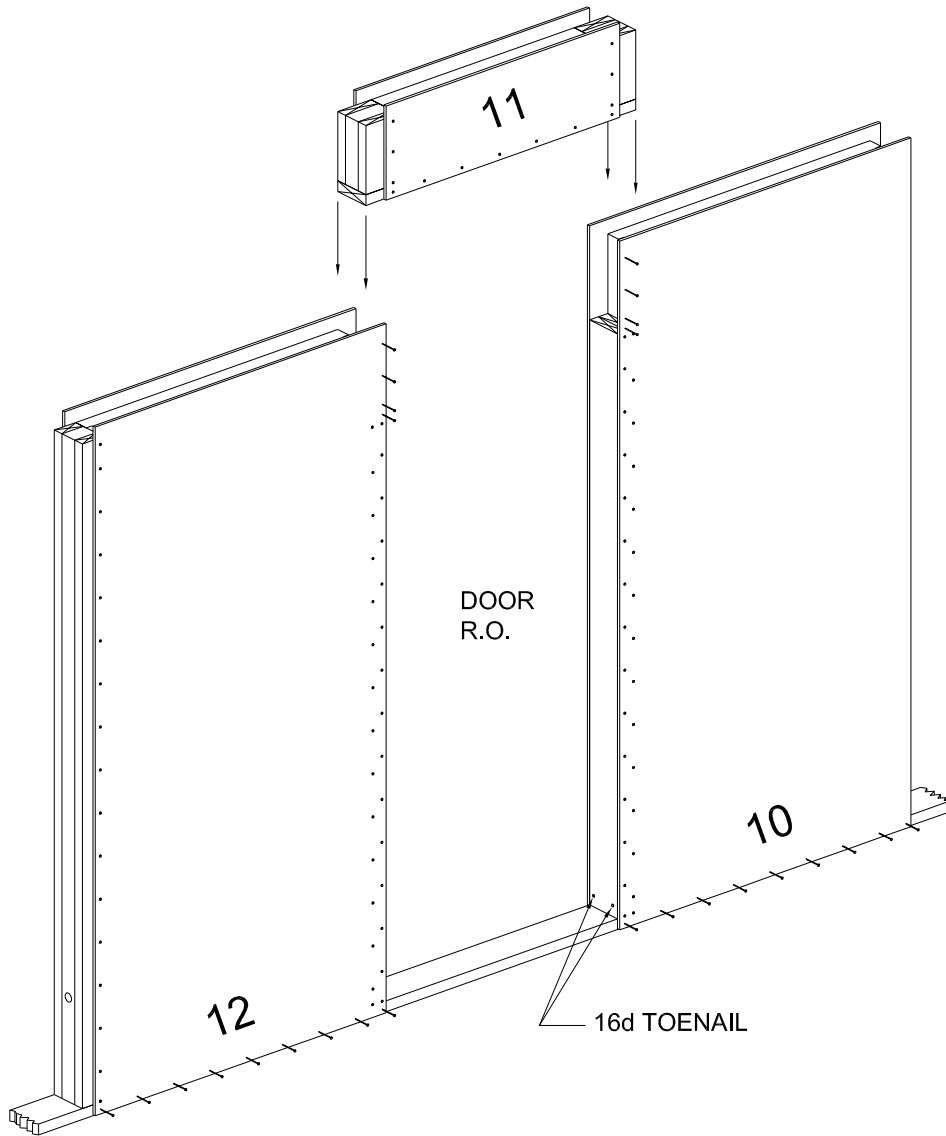
DOOR PANEL INSTALLATION

NOTE: Installation of door panels is similar to windows except there is no lower panel.

1. Determine the approximate position for panel #12.
2. Apply sealant to the sill plate in this area.
3. Tilt and slide panel #12 into position. **DO NOT NAIL THE PANEL AT THIS TIME**
4. Apply sealant to the upper portion of #10 and #12 and slide door lintel #11 into place.
5. Push panel #12 over firmly against header panel #11.

NOTE: Lower width of rough opening must equal upper width.

6. Plumb panel #12 and nail all panels with 8d nails on 6" centers, on all interior and exterior edges.



PANEL GROWTH

WHAT AND WHY

Panel growth refers to the increase in length of panel walls and roofs due to the $\frac{1}{8}$ " spacing at panel joints. Difference in humidity or failure to obtain a tight fit between panels can also cause growth. Post must be in contact with EPS. This $\frac{1}{8}$ " space ($\frac{1}{16}$ " minimum) is necessary to allow for the natural expansion and contraction of the OSB sheathing.

CORRECTION METHODS

For standard 4'-wide panel applications, Enercept has designed each corner panel to allow the builder to easily shorten the panel by the amount of growth. For jumbo 8'-wide panel applications and panels using thermal OSB splines, it may be necessary to correct panel growth before the end of the wall to ensure that rough openings remain in the proper locations. Enercept recommends measuring periodically against opening centerline dimensions for growth as panels are set in place.

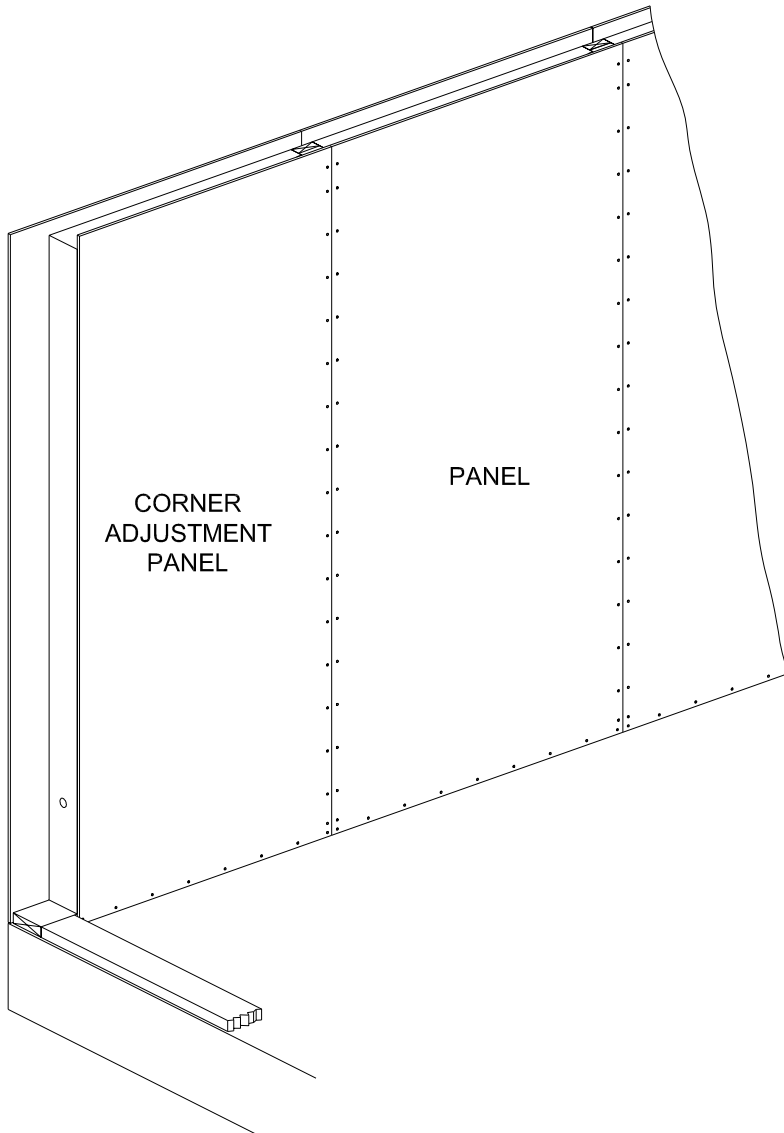
1. An electric foam scoop can be obtained from Enercept to cut back the foam by the amount of panel growth. (Enercept gives each builder the option to purchase a foam scoop.)
2. Use a circular saw (Skilsaw) or reciprocating saw (Sawzall) to cut the sheathing back by the same amount.

CORNER ADJUSTMENT PANEL

Temporarily set the corner adjustment panel into position.

DO NOT NAIL OR APPLY SEALANT AT THIS TIME!

Any growth that may have occurred during the erection of the previous panels will be compensated for by following the instruction on the next page.

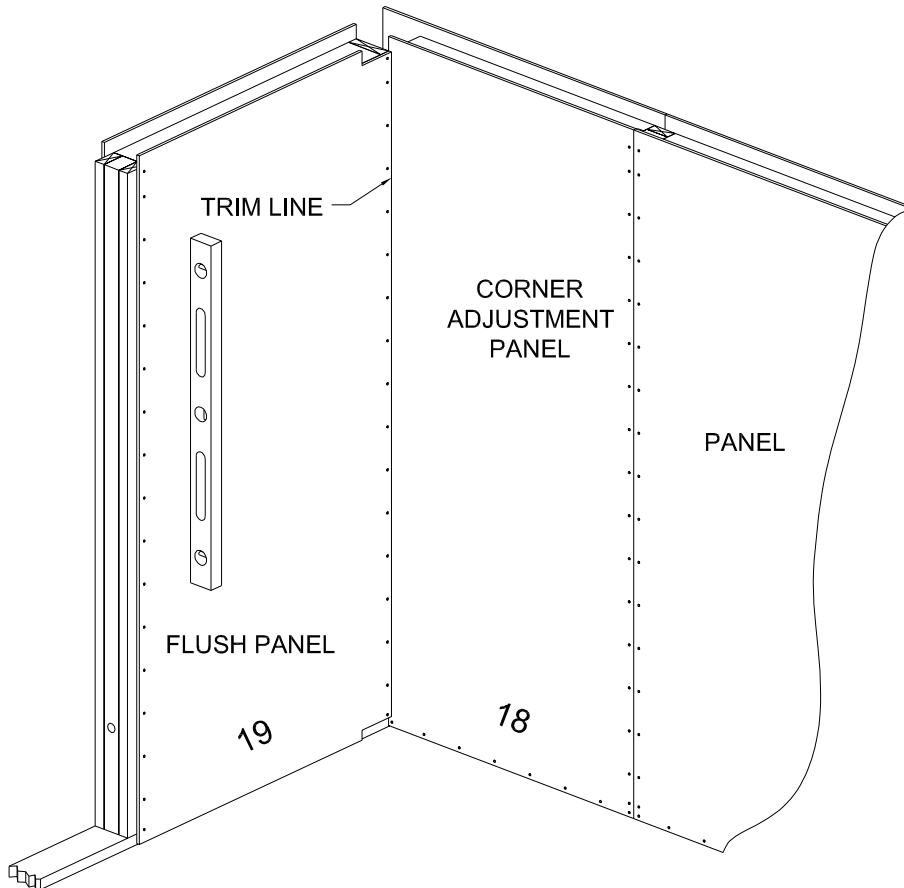


FITTING CORNER ADJUSTMENT PANEL

1. Temporarily set the flush panel #19 into position over the sill plate and slide it against the inside surface of the corner adjustment panel #18.

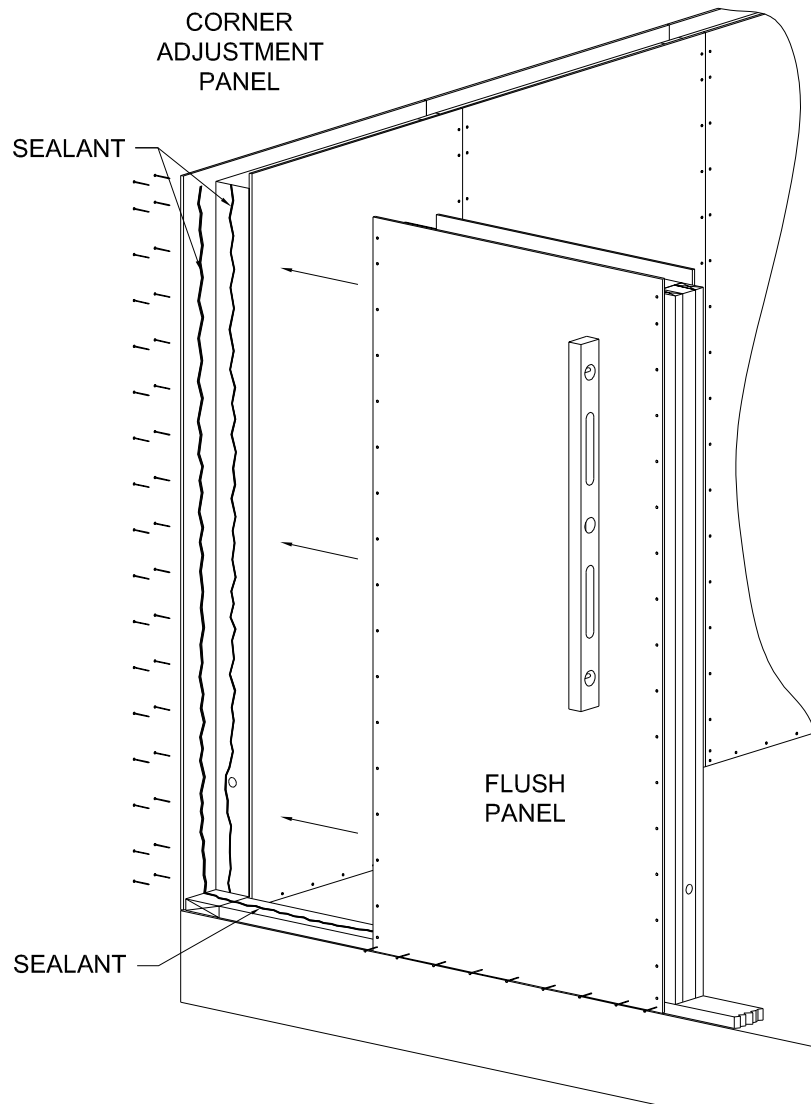
NOTE: If no growth has occurred, flush panel #19 will slide completely into the corner. If this is the case, remove this panel and permanently install panel #18, following all required steps. Then go on to the next page. If trimming of the panel is necessary, follow steps 2-4.

2. Level the interior of the panel as shown, tilting the panel in or out until the surface is vertically plumb.
3. With the edge of panel #19 as a guide, mark and trim the adjustment panel.
4. Trim and remove the excess material and install the corner panel as described on the following page.



CORNER ADJUSTMENT PANEL INSTALLATION

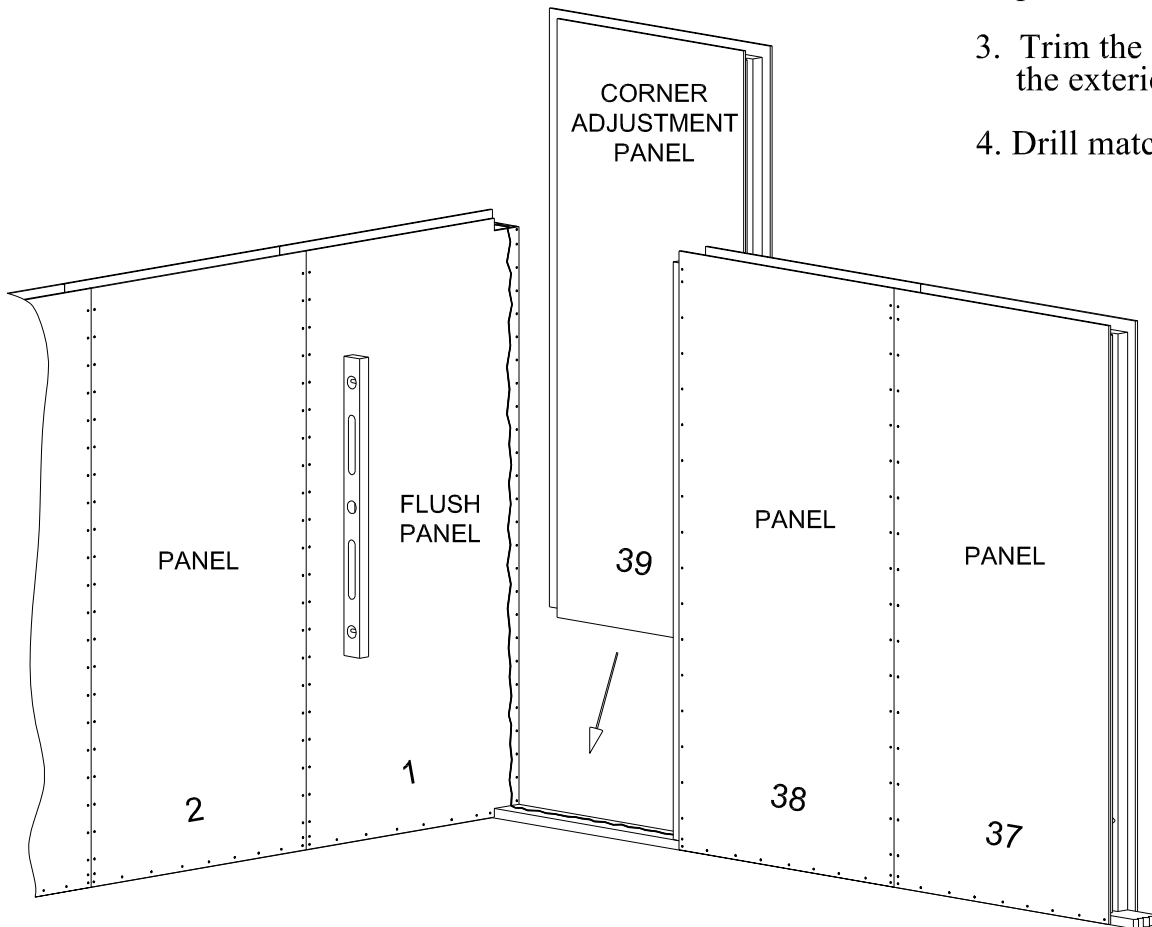
1. Check the bottom of the panel for vertical electrical channels and drill a matching hole through the sill plate.
2. Apply sealant to the required area as shown.
3. Tilt the corner panel backward and slide into position.
4. Plumb the panel.
5. Fasten the panel to the sill plate on interior and exterior edges with 8d nails on 6" centers.
6. Use 8d nails, spaced as shown, and fasten the exterior corner.

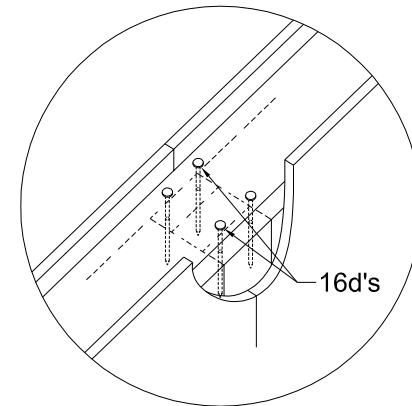
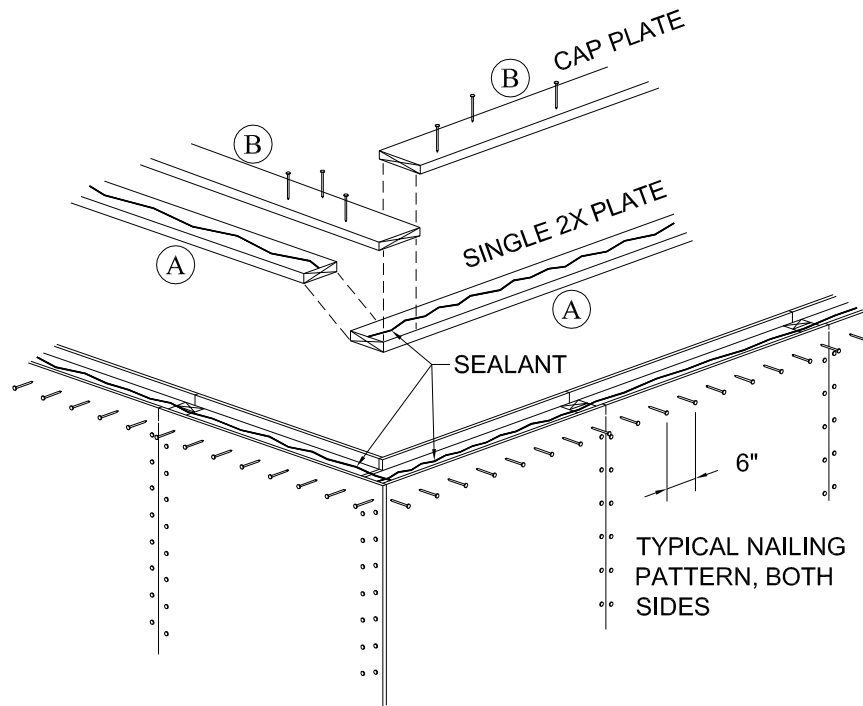


FINAL ADJUSTMENT PANEL INSTALLATION

NOTE: Installation of the adjustment panel in the final corner is slightly different than the previous corners since one corner panel is already in position (the first panel erected.)

1. Use a level and check panel #1 to assure that it has remained plumb.
2. Measure the distance between the inside face of panel #1 and the leading edge of the sheathing in panel #38 at both the top and bottom. Trim the interior OSB and EPS core of panel #39 to correspond to these dimensions.
3. Trim the exterior sheathing of panel #39 so it is flush with the exterior surface of panel #1.
4. Drill matching electrical holes in sill as necessary.
5. Apply sealant and lift panel #39 above panel #1 and #38 and slide into place.
6. Using 8d nails on 6" centers, fasten all interior and exterior edges.
(As shown on the preceding page.)





SINGLE TOP / CAP PLATE INSTALLATION

DETAIL

1. Check the top surface of the panel cores for vertical wiring channels. Mark these positions on the interior sheathing for later drilling reference.

2. Place continuous $\frac{1}{4}$ " bead of sealant on the core of the panels and place the first plate (A) into position.

NOTE: Allow a minimum joint offset of at least 4'.
Do not splice over window or door openings.

3. Fasten first plate (A) to stud post using four 16d nails as shown in Detail.

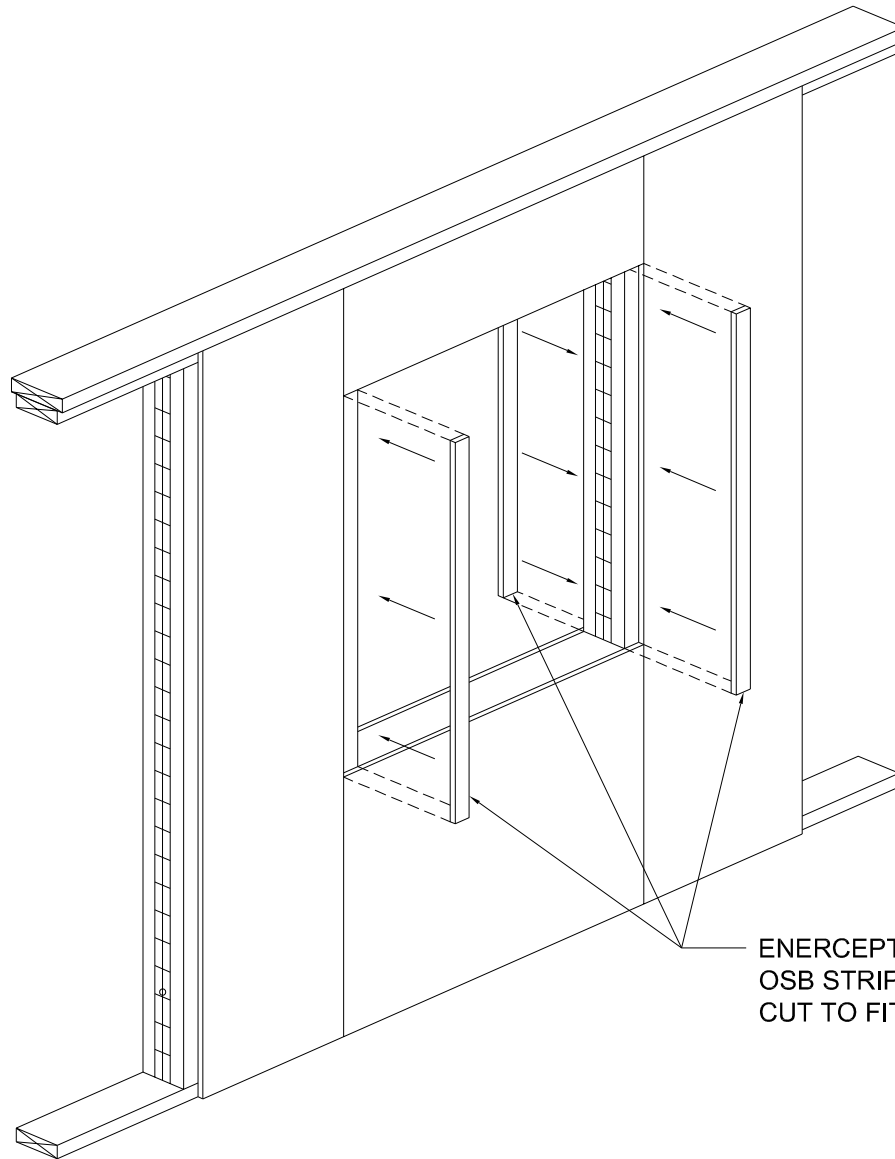
4. Place a continuous $\frac{1}{4}$ " bead of approved sealant on top of the first plate (A).

5. Install plate (B) using 16d nails on staggered 16" centers.

6. Firmly press plates (A) and (B) into position, nail with 8d nails on 6" staggered centers through interior and exterior sheathing.

7. Drill through both plates into the vertical electrical channels previously marked in Step 1.

WINDOW FILLER STRIPS



Window strips are supplied to fill in the areas around openings in which the thermal post connection member is exposed.

These OSB strips are sent 1 ½" wide in 4'-0" lengths to be field cut to size and installed around openings that have an insulated post located on either side of the opening.

Openings using 2X posts at either side are constructed flush with the panels and will not require the use of window filler strips.

ENERCEPT SUPPLIED
OSB STRIPS. FIELD
CUT TO FIT OPENING.

SECTION 6

BEAM / CENTER WALL



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VAPOR BARRIER

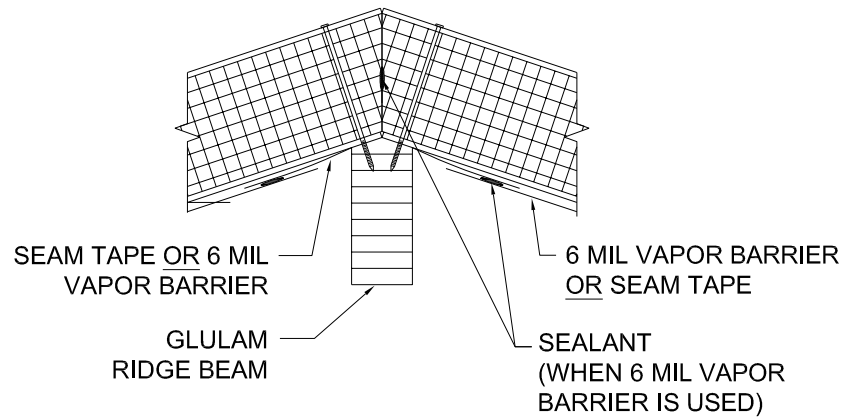


FIGURE 1

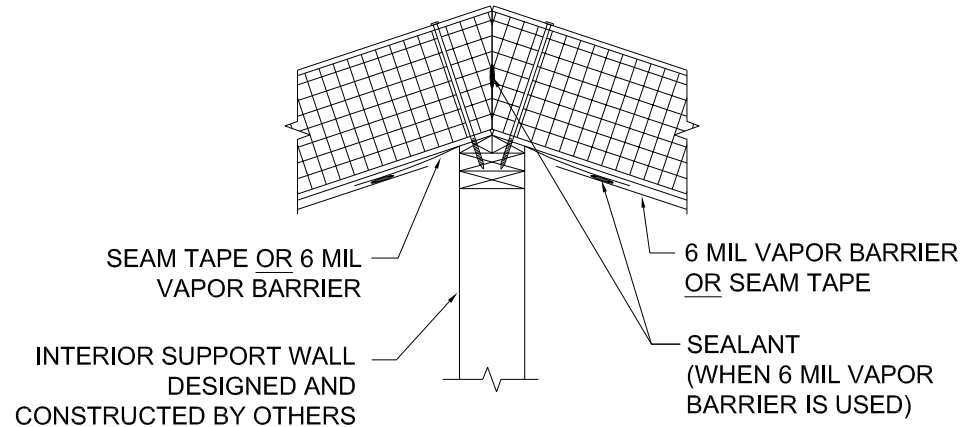


FIGURE 2

VAPOR BARRIER / SEAM TAPE

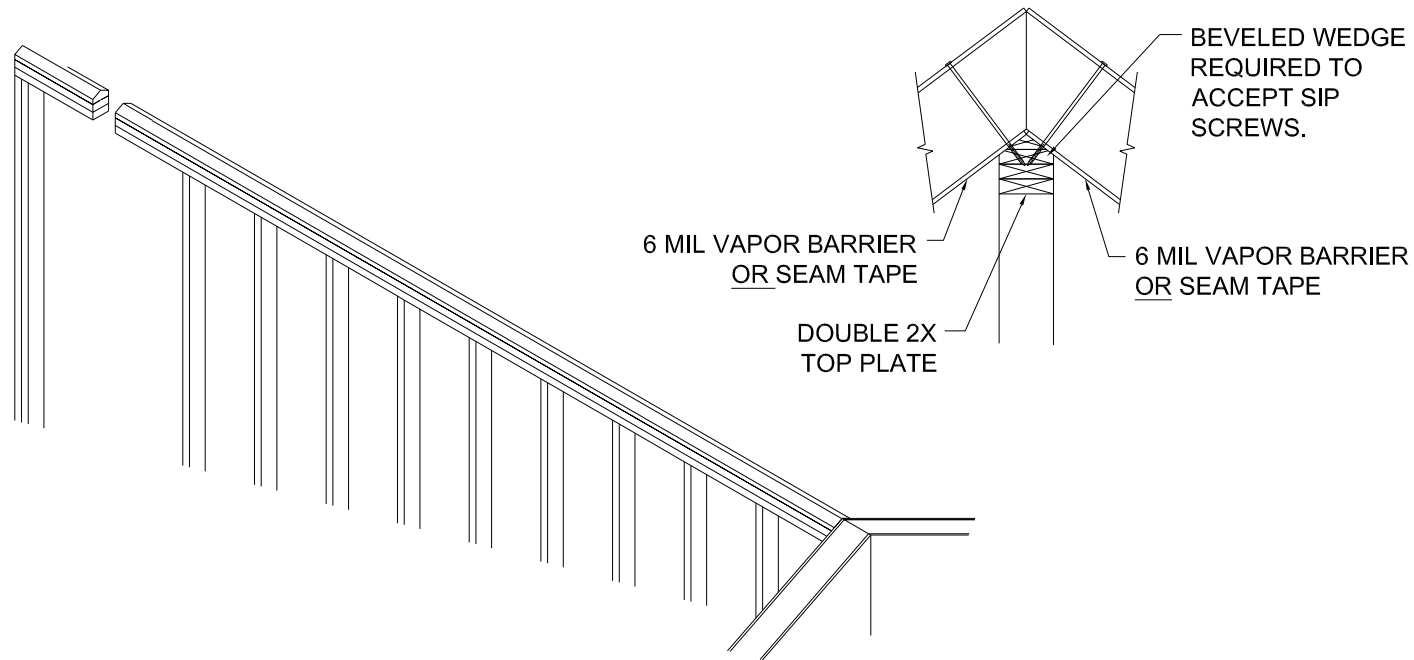
To insure a complete vapor barrier, either seam tape or 6 mil poly vapor barrier should be used. Drape the beam / center wall with a sheet of 6 mil poly, leaving a minimum of 2' on each side. If using seam tape, drape the seam tape (paper side up) and staple it to the top side of the beam / center wall. Do not remove paper backing to seal until after the panels are installed.

NOTE: Be sure the vapor barrier is tucked up into the corner between the ceiling and beam so that it will not be torn when the sheet rock is installed.

Before installing sheet rock, install the 6 mil poly vapor barrier over the inside surface of the exterior wall and roof panels. Overlap all seams in the vapor barrier by a minimum of 6" and apply a bead of acoustical sealant between the two as shown in Figure 1 and Figure 2. Seam tape should be applied over seams if 6mil poly vapor barrier is not used.

NOTE: To ensure interior walls do not pull away from the panels,
ALL INTERIOR WALLS MUST BE SCREWED TO
ENERCEPT WALL AND ROOF PANELS WITH 3" SCREWS.
DO NOT NAIL! DO NOT NAIL! DO NOT NAIL!

CENTER BEARING WALL



NOTE: Center bearing walls used to support roof panels shall be designed and supplied by others.

Enercept typically suggests using a minimum of 2x6 wall construction to accommodate bearing requirements for roof panels. Enercept does not, however, claim that the aforementioned 2x6 framing is adequate. Circumstances such as wall height or loading may dictate that other construction is required.

Construct the center support wall so its height will equal the height of the gable top plate peak.

RIDGE BEAM INSTALLATION

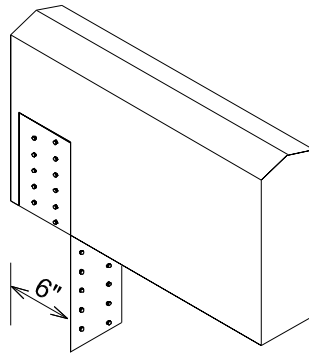


FIGURE 1

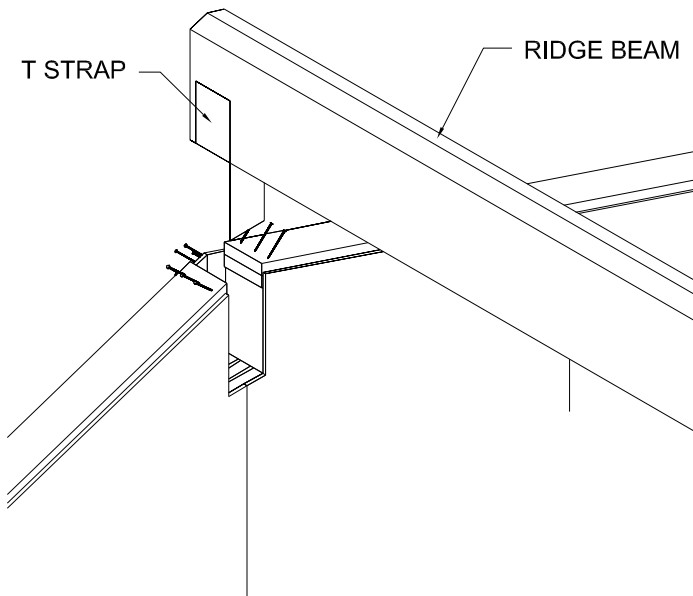


FIGURE 2

1. Plumb and brace all walls.
2. Check beam measurements against site measurements.
3. Adjust beam length if needed.

NOTE: Do not notch or drill holes into any beams without contacting Enercept or Beam Supplier.

4. Confirm beam pockets and beam depth is accurate.
5. If necessary, adjust the beam pocket size prior to installation.

NOTE: Beam pockets are often slightly wider and deeper than required for adjusting beam placement within pocket. Shim within beam pocket when necessary to attain proper bearing height.

6. Install T-connector(s) as illustrated in Figure 1 and nail to beam.
7. All intermediate beam supports must be installed prior to installing the beam.
8. All beam support points must be at the same height and level.
9. Lift beam into position. Insure that the beam is level.
10. Toenail with 16d nails spaced 2" apart as illustrated in Figure 2, also nail through the exterior sheathing into the end of the beam with 8d nails on 2" centers.
11. Fasten T-connector(s) to wall panel with 8d nails.
12. Attach intermediate beam support points to beam.
13. Seal any gaps / voids with expanding foam sealant around the beam in the panel beam pockets.
14. Before and during setting of roof panels check for lateral movement (bowing).
15. Drape a 6 mil plastic vapor barrier or seam tape (paper side up) and tack in place before setting any roof panels.

SECTION 7 GABLE WALLS

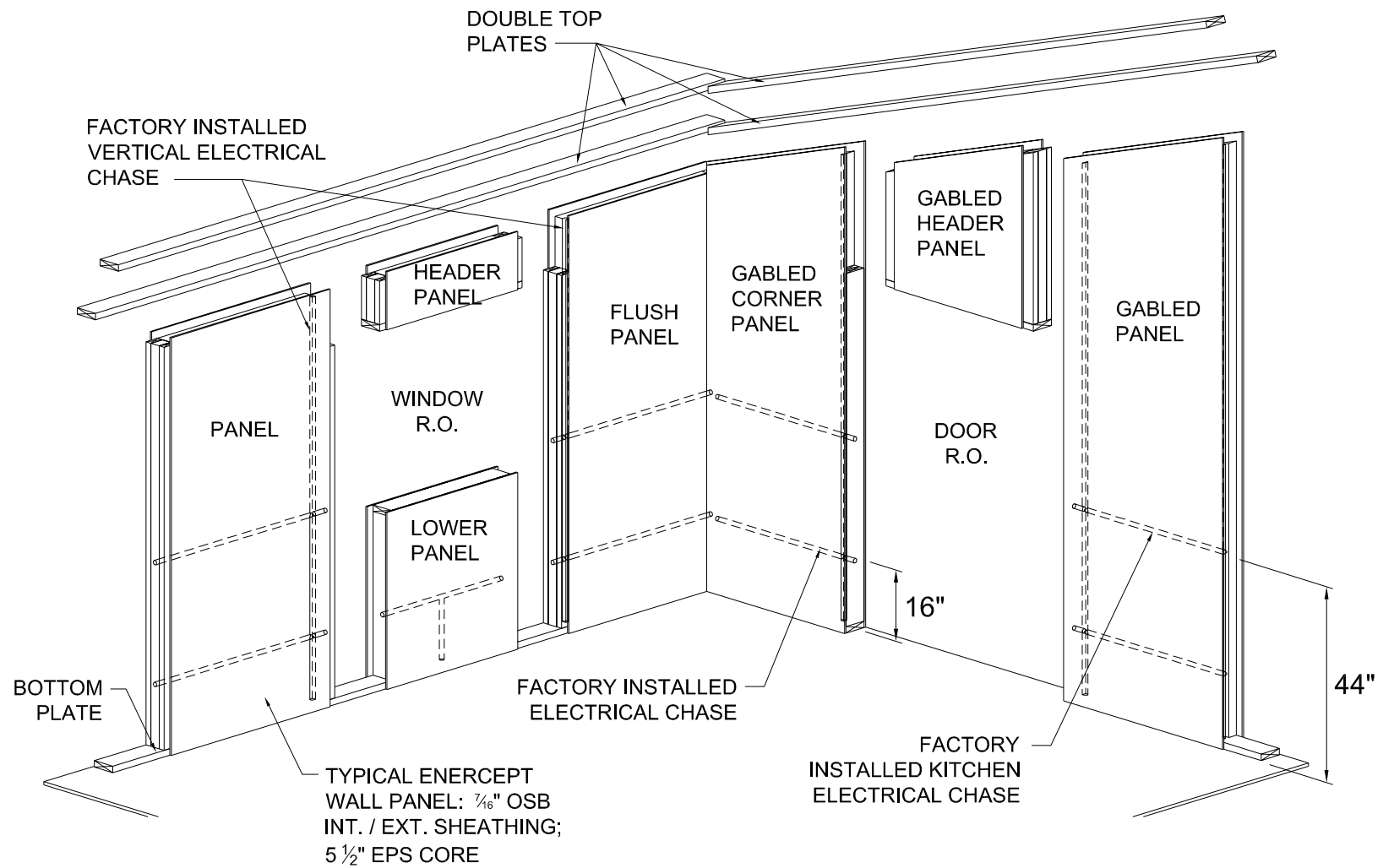


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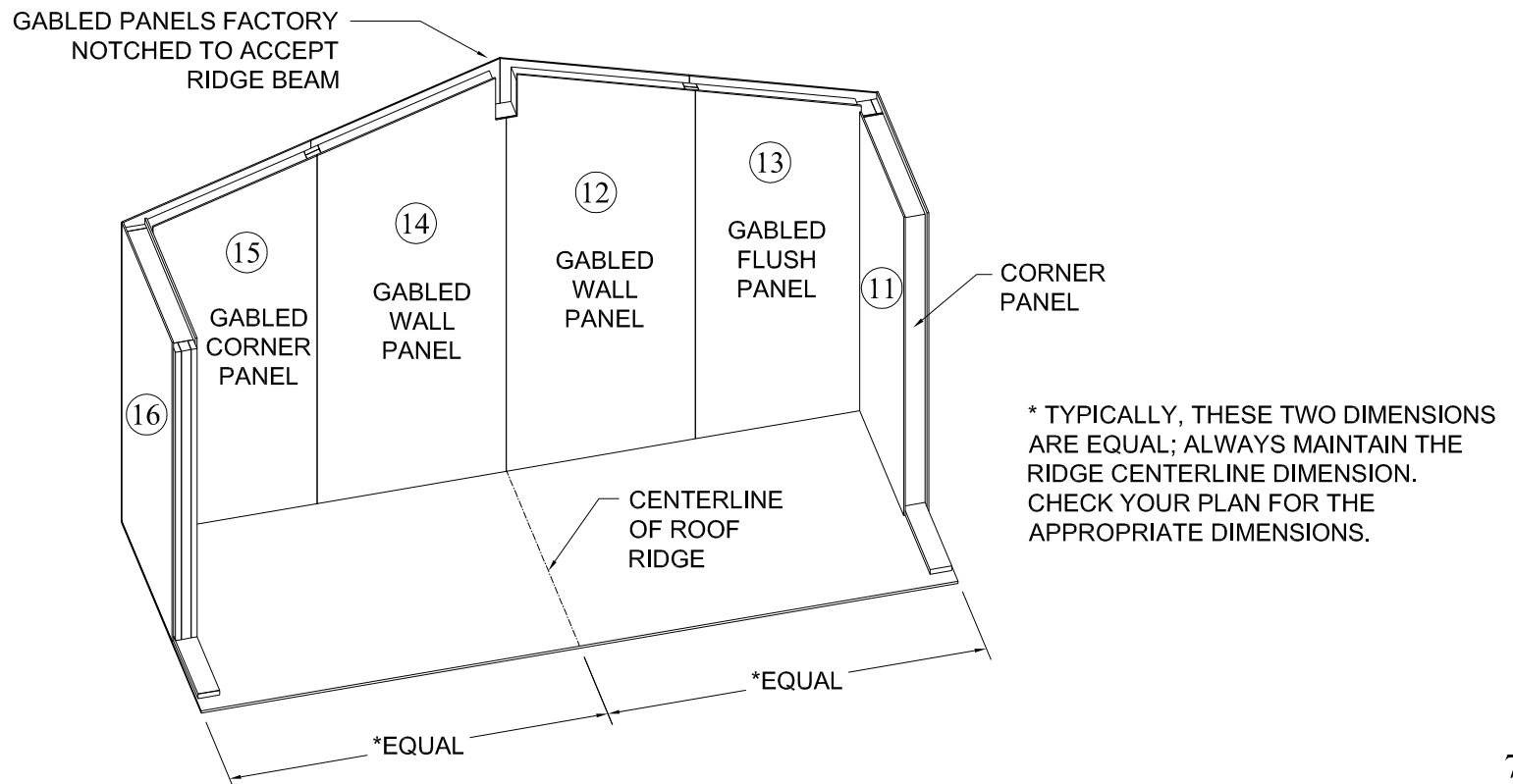
TYPICAL GABLE WALL LAYOUT



TYPICAL GABLE WALL LAYOUT

NOTE: Centerline dimension and pitch must be maintained. Any panel growth must be addressed at the corners.

1. For easier installation do not set wall panel #11 until gabled flush panel #13 is in place (see Wall Panel Section pgs. 5-9 to 5-10).
2. Mark centerline of beams and windows prior to installation as per panel layout.
3. Start with gabled wall panel #12 (as shown below), setting panels from the center to the outside.
4. Continue setting panels. Any growth must be addressed on the gabled flush panel.
5. Set panel #14 and continue to the corner, address any panel growth on the gabled corner panel.



SECTION 8 STRUCTURAL ROOF



If you have any questions
or concerns call us at:

1-605-882-2222

CALL BEFORE YOU CUT!

LIFTING PANELS ONTO THE ROOF

The easiest and safest way to pick up and set your roof panels into position is using a crane or a boom truck.

The 8" structural roof panel weighs approximately 3.75 pounds per square foot.

The 10" structural roof panel weighs approximately 4.5 pounds per square foot.

The 12" structural roof panel weighs approximately 4.8 pounds per square foot.

Listed below are suggested options for picking up panels:

1. Use a $\frac{3}{4}$ " diameter eye bolt (14-16 inches in length) with a $\frac{1}{4}$ " x 6" square steel plate and nut. Drill a $\frac{3}{4}$ " hole in the center of the panel (for roof pitches over 4:12 you may want to offset this hole 3 or 4 inches per pitch change towards the top of the panel - this will angle the panel closer to the desired pitch). Insert the eye bolt through the panel and secure with the plate and nut. Fastening a guide line to the panel is also recommended.
2. Using 3 or 4 inch wide lifting straps (crane operators typically have these available) wrap the straps all the way around the panel and fasten to the crane hitch. On single sided panels over ten feet in length, you may want to use 2 straps spaced approximately 4 feet apart. Fastening a guide line to the panel is also recommended.
3. See page 8-3 for lifting plate detail.

*** Do not use the electrical wire in the roof panel as a guide rope.**

Whether you use one of the suggestions listed above or another method that you develop yourself, please make safety your first concern.

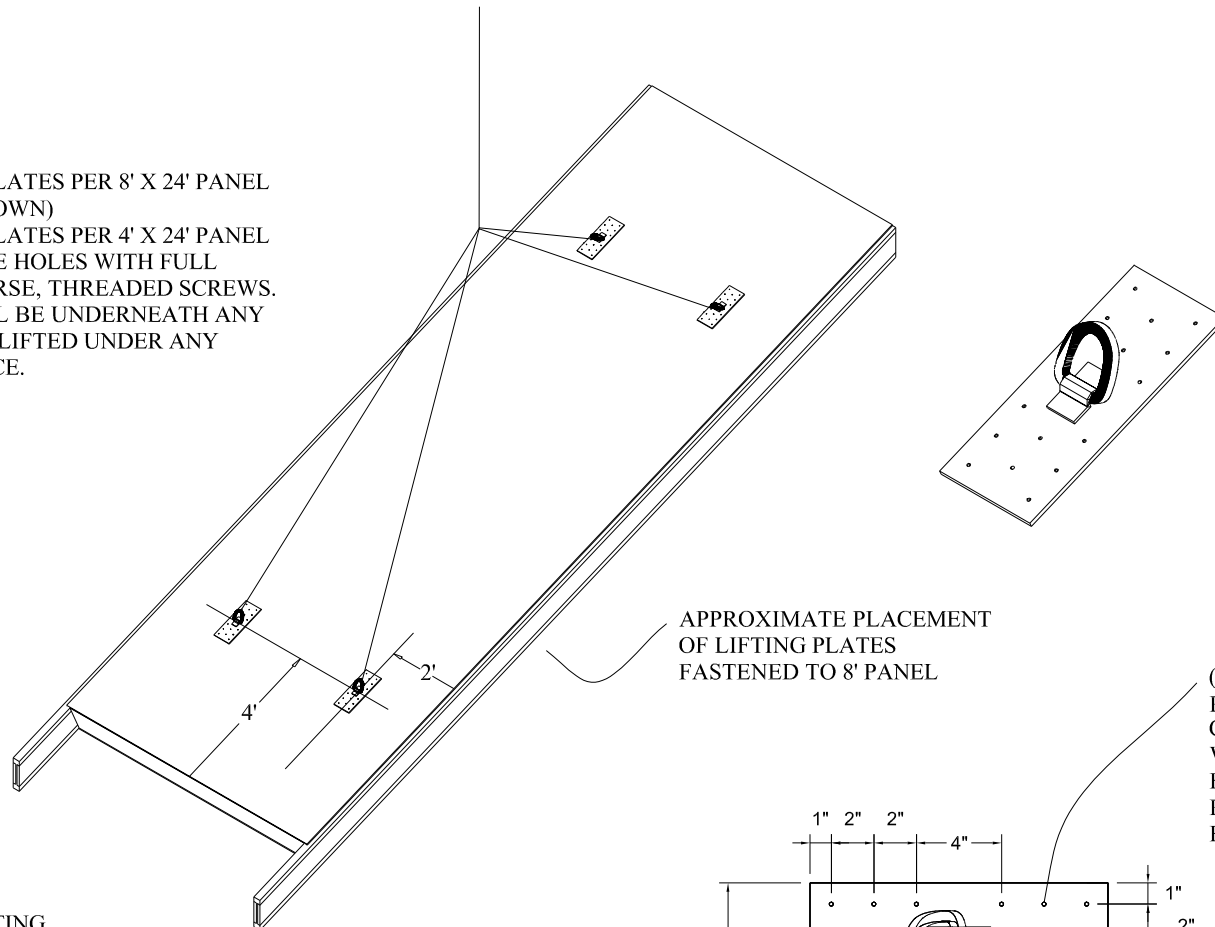
NOTE: Place required 6 mil vapor barrier or seam tape draped over beam / center wall before setting roof panels. (For further information, refer to Vapor Barriers on page 6-2.)

LIFTING PLATE DETAILS

NOTES:

- USE (4) LIFTING PLATES PER 8' X 24' PANEL (EXAMPLE SHOWN)
- USE (2) LIFTING PLATES PER 4' X 24' PANEL
- FILL ALL 16 PLATE HOLES WITH FULL LENGTH, COARSE, THREADED SCREWS.
- NO PERSON SHALL BE UNDERNEATH ANY PANEL BEING LIFTED UNDER ANY CIRCUMSTANCE.

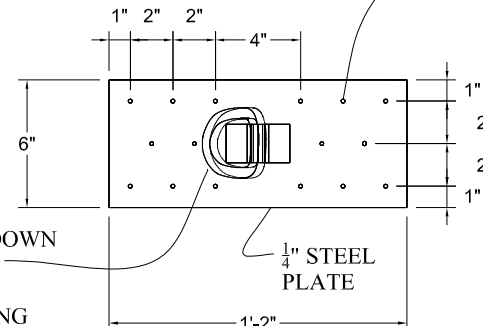
SPECS AND FASTING
PATTERN APPLY ONLY
TO LIFTING PLATES
SUPPLIED BY ENERCEPT



APPROXIMATE PLACEMENT
OF LIFTING PLATES
FASTENED TO 8' PANEL

(16) $\frac{3}{16}$ " HOLES PER
PLATE. USE #6 X $1\frac{1}{4}$ "
COARSE THREAD
WOOD SCREWS TO
FASTEN PLATE TO
PANEL. FILL ALL
HOLES

2 $\frac{5}{16}$ " D-RING TIE DOWN
WITH MOUNTING
BRACKET #1200
MINIMUM WORKING
LOAD. BRACKET
FULLY WELDED TO
PLATE BY CERTIFIED
WELDER.



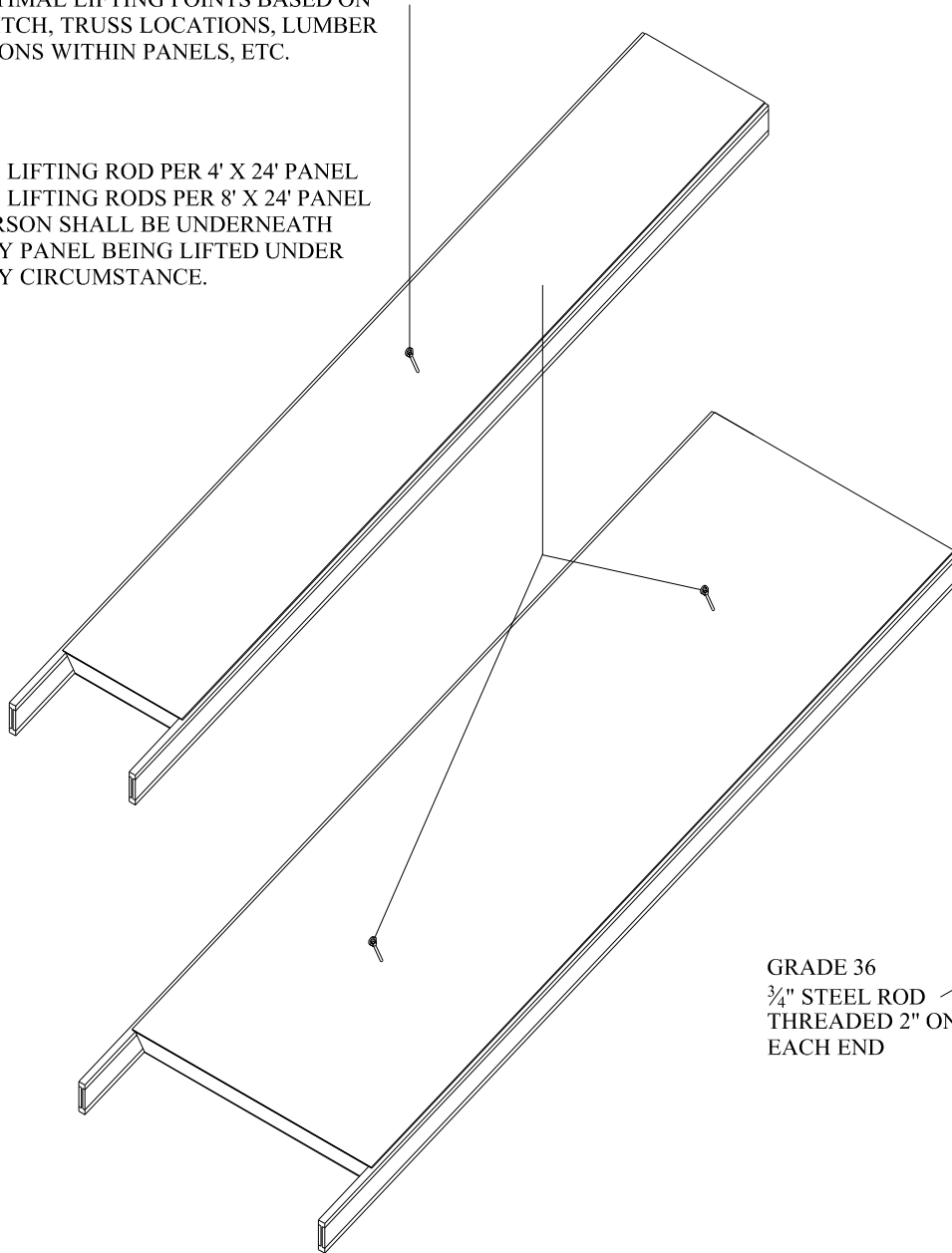
LIFTING PLATE
CAPACITY:
416lb MAXIMUM
ALLOWABLE LIFTING
CAPACITY PER PLATE.
(ALL 16 HOLES MUST
BE FILLED WITH
SPECIFIED SCREWS)

LIFTING ROD DETAILS

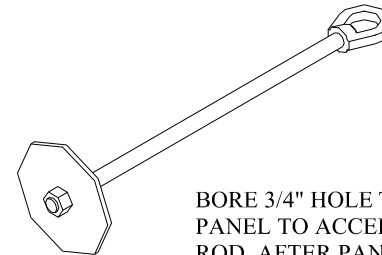
THE CONTRACTOR SHALL DETERMINE THE OPTIMAL LIFTING POINTS BASED ON ROOF PITCH, TRUSS LOCATIONS, LUMBER LOCATIONS WITHIN PANELS, ETC.

NOTES:

- USE (1) LIFTING ROD PER 4' X 24' PANEL
- USE (2) LIFTING RODS PER 8' X 24' PANEL
- NO PERSON SHALL BE UNDERNEATH ANY PANEL BEING LIFTED UNDER ANY CIRCUMSTANCE.



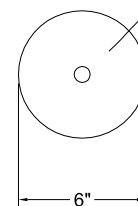
GRADE 36
3/4" STEEL ROD
THREADED 2" ON
EACH END



BORE 3/4" HOLE THROUGH PANEL TO ACCEPT LIFTING ROD. AFTER PANEL IS SET AND SECURELY FASTENED IN PLACE, UTILIZE SPRAY FOAM TO SEAL HOLE.



EYE NUT THREADED ONTO 3/4" ROD AND WELDED INTO PLACE (A105)



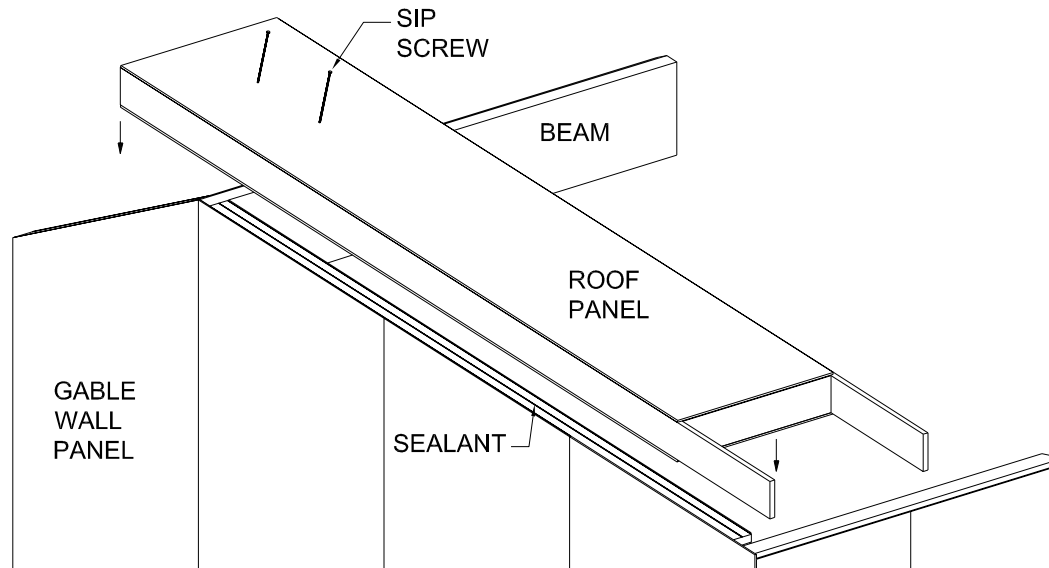
1/4" X 6" DIAMETER STEEL PLATE. WELD 3/4" HEX NUT TO BOTTOM OF PLATE. (A36 PLATE)



HEX NUT (A563)

LIFTING ROD CAPACITY:
1200lb MAXIMUM
ALLOWABLE LIFTING
CAPACITY PER ROD.

ROOF PANEL INSTALLATION



1. Before placement of any roof panels, make sure all wall / gable panels are plumb and braced against tipping inward / outward.
2. Drape required seam tape or 6 mil plastic vapor barrier over the center beam or center support wall so that after roof panels are in place, vapor barrier can be seamlessly applied to the interior surface of exterior roof and wall panels. Vapor barrier joints/seams need to be sealed. This will help protect panels from indoor humidity and moisture. Seam tape should be tacked directly to the beam paper side up. Remove the paper backing after roof panels are installed.
3. Pre-start SIP screws in the roof panel. The gable screws will be on 16" centers typ. (or as recommended in the plan specifications). Measure from the finished gable edge of the panel to the desired overhang length PLUS half the thickness of the wall panels to pre-start gable screws (centering the screws with the top plates). Keeping the desired overhang in mind, set the long edge of the roof panel square with the wall panels. The plumb cut of the roof panel must be in line with the center of the ridge beam.

NOTE: It is important that the roof panel be installed at a 90 degree angle to the center of the beam / center wall.

4. Re-check wall / gable panels for plumb.
 5. Using SIP screws, fasten the roof panel to the ridge beam and eave wall on 12" centers.
(Or as recommended in panel specifications.)
- * Screws over 18" will have 3" washers.

6. All overframed areas must be properly ventilated.

NOTE: For panels that create overhang, pre-measure where gable wall centerline will fit under roof and pre-start screws in panels before raising into place.

ROOF PANEL INSTALLATION

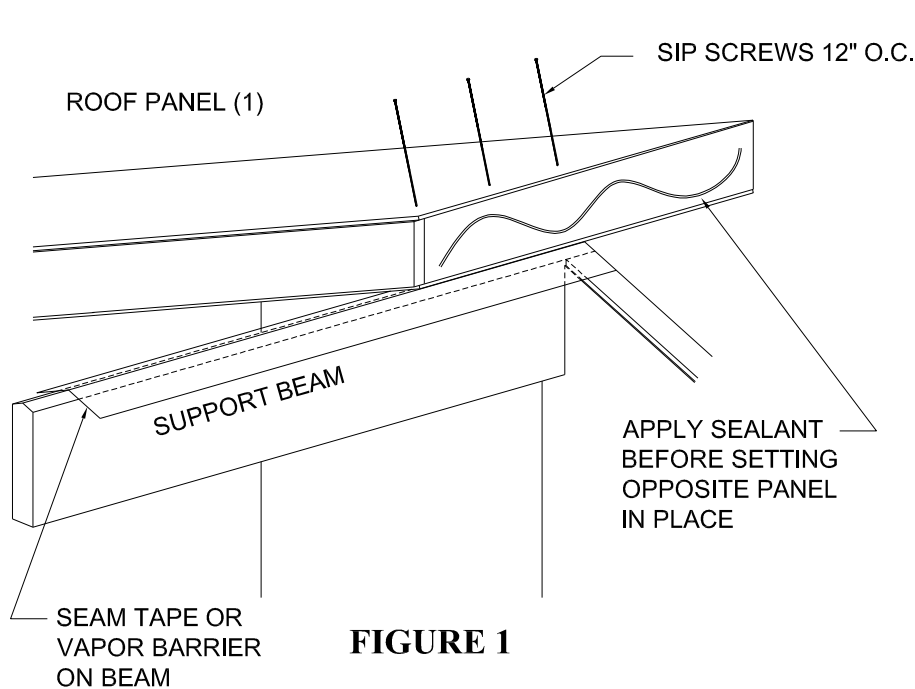


FIGURE 1

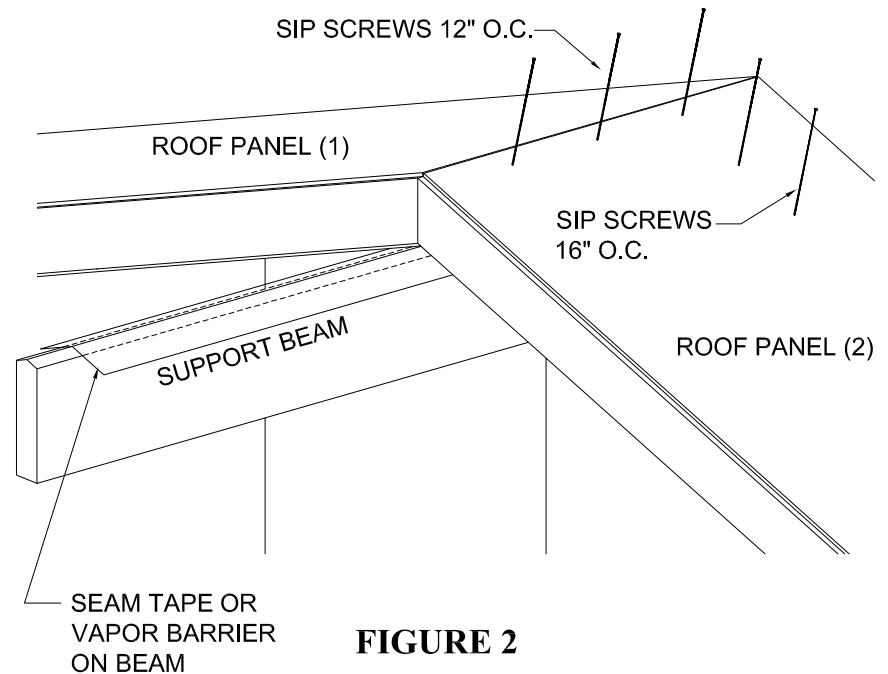


FIGURE 2

NOTE: The top end of the panel should set in middle of the beam / center wall.

1. Attach panel to the beam / center wall using the SIP screws provided on 12" centers.
2. Attach the bottom end of the roof panel to the wall panel using SIP screws provided on 12" centers.
3. Apply sealant to panel #1 as shown.
4. Apply sealant to panel #2 as shown in Figure 1.
5. Set panel #2 into position on the opposite side of the roof, using the same methods as used for panel #1.
6. Butt panel #2 against panel #1, making sure panel #2 maintains a 90 degree angle to the beam / center wall.
7. Install the provided screws in panel #2 on 16" centers to the gable panel.
8. Refer to project layout for required screw spacing.

ROOF PANEL INSTALLATION

CONTINUED FROM PREVIOUS PAGE

8. Apply sealant to recess of the next panel before setting into place, slide panel over the 2x or TJI connecting member, making sure that the top of the roof panel is in the center of the Ridge beam and even with the adjoining panel. 2x or TJI should be in contact with the EPS.

NOTE: There should be a $\frac{1}{8}$ " gap ($\frac{1}{16}$ " minimum) between the adjoining sheathing. Connector must also be in contact with EPS.

9. Once the panel is in the proper position, nail the connecting edges with 8d nails on 6" centers on both the interior the exterior sheathing.
10. Continue installation of roof panels in an alternating pattern from one side of the ridge beam to the other.
11. Periodically measure panel progress for growth. This is critical if any hip / valleys or offsets are involved in your roof design.

NOTE: Panel growth must be addressed before setting panels in the critical measurement areas (hip / valley, offsets). If panel growth occurs, recess the foam and trim the sheathing back accordingly to maintain the necessary dimensions.

Call Enercept before trimming.

12. Install the final roof panels following the same steps as panels #1 and #2.

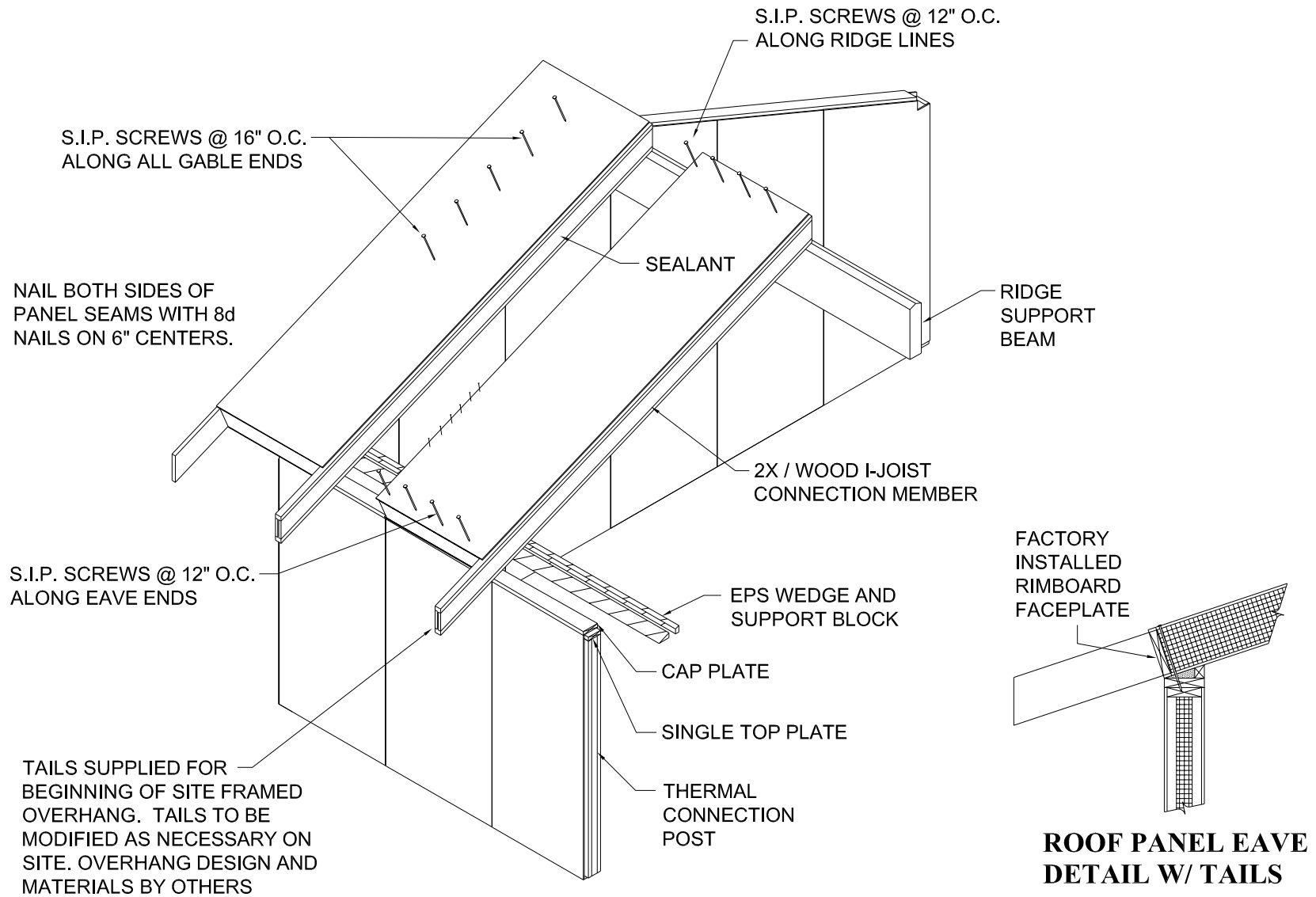
13. **USE EXPANDING FOAM SEALANT AT THE RIDGE TO SEAL ANY GAPS OR CRACKS BETWEEN ROOF PANELS.**

NOTE: Roof panels must be dry prior to application of roofing felt or any roofing product.

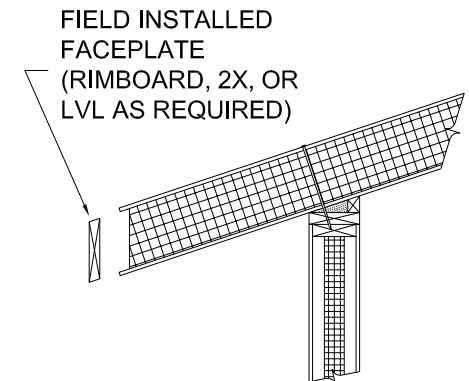
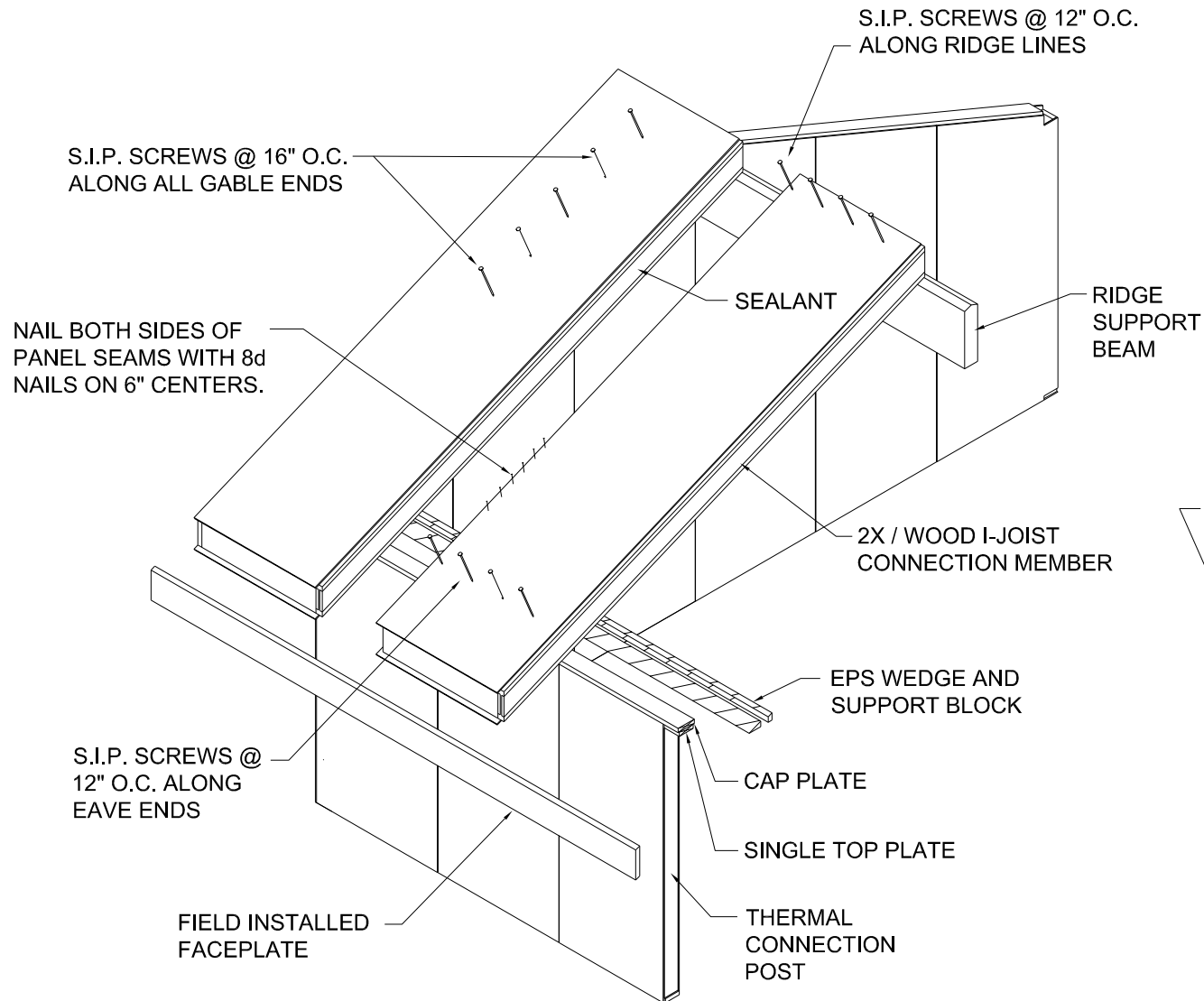
NOTE: Panels must be completely fastened down before electrical wiring is routed.

NOTE: All overframed areas must be vented properly. (Stick or panel.)

STRUCTURAL ROOF PANELS WITH TAILS

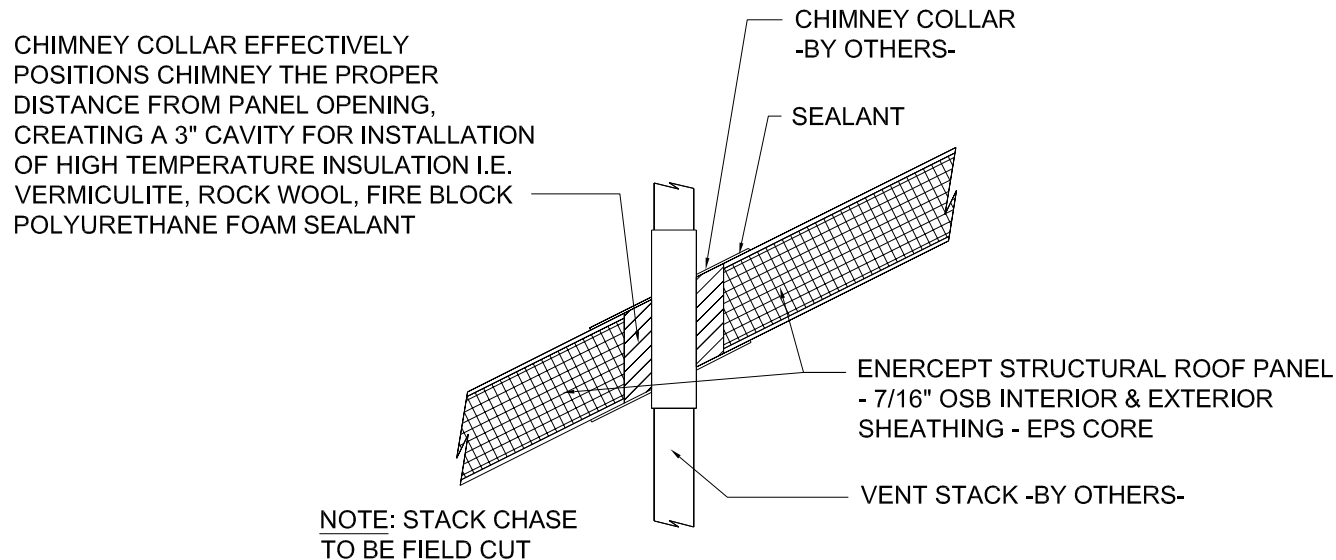


STRUCTURAL ROOF PANELS WITH INSULATED OVERHANG



**ROOF PANEL EAVE
DETAIL W/ PANEL
OVERHANG**

STACK CHASE



CHIMNEY / VENT STACK OPENINGS

1. Determine location on roof panel where the chimney or vent stack will be located.
2. Cut an opening to allow a minimum of 3" clearance from a chimney stack to the edge of the roof panel opening. Allow 1" clearance from a vent stack to the edge of the opening
3. Follow industry standards for installing chimney / vent stacks using chimney / donut / collars on the interior and exterior of the panel.
4. Before setting the last collar, fill the 3" cavity around the chimney stack with high temperature insulation, i.e. vermiculite, rock wool, fire block polyurethane foam sealant. Fill cavities around a vent stack with expanding foam sealant.
5. Apply sealant to collars to insure against leaking.

PREVENTING SHINGLE RIDGING

Asphalt and Fiberglass shingles will sometimes ridge or buckle along the vertical joints of the roof sheathing. This can occur on both conventional and Structural Insulated Panel (SIPs) roofs. It is believed that much of the shingle ridging that occurs over the joints are caused by moisture migration through these joints. The moisture caused the felt paper to expand resulting in a shingle ridge. This is more predominant when lightweight fiberglass shingles are used.

Enercept and the SIP industry have recognized several methods to reduce the moisture migration through the panel joints.

1. Use an approved flexible sealant or adhesive that is compatible with expanded polystyrene to join the panels together. Maintain a continuous bead of sealant to prevent moisture migration.
2. Maintaining a $\frac{1}{8}$ " gap between the sheathing of adjoining roof panels will reduce ridging caused by oriented strand board (OSB) expansion.
3. Roof panels must be dry prior to application of roofing felt or any other roofing products. See recommended shingle manufacture's specifications for further details.
4. A 6 mil plastic vapor / moisture barrier or seam tape is required over the inside of the exterior walls and roof panels. See page 2-3, 4-7 through 4-9 and 6-2.
5. Construction moisture from poured concrete, fueled heaters, and painting contribute high amounts of water vapor. In cold climates, moisture migrates from high to low humidity areas, typically toward the exterior of the building. Venting and circulation of the moisture laden air and replacing it with fresh air reduces the moisture content and moisture drive at the joints. During the construction phase use of dehumidifiers to control and reduce the high moisture content is recommended.
6. Selection of heavier grades of roofing felt and shingles tend to maintain flatness better than lighter materials and will reduce the potential for ridging because of their greater rigidity. Check the manufacturers warranty before you buy fiberglass or asphalt shingles. There are several manufacturers that offer full warranties on both vented and unvented roofs. Ice and snowguard products used in conjunction with other methods of reducing moisture provide additional resistance to ridging.
7. Installation of a whole house mechanical ventilation system, such as an air exchanger is strongly recommended. This will insure indoor air quality as well as reduce the potential for damaging high humidity levels in the home. Relative humidity levels should be kept between 35 and 40 percent. Higher levels can create moisture, drive, condensation problems and promote mold / mildew growth, all of which can affect the performance of the structure and the health of the occupants.

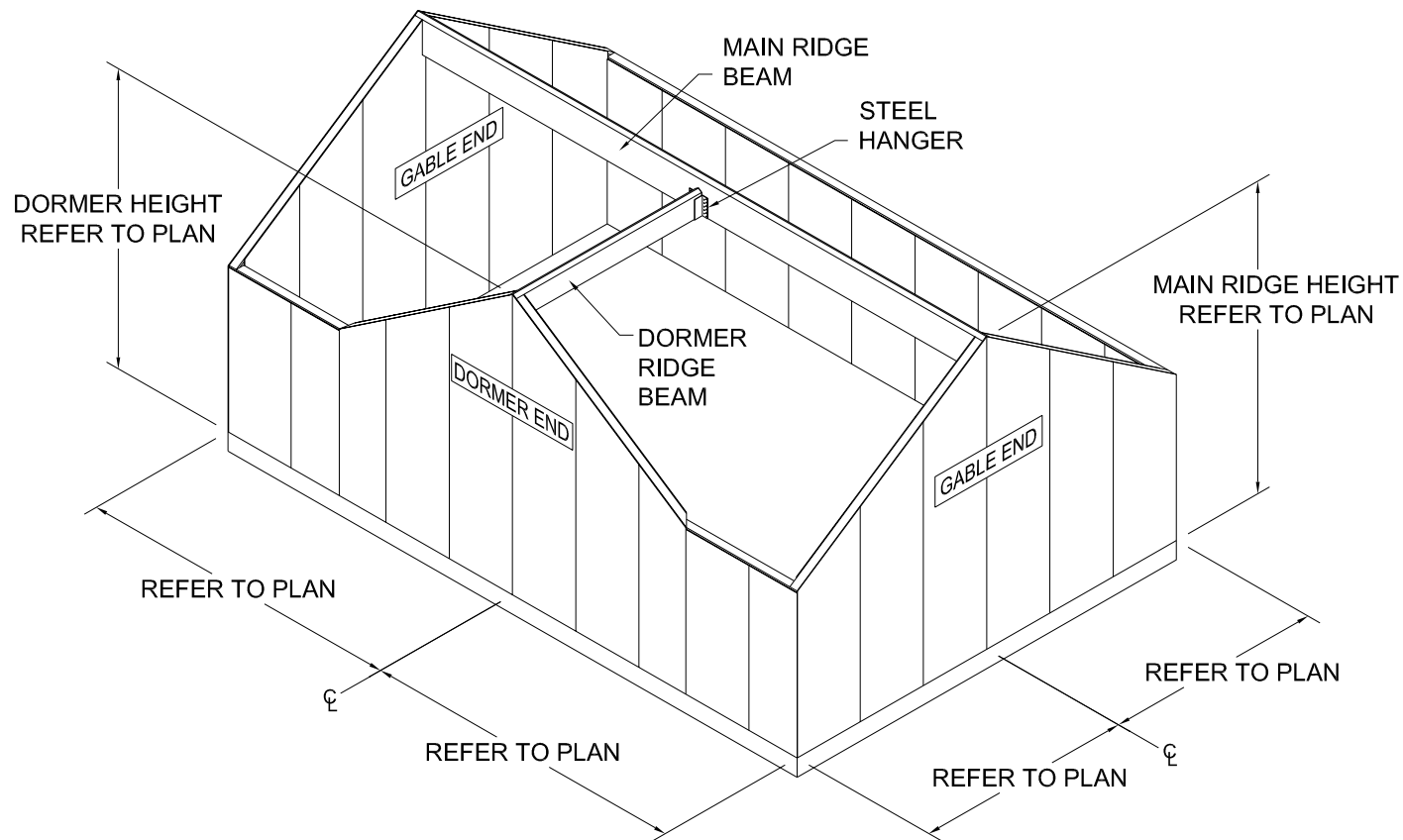
SECTION 9 DORMER ROOF



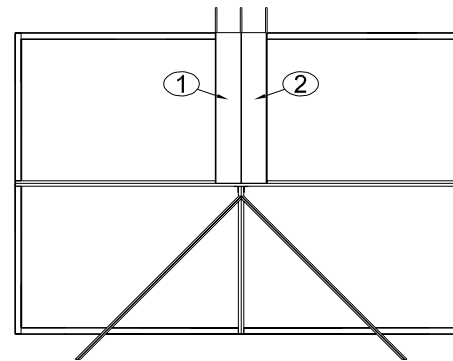
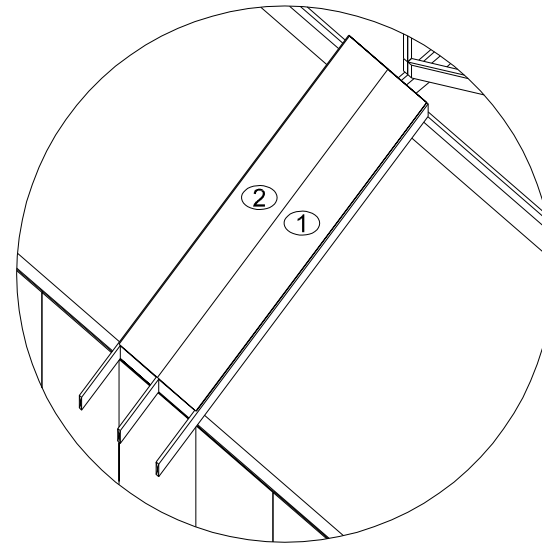
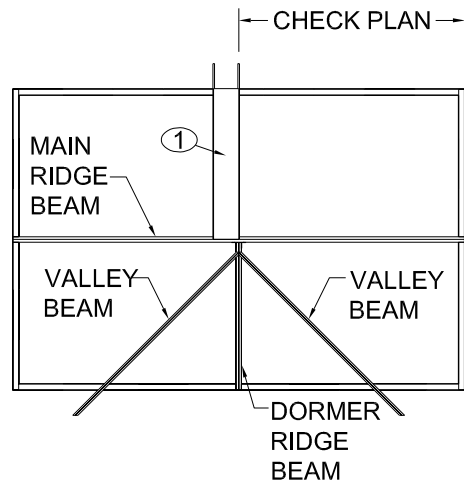
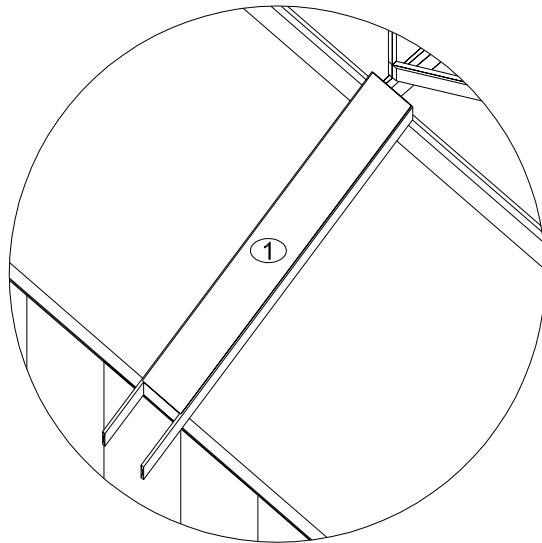
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or concerns call us at:

1-605-882-2222

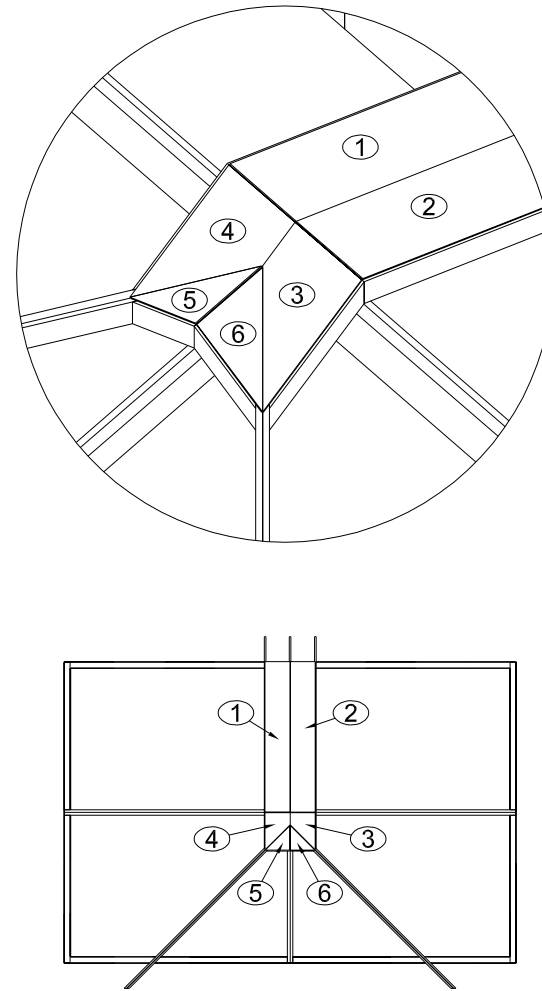
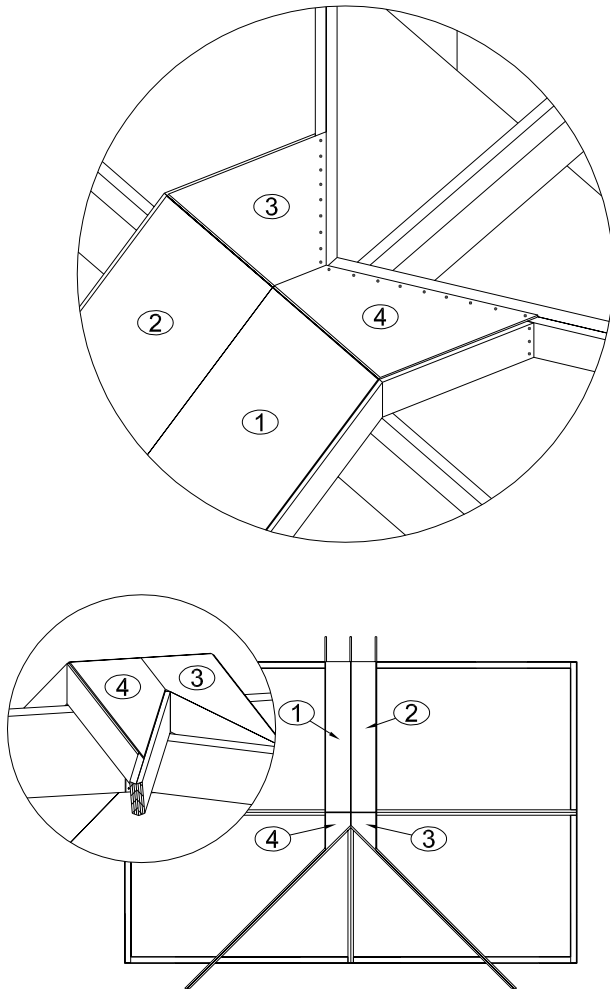
CALL BEFORE YOU CUT!



1. Field confirm measurements of the dormer and gable wall centers and heights. THESE MUST MATCH THE MEASUREMENTS SHOWN ON YOUR PANEL LAYOUT.
2. Set the main ridge beam in place - before final attachment to the gable ends and support points, check the main ridge height and level PER THE LAYOUT.
3. Dormer beam / beam hanger must be attached to the main ridge beam at the same height as the support point in the dormer wall panel.
4. Before final attachment of the dormer beam, check level and squareness of the connection with center beam.



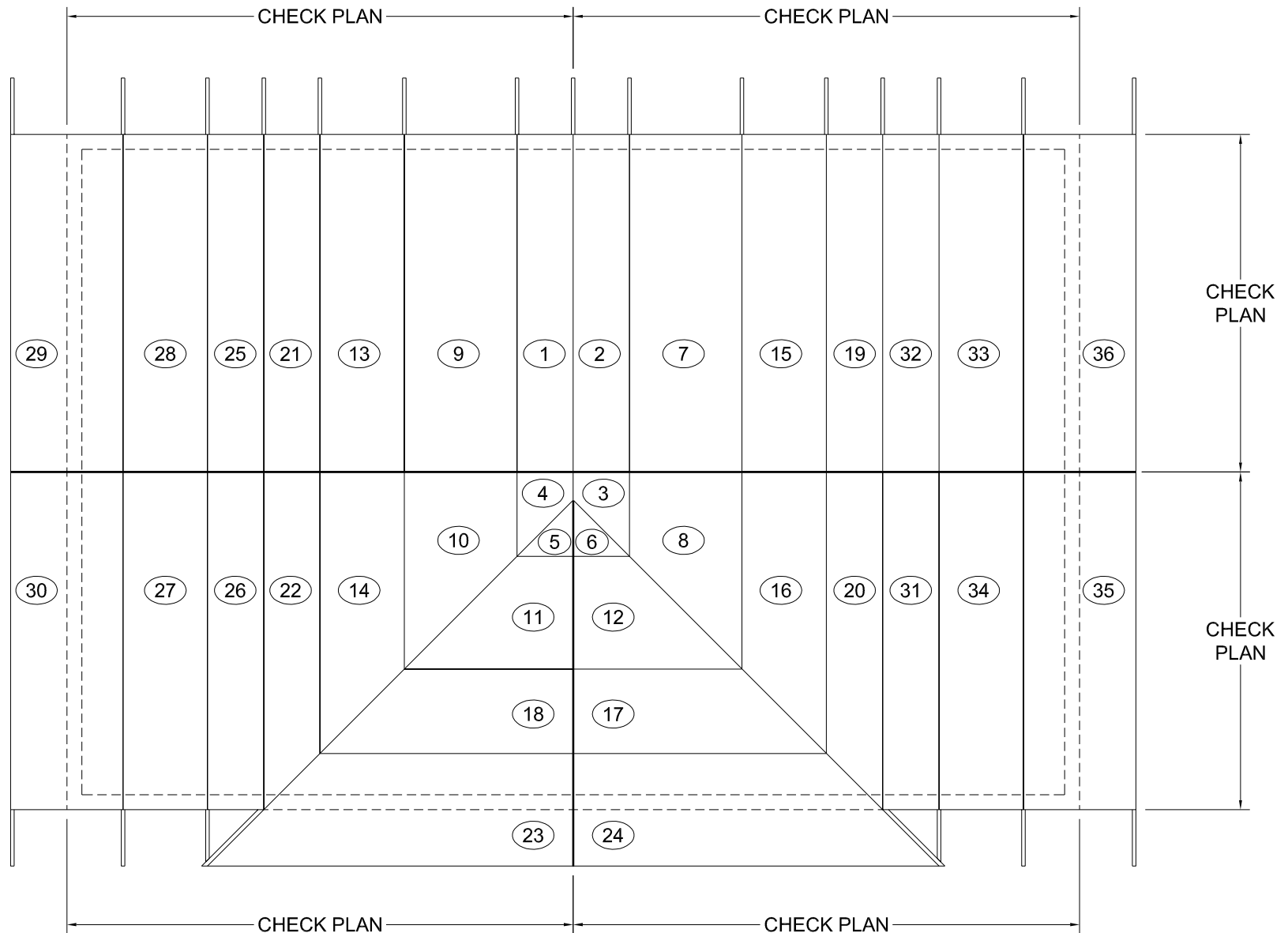
5. Set roof panels (#1 & #2) opposite of dormer side into position according to the panel layouts measurements, and fasten (this will give you a working platform and keep the ridge beam from moving).



6. Set the valley beams into position and slide roof panels #3 & #4 over valley beam.

7. Fasten panels #3 & #4 to the ridge and valley beams.

8. Install panels #5 & #6 and fasten to the dormer and valley beam.



9. Continue setting remaining panels in numerical order as shown on the panel layouts and refer to the Enercept construction guide (structural roof) section for additional information.

SECTION 10 SINGLE & DOUBLE SIDED ROOF



If you have any questions
or concerns call us at:

1-605-882-2222

CALL BEFORE YOU CUT!

SINGLE SIDED & DOUBLE SIDED ROOF PANEL WITH OSB THERMAL SPLINE

1. Set and square 1st panel into position (as shown on the panel layout), with the exterior edges of the roof panel set at the desired overhang.

NOTE: It is important that the roof panel is set square with the decking, support beams, trusses and / or purlins.

2. Fasten panel to support beams, trusses, purlins or decking with the S.I.P. screws supplied, using the pattern and spacing shown on the roof layout. A minimum of 1 1/2" penetration into the support is required. Do not over drive fasteners - this will cause an irregular surface.

NOTE: Enercept bases fastener quantities on this pattern and spacing. If you wish to use more fasteners, they can be purchased from Enercept.

3. Carefully check spline chase for defects or foreign material. Apply a 1/4" bead of sealant to the panel, below the OSB thermal spline chase. Carefully insert OSB thermal spline into spline chase.

4. Position next panel and slide over spline. Fasten as in step 2.

5. Apply sealant to each spline splice.

6. Periodically measure panel progress for growth. This is critical if any beams, trusses, purlins, hips / valleys or offsets are involved in your roof design. Panel ends must maintain a minimum of 3/4" bearing surface unless otherwise noted on the panel layouts.

NOTE: Panel growth must be addressed before setting panels in the critical measurement areas (hip / valley, offsets). If panel growth occurs, trim the panel accordingly to maintain the necessary dimensions and recess the foam.

Call Enercept before trimming.

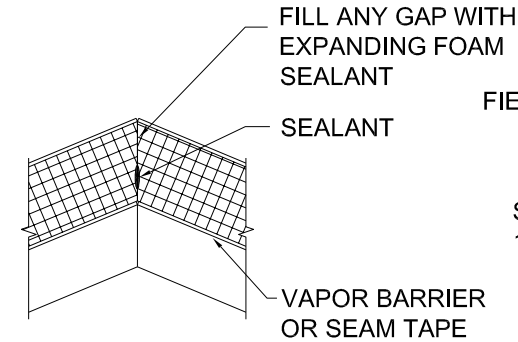
7. Continue setting the roof panels (following steps 2, 3, 4, 5 & 6) as specified on the panel layouts until finished.

8. Seal any gaps or voids in the peak or hip/valley areas with expanding foam sealant.

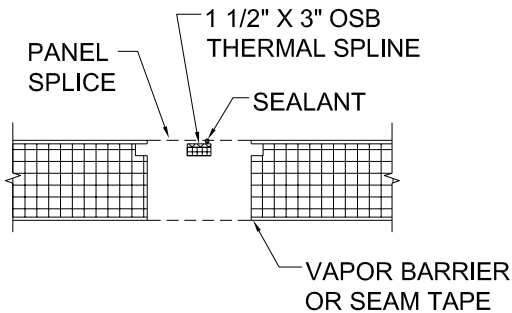
9. Field install faceplate material (rimboard, 2x, or LVL, as supplied) at eave & gable end recesses.

10. Roof panels must be dry prior to application of roofing felt or any other roofing products

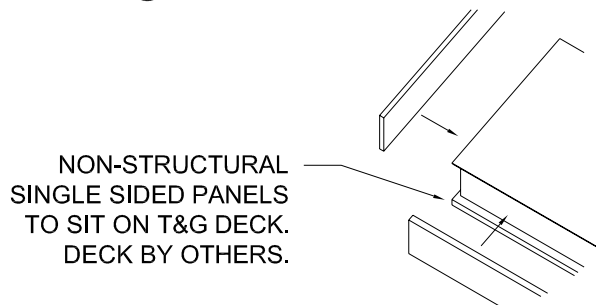
SINGLE & DOUBLE SIDED ROOF WITH OSB THERMAL SPLINE PANEL INSTALLATION



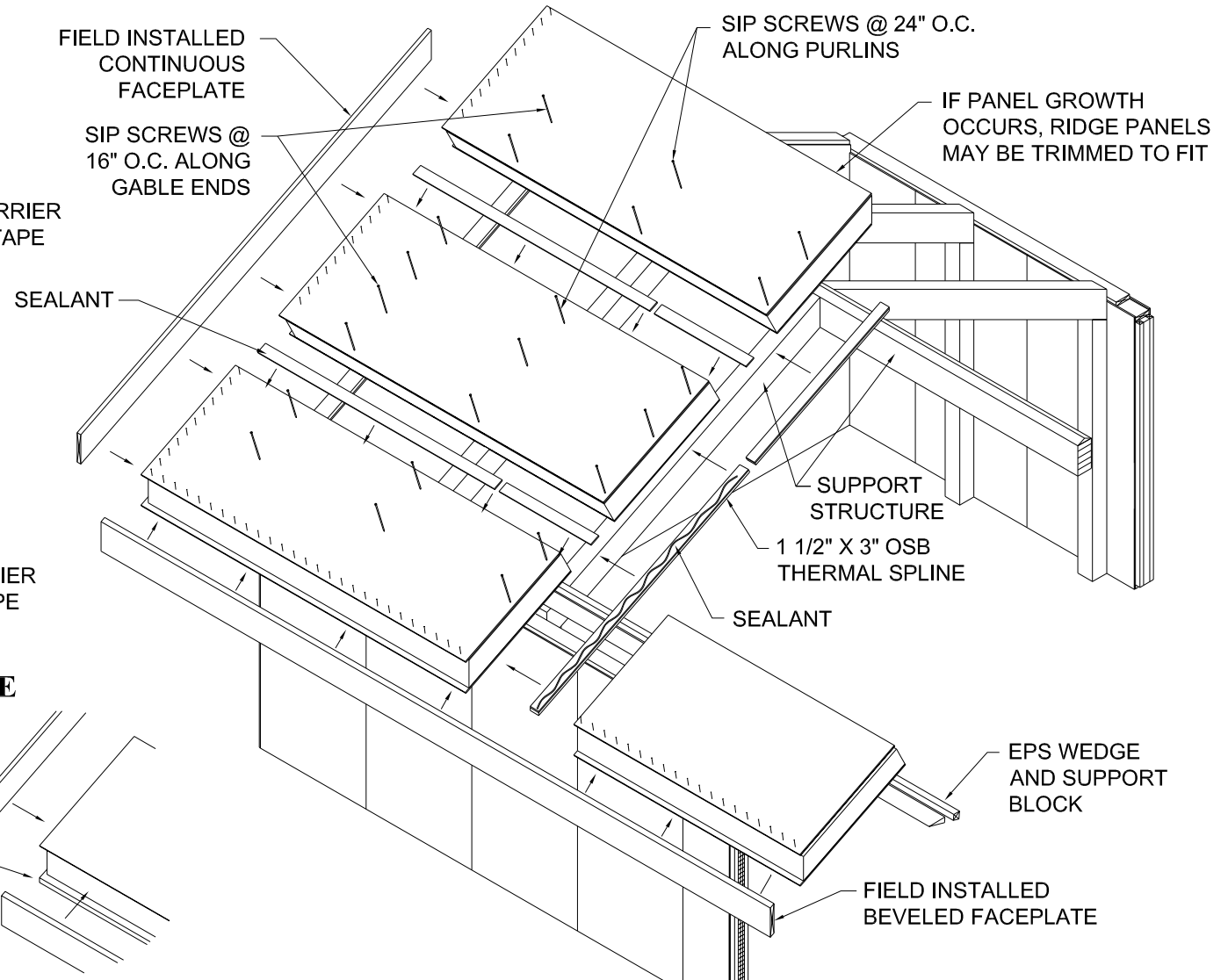
RIDGE DETAIL



**OSB THERMAL SPLINE
SECTION @ PANEL SPLICE**



SINGLE SIDED PANEL



SECTION 11 ELECTRICAL



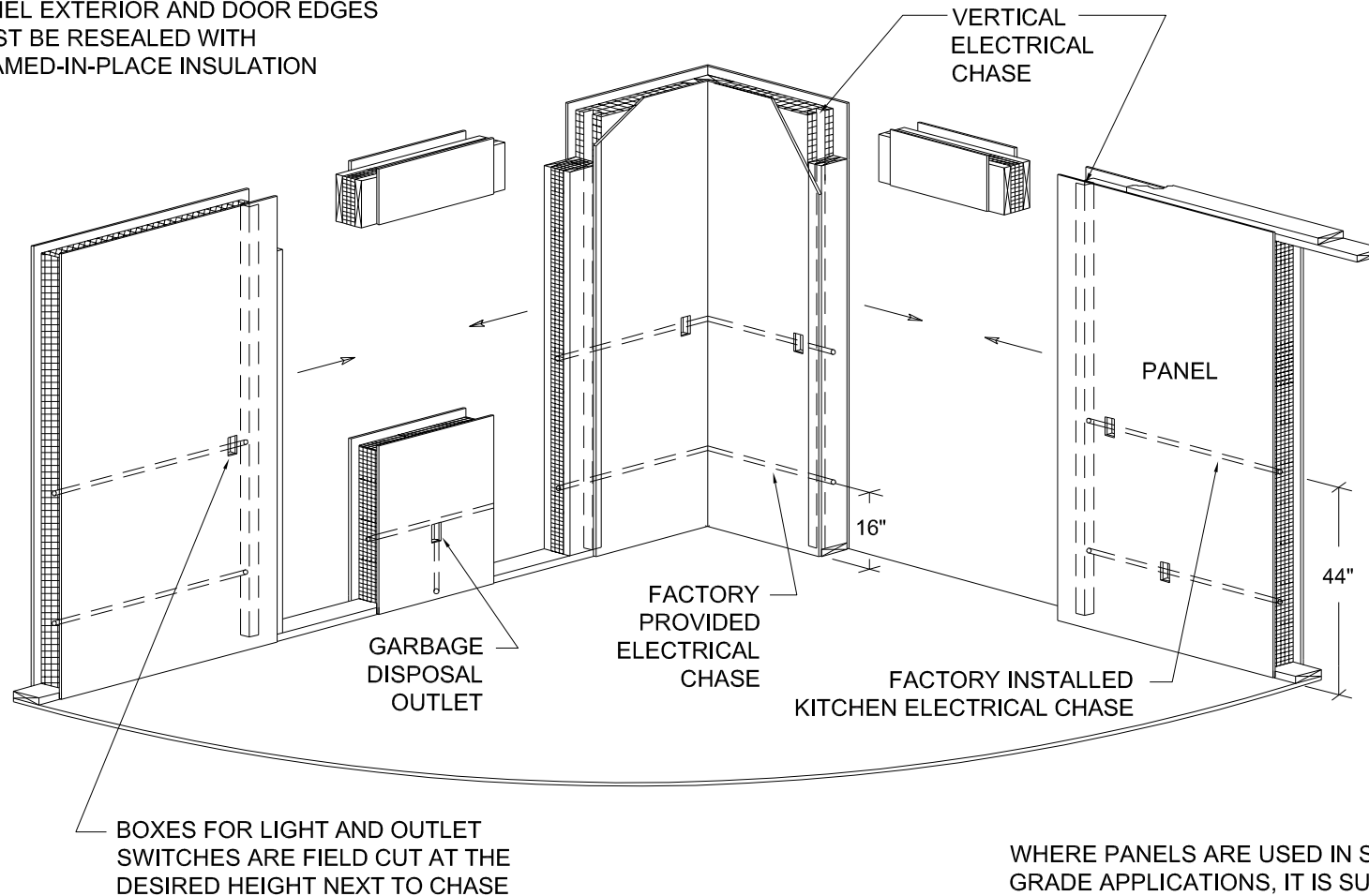
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TYPICAL ELECTRICAL LAYOUT

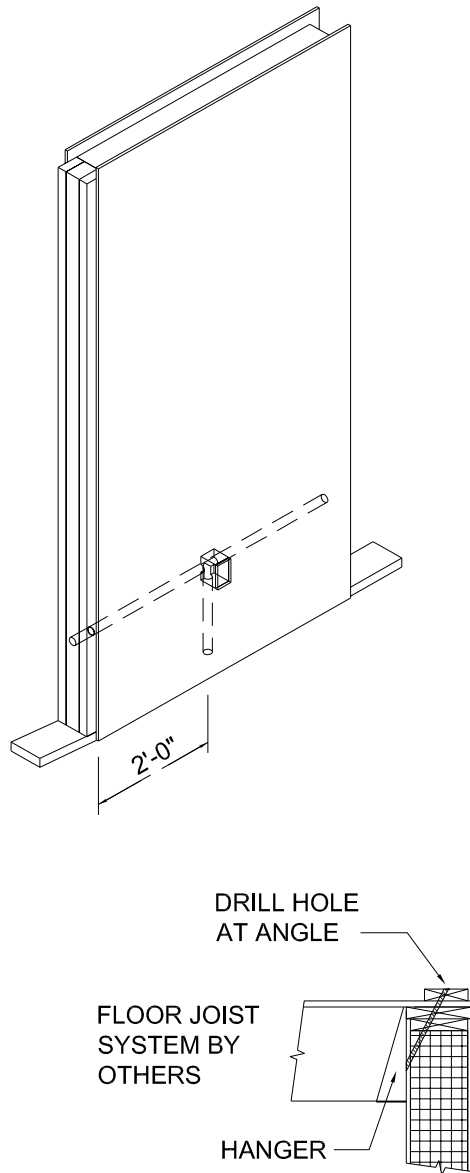
ALL PENETRATIONS THROUGH THE
PANEL EXTERIOR AND DOOR EDGES
MUST BE RESEALED WITH
FOAMED-IN-PLACE INSULATION



WHERE PANELS ARE USED IN SLAB ON
GRADE APPLICATIONS, IT IS SUGGESTED
THAT CONDUIT IN SLAB BE UTILIZED TO
ROUTE ELECTRICAL WIRING.

CUSTOM ELECTRICAL CHASE LOCATIONS
PROVIDED UPON REQUEST.

ELECTRICAL CHASES - GENERAL



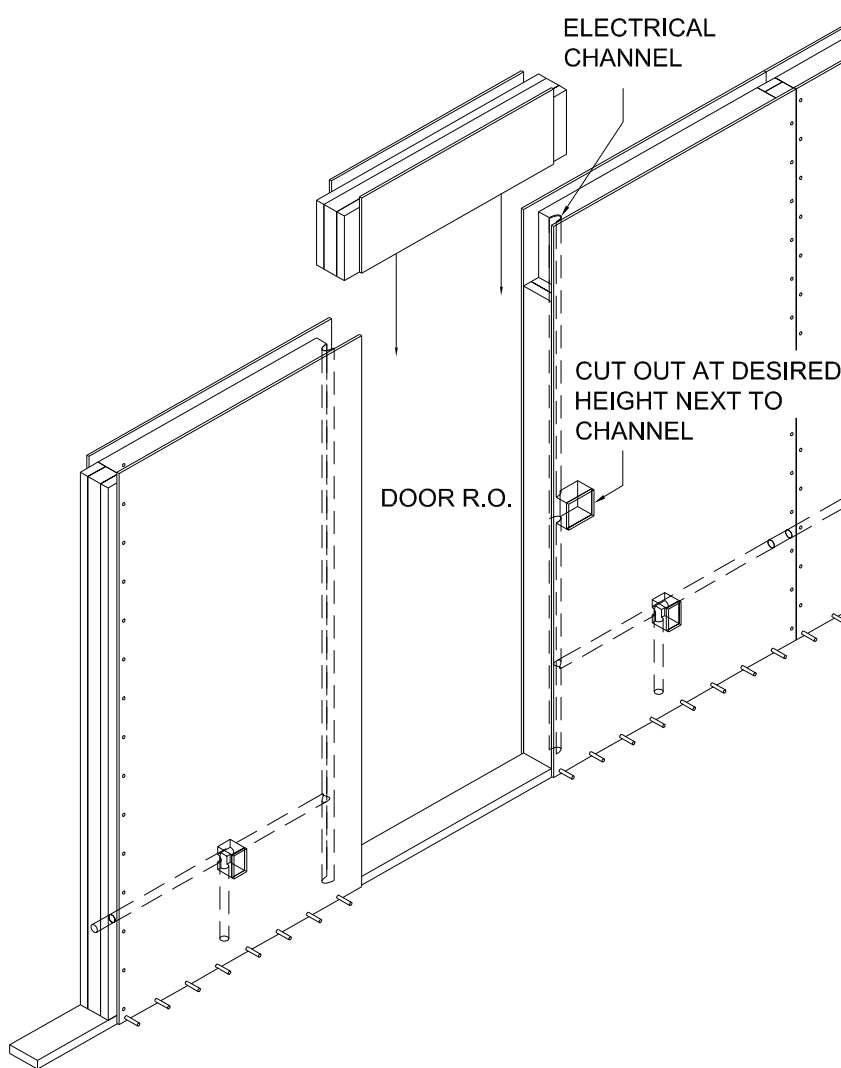
- A. All electrical wiring is run through the typically 1 ¼" diameter channels that are provided in the panels. All panels will have a horizontal channel located 16" from the bottom of the panel sheathing as shown. The insulated posts will also have this channel to allow the wiring to run continuously between panels. All 4' wide panels, and lower window panels will have a vertical channel centered in the panel connecting to the 16" horizontal chase. Factory cutouts for outlet boxes are installed in 4' and lower window panels only (does not include basement panels), all others must be field cut. All channels will be marked in blue.
- B. As previously illustrated, a matching 1 ¼" hole is drilled through the sill plate before the panels are set into position. Electrical wires are then run up from the basement through the vertical channels. (In situations that will have the floor system hung inside the wall panel, be sure to drill the 1 ¼" hole at an angle so that the wire chases can be accessed to run wire. See detail.)
- C. Cutouts for outlet boxes should be cut directly below the horizontal channel. When cutting these openings, care should be taken not to remove any more of EPS insulation than is necessary.

NOTE: DO NOT CUT PANEL SKINS without contacting Enercept first. OSB skins are an important part of the structural integrity and load bearing capacity. Improper cutting of panel's OSB interior / exterior skin may damage the structural integrity of the panel / structure.

NOTE: Foundation panels do not include electrical chases. Basement panels include only a vertical electrical chase in each panel.

NOTE: Recessed light fixtures are not allowed in SIP panels.

ELECTRICAL CHASES - DOORS

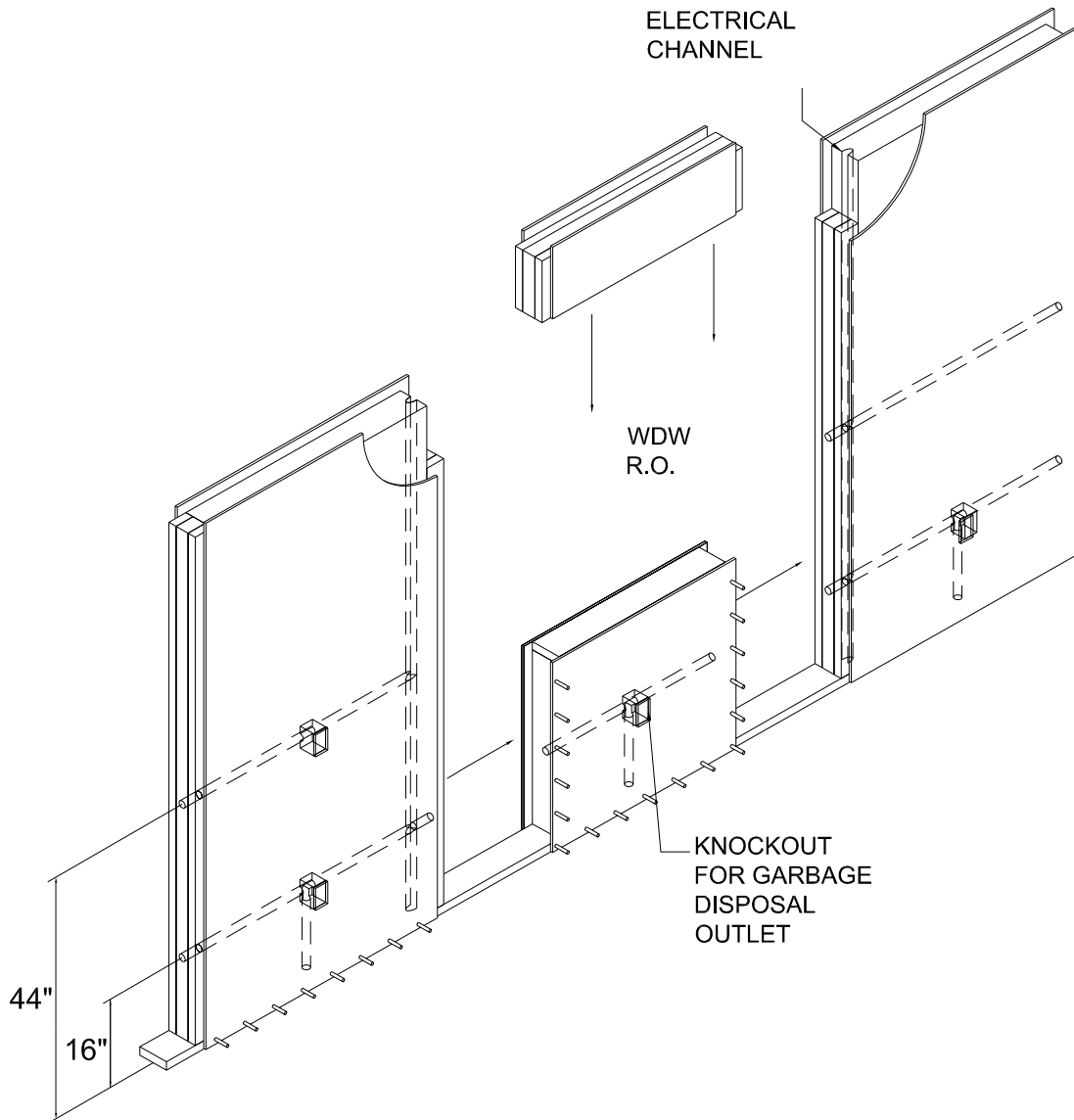


1. To allow for wiring of switches, doorbells, exterior lights, etc., vertical channels are provided in the edge of each panel adjacent to a door opening. See illustrations.
2. Boxes for light switches can be cut at the desired height next to this channel.
3. For exterior lights, doorbells and exterior outlets, drill through the outside surface of the panel into the electrical channel at the desired height.

NOTE: Caution must be taken when cutting and drilling into the panel to remove no more insulation than necessary. Use approved expanding foam sealant to fill voids.

5. All penetrations through the panel exterior and door edges must be resealed with foam-in-place insulation.

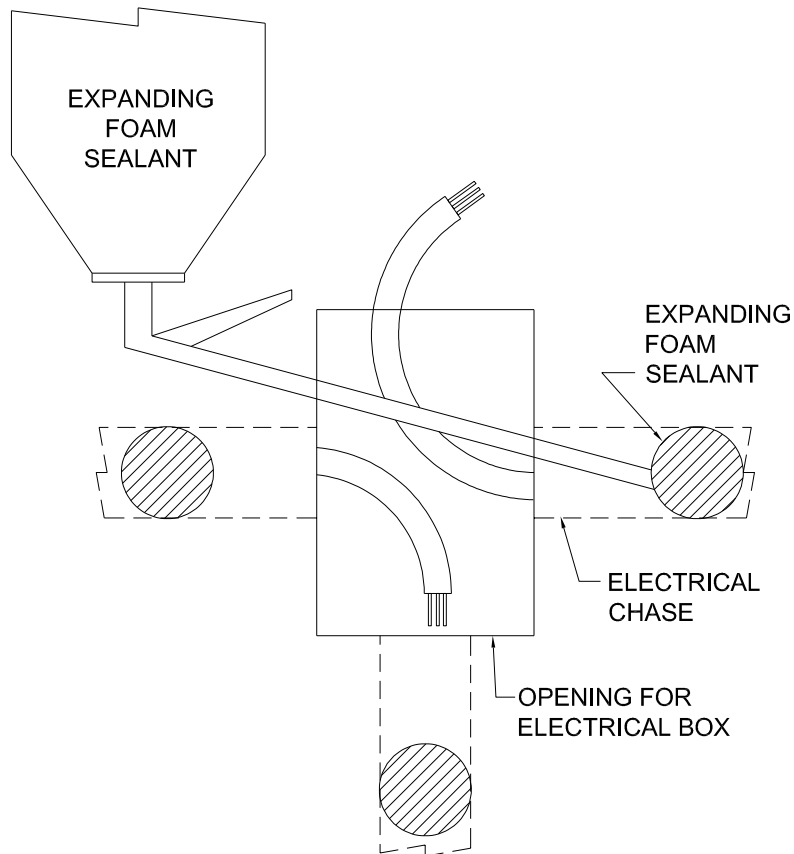
ELECTRICAL CHASES - COUNTER HEIGHT



1. To allow for outlets above the countertop, an additional horizontal channel 44" above the floor is located in the panels the length of the counter.
2. To reach these horizontal channels with the wiring, a vertical channel is provided at the edge of the panels on either side of the window.
3. Openings for switches and outlet boxes can be cut into the panel at the desired locations.

NOTE: If a light is requested above the sink work area, a short vertical channel is located in the center of the lintel above the window opening. Wiring for this light would run up the vertical channel in the panel edge, above the double plate on the top of the panels, and down through the short vertical channel.

SEALING ELECTRICAL CHASES

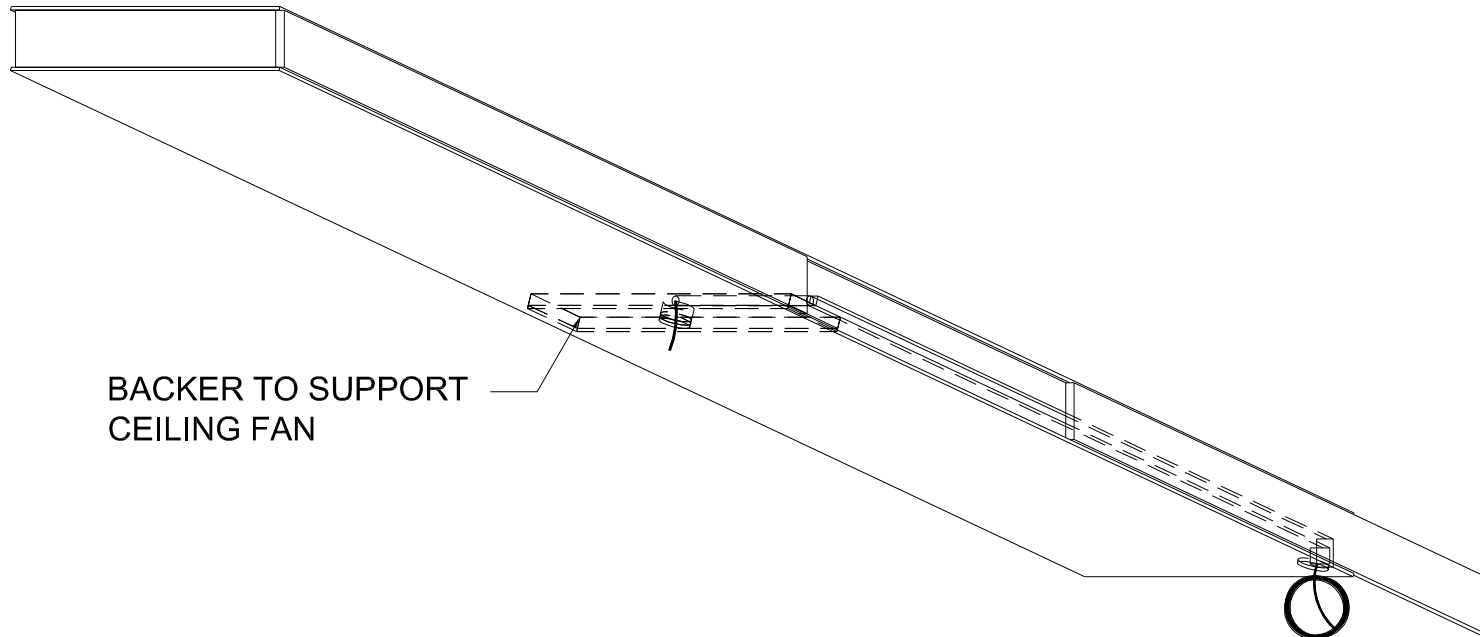


ELECTRICAL CHANNELS - EXPANDING FOAM SEALANT INSULATION

After pulling all wires, but before receptacles and/or switches are installed, insure the elimination of air infiltration by foaming in place each electrical channel as shown. Use only enough insulation to seal the channel without expanding into the electrical box.

NOTE: Allow expanding foam sealant to cure before installing fixtures and connecting wires.

ELECTRICAL CHASES - ROOF PANELS



ELECTRICAL CHANNELS - CEILING LIGHTS / FANS

NOTE: At all locations in the ceiling panels where there will be ceiling lights or fans, a 12-3 with ground electrical wire will be factory installed, unless local codes indicate otherwise (notify Enercept in this case).

NOTE: A sufficient length of wire protruding from an opening prepared for a 3 ½ x 3 ½ electrical box (electrical box by others) will be furnished at the location of the light.

1. At the lower end of the panel, wire will be provided to reach either a controlling switch or a junction box.
2. Vertical channels will be provided in the wall panels for this purpose as required.

SECTION 12

SEAM TAPE / VAPOR BARRIER



If you have any questions
or concerns call us at:

1-605-882-2222

CALL BEFORE YOU CUT!

SEAM TAPE / VAPOR BARRIER

The function of a vapor barrier / retarder is to resist the migration of water vapor. Typically, it consists of a plastic or foil sheet that has a permeability rating of less than 1 perm. In a structural insulated panel (SIP) structure the panel seams / joints are the most vulnerable points where water vapor can attempt to pass through the panel due to improperly mated materials, gaps, voids, etc.

Enercept highly recommends that seam tape or 6 mil polyethylene plastic sheeting be used on all wall panel seams. Enercept requires the usage of either seam tape or poly sheeting at all wall panel to roof panel connections along with all roof panel seams, ridge, hip, valley beam areas.

It is not the intent of Enercept or this guide to provide information on seam tape / vapor barrier installation or usage which may contradict inspecting authorities at point of construction. The builder / homeowner doing this work is ultimately responsible for satisfying the authority with jurisdiction for appropriate codes.

Seam Tape Installation (Interior Panel Surface Only)

Seam tape should be installed (paper side up) over all beams or center walls before roof panels are set in place (do not remove the paper backing until roof panels are in place and fastened to the beam / center walls).

Seam tape should be installed in the temperature range from 0° F to 120° F over panel surfaces that are clean, free of dirt and debris, and have not absorbed water. Surfaces should be free of any damaged, unsupported areas, sharp protrusions or voids.

Position tape so that it is centered over panel joint and peel back a few inches of one side of the split paper release liner. Remove the liner while applying firm pressure to the seam tape surface as it comes into contact with the panel surface. Repeat this procedure with the remaining side of the paper release liner and tape. Using a roller (rubber, wood or steel “J” roller) apply sufficient pressure along the entire tape surface to ensure a continuous seal and to eliminate trapping air beneath the tape. (On tall wall, roof / ceiling panel seams we would recommend that you place staples on the outside edge of the tape every 4' to assist keeping it in place). Overlap the tape at least 3” at tape joints and end of roll points.

Vapor Barrier Installation (Interior Panel Surface Only)

When using 6 mil poly sheeting as the vapor barrier, seam tape should be installed over all beams or center walls before roof panels are set in place.

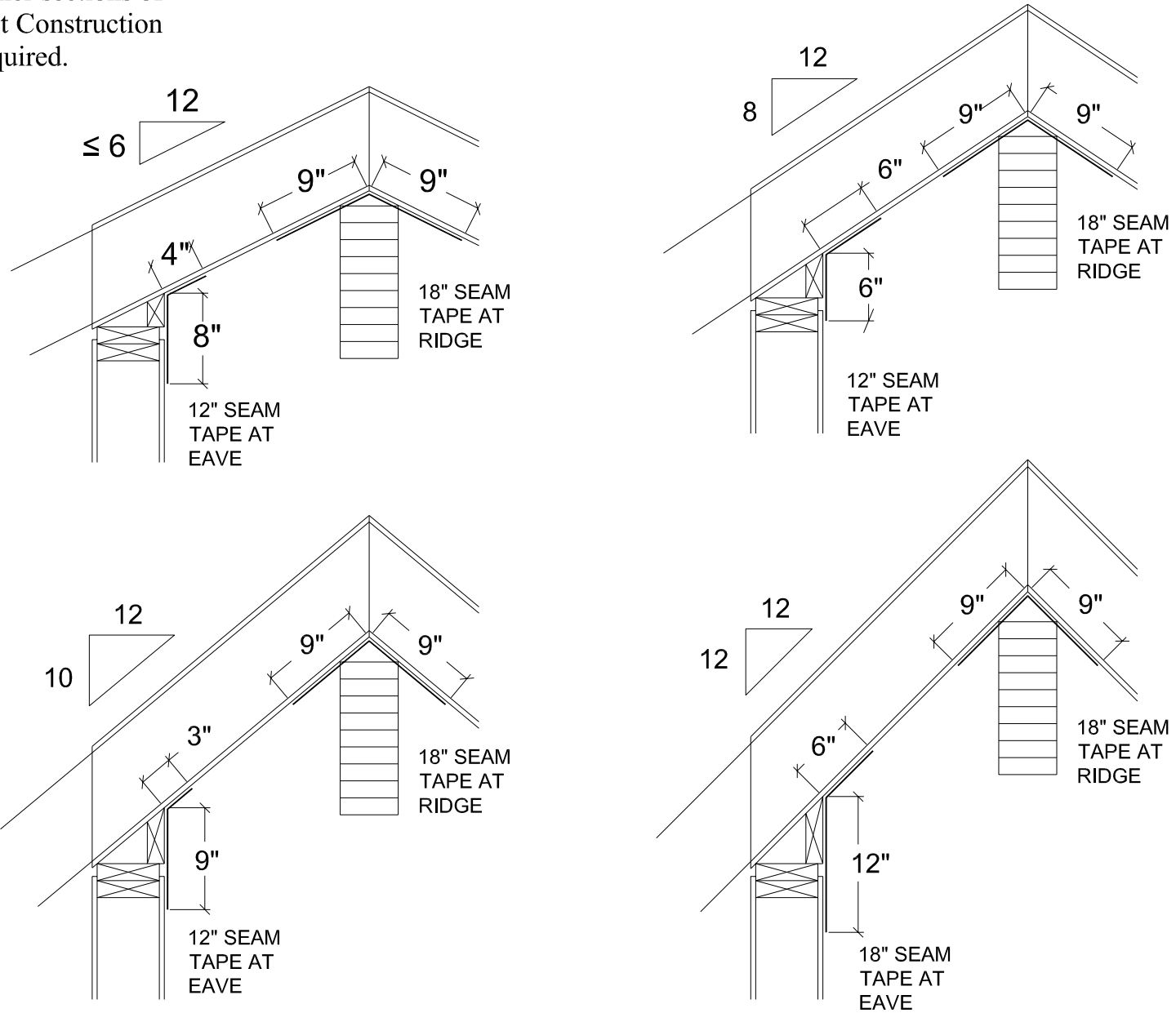
Before installing gypsum board (drywall) or interior finishes, panel surface must be clean, dry and free of dirt, grease, oil, and any other contaminants or objects that may damage the vapor barrier.

Install the 6 mil poly vapor barrier over the interior surface of the wall & roof panels. Overlap the sheeting a minimum of 6 inches and apply a bead of sealant between the two.

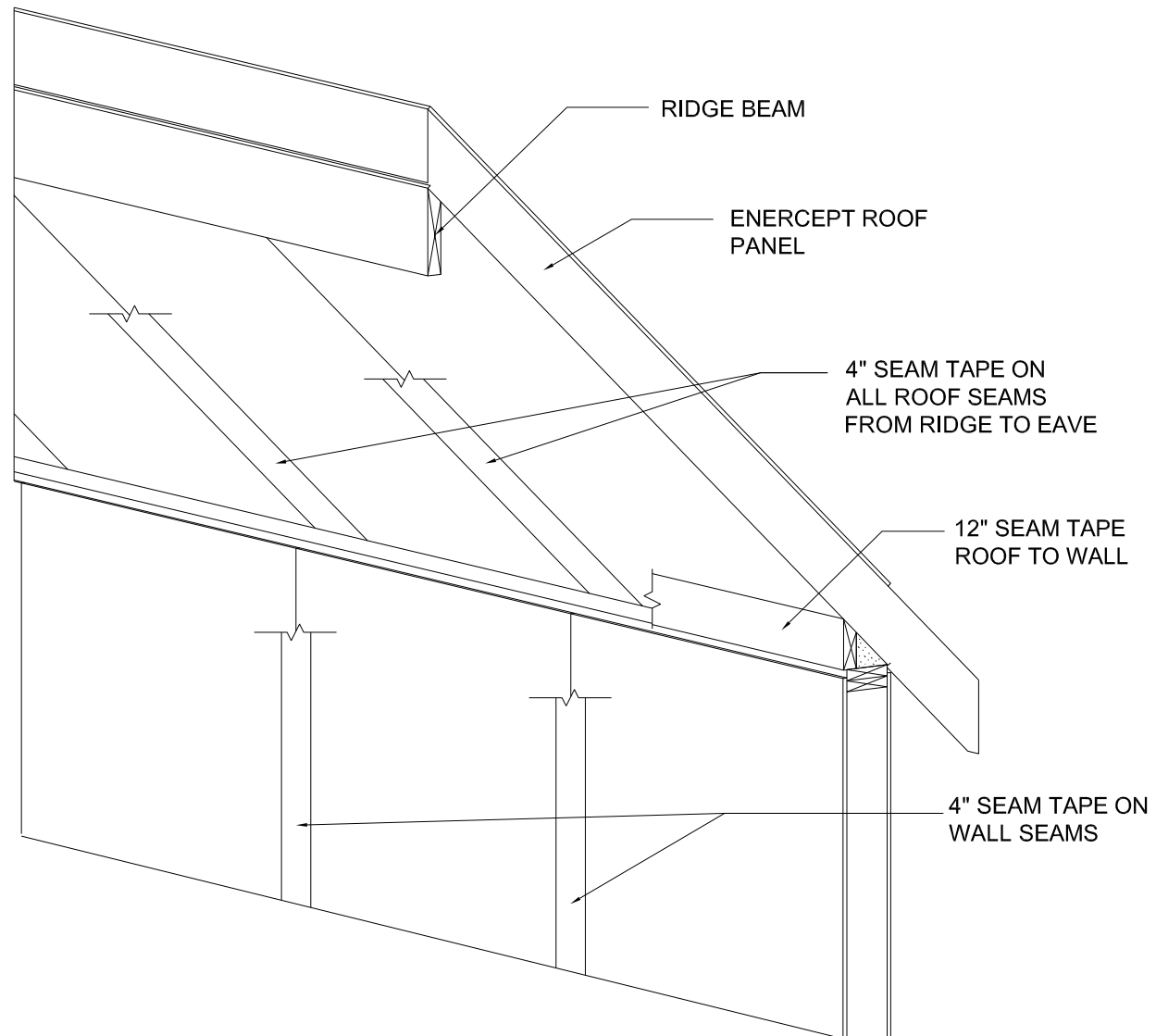
It is not the intent of Enercept or this guide to provide information on seam tape / vapor barrier installation or usage which may contradict inspecting authorities at point of construction. The builder / homeowner doing this work is ultimately responsible for satisfying the authority with jurisdiction for appropriate codes.

SEAM TAPE DETAILS

NOTE: Seam tape or 6 mil.
interior vapor barrier as
shown in other sections of
the Enercept Construction
Guide is required.



SEAM TAPE DETAILS



SECTION 13

GLOSSARY OF TERMS



If you have any questions
or concerns call us at:

1-605-882-2222

CALL BEFORE YOU CUT!

GLOSSARY

Acoustical Sealant: A tar-like substance compatible with polystyrene and OSB that retains flexibility for a long period of time to minimize leakage in seams and joints.

Adhesive: Any adhesive compatible with polystyrene. Do not use solvent based sealants. Use only approved materials.

Basement Panels: Panels constructed with a treated plywood exterior and treated 2x dimensional lumber on 12” or 16” centers. Used in below grade applications.

Beam Bracket: A T-shaped steel strap which fastens center beam to king post.

Beam Hanger: A welded steel bracket typically used to attach beam to other beams.

Block & String Alignment: An accepted carpentry technique used to assure proper alignment. Spacer blocks hold taut string a given distance from the surface to be aligned. Serves as a reference point for measuring parallelism between line and surface.

Center Support Beam: A factory constructed beam that supports the upper end of the roof panels over long, open spans.

Center Wall: A site-built wall used to support the upper end of roof panels. One end of the center support beam may rest on this wall.

Center Wall Connector: A 10” x 10” steel plate nailed on top of the center support wall. Ties upper end of roof panels to support wall.

Chimney Collar: Doughnut-shaped metal flashings designed to fit the circumference of the chimney and provide for a minimum 3” clearance between chimney and combustible structural members. Noncombustible insulation, e.g. vermiculite or rock wool, must be used to totally fill the 3” void before applying the upper collar.

Corner Adjustment Panel: Panel which is designed to be more easily trimmed to compensate for any growth that may have occurred during erection of the panels.

Electrical Chases: Factory-located passageways found at the edge of each panel, beside each opening, and 16” above the lower edge of wall panels used for electrical wiring. Electrical chases can be installed above countertop height in kitchens and bathrooms. Basement panels only contain vertical chases at the edge of each panel. Foundation panels do not contain electrical chases. For additional information, see Enercept Electrical Guide.

EPS: Expanded polystyrene, the insulating core of the Enercept components.

GLOSSARY

EPS Wedge: Roof to wall angled EPS foam wedge placed on top of wall where the roof meets the top of the sidewall to insulate wedge shaped space.

Foam Sealant Insulation: Commercially available polyurethane foam packaged in aerosol cans. Used for filling voids around windows and door openings, exterior electrical passages, and roof-to-wall area.

Growth: Joint spacing and variance of humidity levels can slightly effect the exact measurements of panels. Therefore, finished lengths of SIP walls or roofs can vary slightly. Installation crews must check centerline measurements. Unchecked growth can slightly change rough opening locations. Management of growth in gable walls is critical since beam pocket location is very important.

Insulated Post: A patented thermally insulated connecting spline (or post) made from (2) 2x members and EPS, which is used to easily join panels together.

Left: Direction as viewed from the interior of the home.

Lintel: A narrow panel positioned above a window or door opening.

LVL (Laminated Veneer Lumber): 2x type material manufactured similarly to plywood. Stronger than traditional 2Xs.

OSB (Oriented Strand Board): A composite wood-based panel made from new-shredded, new-growth timber. The strands are oriented or arranged so maximum strength is achieved in any given direction when combined with adhesives to produce greater tension and compression performance.

OSB Thermal Spline: A thermally insulated connecting spline made from a 3" wide piece of OSB and EPS, which is used to easily join panels together. These are commonly used to connect roof and wall panels.

GLOSSARY

Overhang: The part of the roof extending past the exterior wall.


Plate: Dimensional lumber, usually 2x6, used to tie the top and bottom ends of the Enercept Panels together.

Plumb: Perpendicular to the horizon. At a right angle to the level floor.

Right: Direction as viewed from the interior of the home.

RO (Rough Opening): A factory provided opening sized according to the window or door unit actual size.

Sealant: Unbroken, full length 1/4" bead of sealant or any adhesive compatible with expanded polystyrene.

The symbol  is used to designate areas that are have sealant applied. Use only approved sealant. Do not use solvent based materials.

SIP Seam Tape: An adhesive tape designed to be applied to the interior seams of exterior wall and roof SIPs. The purpose is to minimize moist interior air from escaping through panel seams and help protect panels from moisture collection.

Sill Plate: Dimensional lumber, usually 2x6, which is nailed to the subfloor and deck.

SIP: Structural Insulated Panel.

GLOSSARY

Sub-Facia: Dimensional lumber, usually 2X, LVL, LSL, rim board, or multilayered OSB at the lower end of the roof panels. In some instances, this may be factory installed, but in most cases will be field installed.

Sub-Floor: Boards or plywood panels laid directly on floor joists over which a finished floor will be built.

Tapered Support Block: Long odd shaped piece of wood installed between inside of top plate on walls and underside of roof panels. This would be installed after the connection of the wall and roof has sealant applied and the EPS wedge is installed.

Vapor Barrier: The function of a vapor barrier / retarder is to resist the migration of water vapor. Typically they consist of a plastic or foil sheet that has a permeability rating of less than 1 perm. In a structural insulated panel (SIP) structure the panel seam / joints are the most vulnerable points where water vapor can attempt to pass through the panel due to improperly mated materials gaps, voids, etc.

Enercept highly recommends that seam tape or 6 mil polyethylene plastic sheathing be used on all wall panel seams and require the usage of either seam tape or poly sheathing at all wall panel to roof panel connections along with all roof panel seams, ridge, hip and valley beam seams.