

Off-Site Panelization of ZIP System Sheathing

Huber Engineered Woods, LLC (HEW) is a specialty OSB wood structural panel manufacturer. HEW products are designed to have higher durability, greater moisture resistance and improve installation efficiency compared to commodity OSB panels to provide peace of mind in today's demanding building market. HEW has two major portfolios of specialty OSB products, namely AdvanTech and ZIP System. Both product lines consist of exposure 1 rated OSB wood structural panels and their accessory products.

AdvanTech:

The AdvanTech product line is offered in a sheathing and a subflooring option. Both the AdvanTech sheathing and subfloor panels are designed for higher bending stiffness, fastener holding, and planar shear properties, along with increased moisture resistance to allow for longer exposure time during the construction cycle.

ZIP System:

The ZIP System product line is offered in non-insulated (ZIP System sheathing) and insulated (ZIP System R-sheathing) options. ZIP System sheathing consists of an OSB panel with an integrated water-resistive barrier laminated on the exterior face of the panel. The panel functions as a water-resistive barrier, air barrier, and structural sheathing panel all in one product. ZIP System R-sheathing combines all the benefits of ZIP System sheathing with a rigid foam insulation panel bonded to the interior face of the panel, providing continuous exterior insulation ranging in R-value from 3.6 to 12.6.

With a growing demand for faster project construction cycles and an increasing shortage of labor, the practice of fabricating wall assemblies in a manufacturing facility and shipping the completed sections to a project site, known as off-site panelization, has become more common practice in the building industry. However, when walls are panelized and stored for an indefinite amount of time, there are additional factors to consider that may differ from traditional framing practices.

Moisture Effects on Panels

As with any wood-based structure, moisture is an important factor to consider since moisture can affect wood-based panels during installation and over the lifetime of a structure.

Specifically, wood structural panels will experience small dimensional changes due to changes in moisture content. Below are special considerations when panelizing off-site with wood structural panels:

- *Edge fastener spacing:* When walls are designed to resist the shear forces caused by wind and seismic activity, the number of fasteners on the edges of sheathing panels may be above code minimum in order to increase shear capacity for the wall. However, the

increase in fasteners can limit the capacity for expansion and contraction the panel may experience as a result of the changes in moisture content. It is important to follow the edge fastening requirements for the shear design, but it is equally important to not use more fasteners than required. This will allow for as much panel expansion and contraction as possible.

- *Long, continuously-sheathed walls:* When walls are sheathed for long runs (80 feet or more) with little or no natural breaks offered by windows, doors, or other discontinuities, a minimum ¼” expansion joint should be installed in the center third of the panel run. This expansion joint is designed to accommodate the axial stress compounded through expansion of several panels. Also, consider designing with an expansion joint if the panels are expected to undergo large moisture content changes, as addressed below.
- *Moisture content changes from manufacturing facility to jobsite:* OSB panels manufactured by Huber Engineered Woods have an initial moisture content of approximately 2-4%. In-service conditions over the life the building may range from 6-14% moisture content, depending on the climate conditions around the build. Due to this moisture content difference, panels should be acclimated to near-serviceable moisture content before they are fully fastened to framing. The same condition applies to walls that are panelized and stored off-site, where the panels and wood framing may be dried to a moisture content below that of serviceable conditions at the final build location.

Exposure Period

The exposure period of ZIP System sheathing and ZIP System R-sheathing is 180 days while the exposure period for AdvanTech sheathing is 500 days. The sheathing panels and accessories must be covered by an exterior cladding or UV stable membrane within the respective exposure period, and AdvanTech subfloor panels should be dried-in within 500 days of material delivery. The exposure period begins at the date of delivery of panels to the build site for traditional building cycles; however, when walls are panelized off-site, the exposure period is dependent on storage after panelization.

Indoor storage: When panelized walls are stored inside a conditioned manufacturing facility or warehouse where the sheathing and/or accessory products are not exposed to direct UV light, the exposure period will begin on the day the panels are shipped from the storage facility.

Outdoor storage: For panelized walls stored outdoors or in direct exposure to UV light, the exposure period will begin the day the sheathing and/or accessory products begin experiencing exposure to UV light.

Panel Gapping

While fabricating wall sections with ZIP System sheathing and ZIP System R-sheathing, panel gapping should be considered where two panelized sections come together. ZIP System sheathing and ZIP System R-sheathing panel seams need to be sealed with ZIP System tape or ZIP System liquid flash to perform as a water resistive barrier. The maximum gap spanning capabilities are $\frac{1}{2}$ " for ZIP System tape and $\frac{1}{4}$ " for ZIP System liquid flash. Before addressing oversized gaps, please see our technical tip, "[Maximum Panel Spacing for ZIP System Sheathing](#)".

An important area to address proper panel spacing with ZIP System R-sheathing is at inside and outside corners. The recommended installation at corners is to install one panel edge overlapping the adjacent panel edge (Figure 1). This will ensure the continuous insulation will be maintained throughout the corner, but also help to ensure proper seam sealing in the field.

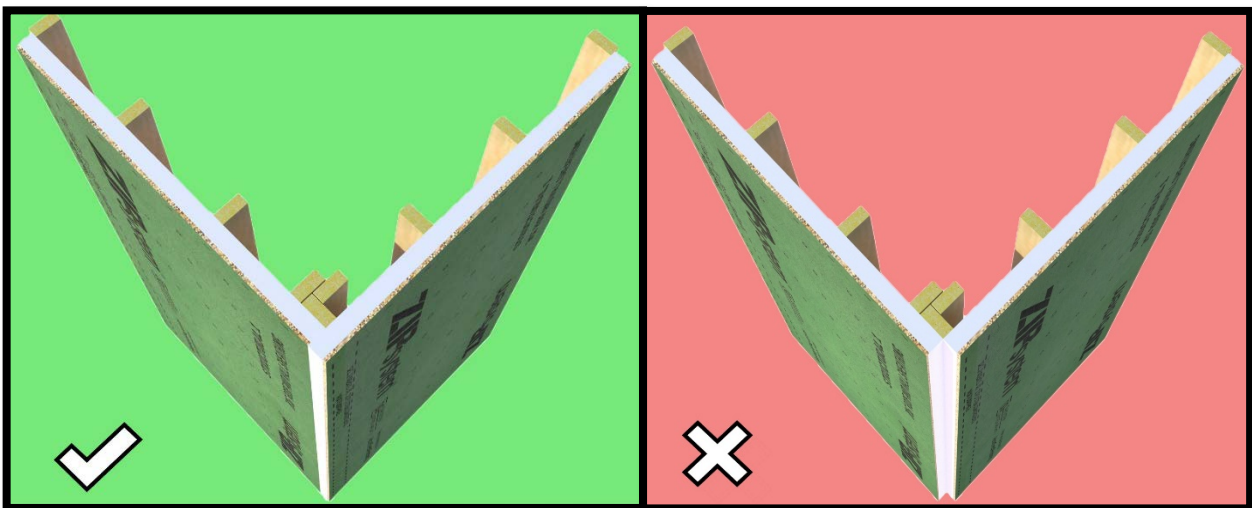


Figure 1: Sheathing at inside and outside corners should be installed to provide a solid taping surface.

When panelizing walls for a multi-story building, it is important to properly transition from one floor to the next. In many situations, the second floor rim joist, floor joists, and subfloor are installed on site after the first floor wall has been installed. The second floor walls are then installed as usual with the bottom plate resting on the subfloor. Finally, the rim joist is sheathed

with ZIP System sheathing which has been sized and cut to fit the gap. Because this area is commonly measured at just above 12" or 24" in width, there is a tendency to rip the ZIP System sheathing into quarters or halves, leaving a panel gap at the top and/or bottom that is too large for the tape to span. To avoid this issue, we recommend designing the second story wall with sheathing overhanging the bottom joist at least the thickness of the subflooring in order to compensate for the gap in sheathing without creating excessive waste (Figure 2).



Figure 2: Plan ahead to ensure the ZIP System sheathing seam above the rim joist will take into account the thickness of the subfloor.

Shipping and Onsite Storage

While shipping panelized walls to site can be a beneficial and efficient method of construction, there are several factors that should be taken into consideration in this practice.

- **ZIP System R-sheathing shipping weight:** The rigid insulation portion of ZIP System R-sheathing has a minimum 20 psi compression strength; panelized walls using ZIP System R-sheathing should consider this limitation when stacking full wall sections. Special provision may be necessary in order to ship these walls without compressing the rigid insulation, which can lead to a decrease in long-term thermal resistance.
- **Movement during transport:** During the loading, shipping and unloading processes, walls may be exposed to forces not seen in traditional on-site construction. Care should be taken during the use of heavy moving equipment such as lifts and cranes in order to avoid damage to ZIP System sheathing panels, the water resistive barrier overlay, and accessory flashing products. Because wall sections may shift during transport, an inspection of the wall sections upon arrival is recommended. Huber Engineered Woods is not liable for

damage that occurs to panels or accessories during the shipment of panelized wall sections.

- *Storage vs. Site moisture exposure:* As mentioned, wood structural panels are subject to small dimensional changes due to moisture content changes. In traditional construction, these moisture content changes mostly occur during the distribution and onsite storage period, before panels are fastened to framing. However, when walls are panelized in a dry climate then shipped to a moist climate after being fastened, the sheathing panels may be at a higher risk of buckling due to expansion. This issue can be avoided by:
 - 1) Acclimating panels to a moisture content nearer to the in-service moisture content of the destination climate, or
 - 2) Tacking panels during the panelization and fully fastening after arrival and acclimation on the construction site.

- *Site storage:* After panelized walls have arrived on the jobsite, it is important to store walls in in such a way that will prevent bowing of the entire wall assembly, as well as protecting the walls from absorbing ground moisture. Walls should *never* be stored directly on the ground, at the bottom of water drainage areas, or in any manner that exposes framing or sheathing to excessive moisture. It is recommended to store walls on stickers and cover loosely with waterproof protective material, with covers anchored on top of the wall but away from the sides and bottom to assure good air circulation (see Figure 3 below).

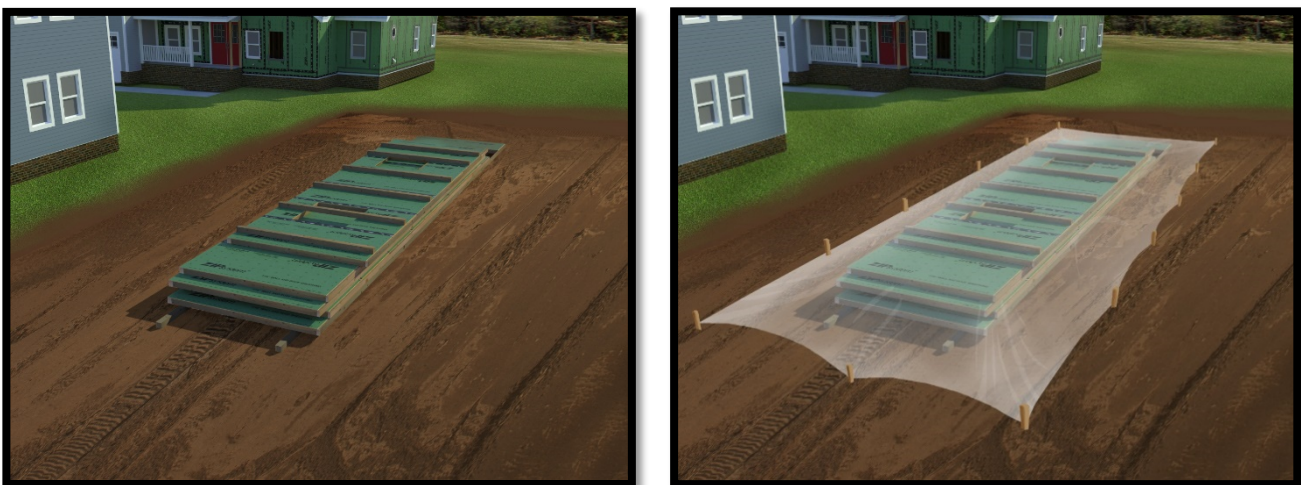


Figure 3: Wall sections stacked to prevent wall bowing, away from water drainage, and tarped for longer storage periods.

Applications of Sealants and Flashing Products

Sealants, mechanical flashings, and seam sealing products may be installed at any time during the panelization and construction process that will allow the products to perform as intended. Care should be taken during all parts of the construction process not to damage these products, and any product that is damaged should be replaced or repaired as described in the manufacturer's guidelines.

For ZIP System wall assemblies, sheathing and fastener inspection should be taken into consideration when determining the ideal time to flash and seal the assembly.

Please visit huberwood.com or contact our technical services team at 800-933-9220 Ext 2716 or at techquestions@huber.com with any questions or comments.