



**Installation Manual**



# **Installation Manual**

for

## **Wall Panel Systems**

and

## **Roof Panel Systems**

Revision 02 – 01/21/2011

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<b>Introduction</b> .....	<b>3</b>
<b>Pre-Installation</b> .....	<b>4</b>
Planning and Design .....	4
Structural Panel Systems are made of conventional materials and installed with standard framing tools. The superior engineering and performance of the panels require special planning for correct product selection, accurate production, and efficient installation. ....	4
Receiving .....	4
<b>Pre-Installation (continued)</b> .....	<b>5</b>
Tools and Materials .....	5
Drawings .....	5
<b>Pre-Installation (continued)</b> .....	<b>6</b>
Numbering and Marking .....	6
Onsite Panel Cutting .....	6
<b>Wall Panels</b> .....	<b>7</b>
Base Plate .....	7
Layout .....	7
First Panel .....	7
<b>Wall Panels (continued)</b> .....	<b>8</b>
Spline Connections .....	8
Headers and Sills .....	8
Corners .....	8
Top Plate .....	8
<b>Roof Panels</b> .....	<b>9</b>
Layout .....	9
Lifting.....	9
Connections .....	9
Nail Base Panels.....	9
<b>Roof Panels (continued)</b> .....	<b>10</b>
Structural Panels.....	10
Ridge Cap .....	10
Eaves & Fascia .....	10
<b>Post-Installation</b> .....	<b>11</b>
Electrical.....	11
Plumbing .....	11
<b>Post-Installation (continued)</b> .....	<b>12</b>
Ventilation .....	12
Fire Code .....	12
Tax Credit.....	12
<b>Appendix: Fastener Notes and Assembly Detail</b> .....	<b>13</b>



# Installation Manual

## Introduction

Congratulations on your choice to use Structural Panel Systems, building products that are engineered for superior strength, maximum energy efficiency, and enough cost savings to actually pay for themselves.

After learning of the many benefits of using our panel systems and entrusting us to deliver a superior product, we are ready to assist you in every step of the installation process.

To maximize the benefits of a superior building system, proper installation is essential. Whether you're an old pro, or if this your first time building with Structural Panel Systems, our goal is to help you build a more durable, comfortable, and energy efficient home or office.

Proper installation of Structural Panel Systems actually begins in the planning stages. We will assist you in designing and choosing the right products and then prepare you to stand panels as soon as possible. We can make preparations long before you even break ground!

It all starts with reading this manual. From this point right up to completion of your project, you will be confident every step of the way, and you will be sure that you made the right choice with Structural Panel Systems.

When you're ready for delivery, we'll be right there with you to get started. Then, keep this manual handy and if you have questions, please do not hesitate to call us. Please refer to the Typical Assembly Detail drawings in the Appendix.

Thank you again for choosing Structural Panel Systems and letting us help you get started on The Future of Building!

Greg Mitchell  
President



# Installation Manual

## Pre-Installation

### Planning and Design

Structural Panel Systems are made of conventional materials and installed with standard framing tools. The superior engineering and performance of the panels require special planning for correct product selection, accurate production, and efficient installation.

Our Sales department will ensure that you are aware of all product options to best meet your structural and insulation needs. Our Design Drafter will work with you and your suppliers to create production drawings that accurately represent your plans. Then, our Technical Support staff will work with you and your contractors to keep the installation process running smoothly and on schedule.

### Receiving

When taking delivery of your panel system, store the panels on a level surface. Moisture and temperature can have an effect on the panels and the assembly process. We recommend that the panels remain covered whenever possible.

The delivery must immediately be inspected to account for all materials on the packing list, and to confirm that all panels have been received in good condition. Reporting damaged or missing items at this time will allow us to quickly address an issue, to expedite a correction, and to keep you on your schedule.

Experienced contractors know that the building process doesn't always go as planned. If your foundation doesn't turn out to be level, or if you require a design change for the panel system, please let us know immediately so that we may assist you. If field alterations are made prior to contacting us or without our approval, the structural integrity of the system may be compromised, and we may not be able to honor the warranty.

## Pre-Installation (continued)

### Tools and Materials

#### Required Tools:

- ◆ Standard framing tools (e.g.; level, square, saws, nail and staple guns);
- ◆ Foam gun for low expanding sealant foam (provided by SPANELS);
- ◆ Foam trimming tool such as a hot knife, wire, or rasp (available from SPANELS);

#### Rigging and Lifting:

- ◆ Eyebolts and washers, lifting plates with screws, lifting straps;
- ◆ Ratcheting straps for assembling larger and heavier panels;

#### Materials:

- ◆ 2x dimensional lumber for sill plate, which is offset 7/16" from edge of foundation wall to support outer panel skin and offset 7/16" from the corner butt joints to allow for the inner panel skin of the corner panel butt joint (not provided by SPANELS); all sub-floor material, including rim joists and framed basements shall be inset 7/16" to allow for uniform exterior sheathing from the foundation transitioning to each floor; good planning is required here;
- ◆ Standard 2x dimensional lumber (Kiln dried preferred) for header and sill trimmers, corners, splines, and double top plates (not provided by SPANELS);
- ◆ An optional item is SIP tape which is recommended to obtain an even tighter seal at floor and ceiling joints, and is also used to compensate for non-level portions of the foundation.

### Drawings

Your panel system is customized and engineered for your project. To meet the highest standard of accuracy, panel drawings are drafted and submitted for your approval before the production process ever begins. Please review these drawings carefully as they will be built exactly to these specifications. If necessary, we recommend that you forward the drawings to your architect or designer for their approval as well.

## Pre-Installation (continued)

The first page(s) of the drawing set that you will need is the Plate Layout (plan view), which indicates the position of each panel on the base plate of each floor. The panels are typically numbered from left to right. The remaining pages are the elevation view of the panels, showing panel dimensions and foam recesses. The perspective of these drawings is from the outside of the house.

### Numbering and Marking

The first digit of the numbering scheme corresponds to the level of the building: 0.xx for basement, 1.xx for first floor, and 2.xx for second floor or roof. The succeeding digits are kept in numerical order as much as possible. The letter 'A' after a number indicates that it is a Header, and the letter 'B' represents a Sill.

The electrical wire chases are marked on the inside edges of the panels. There are typically two horizontal chases to accommodate receptacles and switches, and there is typically one vertical chase to supply power from the levels above or below.

### Onsite Panel Cutting

To accommodate beam pockets, irregular foundations, or post-approval design changes, cuts can easily be made in the field. For a straight cut on panels that exceed the diameter of the saw blade – make a cut on one side, flip the panel, and make the same cut on the other side. Reciprocating saws can be used for notching out and making smaller trim cuts. Beam saws may be faster, but their use is not necessarily recommended for smooth cuts through the OSB skin – this is a personal preference. After a cut, the inner foam may need to be recessed to accommodate a connector such as a spline or 2x dimensional lumber at a corner, at a header trimmer, or at the top and bottom plates. The foam recessing can easily be done with a 'hot knife' heated iron, a hot wire, or with a rasp.

## Wall Panels

### Base Plate

A level foundation is the first requirement for a square, air tight panel system. Corrections are first possible at the base plate. Be sure to use treated lumber and rolled foam sill sealer where required, then shim wherever necessary to create a level surface before standing the wall panels.

When laying the base plate, remember to offset it 7/16" from the outer edge of the foundation/wall to allow for the outer OSB skin. At the corner joints, the base plates are offset 7/16" from each other to allow for the inside OSB skin

### Layout

After the base plate is installed, lay out and mark the location of each panel. This will allow a direct comparison of the panel drawings to the actual panels delivered to the jobsite. Measuring and marking the width of each panel, along with the panel number, will keep the process moving steadily.

If there is enough room on the jobsite, you may consider moving each panel to its installation position, remembering to store them on a level surface and to keep the panels protected from weather.

### First Panel

Your particular design will determine the best starting point. Typically, you will start at the corner panel with the lowest panel number. However, it may be advisable to start at a central point moving outward toward the corners. We will be happy to suggest a path for you. Panels are designed to fit snugly over the base plate, so after the bead of sealant foam is sprayed onto the base plate, start by sliding one corner of the panel over the plate, then lowering the rest of the panel in line, sliding the panel along the plate into position. The first panel, or panels that are installed out of sequence, will have to be temporarily braced. Once attached properly to the base plate and adjacent panel, the bracing can be safely removed. The panels are sturdy enough to adjust their position before final fastening, making it easy to maneuver during the assembly process.

Remember to plumb and square each component as the system is installed. Please review the approved list of fasteners to determine if staples, nails, or screws are required.

### Wall Panels (continued)

#### Spline Connections

Wall panels are connected together by a double spline system. These splines, supplied by Structural Panel Systems, have a bead of sealant foam applied, then are inserted into the recesses of the inner and outer skins of the installed panel. The next panel to be installed is then inserted over these installed splines and both panels fastened with staples. For each step of the installation process, please review the approved list of fasteners to determine if staples, nails, or screws are required. Remember to plumb and square each component as the system is installed.

#### Headers and Sills

When an adjacent panel is a header, the spline system is not utilized. Instead, a bead of sealant foam is applied, and a length of 2x lumber is inserted into the recess of the installed panel. Next a 2x trimmer is cut to length for support of the adjacent header. If it is a window header, the trimmers are installed for attachment to the sill panel. If the header is for a doorway, proceed to the next panel and prepare to lower in the header onto the adjacent panels supported by the 2x lumber cut to length on site. Remember to plumb and square each component as the system is installed.

#### Corners

Be sure to review the assembly details before laying the base plate, attaching the butt joint corners, and installing the SIP performance screws.

#### Top Plate

To complete the installation of a wall system, a bead of sealant foam is applied in the top foam recess and the double top plates are cut and installed in a staggered manner that ties the panels to one another with the strongest connection possible.

## Roof Panels

### Layout

Planning and marking the position of your panels will ensure that the process proceeds smoothly once it's begun. Review the panel drawings and stage each panel on a level surface at the position of the roof where the panel will be installed, or at the lifting point near the crane/forklift.

### Lifting

The smaller, lighter panels can be handled by one or two workers, but mechanical lifting can be done easily, safely, and quickly. Depending on its size, holes can be drilled through the panel for the use of eye bolts and washers. Or if desired, lifting plates are available from Structural Panel Systems. These plates can be used to raise multiple panels that have been attached on the ground or floor level prior to lifting. As always, please consider the pitch of the roof and current weather conditions, to ensure that all work is done safely. Proper lifting tools and straps, along with good planning, will prevent accidents and delays in your construction schedule.

### Connections

Depending on the type of panel used in the design of your roof system, connections can be made from a wall to ridge beam or purlin, directly to a truss, and from panel to panel. These connections are different from the wall splines, and also require different fasteners. Please review all of these requirements prior to installation.

### Nail Base Panels

The lightest and simplest panel available is the 'Nail Base' Panel, since it requires only an outer OSB skin and connects with a SIP performance screw directly to a roof system, typically a truss with or without tongue and groove board. The expanded foam acts as a moisture barrier, but we recommend laying a sheet of 6 mil plastic to increase the efficiency of the barrier and the air tightness of the structure. Timber frame and log construction can easily accommodate this least expensive and most energy efficient system. For more information on design and fastening choices, please contact our sales and technical support department.

### Roof Panels (continued)

#### Structural Panels

Roof systems can be designed and engineered to solely provide the structural support, or be used in conjunction with conventional truss systems. Using a structural roof system can allow a wider range of interior design choices, while simultaneously providing the greatest energy efficiency and reducing labor costs.

These roof panels are installed by safely lifting and positioning the panel on the roof frame, screwing from the outside skin down through the panel into the support member, such as wall and ridge beams. Then to attach panel to panel, an LSL or LVL board is provided and factory installed on one side of the panel. This LSL or LVL board is inserted into the recess of the adjacent panel and fastened according to our required fastener and assembly details.

#### Ridge Cap

Roof panels can be supplied with the ridge ends either straight cut or plumb cut. A straight cut will leave a space at the ridgeline that is filled with a custom cut piece of expanded foam, then sheathed with OSB, and roofed as usual. Remember to use the sealant foam to fill gaps and adhere the components together. Plumb cuts provide a flush connection, and do not require these additional steps.

#### Eaves & Fascia

Whether eaves are left with straight cuts, or have been plumb cut in the factory, recesses in the expanded foam are provided for the fascia board of your choice (not provided by Structural Panel Systems). Please ensure that the dimensions of the fascia board are included in the original design plans and appear on the approved panel production drawings.

### Post-Installation

#### Electrical

Despite many electrical contractors' reservations, if the following guidelines are followed throughout the installation process, running electricity through your panel system is quite simple.

First, please note the location of the pre-cut wire chases in each panel; there are two horizontal that correspond to the standard height of receptacles and switches, along with one vertical to provide the power supply from the level immediately above or below. Roof systems utilize one vertical wire chase to provide the power supply to any point in the panel.

For all panels, the most important step in the electrical installation process is to ensure that wire chase holes are drilled in all 2x assembly lumber – including the corner studs, header and sill trimmers, the double top or bottom plates, and the roof connections as well. The wire chases will not work properly if their continuous run is blocked at a panel connection.

If the chases are clear, then the electrical contractor is free to position any box or fixture by cutting the inner OSB skin to size and removing the inner rigid foam. If required, additional support lumber may be attached between the outer and inner OSB skins.

It is extremely important to note that the structural value of each panel rests on both the inner and outer skins. Cutting and removing even one of these skins must be kept to a minimum to retain the structural strength of a panel. If the skin must be cut in any great amount, the rigid foam must be replaced, and a replacement skin segment must be applied to the panel and adhered with the sealant foam.

If alterations of this kind are required in the field, please inform us immediately.

#### Plumbing

We typically don't encounter plumbing in the external wall and roof systems. However, if required, please follow the same electrical guidelines and limit the cutting of the skins to an absolute minimum. Again, please let us know about any alteration to the panel system, so that we may be able to offer proper guidance.

### Post-Installation (continued)

#### Ventilation

Structural Panel Systems create an air tight, mold proof, and pest resistant environment. As with any structure with increased insulation and decreased leakage, an air exchanger may be required. A heating or cooling system will provide a solution, but if not included in the design plans, please consider adding some type of air circulation unit.

#### Fire Code

Structural Panel Systems have been properly fire tested and rated. Check your local code requirements, but our panel systems will typically require the standard fire barrier of at least one sheet of Gypsum Wall Board.

#### Tax Credit

Structural Panel Systems meet or exceed the International Energy Conservation Code, and qualify the Home Builder and Home Owner for IRS Tax Credits. Please ask us for details.

### Appendix: Fastener Notes and Assembly Detail

As with all building systems, fasteners play a critical role in the assembly and structural value of SIPs.

Unless otherwise noted in approved structural drawings, it is imperative that all fasteners are spaced to the following minimum specifications:

#### **Panel to Panel**

These connections require 1 ½" 16 ga. staples at 3" o.c. on both sides of the joint, and the inner and outer sides of the panel.

Although some spline connections are fastened prior to shipping, it is still required to ensure that the fastener spacing meets the minimum requirements during field construction.

#### **Wall Panel to Base Plate**

These connections require 1 ½" 16 ga. staples at a minimum of 3" o.c. inserted on the inner and outer sides of the panel.

#### **Wall Panel to Double Top Plates**

These connections require 1 ½" 16 ga. staples at a minimum of 3" o.c. inserted on the inner and outer sides of the panel.

All Top Plates must be nailed together using 16d at 12" o.c. minimum.

#### **Roof**

These connections require a pancake head screw with a 3" washer spaced at a minimum of 12" o.c. (4 screws per 4" panel) at all bearing locations. These screws and washers are provided by SPANELS.

#### **Roof Panels**

Connections to sub-fascia require 1 ½" 16 ga. staples at a minimum of 3" o.c. inserted on the inner and outer sides of the panel.

Where applicable, all sub-fascia shall be attached to LSL and LVL splines with 16d nails at a minimum of 3" o.c.

**Note: 1 ½" 16 ga. staples may be substituted with a fastener of equal or greater value, providing it is in compliance with local code.**