1. General Information

The information provided in this manual is to be used as a general guide. Refer to detailed drawings provided by EPS for job specific information. Be sure to follow local and state building codes.

a. Panel Make Up

Structural insulated panels (SIPs) are high performance building panels used in floors, walls, and roofs. The panels are made by sandwiching a core of expanded polystyrene (EPS), between two structural skins of oriented strand board (OSB), or plywood. EPS panels have standard overall thicknesses of 4-1/2", 6-1/2", 8-1/4" and 10-1/4". Foundation panels have a thickness of 8-7/8".

Wall Type	Core Thickness	Overall Thickness	Panel Make Up	Whole Wall R-Value at exterior temp of 75°	40°	Weight PSF
R-18	3 5/8"	4 1/2"	7/16" OSB, 3 5/8" EPS, 7/16" OSB	18.0	20.6	3.3
R-26	5 5/8"	6 1/2"	7/16" OSB, 5 5/8" EPS, 7/16" OSB	22.8	24.1	3.5
R-33	7 3/8"	8 1/4"	7/16" OSB, 7 3/8" EPS, 7/16" OSB	30.1	31.8	3.6
R-40	9 3/8"	10 1/4"	7/16" OSB, 9 3/8" EPS, 7/16" OSB	38.5	40.0	3.9

*R-Values stated based on standard Type I EPS

b. Foam Specification

EPS used Type I Expanded Polystyrene (EPS) for all SIP panels. Borate is added to the foam to make it insect-resistant. Higher R-Values can be achieved with Graphite Polystyrene also known as GPS with Neopor. Contact EPS for Neopor pricing.

c. Fabricated panels

Fabricated panels are cut to fit each project and ready to assemble. The panel edges are factory routed to accept plates and splines. Window and door rough openings are cut out and routed. Along with having panels cut to fit, vertical and horizontal wire chases are installed in the panels to make the electricians' job easier. Panels are typically cut from an 8'X24' master panel. After a panel comes off the CNC machine it could be as large as 7'-11" wide X the height of the ceiling (jumbos). The panel size will be determined by the engineer. Because each project is unique panel sizes will vary.

d. Thermal Barrier

Section 2603.4 of the 2015 International Building Code requires all foam plastic insulation to be covered with an approved minimum 15 minute thermal barrier. 7/16" OSB itself does not constitute a 15 minute thermal barrier. All interior panel surfaces must be covered with a minimum of ½" type X sheetrock to provide an adequate thermal barrier.

e. Fire Testing

One hour fire test have been performed on wall and roof panels. Please refer to testing reports at the back section of this book.

f. Bracing and Shoring

All the shoring and bracing is the responsibility of the general contractor. An EPS building package has little or no waste. Extra bracing material can be sent upon request.

g. Order Information

Before an engineer can get started, a good set of detailed drawings is needed. These drawings need to have a floor plan, foundation plan, elevations and a door and window rough opening schedule. The opening locations will also need to be dimensioned on the plan view. EPS engineers provide detailed structural drawings and panel shop drawings to ensure a structurally sound building.

After the engineer has all the information, a detailed set of preliminary of drawings will drafted. These drawings will then be sent to the dealer for approval. An approval letter will accompany the drawings. Once the approval letter is returned, the project will be completed and turned into production. Any changes to the preliminary drawings over and above what was ordered will result in change orders. If the drawings need engineering seals additional lead times may apply.

h. Delivery

Job packages will be delivered with a typical tractor trailer and flatbed. The job site will need to be tractor trailer accessible. If job site access is not permitted be prepared to shuttle panels from an alternate location using a smaller vehicle at the contractor's expense.

Proper unloading and handling equipment needs to be on site before the panels arrive. EPS can provide unloading services for an additional fee and some restrictions may apply. EPS packages the panels for optimal efficiency for shipping therefore the panels are rarely in order. Be sure to leave room to sort the panels. Refer to the Tools and Equipment section for recommended unloading and handling equipment.

Once the panels have been delivered proper storage is important. The panels must be kept dry and stacked on level blocking. Some panel bundles may be shrink wrapped. If a bundle is shrink wrapped, a slit is made at the bottom of the shrink wrap to allow any moisture within the bundle to escape. The shrink wrap is for transportation only and should be removed at the job site. The panels are to be tarped once they have been unloaded. It is also recommended to keep all the lumber and spline material covered to keep any excess moisture out of the panels.

i. Materials List

EPS offers a complete structural framing package. The following items are provided in a standard EPS panel package.

Wall Panels:

- Top & bottom plates (treated if required)
- Pre-cut wall panels with door and window cut outs
- Pre-built headers (if required)
- Spline and stud material
- 2x material for door and window bucks
- 1 ½" horizontal wire chase 16" & 44" off floor (optional)
- 1 ½" Vertical wire chases approximately 4' O.C.
- Sealants
- Hand drive or Paslode nails
- Seam tape (if required)

Roof Panels:

- Pre-cut roof panels
- 2x panel edging
- Spline material (2x, LVL, surface as required by span & loading)
- Sealants (2-part foam is optional)
- Wire chase at spline
- Ridge or Mid-span beams (if required)
- Out-looker & rake material (if required)
- Hand drive or paslode nails

Foundation Panel:

- Pre-cut foundation panel
- 2x8 treated top & bottom plates
- 2x8 treated studs
- SPF cap plate
- 1x treated screed board

Foundation Panel continued:

- 6 mil poly film
- Sealants & construction adhesive
- Treated plywood strips
- Hand drive or Paslode nails

Floor System:

- 2x treated sill plate
- Rim board material
- Trusses or joist
- Floor beams (if required)
- Hangers (if required)
- Hand drive or paslode nails
- Sealants
- ¾" T&G Subfloor (Advantech, plywood, OSB)
- Strong back bracing & ribbon material

Roof Truss System:

- Roof trusses with 12" energy heel
- Roof sheathing (OSB or CDX)
- Truss bracing
- Hangers & Ties
- Hand drive or paslode nails
- Plywood clips
- 2x Fascia Board
- Porch headers and columns

j. Tools and Equipment

Builders will utilize the same tools that are used to build stick framed structures and other conventionally framed buildings. In addition, some additional SIP specific tools will be necessary. Panels are large and heavy so special lifting equipment is recommended.

General tools:

- Hammer
- Tape Measure
- 4' Level
- Hand Saw
- Caulking Gun/QT
- Square
- Electric drill
- Sledge hammer
- 1" Wood Bit
- Circular saw
- Reciprocating saw
- Pry bars
- Ladders
- String line
- Chalk line
- Come-a-long

SIP specific:

- Foam Scoop
- Chain saw & guide
- Sausage tube applicator
- Hot wire assembly (optional)

Equipment:

- Fork lift or crane
- Fork extensions
- Lifting plates
- Ratchet straps

k. Structural Loading

The base building is designed for the necessary top chord live load, 10 psf dead load on the top chord, and 10 psf dead load on the bottom chord. In the case of SIP roof panels the panel is designed for the necessary live load in addition to 15 psf of total dead load.
The live load is calculated by the county or elevation in which the building ships to and the building use and conditions. EPS can engineer a building above and beyond the local loadings upon request. The structure is assumed to be located in an area defined as Exposure "C" and have an importance factor of 1.0. Exposure "C" is defined as an open, unobstructed area.

The wind load is designed for an IBC 2015 – 115 mph ultimate wind, Exposure "C". Contact EPS for design requirements which exceed what is stated here.
Floor systems will be designed with a minimum loading of 40 psf live load, 10 psf dead load on the top chord, and 5 psf dead load on the bottom chord. Be sure to verify loads stated on contract & construction documents are suitable for the particular location of the project.

I. Design Considerations

The following are features of residential structures that may affect the structure. These items need to be discussed with EPS personnel prior to placing the order.

- Roofing materials. The standard loading assumes standard roof sheathing and asphalt shingles. Roofing materials such as clay tile and slate are much heavier and must be addressed.
- Floor coverings. Areas with heavy flooring materials such as slate, granite, stone or gypcrete covering must be accounted for.
- Architectural features such as stone fireplaces, glass block walls, ect. can impose large loads on the floor system and need to be noted.
- Decks that are attached to the EPS structure need to be noted to ensure that a proper surface is provided for attachment.
- Window walls. Walls with a large number of openings may not be feasible to build with SIPs. This will be noted on the preliminary drawings. Materials will be provided to stick build these areas.
- Window and door rough openings and locations. Due to the nature of SIP panels all window and door rough openings and locations are necessary for the building design. The order ***WILL NOT*** be started in engineering until all rough openings and locations are determined.

Specifications beyond the standard loading are subject to an increase in price up until the time the preliminary drawings are sent.