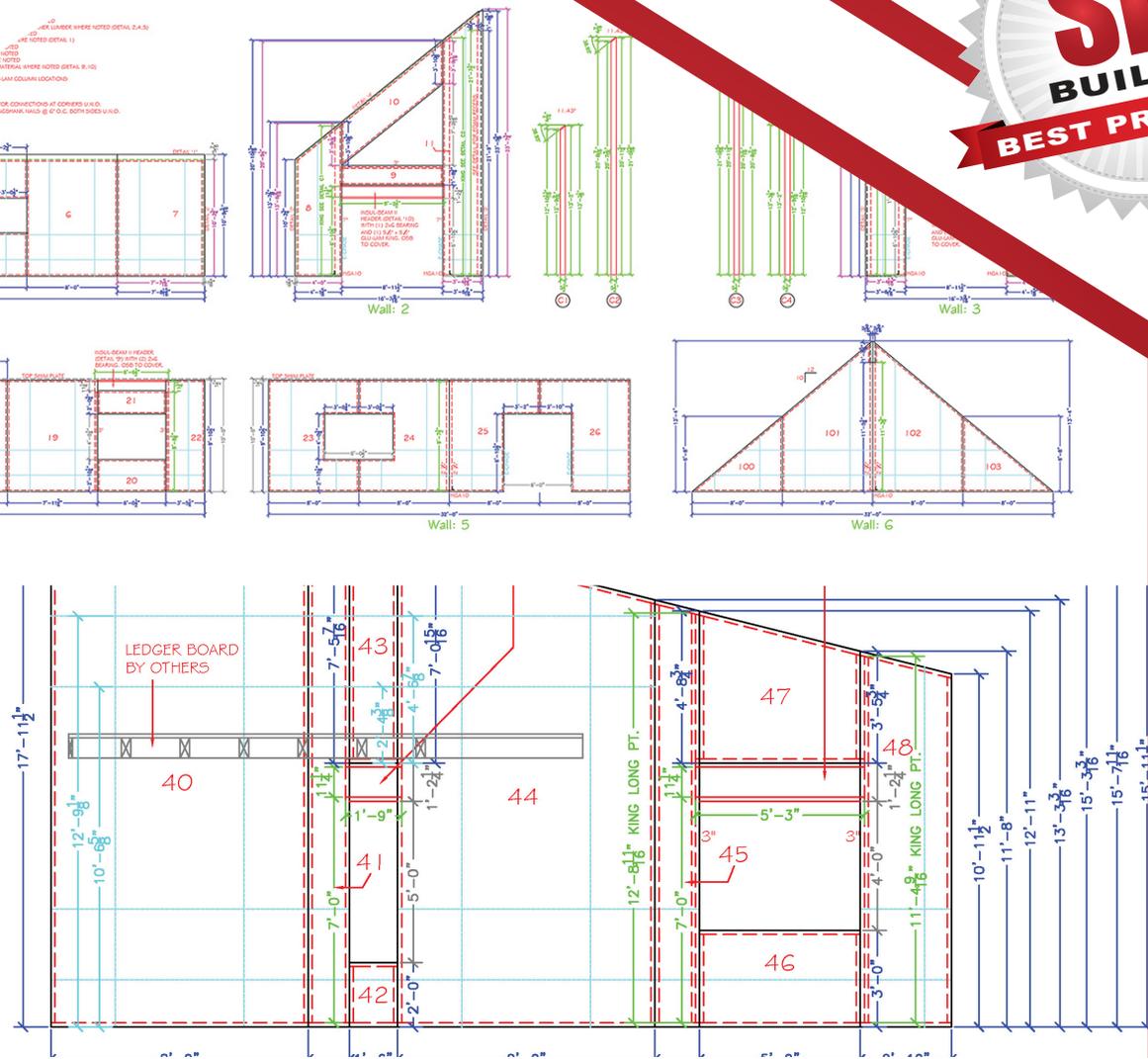


SIP BUILDER-BP 5: SIP Shop Drawings



SIP BUILDER-BP 5:

SIP Shop Drawings

This document is created specifically for builders by the manufacturing members of the Structural Insulated Panel Association (SIPA). It dives deeper and provides more background into each of the summarized topics presented in the [Building with SIPs: NEED TO KNOW](#) overview which highlights important considerations during the construction phase of a Structural Insulated Panel (SIP) structure. Decades of combined knowledge from SIPA manufacturers will help reduce the learning curve and leverage SIPs' exceptional qualities to achieve the high-performance results owners expect when building with SIPs. The considerations of how and why the best practices were developed as the common industry platform for SIP construction are explored here.

The index below outlines eleven topical areas, listed in sequence to match the order of building considerations and construction. The details in each chapter provide a deeper understanding of the subject matter to facilitate successful SIP construction. The current chapter is highlighted in blue.

1. High-Performance SIP Building Envelope
2. HVAC Systems with SIPs
3. SIP Structural Capabilities
4. SIP Sizes

5. SIP Shop Drawings

5.1. Understand the difference between purchasing SIPs without any fabrication, fabricated SIPs, or a full ready-to-assemble (RTA) package. Fabricated or ready-to-assemble SIP packages reduce waste onsite and require less time and skill.

5.2. Depending on complexity of design, need for engineering, permitting and possible revisions, the development of SIP shop drawings is a process that relies on engagement from those reviewing these drawings on behalf of the building owner.

5.3. Window/door schedule will need to be provided with the construction plans so the SIP manufacturer can draw the SIP shop drawings.

5.4. SIPs are pre-cut in the factory according to the SIP shop drawings. Building the foundation as accurately as possible will help reduce onsite adjustment.

5.5. SIP shop drawings are provided for client review and approval.

5.6. There will be a lead time from SIP shop drawing approval to delivery.

6. SIP Fabrication/Manufacturing
7. SIP Installation
8. SIP Roof and Wall Assemblies
9. SIP Electrical
10. SIP Plumbing
11. SIP Field Modifications

SIP BUILDER-BP 5: **SIP Shop Drawings**

SIP manufacturers typically convert architectural drawings into SIP shop drawings. Shop drawings specify SIP size, layout, assembly details and installation specifications. They are also used by the SIP manufacturer for accurate CNC fabrication.

SIP BUILDER-BP 5.1:
Understand the difference between purchasing SIPs without any fabrication, fabricated SIPs, or a full ready-to-assemble (RTA) package. Fabricated or ready-to-assemble SIP packages reduce waste onsite and require less time and skill.

Not all SIPs are the same; know what you are getting before you buy. SIPs are customized to varying levels depending on the customer's needs. The customization includes blank SIPs, prefabricated SIPs, and RTA packages. Consult your SIP manufacturer to see which options are available.

RTA packages include internal lumber and headers, provided and pre-installed in the factory, to maximize speed and efficiency on site. With the fully customized RTA packages, all the rough openings will be factory cut and bucked out, ready to receive doors and windows. Wiring chases and beam pockets are also factory installed. The RTA package will include plate material, seam tape, sealant and sausage gun, SIP screws, SIP shop drawings, and beam packages as needed. As on-site labor becomes more difficult to source, RTA packages are gaining in popularity. Consult with your SIP manufacturer regarding the materials they supply with the package.

Prefabricated SIPs are configured, optimized and cut in the factory. However, plates, splines (electric chases might be drilled if applicable), lumber (possibly multi-ply material fastened together if applicable), I-joists and headers within the SIP are typically not pre-installed. This step will be completed on site, increasing the time of site installation. Fit and finish of the SIPs is completed on the jobsite. **Prefabricated SIP packages are typical**; consult with your SIP manufacturer regarding the materials they supply with the package. Reference [SIP Builder Best Practices 6: SIP Fabrication/Manufacturing](#) for details and example photos.

Blank SIPs are the least expensive to purchase from the SIP manufacturer. Pre-cutting of the SIPs for the specific project does not occur at the SIP manufacturing plant. The SIP panels are provided in a "blank" rectangular shape. All fabrication takes place after the SIPs are shipped from the SIP manufacturer. If fabrication takes place on the jobsite, blank panels limit the installation speed advantage, create more waste, and require a higher degree of installation skill as all cutting is performed on site.

Whichever SIP package is selected, SIPs are structurally stronger than traditional wood framed structures, straighter, tighter, and offer a quicker construction cycle with less construction site waste.

SIP BUILDER-BP 5.2:

Depending on complexity of design, need for engineering, permitting and possible revisions, the development of SIP shop drawings is a process that relies on engagement from those reviewing these drawings on behalf of the building owner.

The SIP shop drawing process (similar to manufactured trusses) **may require weeks of planning** prior to the fabrication and delivery of the SIPs, depending on complexity of project and customer approval processes. This upfront planning ensures smooth installation with minimal field changes, resulting in reduced installation time and waste.

SIPA manufacturers use architectural drawings as the basis to create a set of SIP shop drawings which will be used by the manufacturer to fabricate SIPs to exacting standards. In order to ensure that these SIP components will fit precisely, meet all architectural plan requirements and optimize construction time, the importance of the drawing review process, by either the owner or an authorized representative of the owner, cannot be overstated. The old adage, “measure twice, cut once,” cannot be more appropriate than to the SIP shop drawing review.

SIP shop drawings specify SIP size, layout, assembly details and installation specifications. The SIP manufacturer is best positioned to factor in material yield, ease of installation, cost of fabrication, structural requirements and building design intent when designing the SIP layouts. When it comes to designing and building a high-performance SIP structure, the upfront investment in the SIP drawing review will prove to be the best investment, resulting in a faster install and a reduction in the manpower needed on the jobsite.

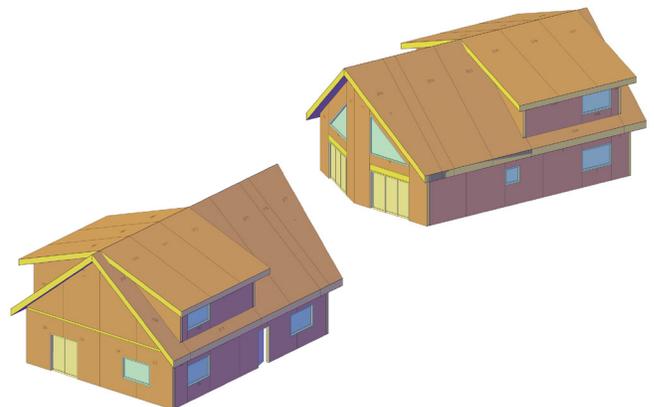
SIP manufacturers will use the architectural construction drawings (see Image 5.1) provided by the client/customer to create SIP shop drawings.

IMAGE 5.1:
ARCHITECTURAL CONSTRUCTION DRAWINGS



The SIP shop drawing is the SIP manufacturer's drawn version of information shown in the architectural construction documents. This usually starts with constructing a 3D model of the project as seen in Image 5.2.

IMAGE 5.2:
3D MODEL SIP SHOP DRAWINGS



The SIP shop drawings normally show more detail (see Image 5.3) than the architectural construction documents regarding the SIPs. The SIP shop drawing is drawn to explain the fabrication and/or installation of the SIPs to the SIP manufacturer's production crew and the contractor's installation crews. The information shown on the SIP shop drawing is usually very different from that of the designer's or architect's construction drawing. The SIP shop drawings' primary emphasis is on the SIP product and excludes notation concerning other products and installations unless integration with the SIP is necessary.

IMAGE 5.3:
SIP SHOP DRAWINGS



It is very important that the client/customer review the SIP shop drawings prior to manufacture of the SIPs for dimensional accuracy, rough opening dimensions and placement, SIP thicknesses, roof pitch and other items pertinent to the project.

The customer will be asked to “red line” or comment on the SIP shop drawings as necessary and to approve the SIP shop drawings before manufacturing is initiated. Prompt return of the approved SIP shop drawings ensures the timely delivery of materials. Production lead times vary by manufacturer, time of year, and the size and complexity of the project.

Approval of the SIP shop drawings usually consists of signing and dating an approval stamp or document. A sample approval stamp is shown in Image 5.4. The person or entity signing the SIP shop drawings is typically the person or entity purchasing and paying for the materials. Depending on the situation, this could be the GC, builder, or homeowner.

IMAGE 5.4:
SIP MANUFACTURER APPROVAL STAMP

CUSTOMER APPROVAL

APPROVED DATE _____

APPROVED AS CORRECTED

REVISE & RESUBMIT

NOT APPROVED

PLEASE RETURN TO: SIP Manufacturer

SIGNATURE _____

PANEL WANT DATE _____

SIP BUILDER-BP 5.3:

Window/door schedule will need to be provided with the construction plans so the SIP manufacturer can draw the SIP shop drawings.

If you have selected the Prefabricated SIP package or an RTA SIP package, the SIP manufacturer or SIP fabricator will need the information regarding the openings for doors and windows to manufacture the SIPs with the properly sized openings. To facilitate this process, windows and doors will need to be selected for the project so the properly sized openings can be indicated on the SIP shop drawings.

The selection of the window and door supplier is a very important step in the layout of the SIP shop drawings for the project, and needs to occur early in the project schedule. Each window and door manufacturer has different requirements for the rough openings for their materials. Rough openings are the actual size of the opening in the SIP that the SIP manufacturer or fabricator will cut into the SIPs to accommodate the doors and windows selected for the project.

SIP BUILDER-BP 5.4:

SIPs are pre-cut in the factory according to the SIP shop drawings. Building the foundation as accurately as possible will help reduce onsite adjustment.

The foundations need to be accurate and must be installed level and square in the field. Otherwise, the SIP package will not fit properly; this is unlike stick framing where you can be off several inches and adjust the structure in the field.

SIP BUILDER-BP 5.5:

SIP shop drawings are provided for client review and approval.

As stated above in section 5.2, it is very important that the client/customer review the SIP shop drawings prior to manufacture of the SIPs for dimensional accuracy, rough opening dimensions and placement, SIP thicknesses, roof pitch and other items pertinent to the project.

The customer will be asked to “red line” or comment on the SIP shop drawings as necessary and to approve the SIP shop drawings before manufacturing is initiated. Prompt return of the approved SIP shop drawings ensures the timely delivery of materials. Production lead times vary by manufacturer, time of year, and the size and complexity of the project.

Approval of the SIP shop drawings usually consists of signing and dating an approval stamp or document. A sample approval stamp is shown in Image 5.4. The person or entity signing the SIP shop drawings is typically the person or entity purchasing and paying for the materials. Depending on the situation, this could be the GC, builder, or homeowner.

IMAGE 5.4:

SIP MANUFACTURER APPROVAL STAMP

CUSTOMER APPROVAL

APPROVED () DATE _____

APPROVED AS CORRECTED ()

REVISE & RESUBMIT ()

NOT APPROVED ()

PLEASE RETURN TO:

SIP Manufacturer

SIGNATURE _____

PANEL WANT DATE _____

SIP BUILDER-BP 5.6:

There will be a lead time from SIP shop drawing approval to delivery.

Depending on manufacturer scheduling constraints, time of year, and weather conditions, it is advisable to allow plenty of time for the SIP manufacturer to produce SIPs and order any special materials.

Builder schedule will also affect the delivery of the manufactured SIPs to the jobsite. Coordination between the builder and the SIP manufacturer is essential during this stage of the project.

Depending on which of the three types of SIP packages are ordered, time to delivery will vary. RTA packages will take the most time to fabricate and assemble in the plant, and blanks the least amount of time.

Glossary of Terms

Architectural drawings: also called construction drawings (used interchangeably), architectural construction drawings are made according to a set of conventions, which include particular views (floor plan, section, etc.), sheet sizes, units of measurement and scales, annotation and cross referencing. These are not the same as SIP shop drawings.

CNC machining: Computer Numerical Control (CNC) machining is a manufacturing process in which pre-programmed computer software dictates the movement of factory tools and machinery.

SIP shop drawings: drawings showing more detail than the architectural/construction documents regarding the SIPs. The SIP shop drawing explains the fabrication and/or installation of the SIPs to the SIP manufacturer's production crew and the contractor installation crews. Refer to [SIP Design Best Practices 5: SIP Shop Drawings](#), and/or SIP Builder Best Practices 5: SIP Shop Drawings.

SIPA: Structural Insulated Panel Association (www.sips.org), a non-profit trade association representing manufacturers, suppliers, dealer/distributors, design professionals and builders committed to providing quality structural insulated panels for all segments of the construction industry.

SIPs: Structural Insulated Panels, a high-performance building component for residential and light commercial construction.

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Panel Association**