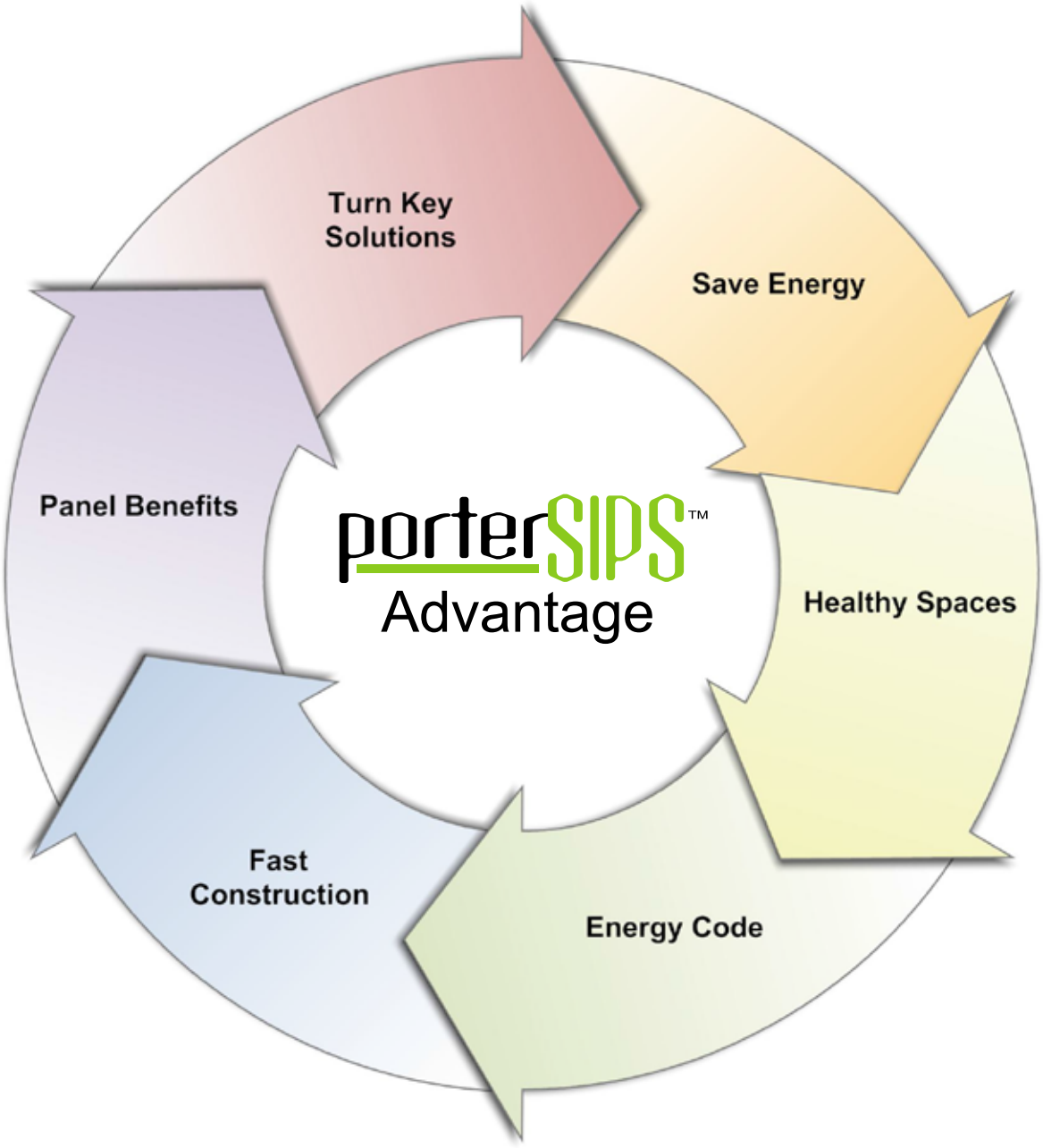
porterSIPS™

Structural Insulated Panels

QUALITY-MADE. GREEN-DRIVEN

www.portersips.com



THE PORTERSIPS ADVANTAGE

PorterSIPs are the key to energy efficient building. A few reasons why architects and builders are using PorterSIPs:

- SIP buildings use approximately half the energy of conventional buildings.
- SIPs can be used for virtually any building design and are particularly useful when open designs with long roof spans are desired.
- SIPs can be erected 3x's faster than conventional building.
- SIPs are an engineered product that can be designed to meet the required loads and are inherently stronger than conventional framing.
- Owners of SIP buildings report less interior noise, fewer drafts, and more consistent interior temperatures due to the continuous foam core inside every SIP.
- Due to their inherent air-tightness, SIPs make control of indoor air quality possible since incoming air can be filtered and stale air can be expelled in a controlled manner.
- SIP buildings may be insured for less, specifically in high wind areas due to their superior strength.
- Building with SIPs helps earn LEED points.

TABLE OF CONTENTS :

PORTERcorp, founded in 1964 as W. H. Porter, Inc., is a design, engineering, and manufacturing company focusing on exterior structures and insulated building envelopes. PORTERcorp was one of the first producers of SIPs (Structural Insulated Panels).

porterSIPS™ by PORTERCORP™

PORTERcorp in Holland, MI has earned Forest Stewardship Council (FSC ®) Chain of Custody certification from SCS Global Services, the leading FSC certifier in the United States. FSC provides third-party certification confirming that materials used are harvested from well-managed forest operations. SCS Global Services is the leader in environmental and sustainability certification. One of the first bodies accredited by the Forest Stewardship council in 1996, SCS has since certified more than 30 million acres of well-managed forests and 3,000 companies in the FSC supply chain worldwide. PORTERcorp's FSC License code is FSC-C006121. For more information or to find a certified product, please contact PorterSIPs.

HOW SIPs WORK

In the last two centuries, manufactured housing components have evolved slowly. However, no longer do we have cheap energy, vast forests, primitive manufacturing and a lack of concern for environmental issues. Today's manufacturing is taking place with computers, plastics, adhesives, engineered wood, modern machinery and a renewed respect for the environment. By keeping some of the best aspects of stick construction and combining these with the newest methods and materials, a hybrid of stick-construction has evolved, and it is called Structural Insulated Panels, or SIPs.

SIPs insulation is a forethought, not an afterthought. Most homes built before 1950 had almost no insulation. When energy became more expensive, insulation was added to stick-built structures by stuffing something between the studs. With SIPs, a foam plastic insulating core and engineered wood faces work together to make large rigid panels that are the frame, sheathing, and insulation of a structure. An all-in-one product, SIPs provide huge energy savings of 50% or more, when compared to traditional stick framing.

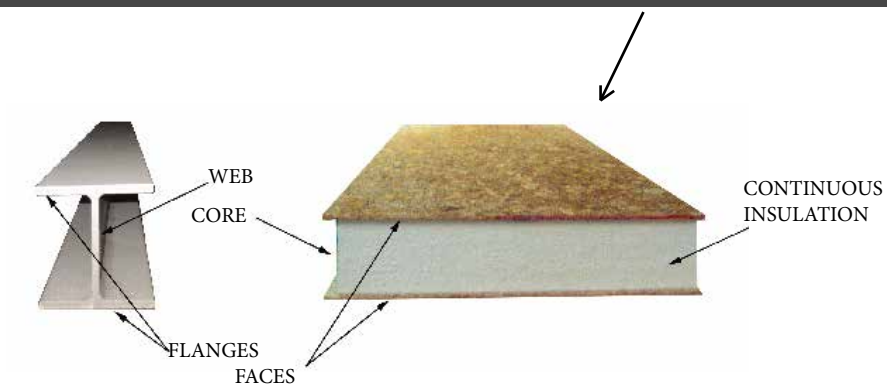
Structural Insulated Panels (SIPs):
These words are descriptive and begin to define the properties of this innovative building material. SIPs are unique because they combine both structure and insulation in one large rigid panel – up to 8' x 24'.

How they work:
SIPs achieve their structural integrity with an "I" beam effect by using rigid sheets of Oriented Strand Board (OSB) as the flanges of the "I" beam and a rigid plastic foam core as the web of the "I" beam. The key to this structure's performance is that the EPS core keeps the OSB skins from buckling by keeping them "in plane".

One material with two benefits:
The rigid plastic foam core of Type I expanded polystyrene (EPS) is the insulation and the web of the "I" beam. The thicker the panel the more load the panel will carry and the greater the insulation value.

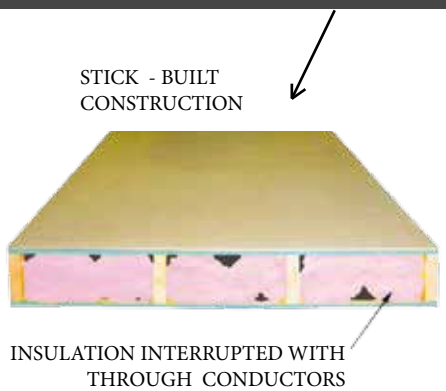
Multiple uses for SIPs:
SIPs can be used for floors, walls and roofs.

A SIP WORKS LIKE AN "I" BEAM



SIP FORETHOUGHT INSULATION

AFTERTHOUGHT INSULATION



Turn Key Solutions:
PorterSIPs can be a single source provider of a Ready-To-Assemble (RTA) package. These turn key RTA packages can vary in scope and can include not just the SIPs, but could also include additional features such as truss packages and installation.

Installation:
Because of our extensive history in the industry, PorterSIPs is associated with numerous competent SIP installers. As a result, PorterSIPs can provide you options to have PorterSIPs install your project.

Job Site Training Solutions:
In addition to our list of competent installers, we can train you and your team on installation techniques of PorterSIPs.

Complete Material Provider:
PorterSIPs will supply the SIPs and the associated materials such as the fasteners and adhesives, but PorterSIPs can also supply loose lumber required for plates and other associated framing needs.

Repeatable Construction:
PorterSIPs has experience in working with architects to value engineer a design for repeated use. These repeatable buildings can be optimized for material utilization and be shipped as an RTA package to your job site anywhere in the country.

Engineering Support:
While PorterSIPs are manufactured under a very strict QA program with 3rd party audits, SIPs are a building component and may require a licensed engineer to evaluate the job specific structural loads placed on the SIPs and review the SIP connections for those capacity requirements. PorterSIPs can support upfront engineering to aid in the design process and assist in the transformation of a conventional framed drawing to a SIP based design.

7-Eleven® Convenience Store

3 Day Thermal Envelope Construction
Turn Key Solutions (Engineering, Manufacturing, Installation)
Easy to make kits for repetitive buildings

"R" Values at 75°

"R" VALUE OF PORTERSIP PANELS

Panel Thickness	Panel "R" Value
4 1/2" (11.4 cm)	15.2
6 1/2" (16.5 cm)	24.7
8 1/4" (21.0 cm)	33.0
10 1/4" (26.0 cm)	42.5
12 1/4" (31.1 cm)	52.0

The whole wall R-value is a measure of thermal resistance used in the building and construction industry. Under uniform conditions it is the ratio of the temperature difference across an insulator and the heat flux (heat flow per unit area) through it. The bigger the number, the better the building insulation's effectiveness.

The R-value of PorterSIPS panels is the published R-value for the panel only.

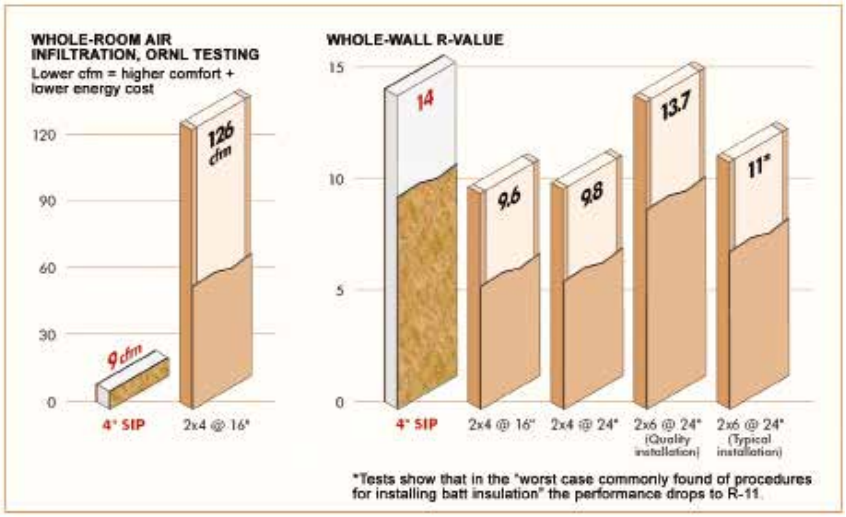
Typically, the thicker the panel, the higher the R-value, thus reducing heating and cooling costs.

Utility costs have been proven to go down by as much as 50-80% in a SIP building when compared to a conventional stick-built structure.

ENERGY EFFICIENCY RATINGS/WHOLE WALL "R" VALUE COMPARISONS

System	Wall Type	Insulation	Whole Wall "R" Value
Stick	2x4@16" O.C.	R-11 BATT	9.6
	2x6@24" O.C.	R-19 BATT	13.7
Metal	3 1/2" Metal	R-11 BATT	6.1
SIPS	4 1/2" SIP	3 5/8" EPS	13.9
	6 1/2" SIP	5 5/8" EPS	21.6
	8 1/4" SIP	7 3/8" EPS	28.3
	10 1/4" SIP	9 3/8" EPS	36.0
	12 1/4" SIP	11 3/8" EPS	43.7

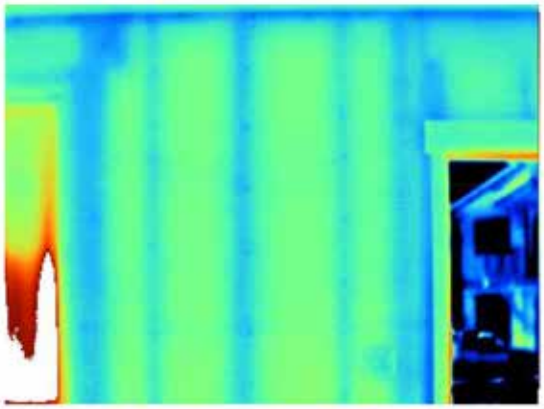
AIR TIGHT



SIPA- Product Guide (Christian, Jeff and T.W. Petrie, Heating and Blower Door Tests of the Rooms for the SIPA/Reiker Project. ORNL March 15, 2002)

When comparing stick framing with SIPs it is important to look at the whole wall R-value. A R-19 stud wall is not equivalent to a SIP with the same R-value. The framing factor of a stud wall is much greater. The studs actually reduce the overall wall's R-value.

Thermal Bridging



Stick

SIPs

Reduced Mechanical Systems - HVAC sizing
Since SIP buildings are well insulated and very air tight, HVAC systems are commonly oversized. When the HVAC system is too big, it tends to run for shorts periods, or "short cycle". Short cycling causes a number of problems.

If an air conditioner short cycles, it will not effectively reduce humidity, it will not run long enough to get to peak efficiency, and it will often switch off the thermostat before the entire house is cool because it will create a wave of cool air. Also, oversized systems tend to be noisier, and require more maintenance.

Some similar problems can occur if the heating system is oversized. Again, the system will short cycle and the heat exchanger will not get up to efficient temperature, it will be noisier, and it will "trick" the thermostat into shutting off early with a wave of warm air, making the building less comfortable. To eliminate these problems, make sure that the HVAC system is designed by a qualified HVAC engineer.

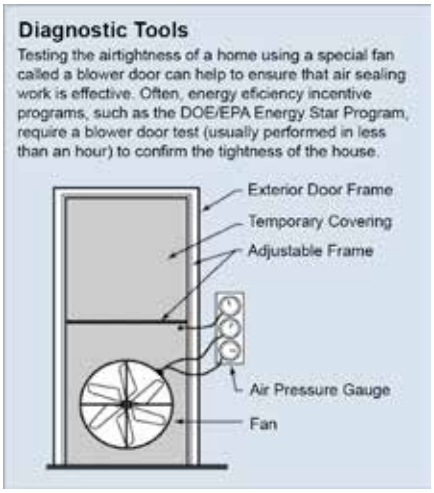
Energy Star v3
Beginning on January 1, 2012, all new homes must follow the ENERGY STAR Version 3 guidelines that include higher insulation levels and an expanded thermal enclosure checklist. Building with SIPs allows builders to meet these requirements faster and easier than with traditional wood framing by creating a well-insulated and airtight building enclosure.

Builders have the option to construct a home to the prescriptive requirements of the ENERGY STAR Reference Design or demonstrating that their home meets the equivalent performance of the Reference Design through energy modeling. Both methods require inspection by a RESNET certified home energy rater.

Insulation:
All insulation must meet RESNET Grade I, meaning that cavity insulation must fill the entire cavity without any sizable gaps or compression. The exception is homes with insulated sheathing, where Grade II is permitted. SIPs deliver Grade I insulation every time, without relying on the work of subcontractors.

Scrap Recycled at Factory:
When pre-cut to size and shape, SIPs can reduce on-site waste of dimensional lumber and sheathing material. Most SIP waste is kept in the factory where it can be recycled. On-site SIP waste is confined to packaging.

Air Infiltration:
ENERGY STAR qualified homes are subject to a blower door test that determines the amount of air infiltration. SIPs have a well-established track record of testing below 2 ACH50, and experienced SIP builders routinely build homes that test between 0.5 and 1 ACH50. Simply installing SIPs per the manufacturers specifications will easily meet the ENERGY STAR air infiltration requirements without any of the additional air sealing measures typically needed on wood frame homes.



Ductwork in Conditioned Space:
Placing ductwork in the conditioned attic space created by a SIP roof bypasses the ENERGY STAR requirement of insulating ductwork. In hot climates, the Prescriptive Path requires a radiant barrier if more than 10 feet of ductwork is placed in an unconditioned attic. If both the ductwork and air handler are placed in conditioned space, duct leakage testing can be waived.*

Climate Zone	Air Infiltration Rate
1, 2	6 ACH50
3, 4	5 ACH50
5-7	4 ACH50
8	3 ACH50

*Structural Insulated Panel Association(SIPA) Technical Bulletin #3

Tax Credits
In 2005, the federal government enacted the Energy Policy Act. In 2008, the tax credits in this act were extended. This act provides financial incentives for people building energy-efficient structures. Using SIPs can qualify a builder or contractor for a $2000 tax credit for a residential building, or up to $1.80/SF for a commercial building.

To qualify for the residential tax credit, the building needs to achieve a 50% energy savings as described in the International Energy Conservation Code (IECC). This code requires that at least one fifth of the energy savings must occur as a result of air tightness and increased R-value on the insulation. Of course, SIPs are the easiest and least expensive way to achieve these goals.

Commercial contractors can qualify for the $1.80/SF tax credit if the new or existing commercial building can show a 50% improvement in energy efficiency in the areas of heating, cooling, water heating, and interior energy cost as detailed in ASHRAE 90.1-2001.

For more details, see www.energystar.gov

US Department of Energy-DSIRE: Database of State Incentives for Renewables and Efficiencies.
DSIRE is the most comprehensive source of information on incentives and policies that support renewables and energy efficiency in the United States. Established in 1995, DSIRE is currently operated by the N.C. Solar Center at N.C. State University, with support from the Interstate Renewable Energy Council, Inc. DSIRE is funded by the U.S. Department of Energy.

The DSIRE web site provides summaries of renewable energy and energy efficiency incentives and policies established by the federal government, state governments and U.S. territories, local governments, and larger electric and gas utilities in the U. S. DSIRE also offers summary maps and summary tables, and a search tool to help users determine which incentives and policies apply (or might apply) to a specific project.

For other energy efficiency incentives available in your area, see www.dsireusa.org

Energy Efficient Loans
Some banks offer special loans for energy-efficient buildings. While these loans do not offer better interest rates, they do offer lower requirements regarding debt-to-income ratios. The goal of programs like these is to encourage home buyers to invest in energy-saving technologies. It is recognized that these technologies will likely cost more initially, but will save on utility bills during the lifetime of the structure. Since the home owner will be spending less each month on utility costs, a larger mortgage may be affordable. SIP construction is an example of one technology that would help a building qualify for this type of loan. Like the Energy Star program, these programs are based on proving that the home is more energy-efficient through the HERS testing.

For more information, see www.fha.com/energy_efficient.cfm

ZEBRAlliance Research Home Comparison
SIP Construction vs. Conventional Framing

www.zebralliance.com

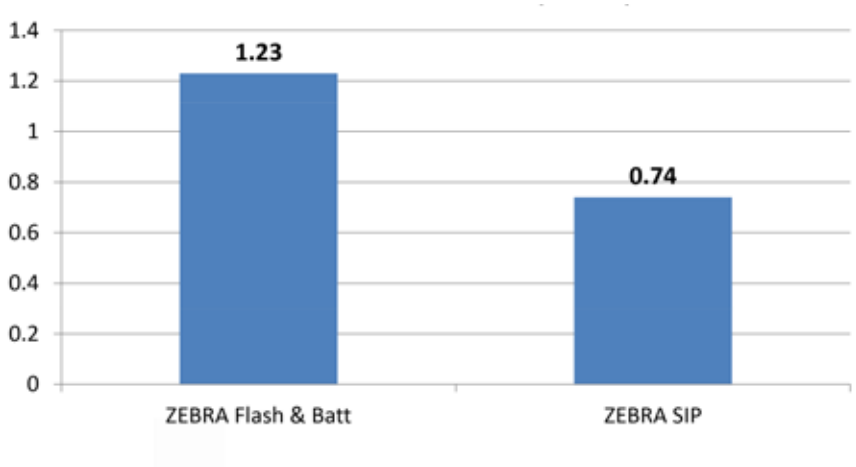
SIP Construction
- 6" SIP with EPS core Attic
- R-35 cathedral (SIPs 10-in)

Conventional Framing
- 2x6, 15% framing factor, flash & batt – ½" spray foam + R-19 fiberglass batts
- R-50 cathedral (aged phenolic) 2x12, 24" o.c.

Summary
- SIPs saved 21% more space heating energy than conventional framing
- SIPs home HERS 46, conventional home HERS 48
- SIPs attained 40% greater air tightness than conventional framing even though it was the framing crew's first SIP job
- Builder went to SIPschool, then built same house with SIPS – envelope went up in only 5 days compared to 15 for the conventional framing

Why the large difference in performance?
- Air leakage
- Thermal bridging
- FTC R-Value myth, is it really R-19?
- ASTM Guarded Hot Box vs Whole Wall R-Value.
- 75F test temp vs real world.
- Tightly sealed box not a wall.

BLOWER DOOR TEST RESULTS (ACH50)



Improved Air Quality
By weight, SIPs use approximately 89% engineered wood (OSB), 10% EPS foam plastic and less than 1% water activated urethane adhesive.

- OSB is manufactured from fast growing, under utilized, and often less expensive wood species grown in carefully managed forests which help to preserve our beautiful old forests with big timber. The OSB production process uses small wood chips and highly automated machinery, making OSB a very efficient use of raw materials.
- About 85-90 percent of a log can be used to make high quality structural panels, and the remainder (bark, saw trim, and saw dust) can be converted into energy, pulp chips, or bark dust.

SIP walls use approximately 12-20% of the dimensional lumber used in the exterior walls of typical stick-built construction. OSB, which is an engineered wood-product, is a renewable, recyclable, biodegradable resource that is easily manufactured in large sheets. Engineered woods like OSB make the best use of forests and have been found to be better for the environment than fiberglass, steel or concrete in terms of energy, emissions and waste.

- EPS is lightweight insulation composed mostly of air. Only 2% of EPS is plastic. Over the lifetime of a house, the EPS insulation used in SIPs will save many times the energy embodied in the petroleum used to make EPS.
- It takes 24% less energy to produce EPS than fiberglass insulation of equivalent R-value.
- Scrap EPS generated during the manufacturing process can be recycled into new EPS products.

The adhesive used in bonding the OSB skins of the panel to the EPS core is water activated, contains no solvents and emits no VOCs during curing.

No Urea Formaldehyde

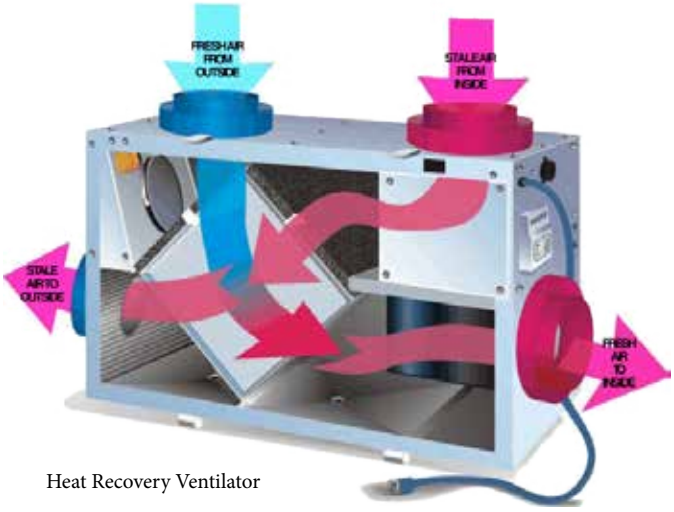
Formaldehyde and its possible adverse health effects are commonly in the news. The OSB used in SIPs does not contain the dangerous urea formaldehyde, but does contain a safe chemical called phenol formaldehyde. Also, the levels of formaldehyde released from OSB are extremely small, only about 0.1 parts per million. This level is actually about the same as the level normally found in nature. According to the research that has been done, formaldehyde at this level poses no health risks. For more, see: www.portersips.com/apaformaldehyde.pdf

Moisture Management

Since SIPs are a hybrid of wood stick-built construction, the single greatest concern with SIPs is potential damage from water exposure. In this regard, SIPs should be treated similarly to wood-frame construction where OSB is used as an exterior sheathing. Like any wood product when exposed to moisture, OSB is susceptible to mold, rot and mildew. The moisture can come from inside the structure as humidity or outside the structure as rain, mist or condensation. To eliminate these problems, the OSB must be kept dry.

Outside: To keep the outside of the SIPs dry a few strategies must be employed. A drain plain, such as 30# building felt, should be installed behind any siding or roofing. All penetrations must be properly flashed. Any time wood, or fiber-cement siding is used over the OSB, it must be back and end-primed. In addition to these precautions, some climates may require use of a vent space between the siding or roofing and the exterior OSB skin of the SIP.

Inside: Controlling moisture from the inside of the structure is just as important. To keep the OSB dry, the following strategies must be employed. During construction, care must be taken to thoroughly seal all panel joints. This is done with expanding-foam sealant, mastic type construction sealant, and vapor barrier tape designed to adhere to OSB. Exhaust fans must be used in any higher humidity area such as kitchens and bathrooms. Also, using an Energy Recovery Ventilator or Heat Recovery Ventilator is recommended. These units expel moist and stale air and bring in fresh air and in cool climates they keep interior humidity from becoming higher than outdoor humidity.



Heat Recovery Ventilator

PORTERcorp, as well as the majority of SIP manufacturers, have selected EPS as the preferred core material. EPS is the best choice due to it low cost, highest R-value per dollar, and its adaptability for advanced panelized construction. Other cores are more expensive and do not hold their R-Value.

SIP FOAM DATA COMPARISON:

	Environmentally Friendly	Greenhouse Gas Blowing Agent	
	EPS Expanded Polystyrene	POLYISO Foam in Place Polyisocyanurate	XPS Extruded Polystyrene IB
Core Density	1# / CF	2# / CF	1.5# / CF
Aged "R" Value @75° F	3.85	5.3	5.0
Foam Cost/CF	EPS is less than ½ the cost of Polyiso or XPS		
Cost/ "R" value	EPS lowest cost for "R" value in place		
Cost/structural value	EPS cost less per structural value		
SIP width availability	8'and 4' wide panels readily available	4' wide Panels Standard	8' and 4' wide panels available
SIP thickness availability	Any lumber size readily available 3 ½", 5 ½", 7 ¼", 9 ¼", 11 ¼"	Limited	Limited
Stability	No off-gassing	Greenhouse off-gassing	
Creep	EPS has less creep than Polyiso		
"R" value stability	Guaranteed stable R-value for long-term performance	Diminishing R-value (Thermal Drift)	

Pest Management

Any building type is susceptible to pest infestation and SIP construction is no different. Some suggestions are:

- Have a pest control specialist treat the site before construction
- Do not bury scrap wood during backfilling; seal or screen any possible entry points
- Store any firewood away from the building
- Keep food in well sealed containers, fix any moisture problems
- Keep trees trimmed so they don't hang over or touch the building
- Do not plant shrubberies within 3' of the exterior of the building
- Keep exhaust and HVAC system filters clean and keep floors free of food particles

TalonGUARD - Termite Resistant EPS

TalonGUARD was created to be an effective termite resistant product. For years the only treated product available would only deter termites, where TalonGUARD actually kills the termites.

- Advanced active ingredient is the same as used in the $2 billion wood preservative industry as a preferred replacement for wood preservatives made with heavy metals
- 3rd party certified by UL, approved for use by ICC for"very heavy termite infestation" areas of the US below grade (see ICC-ES ESR-1962)
- Superior field and lab efficacy against termites - it actually kills the termites by acting on the nervous system while preserving the foam
- May be used below grade or in moist conditions with no loss of termite protection
- Safe for intended use, same active ingredient as used in tick and flea drops topically applied to dogs

Performance Criteria	Plain EPS	TalonGUARD EPS	XPS
Meets ASTM C578 Properties	X	X	X
Meets UL723 Flame & Smoke Limits	X	X	X
UL Approved (R16529 for EPS)	X	X	X
Safe for Environment & People	X	X	X
Approved for Wet Environments	X	X	X
Recycle Content for LEED Credits	X	X	
Low Cost	X	X	
ICC listed ESR-1962	X	X	
No Gasses Emitting Over Time	X	X	
R-Value Warrantee Available	X	X	
Preserves Against Termites		X	
Specifically Tested for Use Below Grade in "Very Heavy Termite Infestation Areas" of the US		X	
Termite Resistance Warrantee		X	

HEALTHY SPACES

Leadership in Energy and Environmental Design (LEED®) provides a rating system for construction that factors in energy use and environmental design. The rating system can be important to builders and owners for tax and grant assistance.

The US Green Building Council certification process, rating system and other data may be obtained as follows:

"Certification Process Project teams interested in obtaining LEED certification for their project must first register online. Registration during early phases of the project will ensure maximum potential for certification. The LEED website, www.leedbuilding.org, contains important details about the certification review process, schedule and fees. The applicant project must satisfactorily document achievement of all the prerequisites and a minimum number of points. See the LEED for New Construction and Homes project checklist or the number of points required to achieve LEED for New Construction and Homes rating levels."

The object of LEED points is to encourage and reward good environmental design and construction.

SIP construction is included and can assist in the LEED point system. Construction with SIPs adhering to enclosed construction details and a sufficient wall and roof thickness for higher insulation value will add points.

Eastside Library
Tallahassee, FL
Architect: Johnson Peterson

PorterSIPs Products Can Assist Your Project with LEED Certification

LEED New Construction and Major Renovations

Energy and Atmosphere, Prerequisite 2 Minimum Energy Performance	**Possible Points**
· SIPs can assist with meeting the mandatory provisions and prescriptive requirements of ASHRAE/IESNA 90.1-2004.	Required

Energy and Atmosphere, Credit 1 Optimize Energy Performance	
· SIPs can assist with exceeding the minimum requirements for energy performance. Depending on option pursued up to 19 points possible.	19

Material and Resources, Credit 2 Construction Waste Management	
· Most SIPs have construction waste that is 95% recycleable.	
- Recycle/salvage 50% of nonhazardous construction	1
- Recycle/salvage 75% of nonhazardous construction	2
- Recycle/salvage 95% of nonhazardous construction	3

Material and Resources, Credit 7 Certified Wood	
· SIPs can be provided with certified wood and assist with meeting the requirements of having at least 50% (based on cost) of wood material and products that are certified in accordance with the Forest Stewardship's Council requirments. PorterSIPs is FSC®-COC certified.	1

Indoor Environmental Quailty, Credit 4.1 Low-Emitting Materials Adhesives & Sealants	
· The adhesives PorterSIPs provides to be used on the interior of the building comply with the South Coat Air Quality Management District (SCAQMD) Rule 1168.	1

Indoor Environmental Quality, Credit 4.4 Low-Emitting Materials Composite Wood & Agrifiber Products	
· Composite wood and laminating adhesives used provided contain no added urea-formaldehyde resins.	1

LEED for Homes

Sustainable Sites, Credit 5 Nontoxic Pest Control	**1/2 Points Maximum**
5b) PorterSIPs requires joints, penetrations, and edges to be sealed.	1/2

Energy and Atmosphere, Credit 1 Optimize Energy Performance	**34 Points Maximum**
Prerequisites 1.1: Performance of Energy Star for Homes. PorterSIPs can assist in meeting the performance requirements of Energy Star for Homes.	Required
Credit 1.2: Exceptional Performance. PorterSIPs can assist with exceeding the minimal performance requirements of Energy Star for Homes	34 maximum

Energy and Atmosphere, Credit 2 Insulation	**2 Points Maximum**
Prerequisites 2.1: Basic Insulation. PorterSIPs can assist in meeting or exceeding the R-value requirements listed in the 2004 International Energy Conservation Code Chapter 4 and meeting the Grade II specifications as set by the National Home energy Rating Standards.	Required
Credit 2.2: Enhanced Insulation. PorterSIPs can assist in meeting the requirements of exceeding the R-value requirements in the 2004 International Energy Conservation Code Chapter 4 by 5% and meeting the National Home Energy Rating Standards Grade I specification.	2 maximum

Energy and Atmosphere, Credit 3 Air Infiltration	**3 Points Maximum**
Prerequisites 3.1: Reduce Envelope Leakage. PorterSIPs can assist in meeting the air leakage requirements by Climate Zones as referenced in the table under this credit in the LEED Rating Guide.	Required
Credit 3.2: Greatly Reduced Envelope Leakage. PorterSIPs can assist in meeting the air leakage requirements by Climate Zones as referenced in the table under this credit in the LEED Rating Guide.	2
or	
Credit 3.3: Greatly Reduced Envelope Leakage. PorterSIPs can assist in meeting the air leakage requirements by Climate Zones as referenced in the table under this credit in the LEED Rating Guide.	3 maximum

Material and Resources, Credit 1 Material-Efficient Framing	**5 Points Maximum**
Prerequisites 1.1: Framing Order Waste Factor Limit. PorterSIPs can assist in keeping the overall estimated waste factor to 10% or less.	Required
Credit 1.2: Detailed Framing Documents. PorterSIPs provides detailed framing plans.	1
Credit 1.3: Detailed Cut List and Lumber Order. PorterSIPs provides a detailed cut list and lumber order, which corresponds to framing plans.	1
and/or	
Credit 1.4: Framing Efficiencies. PorterSIPs can assist in meeting this requirement by providing SIPs wall, roof, and floors.	3 maximum
Credit 1.5: Off-Site Fabrication. PorterSIPs can meet the panelized construction requirements.	4 maximum

Material and Resources, Credit 2 Environmentally Preferable Products	**1 Point Maximum**
Credit 2.2 PorterSIPs can be provided with FSC®-COC+A1 material for different components.	
- Use FSC® material for exterior wall panels.	.5
- Use FSC® material for roof panels.	.5

Material and Resources, Credit 3 Waste Management	**3 Points Maximum**
Credit 3.2: Construction Waste Reduction. Option A: PorterSIPs can assist in meeting the requirements of generating less than 2.5 pounds or less of net waste per square foot.	3 maximum
Credit 3.2: Construction Waste Reduction. Option B: PorterSIPs can assist in diverting 25% or more of the construction waste from landfills or incinerators.	3 maximum

Adjacent Exterior Decks

One very common area to find rot in any wood frame building is where an exterior deck meets the wall of a structure. These areas are penetrated with fasteners, are difficult to seal, and are subject to water falling from the roof and then splashing up off the deck onto the walls of the building. The best solution for this problem is to build the deck to be free-standing and not attached to the building at all. Also, keep a 1"-wide space between the building and the deck to allow for drying and drainage. Keeping the deck surface one step lower than the surface of the interior of the building is also a good idea. This keeps snow or water from migrating under a door, and reduces other possible water entry problems.

Timber Frame and Log Construction

Timber frame and log buildings tend to expand and contract with moisture, sometimes in dramatic amounts. Some of the details shown in this book may need to be modified when SIPs are installed over log walls, or over a timber frame. There are books about timber frame construction that show good details dealing with this issue. See www.tfguild.org; this website is a good resource for timber framers.

Consult A Building Science Expert

Building science techniques are used to improve air quality, improve energy efficiency, and prevent damage from moisture. Different climates, conditions and designs require different details and methods. This catalog does not cover all conditions. Please consult these additional resources with any building science questions:

Building Science Corporation – www.buildingscience.com

The Engineered Wood Association – www.apawood.org

Environmental Protection Agency – www.epa.gov

US Green Building Council – www.usgbc.org

Building Green – www.buildinggreen.com

PATH – www.pathnet.org

National Forest Products Lab - www.fpl.fs.fed.us/

EPA estimates 1 billion board feet of salvageable lumber from stick built homes is wasted every year. That is enough to build 62,000 new 2000 square foot homes.

Less Steps To Meet Energy Standards

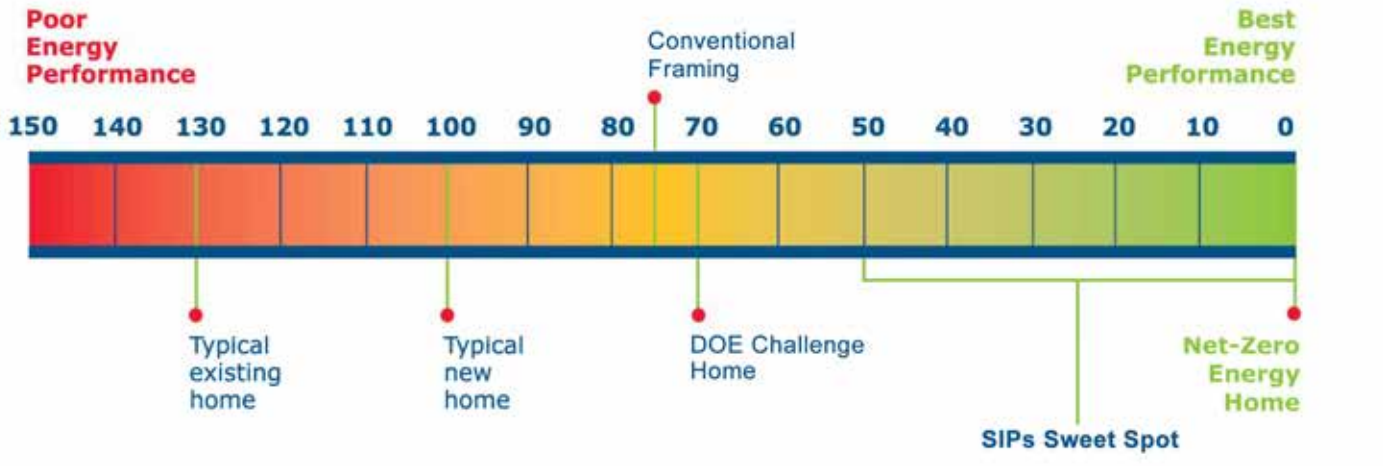
Conventional Framing	VS.	SIPs
Studs		SIP Panel
Sheathing		Drywall
Spray Sealant Barrier (seal stud frame)		Vapor Barrier
Fiberglass Batt Insulation		Siding Layer
Drywall		
Vapor Barrier		
Continuous Insulation Layer (exterior)		
Siding layer		

A Home Energy Rating (HERS) is a measurement of a home's energy efficiency. In the United States, the Residential Energy Services Network (RESNET) is responsible for creation and maintenance of the RESNET Mortgage Industry National Home Energy Rating Standards, as well as certification and quality assurance on RESNET Provider organizations.Energy assessments take into account different climatic conditions in different parts of the country and are benchmarked according to average household energy consumption particular to a given climatic region.

Ratings provide a relative energy use index called the HERS Index – a HERS Index of 100 represents the energy use of the "American Standard Building" and an Index of 0 (zero) indicates that the building uses no net purchased energy (Zero Energy Building). The lower the value, the better.

HERS Index

Building with SIPs will automatically put you in the 50-0 range
3x less effort and cost than new methods to meet this level of air tightness

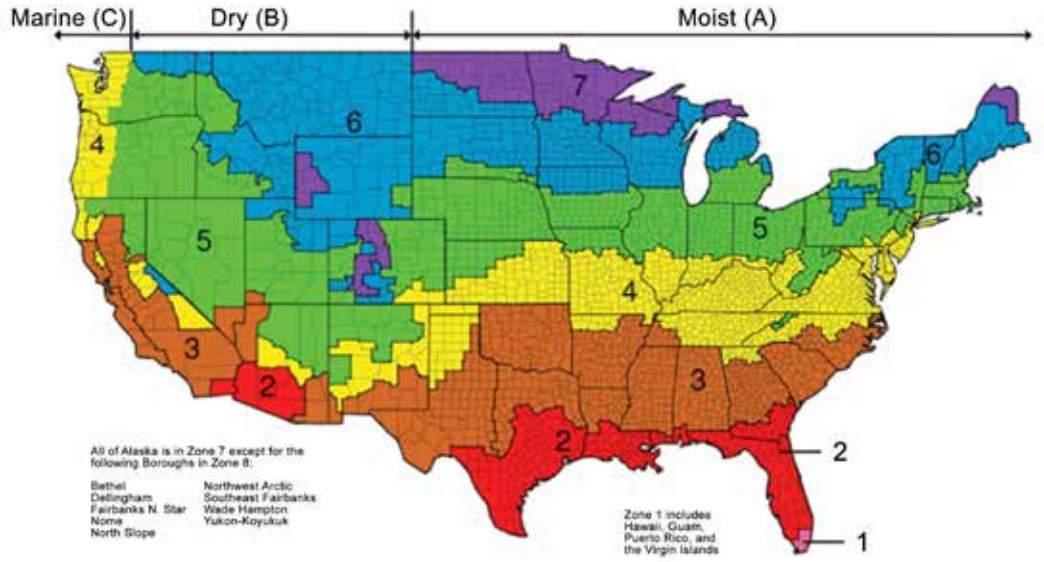


ENERGY CODE

The 2009 and 2012 IECC (International Energy Code Council) is trending toward greater efficiency and is requiring tighter structures. The majority of the energy efficiency of a structure is based upon it's thermal envelope as it pertains to air infiltration and insulation. Any building process that involves a fiberglass or blown insulation approach will require a multiple step solution. NAIMA (association for North American manufacturers of fiber glass, rock wool, and slag wool insulation products) states that even "spray foam insulation is not a one step solution to air leakage". Building with PorterSIPs is a single step building process to that dual requirement.

The building technical society ASHRAE (American Society of Heating, Refrigerating and Air Conditioning Engineers) has classified the country into different zones and has listed prescriptive requirements and has posted the required R-values for those zones. Achieving those R-values in those zones in the most efficient and economical way is one of the main goals of every builder. While there are many options to approach this requirement, only building with PorterSIPs can offer a single-step solution to both air infiltration and insulation.

Climate Zones



2009 IECC

- More efficient windows and doors
- Increased insulation
- Visual inspection of thermal envelope OR blower door test
- Duct leakage testing
- Thermal enclosure inspection
- No mechanical trade offs under performance path

Air Infiltration
– 7 ACH50 all climate zones
– OR visual inspection

PRESCRIPTIVE REQUIREMENTS:
INSULATION + WINDOWS

CLIMATE ZONE	FENESTRATION U-FACTOR	SKYLIGHT U-FACTOR	GLAZED FENESTRATION SHGC	CEILING R-VALUE	WOOD FRAME WALL R-VALUE
1	1.2	0.75	0.3	30	13
2	0.65	0.75	0.3	30	13
3	0.5	0.65	0.3	30	13
4 except Marine	0.35	0.6	NR	38	13
5 and Marine 4	0.35	0.6	NR	38	20 or 13+5
6	0.35	0.6	NR	49	20 or 13+5
7 and 8	0.35	0.6	NR	49	21

2012 IECC

- Even more efficient windows
- Even more insulation
- Blower door test REQUIRED
- Duct insulation
- Less duct leakage allowed

Air infiltration
– 5 ACH50 in climate zones 1-2
– 3 ACH50 in climate zones 3-8
– AND visual inspection

PRESCRIPTIVE REQUIREMENTS:
INSULATION + WINDOWS

CLIMATE ZONE	FENESTRATION U-FACTOR	SKYLIGHT U-FACTOR	GLAZED FENESTRATION SHGC	CEILING R-VALUE	WOOD FRAME WALL R-VALUE
1	0.65	0.75	0.25	30	13
2	0.4	0.65	0.25	38	13
3	0.35	0.55	0.25	38	20 or 13+5
4 except Marine	0.35	0.55	0.4	49	20 or 13+5
5 and Marine 4	0.32	0.55	NR	49	20 or 13+5
6	0.32	0.55	NR	49	20+5 or 13+10
7 and 8	0.32	0.55	NR	49	20+5 or 13+10

Insulated Building Enclosure

The 2012 IECC raises the required insulation levels for some climate zones. In extremely cold climates, exterior insulation is required. By providing continuous insulation, SIPs allow builders to meet these requirements without the added step of installing exterior insulation. This adds to the labor savings gained with SIP construction, determined by a third party R.S. Means study to be over 50 percent faster than wood framing.*

*Structural Insulated Panel Association(SIPA) Technical Bulletin #5

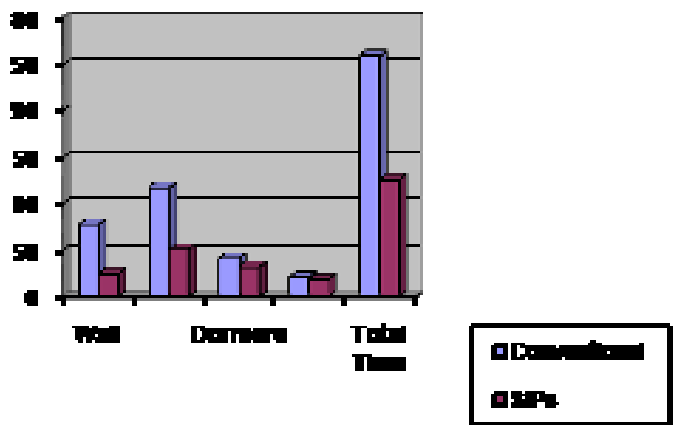
Are SIPs cost-effective?
Building with SIPs offers cost advantages to the builder in terms of speed of construction and reduced labor requirements. Panels are pre-manufactured to exact specifications so they arrive ready to install and fasten together quickly.

A recent time & motion study conducted by Reed Construction Data RSMeans Business Solutions showed that on one studied project utilizing SIPs reduced installation time by 130 labor hours. When compared to RSMeans labor hours for a conventionally framed home, this labor requirement is equivalent to time savings of approximately 55 percent. The house used for the study was a two-story, three-bedroom, 1,176 –square-foot, cape-style home with three dormers on a 12/12-pitch roof. RSMeans cost data was used to benchmark the time and cost for erecting conventionally-framed stud walls, roofs and dormers using exterior sheathing and fiberglass batt insulation.

Thanks to this speed of construction, SIP projects are dried-in sooner. There are fewer hand-offs between trades so crews are more productive – no more waiting for the insulation group to come in after the framers.

SIP walls are flat and don't warp, expand or contract, so doors and windows go in quickly as designed. All wall intersections are true so cabinets install quickly. It all adds up to reduced field adjustments which yields time saved. Perhaps most importantly, these technologies can help reduce call-backs, keeping crews moving forward to the next project and improving overall productivity.

Actual Installed
Time-Comparison
(hours)
(Reprinted with permission of
BASF)




Day 1


Day 1

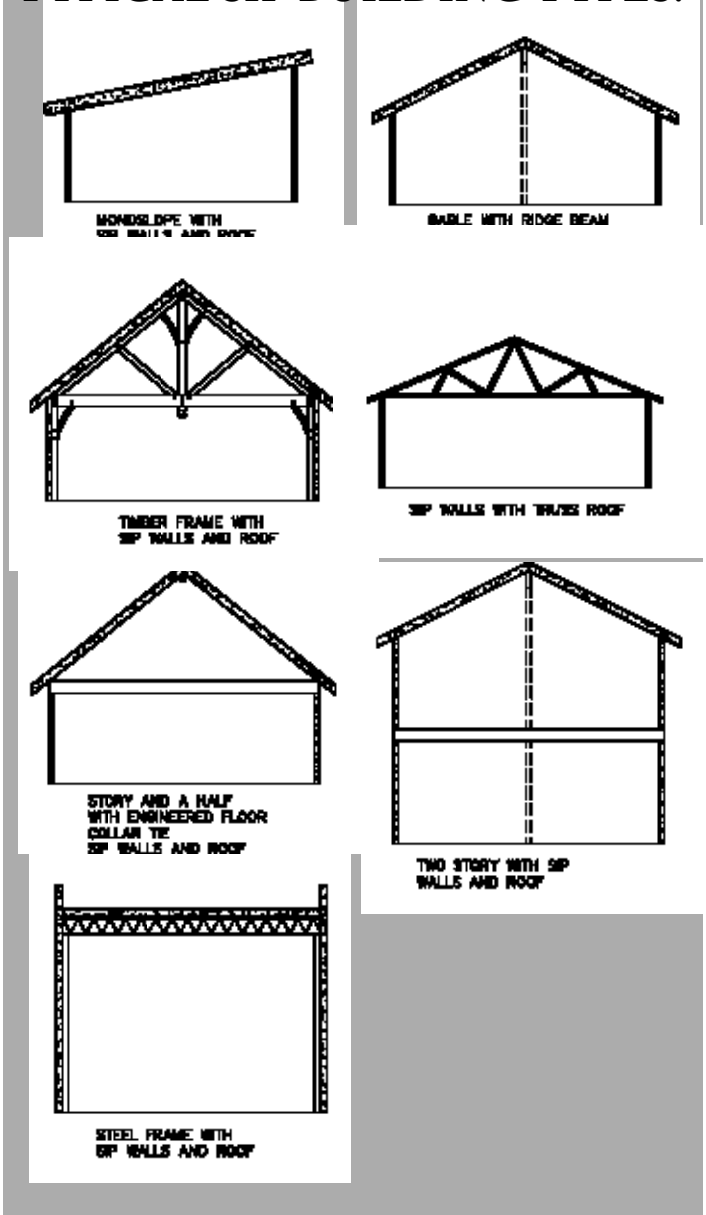

Day 2


Day 3

Advantages of size:
SIP panels are available in sizes up to 8'x24'. This is the raw material size that your SIP panels will be cut from. This allows walls that are 8' tall or less to be built up to 24' long in some cases, which minimizes the number of pieces to be handled in the field, thereby cutting down on time spent on the jobsite. Walls taller than 8' will be made in 8' sections. Utilization of material is crucial in controlling costs, so incorporating dimensions that fit within 4' increments will usually make the most efficient use of material.

SIP Floors:
SIP floors make the most sense when used to separate a heated space from an unheated space. Typically, floors over an unheated garage, crawl space or elevated rooms are good examples. Because there is no opportunity to run ductwork or plumbing in a SIP floor system, interior floors are seldom used.

TYPICAL SIP BUILDING TYPES:



SIP Roofs:
Roofs can be designed with significant distances between supports to allow open concepts such as cathedral ceilings, or just to minimize additional structural members. Sometimes the panels can span from the outside wall to a ridge beam with no intermediate support. See NTA code reports in this book for span charts to determine panel thickness and allowable spans, or consult PorterSIPs when the building design is more complex.

SIP walls:
When used as the main structural system, SIP walls can be incorporated into the building design much in the same way as any conventionally framed wall system. Windows and doors can be located with no additional restrictions. Trusses, rafters and beams can bear on top of the SIP walls with columns or beam pockets located in the walls for higher concentrated loads just as they would be with conventional framing.

SIPs as an insulated skin around a separate structure:
A very common use of SIP panels is in timber frame construction. In this application the SIP panels are attached to the outer face of posts and beams that are carrying the loads on the building. In most cases the wall panels will not require headers over openings because they are not carrying any roof or floor loads from above. The advantage is a tightly sealed and insulated envelope around the structure.

SIPs are an evolution of stick construction:
Structural insulated panels have evolved as a hybrid of stick-built construction and use dimensional lumber for plates and window/door framing. SIPs are made to work with dimensional lumber; 2 x 4, 2 x 6, 2 x 8, 2 x 10 and 2 x 12. Much of the assembly process is the same as rough framing a house except with SIPs a lot of the steps are eliminated and time is saved. The standard module for SIPs is 8' x 24'. This panel weighs about 800 pounds.

EPS:
EPS foam can be made more dense where greater physical strength is needed, or lighter where cost is a greater concern. EPS is the least expensive rigid plastic insulation product on the market. Unlike other products, EPS has no thermal drift, the insulating value is the same now as 25 years from now. EPS can be customized to the thickness, width, length, slope, or otherwise machined to meet your needs as delivered, ready to install.

No-Burn®, Incorporated and PorterSIPs announce the first success of a collaboration created to utilize specialty coating technology and innovative structural insulated panel (SIP) design to enhance the value offered to architects, engineers, building contractors and building owners. The two companies successfully ran a UL 1715 full-scale room fire test combining PorterSIPs™ panels with No-Burn® Plus intumescent coating to demonstrate that this system could provide the code-prescribed 15-minute thermal barrier rating without the need for typical membrane protection, commonly provided by gypsum wallboard. Thermal barriers are required as a method of separating foam plastic insulation from the interior of a building according to the International Building Code (IBC) section 2603.4. In practical terms, this means that materials such as the rigid insulation used in SIPs require a form of fire protection to be provided that allows the panel to "last" a minimum of 15-minutes in a fire situation so that inhabitants can exit the structure and the fire service can gain control of the fire. According to PORTERcorp, the parent of PorterSIPs, "The significance of this development is that we can now offer customers the option of eliminating the labor and material cost of installing gypsum wallboard over our structural panels in the construction of a variety of building types in both the residential and light commercial arena." Preliminary estimates indicate that this alternative approach could equate to a savings of over $1.00 per square foot of wall or ceiling surface area. Examples of construction applications for which this system could be used include low income housing units, storage and warehouse facilities, timber framed commercial and institutional buildings, temporary housing structures, and a host of others. "The cultures of No-Burn® and PORTERcorp are closely aligned," stated Ron Crawford of No-Burn®, Inc, "in that both organizations place a heavy emphasis on adding value to our customer relationships by identifying opportunities to utilize technological innovation as a means of improving production processes and reducing costs."

Structural insulated panels (SIPs) manufactured by PorterSIPs have found increasing use in construction of multiple building types over the past decade, and are getting a significant boost with the developing trends toward "green building." PorterSIPs™ panels can be used to produce a structurally superior, better insulated, faster to erect, and more environmentally friendly home or commercial structure than ever before possible. They are high performance building panels used in floors, walls, and roofs for residential and light commercial buildings. The panels typically consist of a foam core of rigid insulation laminated between two sheets of 7/16" Oriented Strand Board (OSB) with an industrial adhesive to form one solid structural member. Other lamination faces are available, both structural and non structural. SIPs are manufactured under factory controlled conditions and can be custom designed for each structure. The result is a building system that is extremely strong, energy efficient and cost effective. This latest innovation adds one more factor to the already compelling reasons to consider SIPs for a new construction project.

Start of test: Wooden crib ignited in corner of room

Conclusion of test: Flame has been confined to point of origin

15 Minute Thermal Barrier

The International Building Codes (IBC and IRC) specify that SIPs shall only be used on buildings of combustible construction. (Type V)

The IBC and IRC building codes further state that any foam plastic insulation shall be separated from the interior of the building by an approved 15 minute thermal barrier consisting of ½" of gypsum wall board or an equivalent thermal barrier. Since the core of a SIP is a foam plastic, the inside of a wall or roof panel will need to be covered by a 15 minute thermal barrier.

The APA has reported that 23/32" western species plywood or OSB will meet the 15 minute thermal barrier. This report additionally states that, according to IBC section 2603.4.1.5, 15/32" plywood or OSB prescriptively meet this thermal barrier requirement for roof assemblies.

Beside gypsum wall board, plywood and OSB, other materials such as T&G decking may meet the 15 minute thermal barrier requirement. However, before proceeding, consult your local building code or inspector. While decisions made within one code jurisdiction may be considered as a precedent for others, the final decision on materials not specifically listed in the code, are usually made on a case-by-case basis within each jurisdiction.

See Section 2603 of the IBC "Foam Plastic Insulation" for more detailed information.

ONLINE CERTIFICATIONS DIRECTORY

BXUV.U532
Fire Resistance Ratings – ANSI/UL 263

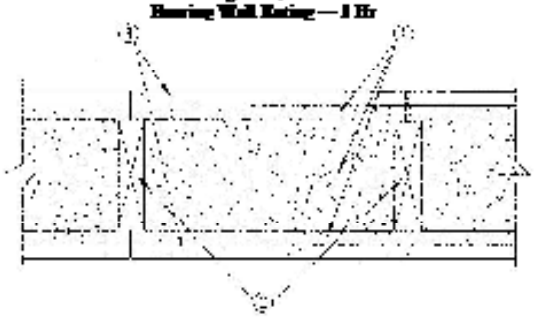
Design/System/Construction/Assembly Usage Disclaimer

- Authorities Having Jurisdiction should be consulted in all cases as to the particular requirements covering the installation and use of UL Listed or Classified products, equipment, systems, devices, and materials.
- Authorities Having Jurisdiction should be consulted before construction.
- Fire resistance assemblies and products are developed by the design submitter and have been investigated by UL for compliance with applicable requirements. The published information cannot always address every construction nuance encountered in the field.
- When field issues arise, it is recommended that first contact for assistance be the technical service staff provided by the product manufacturer noted for the design. Users of fire resistance assemblies are advised to consult the general Guide Information for each product category and each group of assemblies. The Guide Information includes specifics concerning alternate materials and alternate methods of construction.
- Only products which bear UL's Mark are considered as Classified, Listed, or Recognized.

Fire Resistance Ratings – ANSI/UL 263

See General Information for Fire Resistance Ratings - ANSI/UL 263

Design No. U532
August 08, 2001
Bearing Wall Rating — 1 Hr



1. Building Units* — Composite panels consisting of a nom. 3-1/2 in. thick polystyrene foam plastic core faced on both surfaces with min. 7/16 in. thick oriented strand board. Building Units* loaded to a max of 1800 lb. per linear foot which is 60 percent of recommended axial design load.

PORTER CORP — Type Porter Structural Insulated Panels.

2. Studs and Bearing Plates — Nom. 2 by 6 in. thick No. 2 lumber installed in Building Units* (Item 1) in pre-cut channels. End stud and bearing plate secured to the oriented strand board with 1-5/8 in. long ring shank nails spaced 12 in. OC along the edges on both faces.

3. Gypsum Board* — 5/8 in. thick, 4 ft. wide, applied vertically installed with 1-5/8 in. long high/low bugle-head steel screws spaced 8 in. OC along the edges and 12 in. OC in the field. Vertical joints over vertical joints of Building Units* (Item 1). Gypsum Board joints covered with joint tape and joint compound. Screwheads covered with joint compound.

CANADIAN GYPSUM COMPANY — Type C.
UNITED STATES GYPSUM CO — Type C.
USG MEXICO S A DE C V — Type C.

*Bearing the UL Classification Mark

DETAILS - SIP HEADERS

Insulated Header

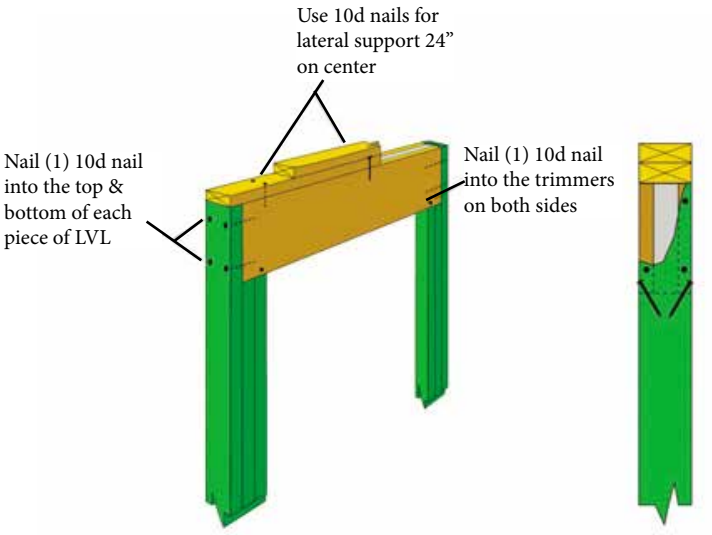
- 3 ½" width for 2x4 construction
- 5 ½" with for 2x6 construction
- Available Depths 9 ¼" & 11 ¼"
- Value engineered for commercial jobs.
- Custom depths available (call for details)
- Full Thermal Break (Foam Core Construction)
  3 ½" Insulated Header = R7.75
  5 ½" Insulated Header = R17.7
- Right size every time.
- No cupping, twisting, or bowing.
- Less call backs for drywall problems.
- Available in lengths up to 16' (Precision End Trim Offered)
- Bonded with exterior code listed structural adhesive

5 ½" Construction Description:

1 ¼" LVL (Laminated Veneer Lumber)
3" of Expanded Polystyrene (EPS)
1 ¼" LVL (Laminated Veneer Lumber)

3 ½" Construction Description:

1 ¼" LVL (Laminated Veneer Lumber)
1" of Expanded Polystyrene (EPS)
1 ¼" LVL (Laminated Veneer Lumber)



ROOF LOAD

Allowable Uniform Roof Loads 115%

Size	Span	2'	2-6"	3'	3-6"	4'	5'	6'	7'	8'	9'	10'	11'	12'
3 1/2 x 9 1/4	LL	2807	2245	1870	1602	2034	1626	1354	1160	1007	749	544	408	313
	TL	2807	2245	1870	1602	2034	1626	1354	1160	1007	795	643	530	419
3 1/2 x 11 1/4	LL	2806	2244	1869	1601	2473	1977	1647	1411	1234	1096	915	737	566
	TL	2806	2244	1869	1601	2473	1977	1647	1411	1234	1096	945	755	634
5 1/2 x 9 1/4	LL	2807	2245	1870	1602	2034	1626	1354	1160	1007	749	544	408	313
	TL	2807	2245	1870	1602	2034	1626	1354	1160	1007	795	643	530	419
5 1/2 x 11 1/4	LL	2806	2244	1869	1601	2473	1977	1647	1411	1234	1096	915	737	566
	TL	2806	2244	1869	1601	2473	1977	1647	1411	1234	1096	915	755	634

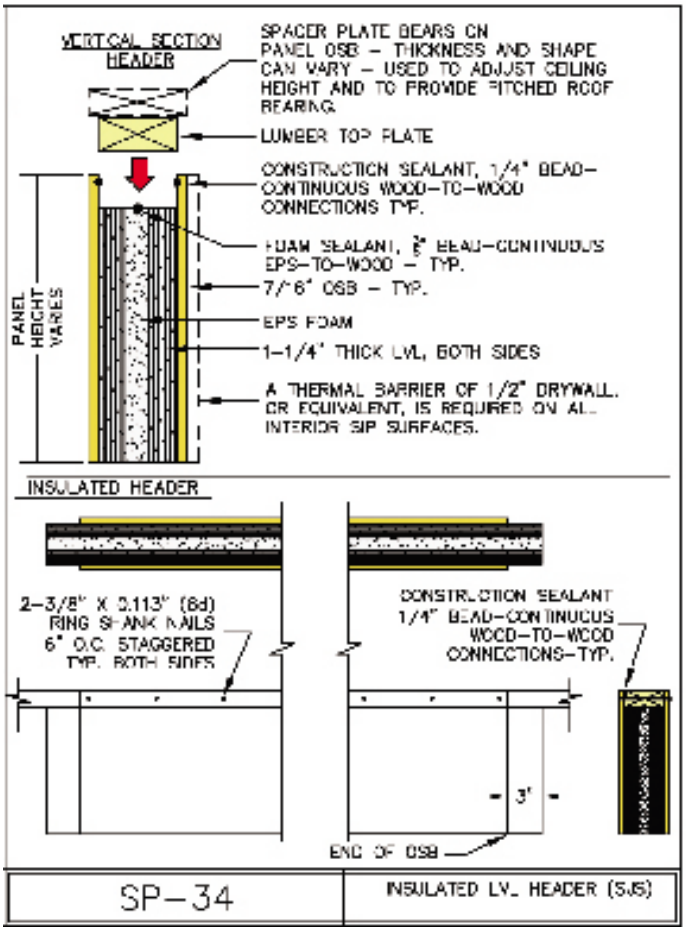
Minimum bearing 1 ½", one trimmer at the ends.
Spans 4' and over require 3" bearing, two trimmers at the ends.
Uniform loads per lineal foot. Deflection L/240 live load, L/180 total load.
Refer to local codes for floor and roof design load criteria.

FLOOR LOAD

Allowable Uniform Roof Loads 100%

Size	Span	2'	2-6"	3'	3-6"	4'	5'	6'	7'	8'	9'	10'	11'	12'
3 1/2 x 9 1/4	LL	2807	2245	1870	1602	1768	1413	1177	1008	710	497	361	270	207
	TL	2807	2245	1870	1602	1768	1413	1177	1008	875	690	544	408	313
3 1/2 x 11 1/4	LL	2806	2244	1869	1601	2150	1719	1431	1226	1072	898	653	489	375
	TL	2806	2244	1869	1601	2150	1719	1431	1226	1072	952	795	656	550
5 1/2 x 9 1/4	LL	2807	2245	1870	1602	1768	1413	1177	1008	710	497	361	270	207
	TL	2807	2245	1870	1602	1768	1413	1177	1008	875	690	544	408	313
5 1/2 x 11 1/4	LL	2806	2244	1869	1601	2150	1719	1431	1226	1072	898	653	489	375
	TL	2806	2244	1869	1601	2150	1719	1431	1226	1072	952	795	656	550

Minimum bearing 1 ½", one trimmer at the ends.
Spans 4' and over require 3" bearing, two trimmers at the ends.
Uniform loads per lineal foot. Deflection L/360 live load, L/240 total load.
Refer to local codes for floor and roof design load criteria.



TRUFAST SIP Fasteners are specifically engineered for attaching SIPs and nail base panels to wood and metal framing. Featuring large, pancake head style with 6-lobe drive, TRUFAST SIP Fasteners drive quickly and smoothly, and draw panels securely without the need of a washer. Only TRUFAST offers three fastener styles for use in wood, corrugated steel and steel members without pre-drilling. Contact your panel manufacturer or distributor and ask to test drive a TRUFAST SIP Fastener, and see why they're the #1 fastener in the SIP industry.

Length in.	(mm)	SIPTP Part #	SIPLD Part #	Pkg Qty.
2	(51)	SIPTP-2000	NA	500/Pail
2-1/2	(64)	SIPTP-2500	NA	500/Pail
3	(76)	SIPTP-3000	SIPLD-3000	500/Pail
3-1/2	(88)	SIPTP-3500	SIPLD-3500	500/Pail
4	(102)	SIPTP-4000	SIPLD-4000	500/Pail
4-1/2	(114)	SIPTP-4500	SIPLD-4500	500/Pail
5	(127)	SIPTP-5000	SIPLD-5000	500/Pail
5-1/2	(140)	SIPTP-5500	SIPLD-5500	500/Pail
6	(152)	SIPTP-6000	SIPLD-6000	500/Pail
6-1/2	(165)	SIPTP-6500	SIPLD-6500	500/Pail
7	(178)	SIPTP-7000	SIPLD-7000	500/Pail
7-1/2	(191)	SIPTP-7500	SIPLD-7500	500/Pail
8	(203)	SIPTP-8000	SIPLD-8000	500/Pail
8-1/2	(216)	NA	SIPLD-8500	250/Pail
9	(229)	SIPTP-9000	SIPLD-9000	250/Pail
10	(254)	SIPTP-10000	SIPLD-10000	250/Pail
11	(279)	SIPTP-11000	SIPLD-11000	250/Pail
12	(305)	SIPTP-12000	SIPLD-12000	250/Pail
13	(330)	SIPTP-13000	SIPLD-13000	250/Box
14	(356)	SIPTP-14000	SIPLD-14000	250/Box
15	(381)	SIPTP-15000	SIPLD-15000	250/Box
16	(406)	SIPTP-16000	SIPLD-16000	250/Box
18	(483)	SIPTP-18000	SIPLD-18000	250/Box

Length in.	(mm)	SIPHD Part #	Pkg Qty.
6	(152)	SIPHD-6000	500/Pail
8	(203)	SIPHD-8000	250/Pail
9-3/4	(248)	SIPHD-9750	250/Pail
11-3/4	(298)	SIPHD-11750	250/Pail
13-3/4	(349)	SIPHD-13750	250/Box

Withdrawal Values in Wood*

Specific Gravity	0.67	0.55	0.50	0.46	0.43	0.36	0.31
SIPTP & SIPLD:	1428	1172	1067	981	917	766	661

*Values are per inch of thread penetration

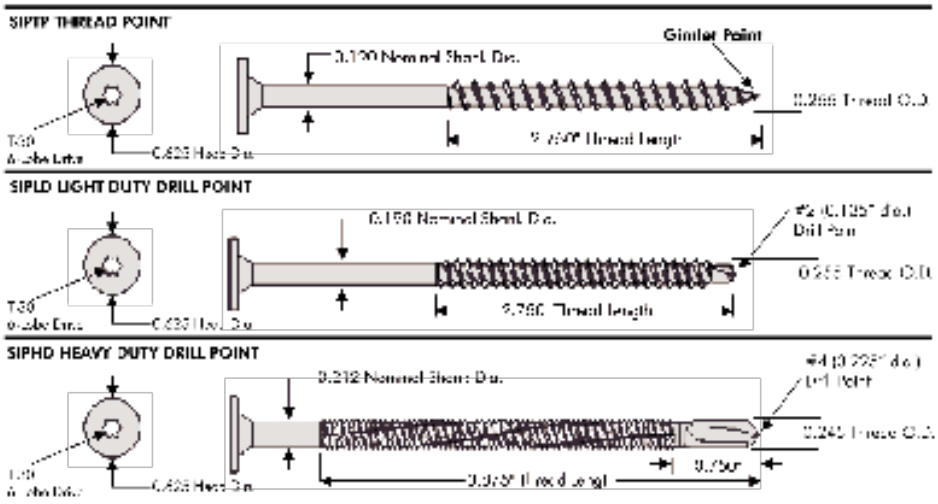
Withdrawal Values in Steel

Type B Corrugated	22 ga	20 ga	18 ga		
SIPLD:	510 lbf	645 lbf	840 lbf		
Structural Steel	16 ga	13 ga	12 ga	3/16"	1/4"
SIPHD:	770 lbf	1130 lbf	1360 lbf	3100 lbf	4000 lbf

Lateral Load Resistance

Fastener	Main Member	Side Member	Load (lbf.)
SIPTP	SPF 2x4	SIP Panel	943
SIPLD	22 ga. Corrugated Steel	Nail Base	411
SIPLD	7/16" OSB	Nail Base	112
SIPHD	1/8" Structural Steel	SIP Panel	929

T-30 Driver Bit



PERFORMANCE DATA

Fastener	Tensile Strength	Shear Strength	Head Pull-Thru Values 7/16" OSB	SIP Panel
SIPTP	3280 lbf.	2900 lbf.	545 lbf.	630 lbf.
SIPLD	3380 lbf.	2900 lbf.	545 lbf.	630 lbf.
SIPHD	6000 lbf.	3400 lbf.	545 lbf.	630 lbf.

PRODUCT FEATURES

- Case hardened and tempered for easy installation and long term durability.
- Large diameter, low profile pancake head provides excellent pull-through resistance without the need for a washer while eliminating "telegraphing" on shingles, metal panels and other roof surface materials.
- 6 Lobe internal drive offers excellent bit engagement during installation, especially in high torque applications.
- Widest selection of fastener lengths in the industry for proper sizing to panel thickness.
- Choice of 3 thread/point styles for pre-matched performance in either wood or steel substrates.

PRODUCT SPECIFICATIONS

Material:	Case hardened and tempered carbon steel
Head Style/Drive:	Pancake head with T-30 Internal Drive
Head Diameter:	0.625"
Nominal Shank Diameter:	SIPTP and SIPLD: 0.190" SIPHD: 0.272"
Thread Length:	SIPTP and SIPLD: 2.750" SIPHD: 3.875"
Overall Lengths:	SIPTP: 2" thru 18" SIPLD: 3" thru 18" SIPHD: 6" thru 13-3/4"
Point:	SIPTP: Gimlet Tip SIPLD: #2 (0.135" dia.) Drill Point SIPHD: #4 (0.225" dia.) Drill Point
Coating:	Epoxy e-coat (black)

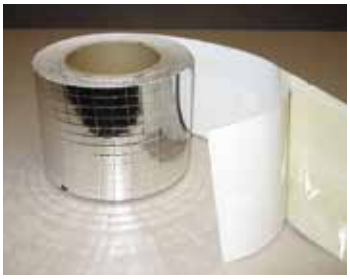
DETAILS - SIP TOOLS & ACCESSORIES

Foam Scoop
Use the foam scoop to recess the EPS foam for edge blocking, plates, jack studs etc. Cross bar adjusts so recess is controlled to 1 1/2", 3", 4 1/2" or as needed.
Scoops are available in 3 1/2", 5 1/2", 7", 9" and 11" wide for various panel thickness.

Foam Sealant
For all wood to foam connections or to fill any small gaps.

SIP Screws and Washer Plates
Used to fasten SIPs to each other and to other framing members. See construction details.

Construction Adhesive
is used for all wood to wood connections and must always be compatible with EPS foam.



Vapor Barrier Tape
Is used to seal all SIP roof joints. This tape should always be installed on the warm side of the panel.

Lifting Plates
Pick up large panels by attaching lifting plates with screws to the top OSB surface. Use #10 coarse thread deck screws (16) per plate.

Prazi Kit
Attach a chain saw to your worm drive circular saw and cut thick SIPs. Compound or straight cuts can be made with the adjustable saw base plate.

Nail base insulated panels are single-faced panels of Oriented Strand Board (OSB) bonded to Expanded Polystyrene foam (EPS). Nail base insulated panels are applied over structural roof decks or walls to add insulation, and to provide a base for nailed roofing or siding. Shingles, slate, metal roofing, tile and membranes can be applied per manufacturer's recommendation over nail base.

Insulation Values
"R" values at 40°F.

Panel O.A. Thickness	"R" Value
2"	7.3
4"	15.7
6"	24.0
7-3/4"	31.3
9-3/4"	39.6
11-3/4"	48.0

Custom Thickness Nail Base
For a variety of reasons, sometimes special thickness panels are required. This is important on projects where fastener penetration is limited in the building structure. Most fasteners are made in ½" length increments. By customizing the insulation thickness, the amount of fastener penetration can be controlled.

Standard Sizes
Typically, nail base is supplied as 4'x8' panels with the foam thickness the same as nominal lumber sizes. Nominal foam thicknesses of 1-1/2", 3-1/2", 5-1/2", 7-1/4", 9-1/4"and 11-1/4" are available. The edges of nail base are square cut. Nail base panels are available as large as 4' x 24'.

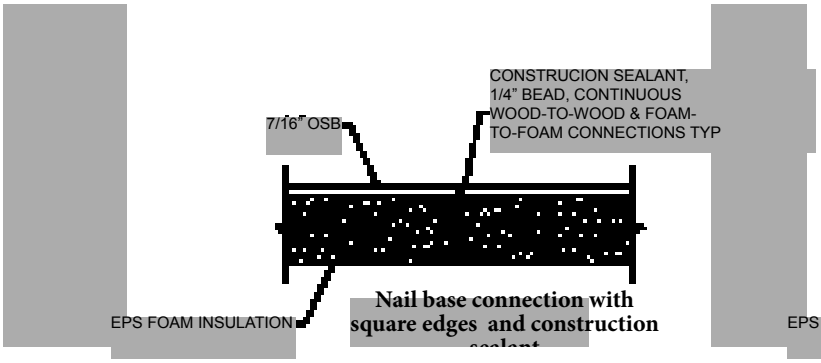
Fire Ratings
The EPS foam plastic has been tested and approved for roof insulation in numerous applications. It must, however, be shielded from the inside with an approved 15 minute thermal barrier for the application. See IBC 2603 for more details.

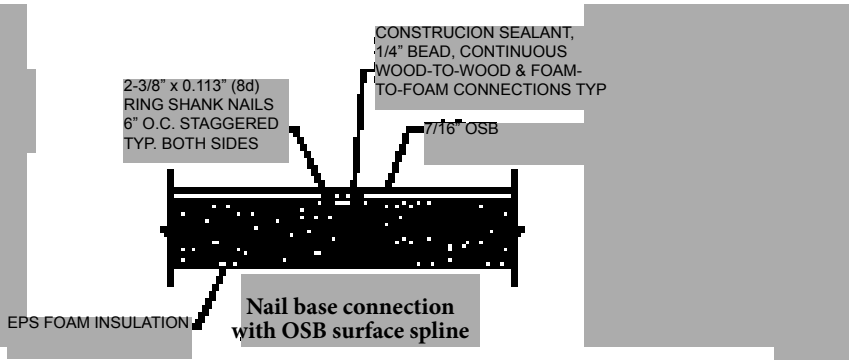
In many cases, the existing roof deck may be an acceptable thermal barrier. General residential applications will require a thermal barrier of ½" gypsum wall board or equivalent. When installed on the ceiling, other equivalent thermal barriers include 1x T&G or 15/32" plywood.

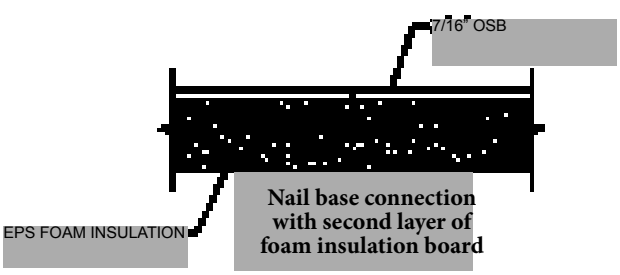
Square Edge
Square edge nail base provides an easy way to insulate new or existing buildings. For good thermal performance all joints should be sealed with construction sealant.

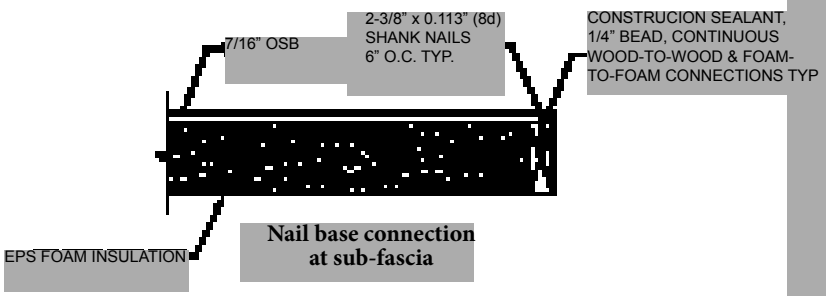
Spline Edge
The OSB top surface may be tied together as one surface by attaching each sheet of OSB to the adjacent sheet of OSB with surface splines. Surface splines of 7/16" x 3" OSB are inserted into a groove cut in the foam behind the OSB face. Splines are nailed with 8d nails, 6" O.C. This option is required on many classified roof decks and most membrane roofs.

Double Layer Insulation
A second layer of insulation is applied, with nail base on top and foam board-stock on the bottom. The nail base is attached with fasteners all the way through both layers to the structure below.









DETAILS - NAIL BASE

Application
Nail base normally requires continuous edge blocking around the perimeter of the roof. Standard dimensional lumber is used for edge blocking. The foam is field recessed to fit over the lumber.

In cold climate regions, a vapor retarder must be installed between the EPS foam insulation and the existing building exterior.

Attachment of nail base is with long, large-head screws through the panel to the roof deck. As little as eight (8) fasteners are sufficient to hold the panel in normal applications. For high wind, high snow loads, or very steep pitches, contact the factory for advice on fastening. Nail base roof panels should be staggered row to row for the best results.

Nail base is not a finished exterior surface and must be covered by an exterior cladding. The appropriate roofing underlayment such as building felt, and a wall drainage plain such as house wrap are required. Nail base can be used on walls as well as roofs, particularly to reinsulated older existing buildings.

Specification
The top facing shall be 7/16" thick Exposure 1 rated oriented strand board.

The insulation shall be expanded polystyrene foam, shall be nominal one pound density, and shall meet ASTM C578. Optional EPS with recycled content is also available.

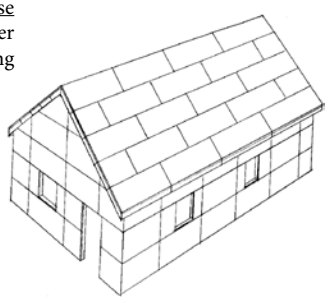
The EPS and OSB shall be bonded with an exterior rated code-listed adhesive. Attachment will be with a minimum of (8) #14 SIP screws per panel with and 3" washer plate for 4'x8' panels. Screws shall penetrate a minimum of 1" into the sub-structure. Extra fastening may be required in areas with high loads. Contact PORTERcorp for more details.

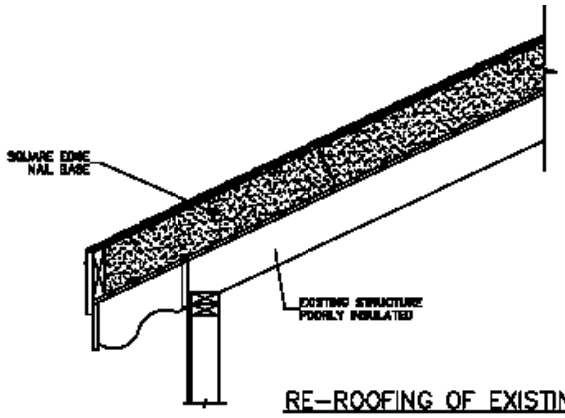
A thermal barrier roof deck as required per building codes shall be in place prior to application of nail base panels.

Standard thickness of the nail base panels are 2", 4", 6", 7-3/4", 9-3/4" or 11-3/4".

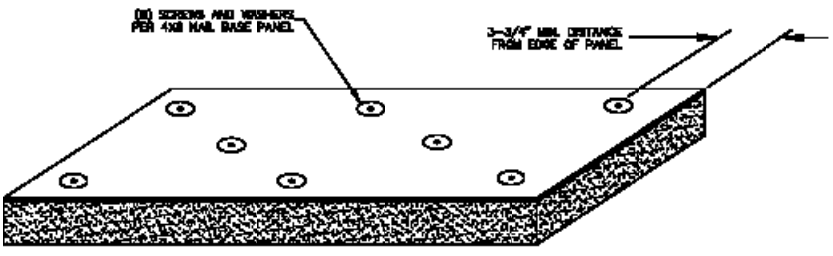
The roof decking and the nail base panels are to be dry prior to and during installation. Installed nail base panels are also to remain dry prior to and during application of finish roofing materials.

Nail base
Installed over
entire building





RE-ROOFING OF EXISTING



4' X 8' NAIL BASE PANEL

Receiving SIPs

SIPs are often delivered via tractor and full-length trailer. Because of the size and weight of the truck, an improved roadway surface with sufficient overhead clearance (approx. 13') is required. A turn-around area may also be required under certain circumstances. The off-loading of the panels is the responsibility of the owner/contractor.

Panels are stacked and bundled according to size. These bundles can be wide and unwieldy. Because of their length, height, weight, and width, the common forklift truck or tractor with a forklift option is sometimes not adequate for unloading a truck. For many shipments, a large capacity forklift with 5' or longer forks or fork extensions will be necessary to safely unload. When notified of the shipment of the delivery, the SIP installer should be available and prepared for the arrival of the truck. Most trucking companies will charge an additional hourly fee if unloading exceeds two hours.

The Bill-of-Materials and Bill-of-Lading are part of the shipment documentation. As material is unloaded, check to confirm the delivery of all items on the itemized Bill-of-Materials. If panels or other material on the Bill-of-Materials are not included in the shipment, or have been damaged during shipment, note those items on the Bill-of-Lading and notify your sales representative immediately. Signing the Bill-of-Lading without notes indicates all materials listed have been received in full and in good condition.

Suggested Tool List

- Pneumatic nailer
- T-30 Torx head bits
- Heavy duty cordless or corded drill, or impact driver
- "Foam scoop" adjustable electric foam cutter
- Panel puller
- 12" drill bit (3/16", ¼")
- RotoZIP
- Electric hand planer
- Steel lifting plates
- Beam saw (optional)
- Circular saw
- Hand saw

WARNING:
The EPS core of the panel can be destroyed by most solvents and petroleum based products. Use only water-based construction sealants and EPS compatible expanding foam.

Onsite SIP Construction Training

Many times, the most cost effective way to install panels is to have an experienced SIP erector train the chosen installation crew. PorterSIPs offers onsite training from staff members or from highly experienced subcontractors. The price for this service will vary depending on the locations and project specifics. This onsite training service typically includes instruction on best practices, hands-on training of 8 techniques that speed assembly, and answering questions. The onsite trainer could also be called on to assist with plan review, suggest specific construction details, and give advice on safety. Contact PorterSIPs for a list of options. Please note, it is the responsibility of the installation crew, not the onsite trainer, to complete the SIP installation.

Storing SIPs

Once panels are unloaded, use blocking to keep panels elevated and flat. Panels will be delivered wrapped in heat shrink plastic. If for any reason the panels are not wrapped when they arrive, tarp them to protect them from precipitation and keep panels elevated above standing water. Dimensional lumber to be used for sills, plates, and splines should also be kept flat and dry. Wet lumber will swell and become difficult to insert into panel recesses. If necessary, store construction sealant and expanding foam in a heated enclosure to keep it above the minimum storage and working temperature (50 degrees F).

SIPs ARE SHRINK WRAPPED FOR WEATHER PROTECTION

SIP PANEL TAG WITH TAG NOTING CODE LISTING

Additional SIPs Accessories

- Dimensional lumber for bracing, splines, sill, top plates, door & window bucks.
- 2-3/8" x 0.113" (8d) ring shank nails
- 3-1/4" x 0.131" (12d) ring shank nails
- Panel screws (1-1/2" longer than panel thickness) for fastening panel-to-panel, and panel-to-plates, etc.
- 3" galvanized washer plates for use under panel screws.
- Construction sealant, EPS compatible for wood-to-wood sealing.
- Expanding foam sealant for filling voids and sealing to EPS.
- 3' lengths of nylon strap for wall panel lifting.
- Steel lifting plates with screws for roof panel lifting.

The Insulated Spline Connection
The preferred method for in-plane connections of panels is the insulated spline joint. This method is easy to install and maintains insulation through the joint.

Insulated splines are supplied 8' long and will need to be cut to length as required for each connection. The cut spline length is slightly less than the distance between the top and bottom plates. For example, for a panel that is 96" tall, with the typical top and bottom plates, which are 1-1/2" thick each, the spline should be cut at 92-7/8". After the splines are cut to length, apply construction sealant to the inside edge of both OSB skins on both panels. Apply a continuous bead of foam sealant on the EPS edges. Insert the splines into the previously installed panel. Locate any horizontal wire chases and verify the wire chase in the spline matches the height of the wire chase in the panel. In some cases you may be required to drill a horizontal electrical chase hole through the spline. Then, apply a continuous bead of expanding foam sealant along the EPS edge of the panel to be installed and a continuous bead of construction sealant along the top of the sill plate under the panel to be installed. Nail both sides of the panel to the splines 6" on center staggered. See detail P-1 (pg 45).

Frequently it will be necessary to install secondary top plates to achieve a specific wall height, or to spread the load to the skins of the panel, or both. Typically, this material will be supplied as part of the SIP package since it is of a unique dimension. This top plate is always sized to be as wide as the overall thickness of the panel. When installing the second top plate, apply a bead of construction sealant between the first top plate and the second top plate. Finally, fasten the second top plate down using two rows of 12d nails, staggered 8" O.C. See details R-3 (pg 41).

SIPs Numbering and Orientation
The panels will arrive on the jobsite individually marked and labeled. Each panel number will correspond to a panel number on the drawings that will accompany the panel delivery. These drawings are referred to as the "Install Pack". This will typically be in a large manila envelope. When panels are manufactured they are numbered to indicate the panel location in the building. The sequence-of-assembly typically will correspond to the number sequence on the panel. Please note that while some panels may appear to be out of order, the numbers will always correlate to the drawings. Panels will always be numbered in a left-to-right sequence as viewed from the outside. Wall panels will contain black lines indicating the location of wire chases. These lines will be located on the interior side of the panel. Roof panels will have one rough side and one smooth side. The rough side of the roof panels will always face upward. Remembering these tips will help eliminate confusion about panel orientation.

Treated Sill Plate
When building with SIPs, it is imperative that the load bearing OSB skins of the panel not be in direct contact with the concrete foundation. Any concrete adjacent to any SIPs first needs a pressure treat "sill" plate attached to it. This treated sill does not have to be dimensional lumber – it could be treated plywood. However, this material must be pressure treated and it must be installed over a capillary break like poly sill seal. Attachment of the treated sill plate and bottom plate to the foundation needs to be done in accordance with local codes and engineering specifications. While it is not required, it is a good idea to use anchor bolts long enough to go through both the treated sill and the bottom plates when attaching to the foundation. In addition, always maintain a minimum of 8" distance between the soil and panel. See detail F1 (pg 38).

Bottom Plates
(inserted into the bottom of the panel)
The bottom plate is the dimensional lumber which attaches the wall panels to the floor. This piece fits into the recessed edge at the bottom of the panel. When building directly onto a concrete slab, or concrete wall, a treated sill below the bottom plate is required; when building on a wood floor platform, the bottom plate sits on top of the subfloor and is fastened directly to the floor joists through the sub-floor material. The OSB skins of a SIP wall are the load bearing components. As such, it is imperative that the edges of both OSB skins must be in full contact with treated sill or floor platform. A common mistake is to install the bottom plate all the way to the outside of the floor – this is a problem since the outside OSB skin would not be bearing on anything.

Position the bottom plate 7/16" in from the edge of the treated sill or the floor platform. This will allow the outside, as well as the inside, OSB skin of the panel to bear on the floor as needed. Fasten the bottom plate with 12D nails. Where possible, drive the nails into the floor joists below the subfloor. To install two corner panels, make sure to leave at least 7/16" gap between the two adjoining bottom plates– this will allow room for the OSB skin of the panel to pass between the bottom plates. See details F-1, F-2, F-3 (pg38-39).

Installing Wall Panels

Prior to installing the first wall panel, determine which corner to use as a starting point. Find the first of two panels that make up this corner. Next, install the corner stud into the end of this first corner panel. Then, find the adjacent corner panel and install the corner stud in the appropriate end of this panel as well. Use construction sealant as noted on the drawing and nail the end studs into position. See detail P-2 (pg 45).

Apply a continuous bead of foam sealant to the top of the sill plate and continuous beads of construction sealant along the upper edge of each side of the bottom plate. Lift the panel onto the bottom plate, then adjust its location, level, and brace. To double check that the panel is oriented correctly, make sure that the horizontal wire chases are located at the bottom of the panel when installed. Locate the adjacent corner panel; note its dimensions and the location(s) of electrical chases.

When required, drill holes in the bottom plate at wire chase locations. Use SIP screws to attach panel corners together up the vertical edge of the overlapping panel into the adjacent panel. See detail P-2 (pg 45). Before attaching the first two panels to the bottom plate, double check for plumb and level both panels with a bubble level. Use construction sealant on all wood-to-wood connections and expanding foam sealant on all wood-to-foam connections. When both panels are in place, nail the interior and exterior OSB skins to the bottom plate using 8d nails, 6" O.C. Typically corner SIP screws are placed 12" O.C., but make sure to double check the fastener schedule for all fastener spacing. Continue installing wall panels by following construction details and working in sequence around the building. If any fastening is missed during the installation process, make sure to go back and complete all fastening requirements.

Trimming the Last Panel of a Run

Dimensional variations in concrete and other framing may require that some panels are trimmed. To do this, temporarily install the final panel in the run, level and brace. Then temporarily install the first panel of the new intersecting run, positioning the panel so that it is abutting the last panel. Plumb both panels and mark the intersection line of the two panels on the appropriate panel. Remove both panels, trim and recess.

Installing Roof Panels

When installing roof panels it will benefit the installer to do as much prep work as possible while the panels are still on the ground. This includes installing sub-fascia, splines, SIP screws, or blocking in any openings in the roof. For pitched roof, always apply temporary roof cleats to the panels before lifting them into position. Make sure to follow the supplied construction details when installing insulated splines, sub-fascia, etc. When applicable, multiple panels can be assembled on the ground together and lifted as an assembly.

When lifting any panel, make sure the method of lifting can safely handle the weight of the assembly being lifted. Typically, the panels weigh about 4 lbs/SQF. Steel lifting plates by PORTERcorp can be used to hoist the panels from the ground to where they will be installed on the roof. The lifting plate is a steel plate that is anchored to the outside face of the OSB with multiple #10 coarse thread deck screws and provides a solid point to attach straps. Use two plates for any panel larger than 4'x8'. When lifting multiple pre-assembled larger panels, use at least 2 lift plates per large panel. Pay close attention to squaring up the first panel on any roof plane to ensure that, as adjacent panels are installed, the roof will remain true and square.

It is important with the roof panels that the panel connections are well sealed to prevent any air leakage as this may cause long-term problems with the integrity of the panels, not to mention loss of efficiency of the panel system. Construction details provided with each job show how to best seal the SIP assembly. Construction sealant, single and two component foam, and vapor barrier tape are typical methods of sealing SIP joints.

After roof panels are installed, make sure that all panels are fastened to the beams, trusses, and bearing walls of the structure. Usually, roof panels are fastened 12" on center with SIP screws and washers. Also, make sure all panel-to-panel joints are fastened as required on both the inside and outside (see fastener schedule on accompanying installation drawings or engineering specs for exact fastener spacing).

When the roof panels are completely installed, fastened, and any gaps are filled with expanding foam sealant, roofing should be applied as soon as possible. It is a good idea, and strongly recommended, to apply roofing felt onto the roof panels the same day the panels are installed.

Field-Cutting of SIPs

Historically, SIPs have been fabricated in the field. As the SIP industry has matured, SIP manufacturers have become much better at designing and cutting SIP packages to meet the needs of the customer. While PorterSIPs is particularly well equipped to engineer, design and cut SIPs accurately, panels can still be cut in the field.

If field-cutting of panels is necessary, it can be done using tools commonly available to the builder. A circular saw, reciprocating saw, and hand saws can perform all cuts required in an installation.

Safety Points

- Know the capacity of your lifting equipment. 8'x24' SIPs weigh about 800 lbs. Assembled sections of roof panels, or dormers can weigh much more.
- Know the capacity of lifting plates and/or eye bolts. Lifting plates from PORTERcorp are rated at 400lbs each. All holes must be filled with #10 course thread deck screw. DO NOT OVERDRIVE THESE SCREWS.
- Use more than one lifting point for large panels.
- Keep lifting points as perpendicular to the face of the panel as possible. This is done to avoid a "stress angle" at the lifting plate.
- Use tag lines to control the lifted panel.
- Be aware of changing weather conditions.
- Use nylon strap loop technique to lift wall panels.
- Wear hard hats and fall-protection harnesses.
- Use temporary roof cleats for higher pitch roofs.
- Be aware of crew experience. Do not try operations that are beyond the skill of the crew.

Large panels assembled on the ground, then lifted.

Large panel rigged at roof angle, when lifted.

WALL PANEL LIFTING LOOPS BEING INSTALLED

1

2

3

4

Installing Headers
Headers are generally sized and designed during the panel submittal drawing process. See page 24 for header design load charts and other technical information.

The maximum width for a field-cut opening is determined by the loads on the walls, the size of the opening, and the height of the header above the opening. Please contact PORTERcorp for advice when field-cutting openings. If a point load is being carried by the wall above the opening, the span of the header panel will be reduced. If there is a question regarding the load-carrying capacity of a field cut panel, an engineering analysis should be conducted. Roof cutouts will be necessary to install vent stacks, chimneys, and other penetrations. Small penetrations of 6" or less can be made without 2x blocking, providing they are well sealed. Insulate any voids between objects and EPS with expanding foam. See detail R-16 (pg 44).

Protecting SIPs from Interior Humidity
While not normally needed in moderate climates and normal conditions, vapor barriers are needed in rooms with higher than normal inside humidity. Rooms containing hot tubs and swimming pools will require additional vapor barrier protection and dehumidification. Consult local building codes for specific vapor barrier requirements.

A vapor barrier shall be installed at the interior of the ridge juncture of the panels. A pliable roof membrane, such as a self-adhesive rubber laminate material or other vapor barrier can be used for this seal. There should be no wrinkles or voids that allow air to enter the ridge juncture. See detail R-17 (pg 44). A heat recovery ventilator or HRV is recommended for any SIP building.

The builder must also seal around all openings in the SIPs part of the building. The sealing of SIP homes is important for two reasons:
1. Thermal efficiency - it is one of the major advantages of SIP construction. By sealing all panel junctures to eliminate unwanted air infiltration, heating, cooling, and air exchange can be precisely controlled and energy demands reduced.
2. Air leakage - humid air can and will leak into any possible voids ("dead air" spaces) adjacent to panel OSB skins. The presence of humid air and dropping temperatures can result in condensation.

To achieve the maximum long-term value that SIP buildings can provide, the builder must use construction sealant and expanding foam sealant throughout the building process. Connections and junctures, as well as gaps around doors, windows, corners, and other penetrations must all be thoroughly sealed. Experience has indicated thermal and vapor sealing at roof ridges and valleys is particularly important and warrants extra attention. It is recommended that roof ridges be filled with expanding foam sealant to fill the ridge juncture. See detail R-17 (pg 44). Also, when electrical work is complete, all electrical boxes and wire chases should be sealed. See detail G-4 (pg 37). For sealing wood-to-wood connections, use the provided construction sealant. For sealing wood-to-foam connections, use the provided expanding foam sealant as recommended.

Site Built Plumbing Chase
To protect plumbing from freezing temperatures, it is advisable to enclose runs in an interior chase. For example, see detail G-3 (pg 37). Do not run plumbing in exterior walls.

HVAC Notes
In the event plumbing or HVAC ductwork is to be run along a SIP wall, a chase can be built that will both conceal and protect the run. See detail G-3 (pg 37). Wherever possible, ductwork should be routed through the stick built (interior) sections of the home.

Electrical
In general, SIP construction is easier when things are planned ahead of time. Wiring in SIPs is no different. When electrical installation in SIPs is a forethought, not an afterthought, it will be much faster and easier.

Start out by understanding where the 1" diameter factory installed wire chases are located. Then, during panel assembly, the plates, and possibly the splines, will need to be drilled. When this drilling is done properly, the electrician should be able to wire a SIP building in about the same time as a stick-built building.

Factory installed wire chases
In the wall panels, horizontal chases are included at the 16" level (for outlets) and at the 44" level (for switches and counter height outlets). Vertical chases, which are located 4' O.C., allow wire to run vertically though the wall panels to access switch locations and at other locations as needed to provide vertical wiring options for the electrician. (All wire chases are marked with a 3" wide ink mark.) PORTERcorp typically installs wire chases per this standard, but wire chases can be installed to exactly match an electrical plan, for an additional charge. Exactly matching an electrical plan is done at the time the panel layout drawings are made, so PORTERcorp would need a detailed electrical plan at that time for this to be feasible.

In roof panels, wire chases are NOT installed as a standard but can be installed upon request. (Adding wire chases to roof panels will be done at a small additional charge.) When a building has a cathedral ceiling with a SIP roof, having wire chases installed in the panels will make wiring for lighting, fans, etc easier. Wiring can be run from an interior wall or can be run along an exposed overhead beam.

Field installed chases and holes
As SIPs are installed, the SIP installer will need to drill the sill and top plates, and any lumber connecting splines, to provide open chase ways for the electrician. If this step is skipped during panel installation, it is possible to cut and drill for access to the chases afterward, but it is much easier and faster to do drilling during installation.

When the electrician comes to the building site, they will review the electrical plan and wire run options to determine which chases to use. Most SIP buildings will still have stick-framed interior walls and conventional floor systems, which give additional flexibility in wiring. Wiring is simplified if major horizontal wire runs take place in the floor systems, using horizontal chases for local runs only.

When horizontal wire circuits must continue from one wall to another intersecting wall, the electrician can use a vertical chase to go up and over, then back down into the intersecting wall, or the electrician could cut a notch in the corner at the height of the wire chase then use this notch to pull the wire around the corner and into the intersecting wall. See detail G-7 (pg 38).

Wire installation
The recommended sequence for wiring is to first locate outlet, switch, and other box locations and mark them on the interior OSB. (Boxes should be offset from the wire chase location so the box will not block the chase following installation.) Typically the electrician will use a tool like a RotoZIP and a template to cut the OSB for the electrical boxes. After the openings are cut, the electrician will use a putty knife to pry out the OSB and the EPS necessary to accommodate the box. Care should be taken in not removing too much of the EPS insulation. The electrician will then fold over the end of the wire and push or pull the wire through the chases as required for the circuits. Finally, the ends of the pulled wire will be inserted into the boxes and the boxes will be mounted using surface type fasteners. See detail G-4 (pg 37).

After rough wiring is complete and the electrical boxes are mounted to the OSB, carefully seal around the box using expanding foam sealant. Also, use expanding foam sealant to seal both used and unused chases at the top and bottom of the panels and wherever chase openings are accessible.

Other options for wire access
When no pre-cut panel chase is available, there are various other options. A 1"-wide slot may be cut in the interior OSB skin into which wire can be placed. Because the OSB is structural, there are limits to the slot length and location. A slot should not extend all the way to the edge of the panel, but should stop 6" short of the panel edge. A vertical slot should be not longer than 48" and a horizontal slot should be not longer than 12" in each panel. Wire should be placed deep enough (see your local electrical code) into the EPS to be out of reach of any drywall screws. Once wire has been placed in the slot, expanding foam sealant should be applied to fill the opening. If there is any question about reducing the structural integrity of the panel, please consult a structural engineer or PORTERcorp.

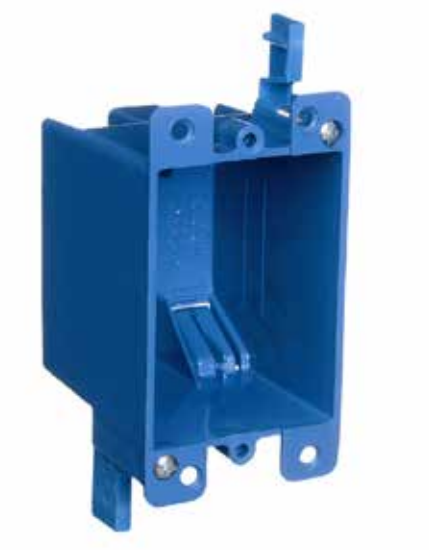
Commercial flush mounted chases such as WireMold can be used.

Conduit which conforms to local code restrictions can be used.

Important notes
Standard "Romex" type wire, labeled as NM-B, of sufficient wire gauge size as required for the anticipated maximum amperage loading, is recommended for use in SIPs.

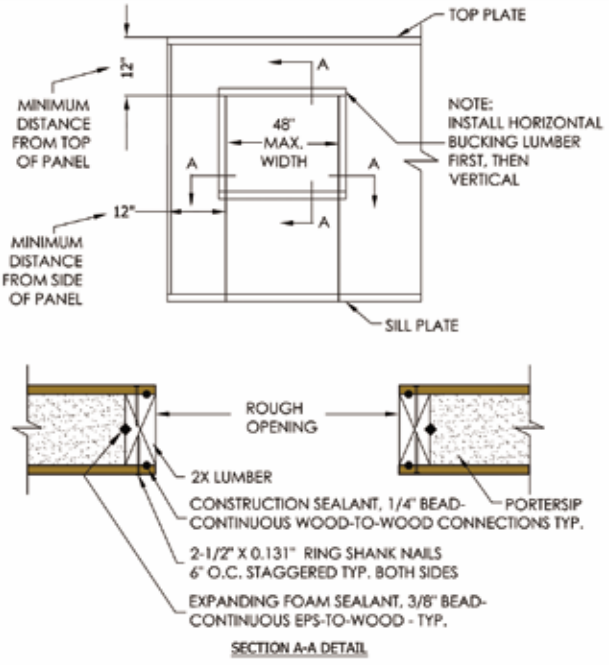
Installing recessed lighting or "can" lights in a SIP roof is NOT recommended. Contact PORTERcorp for more details and options. For ceiling fan mounting option see detail G-5 (pg 38).

Consult with local codes to see if any additional restrictions apply.



ELECTRICAL OUTLET BOX

BASE MOLDING ELECTRICAL SYSTEM



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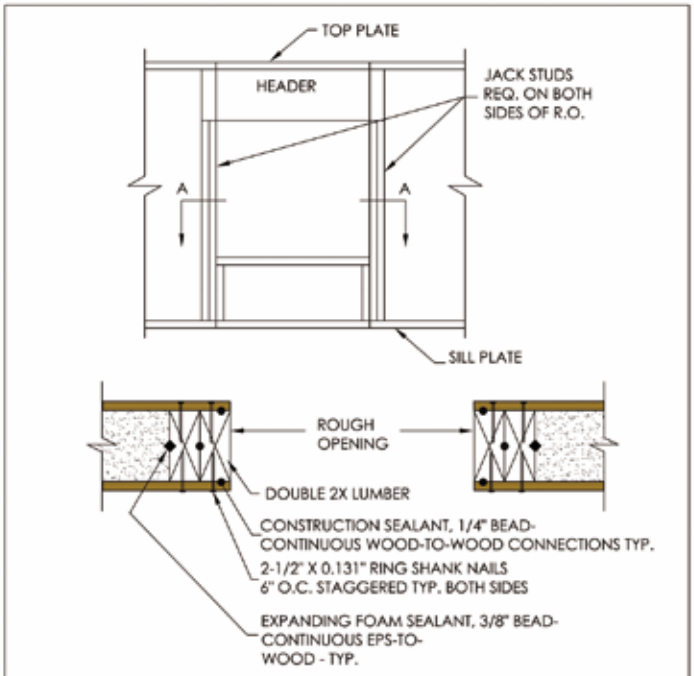
G-1 REINFORCEMENT OF OPENINGS IN WALL PANELS



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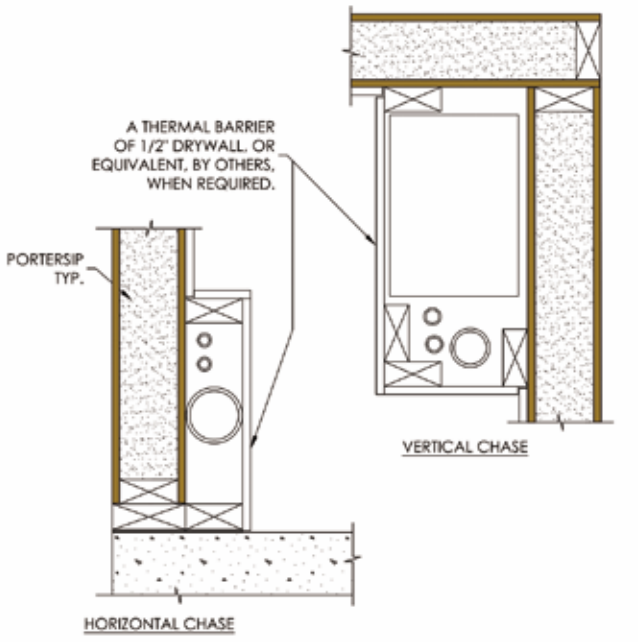
G-2 TYPICAL CONSTRUCTION OF ROUGH OPENING INCLUDING HEADER



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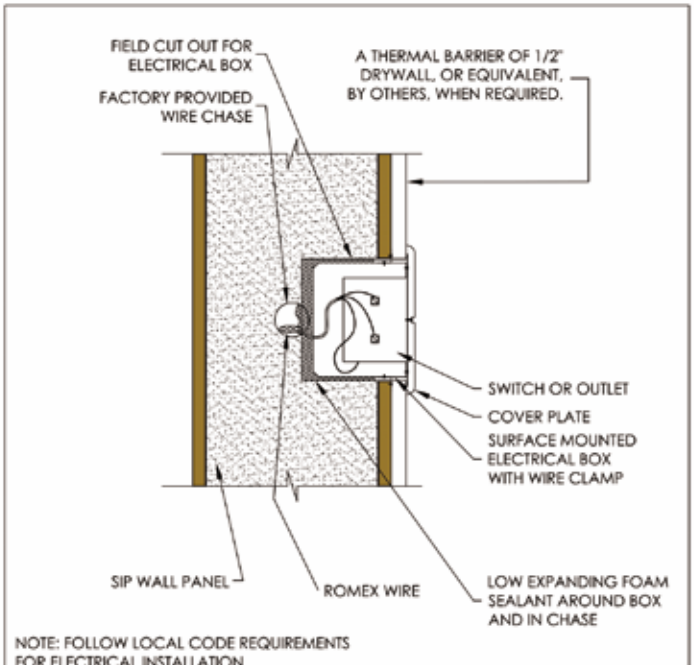
G-3 WALL CHASE - EXAMPLES SITE BUILT



NOTE: FOLLOW LOCAL CODE REQUIREMENTS FOR ELECTRICAL INSTALLATION.

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G-4 BOX FOR SWITCH OR OUTLET

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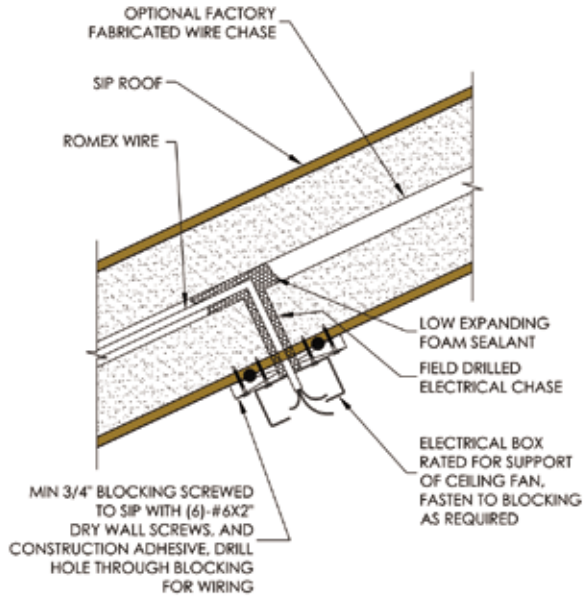

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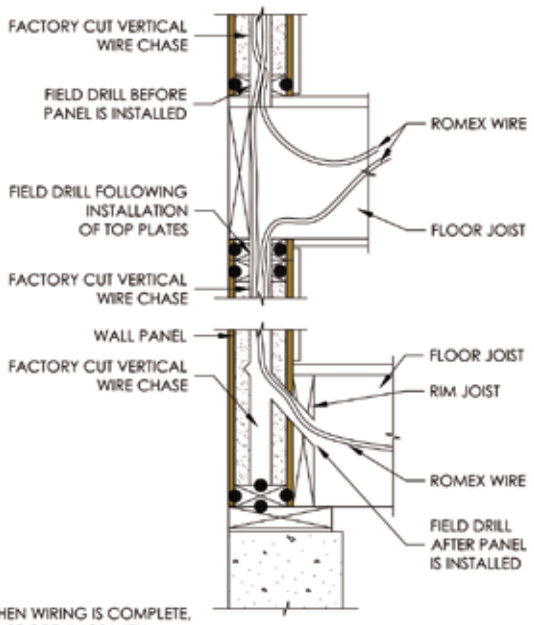
G-5 CEILING FAN ATTACHMENT



NOTE: WHEN WIRING IS COMPLETE, SEAL CHASE OPENINGS WITH EXPANDING FOAM SEALANT

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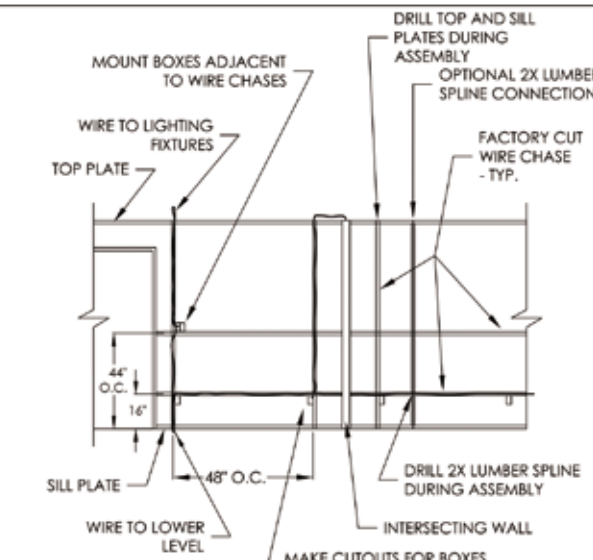
G-6 WIRING WALL PANELS - VERTICAL RUNS



NOTE# 1: WHEN WIRING IS COMPLETE, SEAL CHASES AND AROUND BOXES WITH EXPANDING FOAM SEALANT

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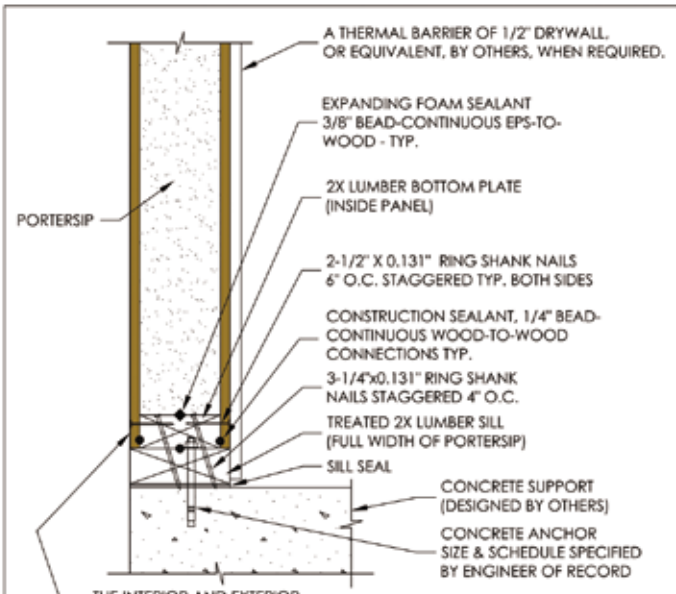
G-7 ELECTRICAL INSTALLATION - WALL PANELS - TYP.



NOTE: MAINTAIN A MINIMUM OF 8" FROM GRADE TO PANEL OSB

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F-1 PANEL ON SLAB

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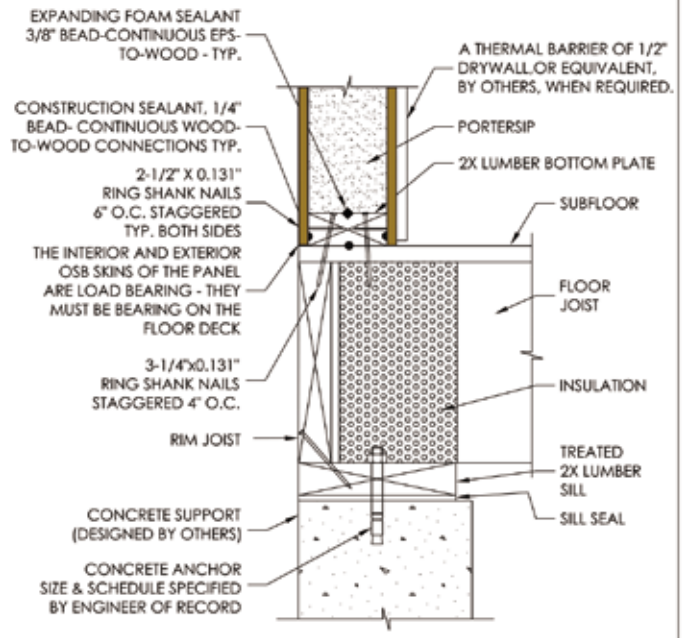

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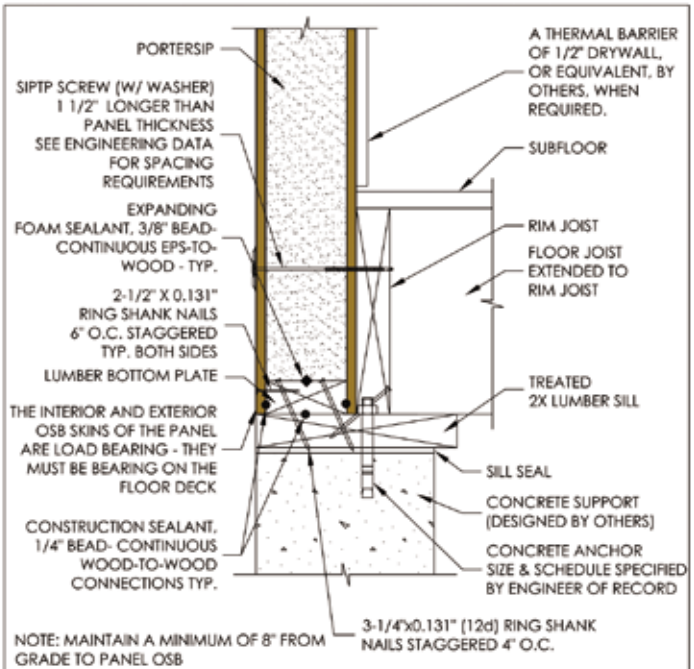
F-2 PANEL ON SUBFLOOR



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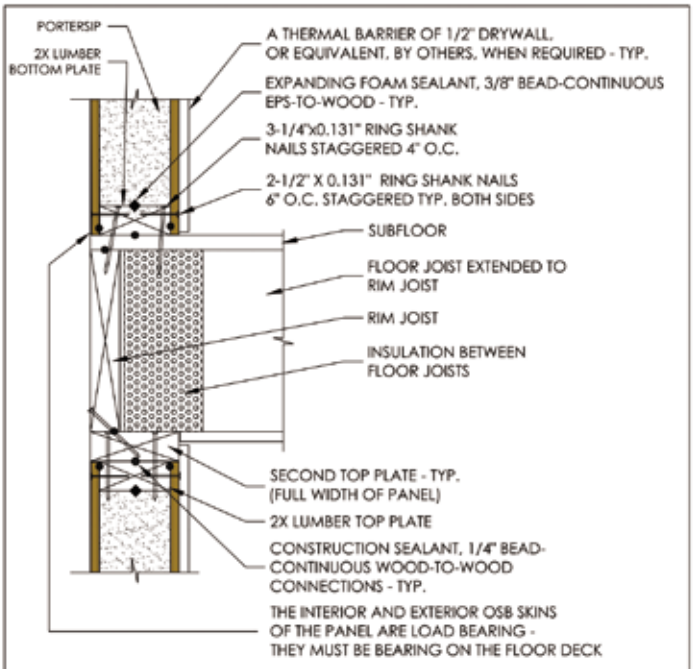
F-3 PANEL ON SILL PLATE W/ RIM JOIST



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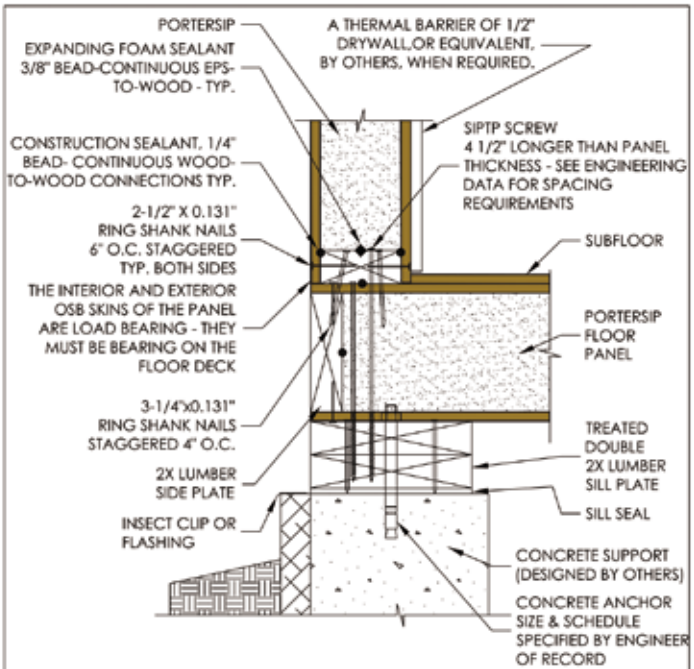
F-4 BEARING WALL TO FLOOR JOIST - MULTI-STORY



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F-5 SIP FLOOR CONNECTION TO WALL

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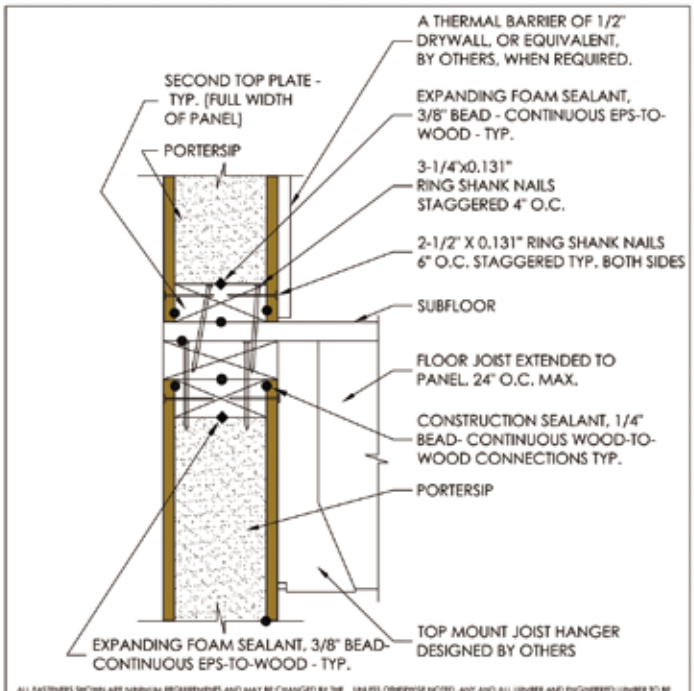

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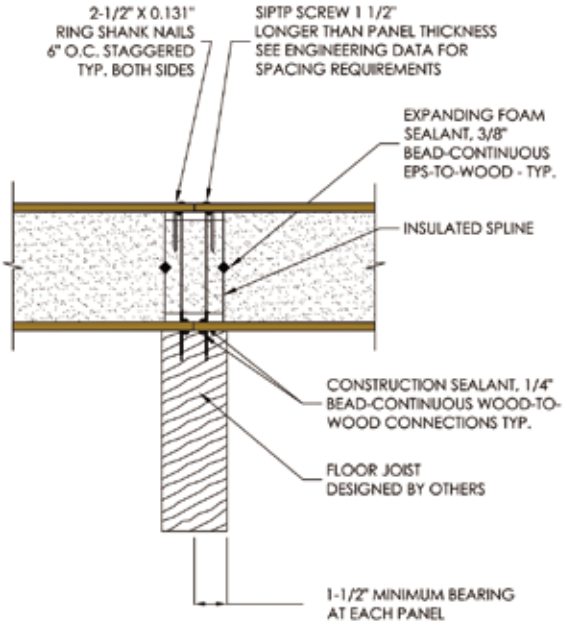
F-6 SECOND FLOOR CONNECTION DETAIL - HANGING FLOOR



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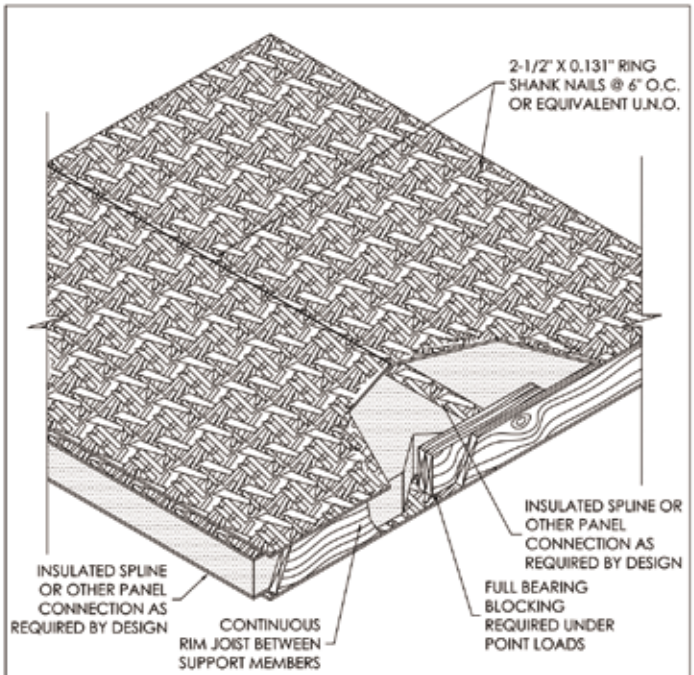
F-7 PANEL-TO-PANEL FLOOR JOIST ATTACHMENT



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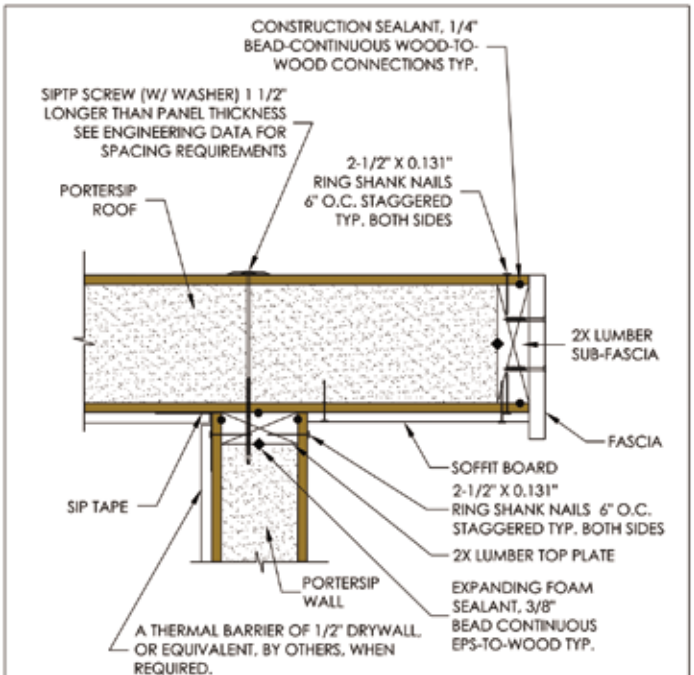
F-8 FLOOR BLOCKING



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R-1 ROOF-TO-WALL CONNECTION GABLE END

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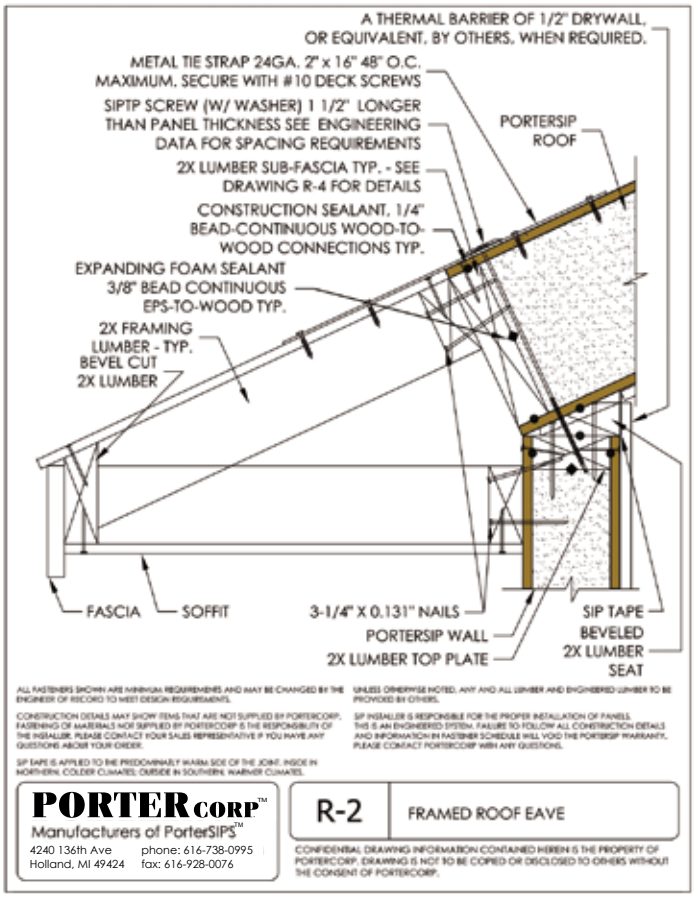

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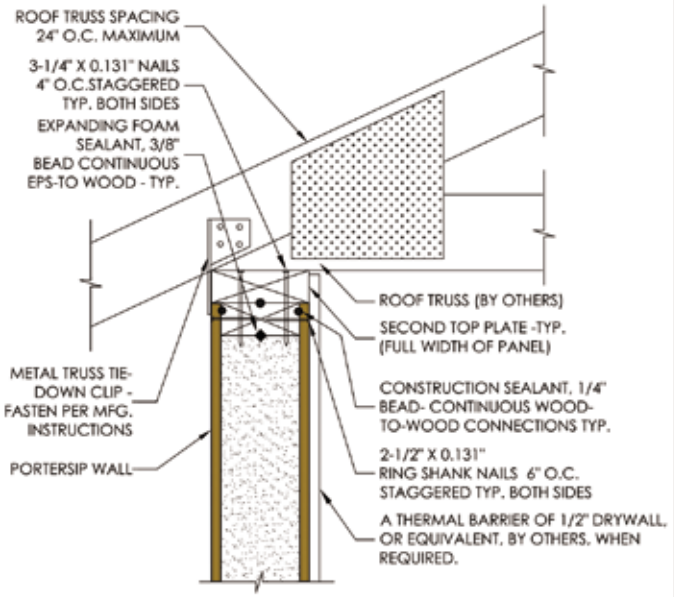
R-2 FRAMED ROOF EAVE



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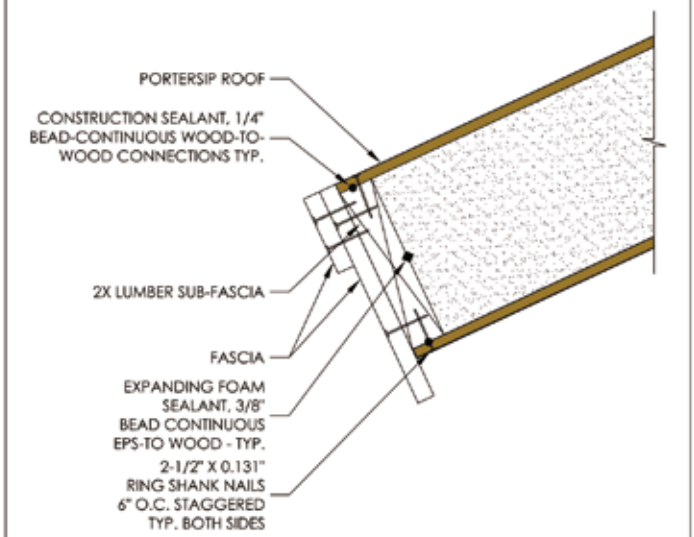
R-3 ROOF TRUSS-TO-WALL CONNECTION



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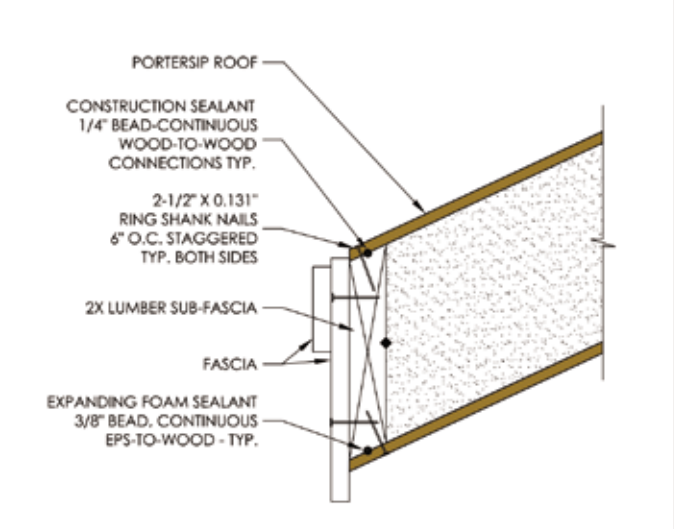
R-4 SQUARE CUT ROOF EAVE



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R-5 PLUMB CUT ROOF EAVE

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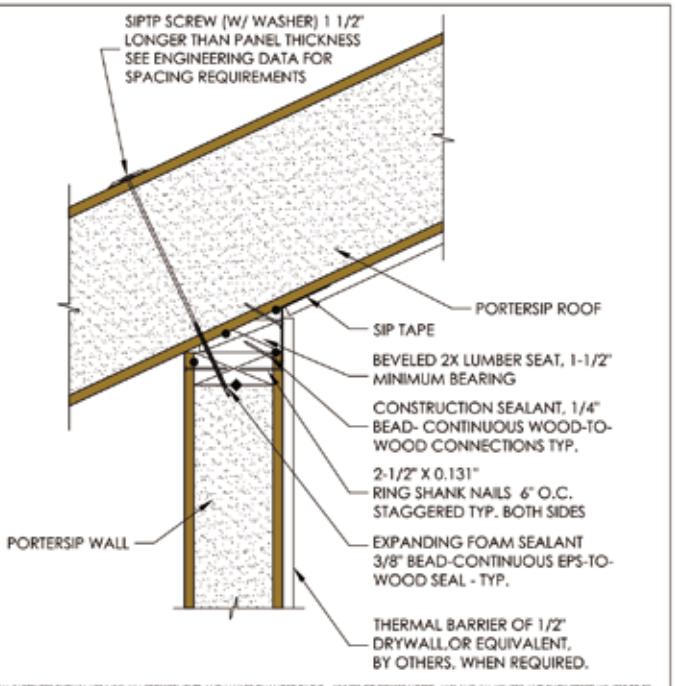

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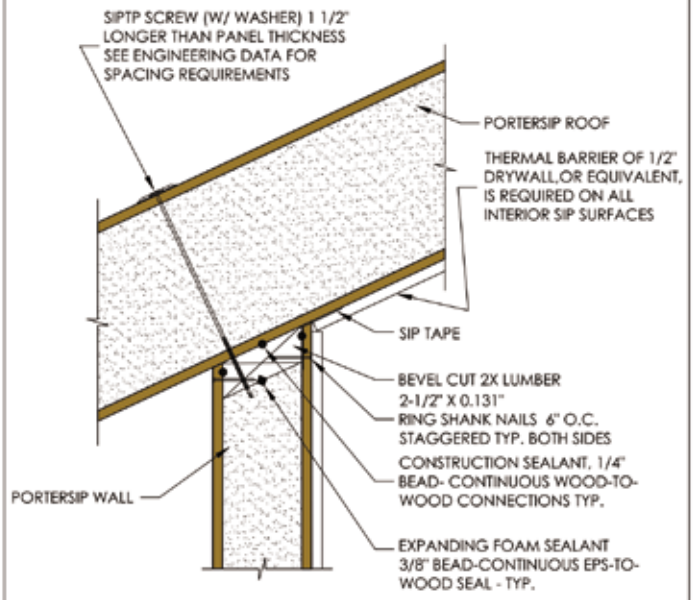
R-6 ROOF-TO-WALL CONNECTION PITCHED ROOF - BEVELED SEAT



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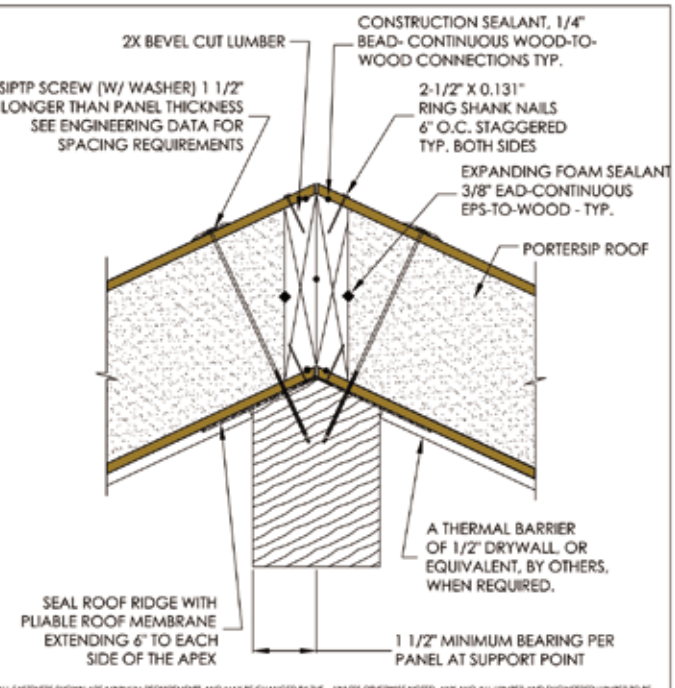
R-7 ROOF-TO-WALL CONNECTION PITCHED ROOF -CANTED PLATE



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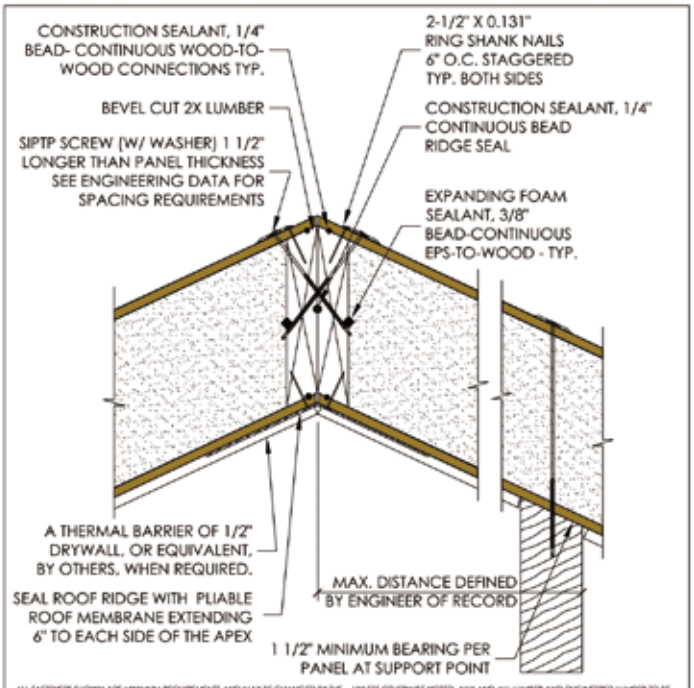
R-8 ROOF RIDGE CONNECTION WITH SOLID BLOCKING



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R-9 CANTILEVER ROOF RIDGE CONNECTION W/ SOLID BLOCKING

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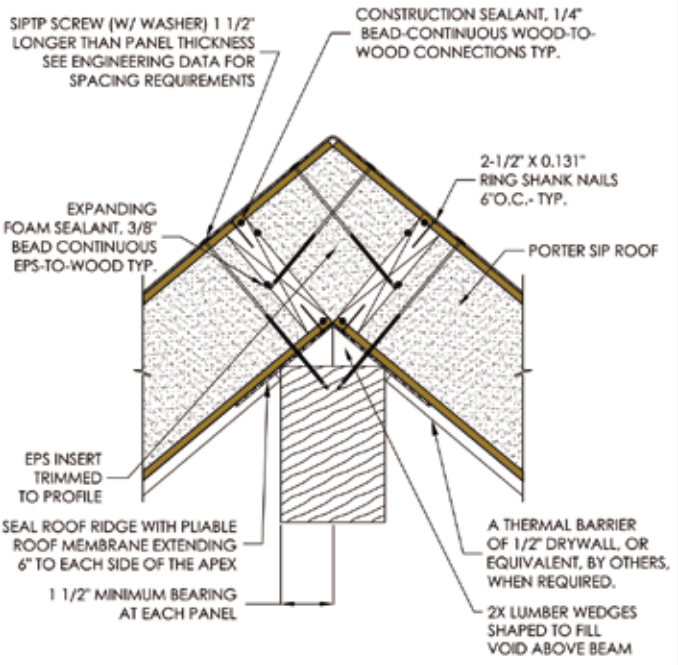

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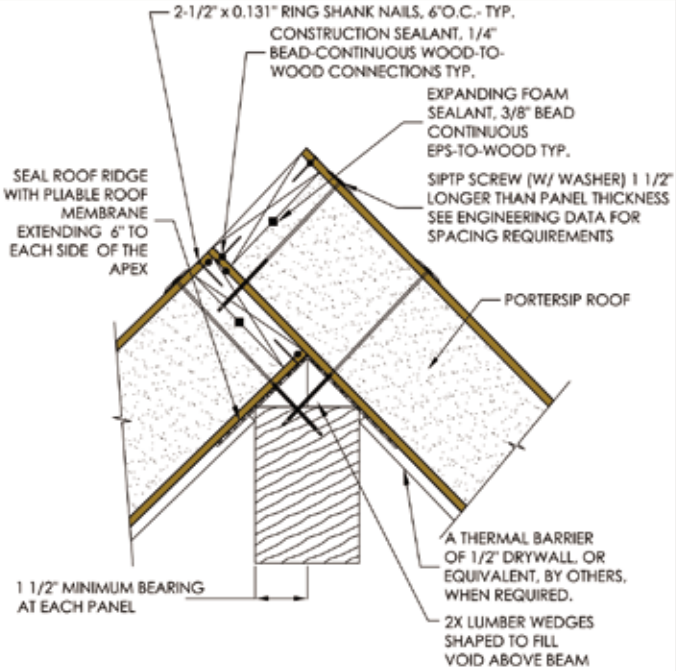
R-10 RIDGE CAP DETAIL



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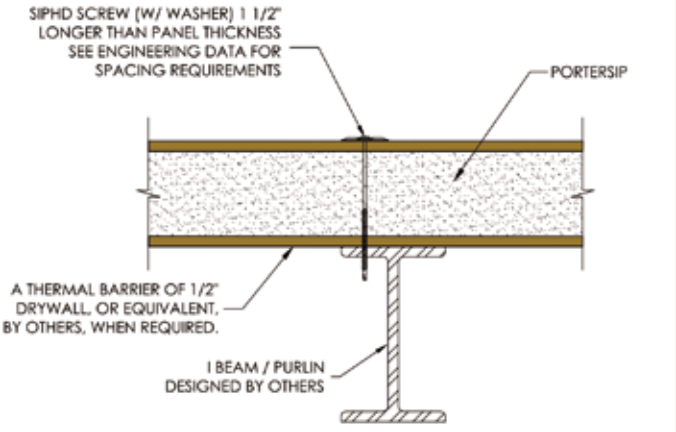
R-11 MAIN ROOF RIDGE TO OVERLAP CONNECTION



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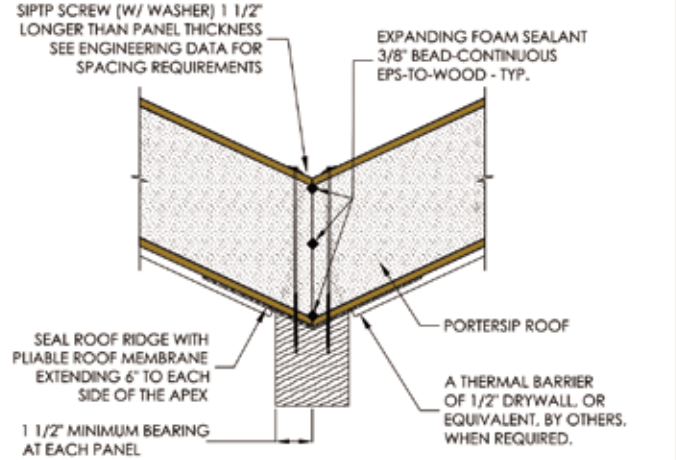
R-12 PANEL TO STEEL I-BEAM / PURLIN



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R-13 ROOF VALLEY CONNECTION

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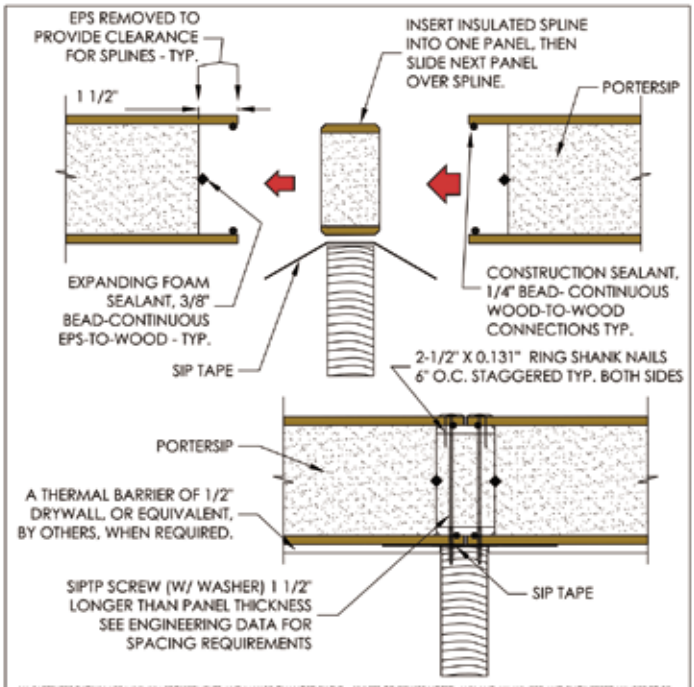

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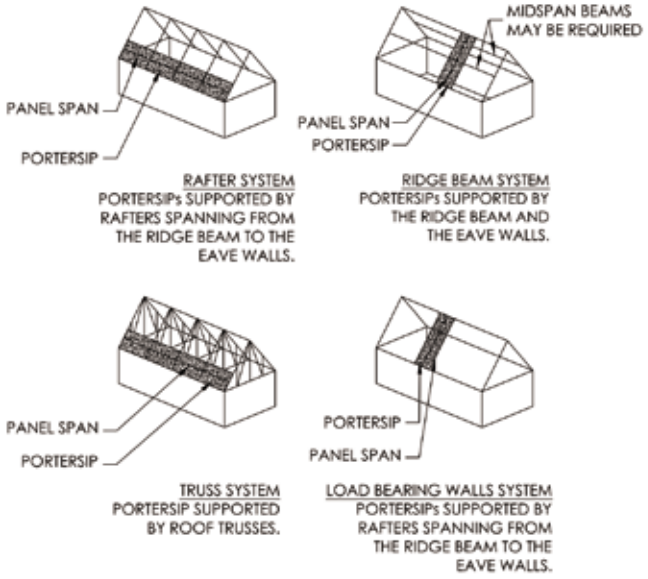
R-14 SPLINE FASTENED AT TOP ONLY



ROOF FRAMING OPTIONS MUST BE CONFIRMED BY NGINEER OF RECORD BECAUSE EACH SYSTEM DISTRIBUTES GRAVITY AND LATERAL LOADS DIFFERENTLY.

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R-15 ROOF FRAMING OPTIONS

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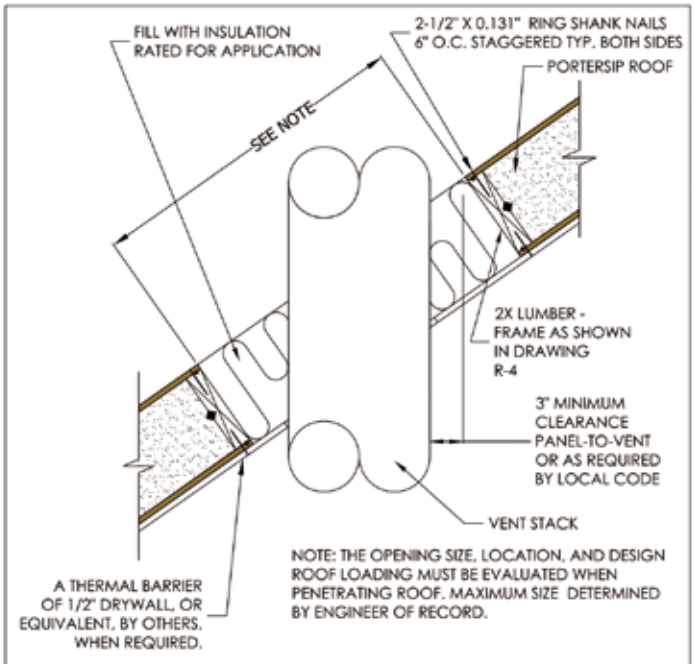

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R-16 FRAMED ROOF PENETRATION

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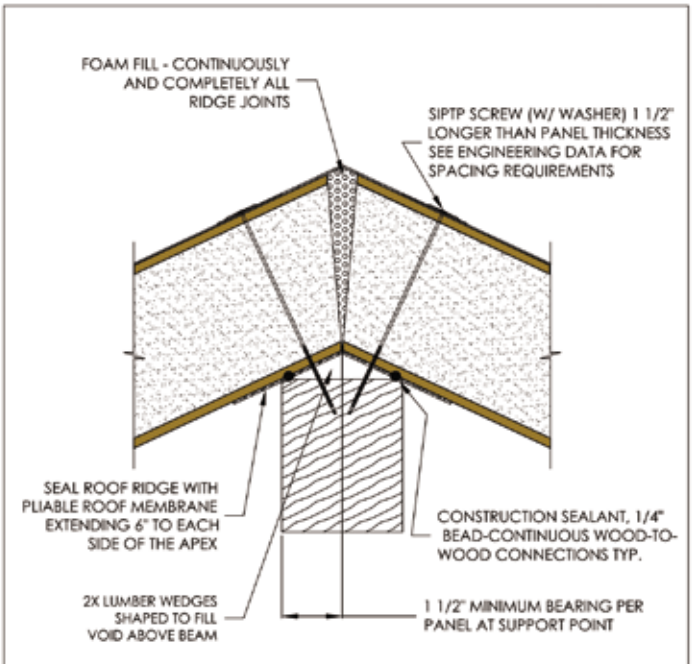

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R-17 ROOF RIDGE CONNECTION WITHOUT SOLID BLOCKING

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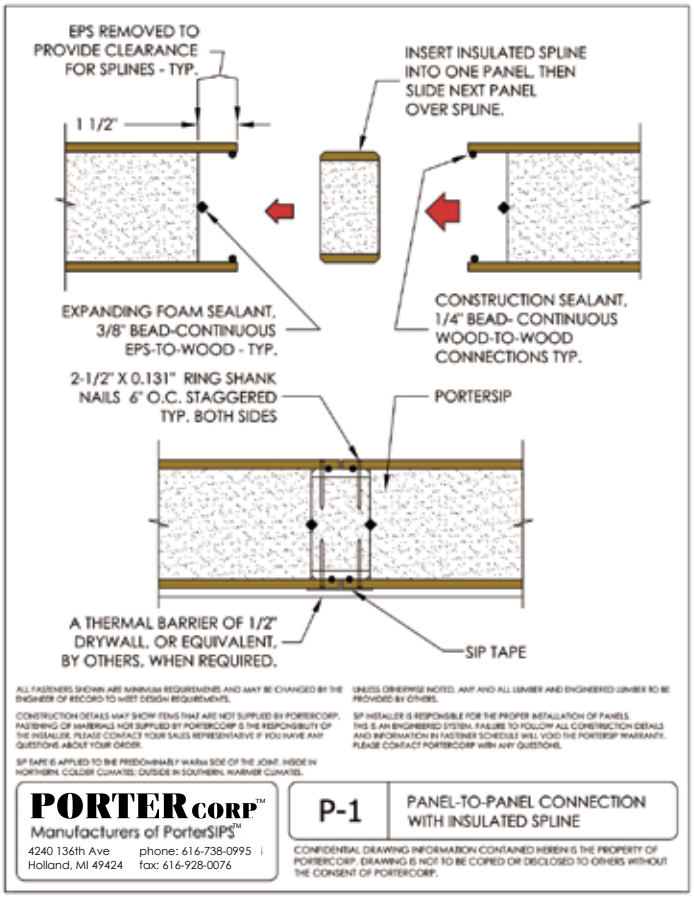

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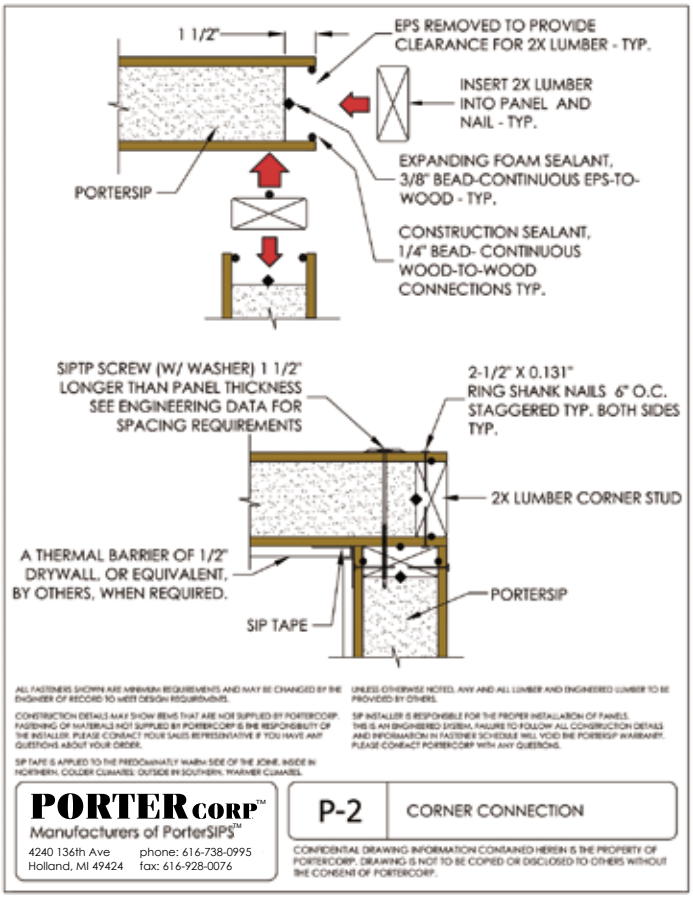
P-1 PANEL-TO-PANEL CONNECTION WITH INSULATED SPLINE



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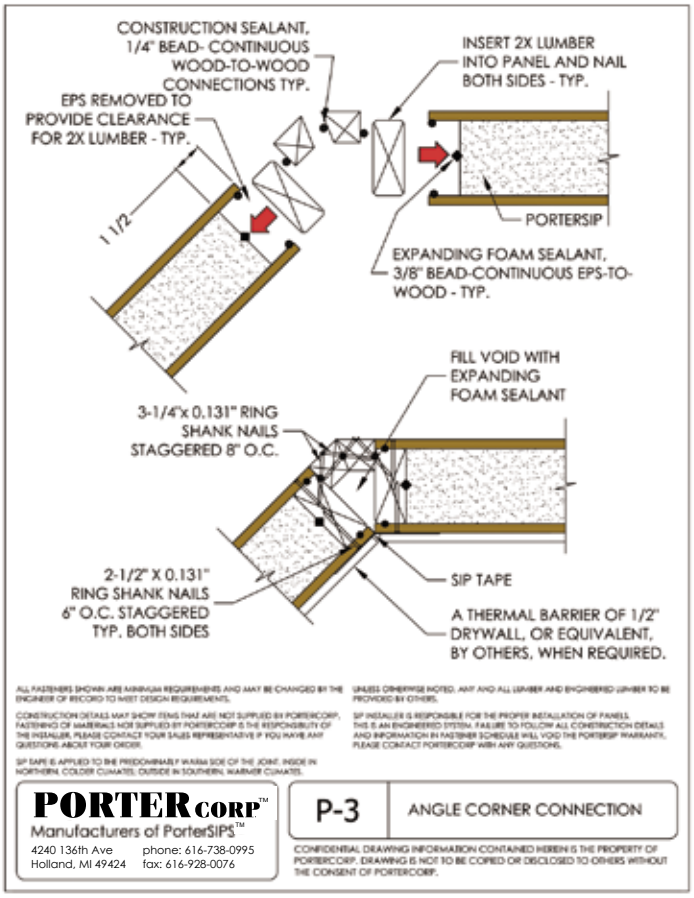
P-2 CORNER CONNECTION



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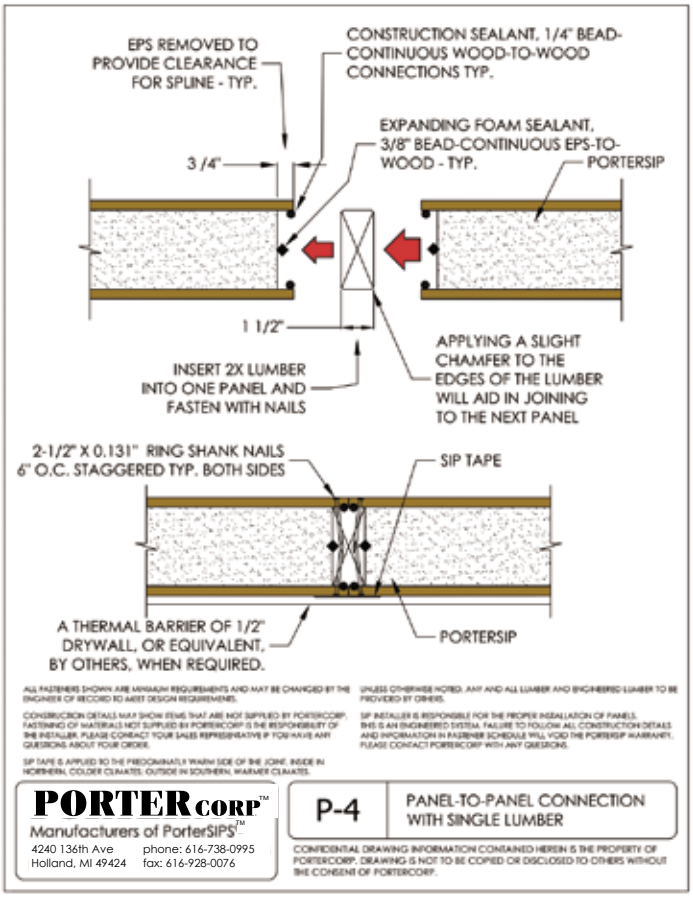
P-3 ANGLE CORNER CONNECTION



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P-4 PANEL-TO-PANEL CONNECTION WITH SINGLE LUMBER

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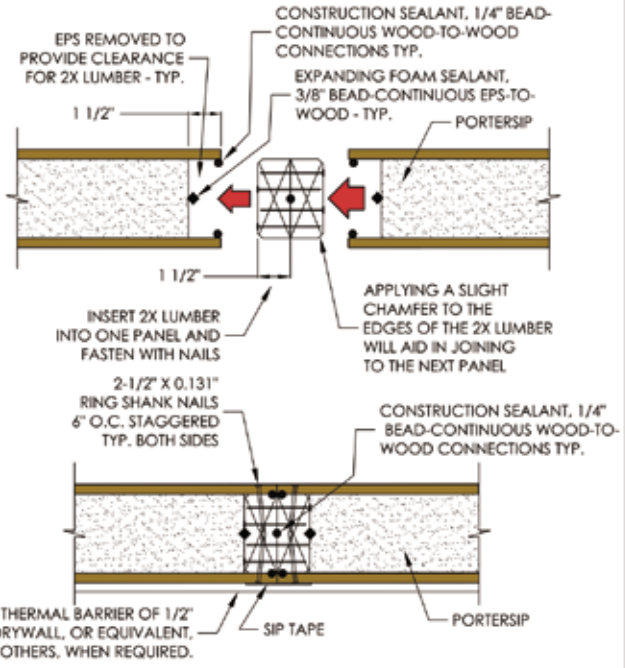

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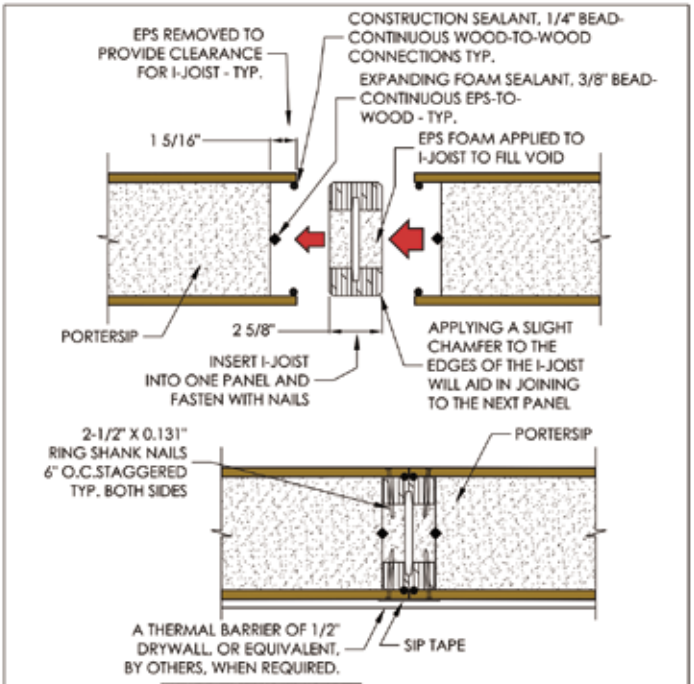
P-5 PANEL-TO-PANEL CONNECTION WITH DOUBLE LUMBER



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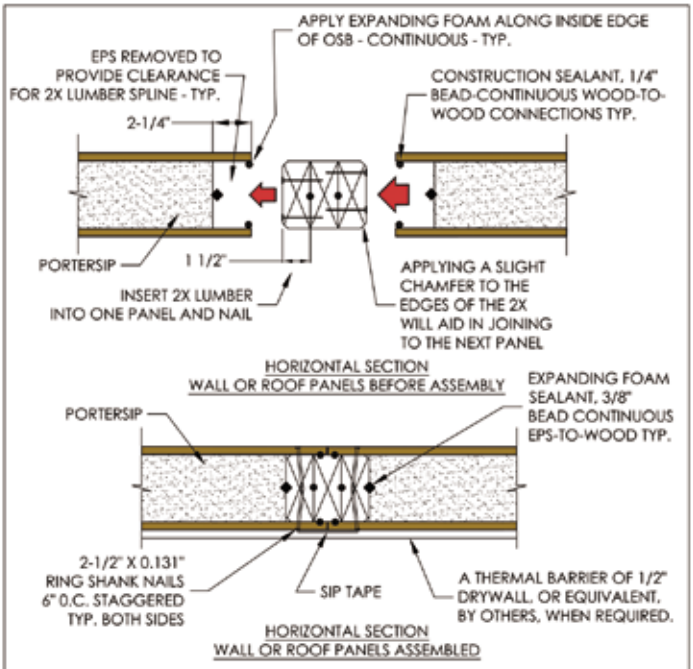
P-6 PANEL-TO-PANEL CONNECTION WITH I-JOIST



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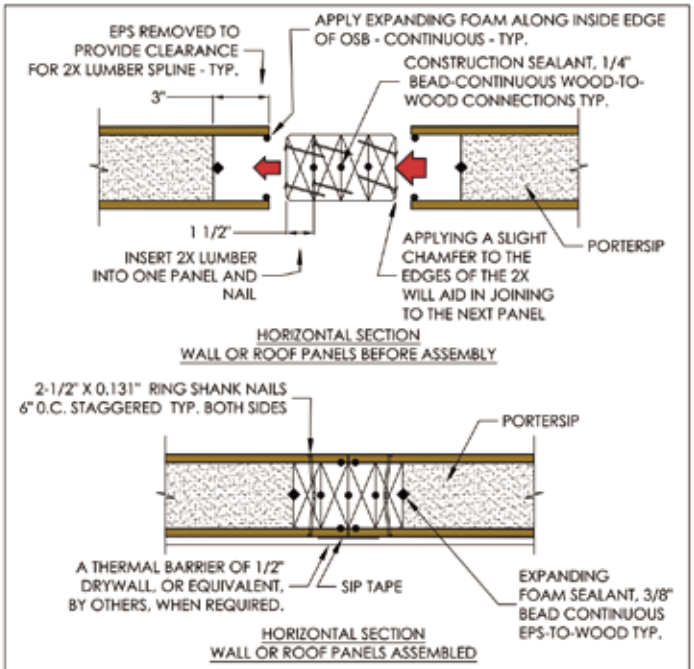
P-7 PANEL-TO-PANEL CONNECTION WITH (3) 2X LUMBER



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P-8 PANEL-TO-PANEL CONNECTION WITH (4) 2X LUMBER

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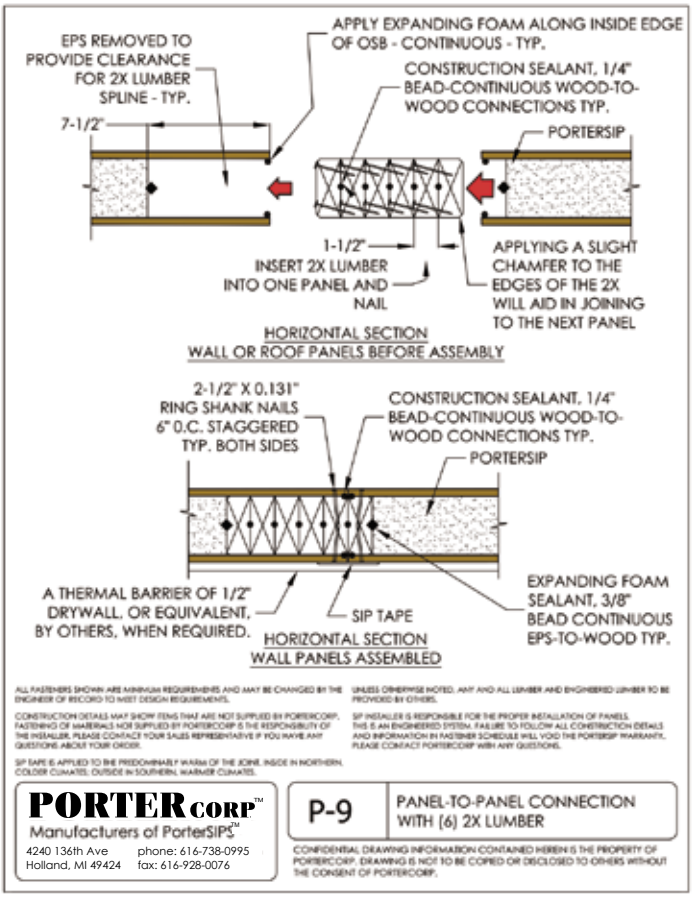

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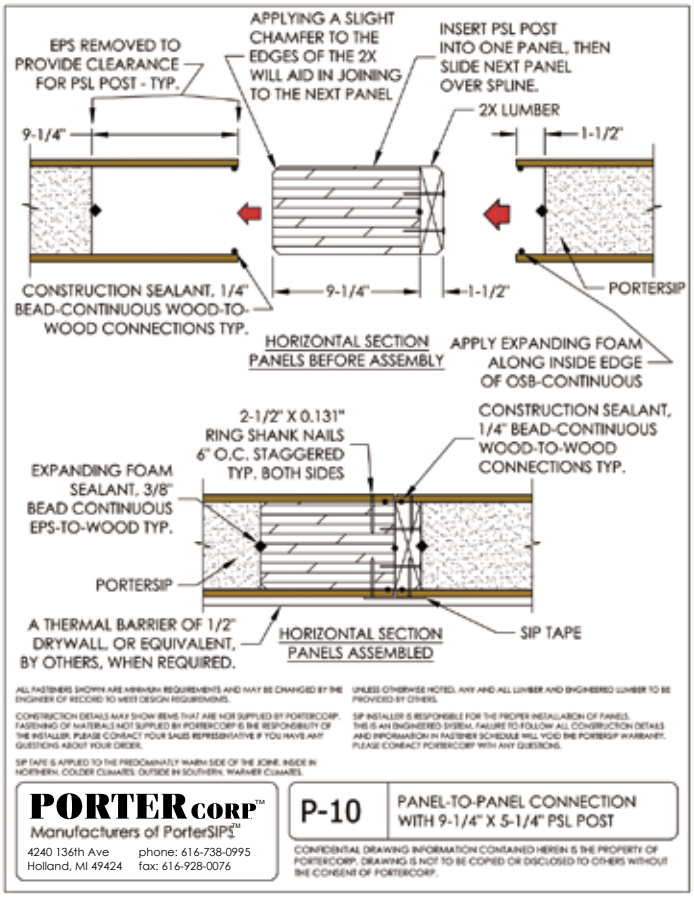
P-9 PANEL-TO-PANEL CONNECTION WITH (6) 2X LUMBER



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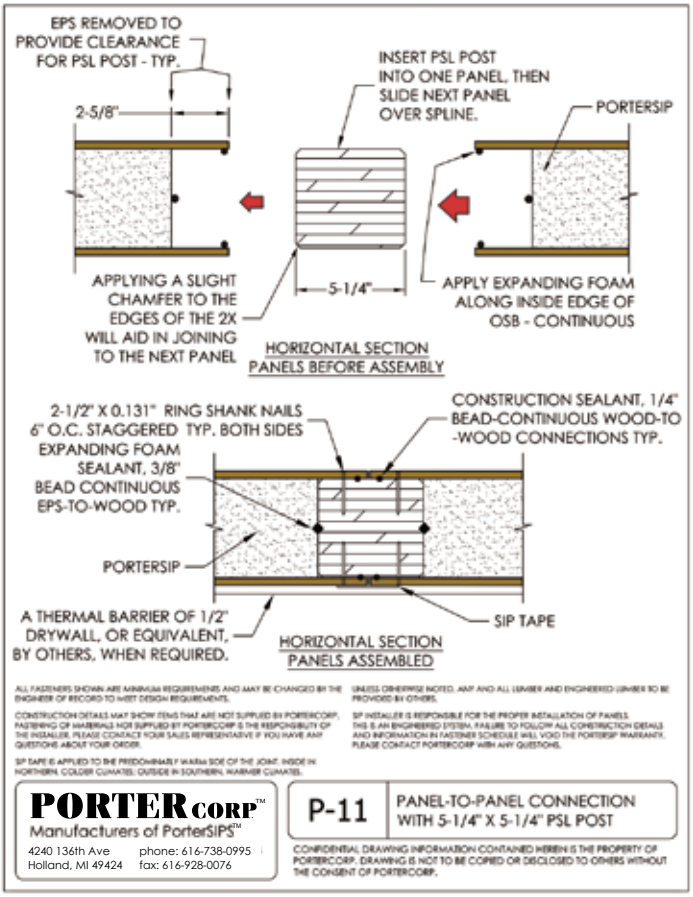
P-10 PANEL-TO-PANEL CONNECTION WITH 9-1/4" X 5-1/4" PSL POST



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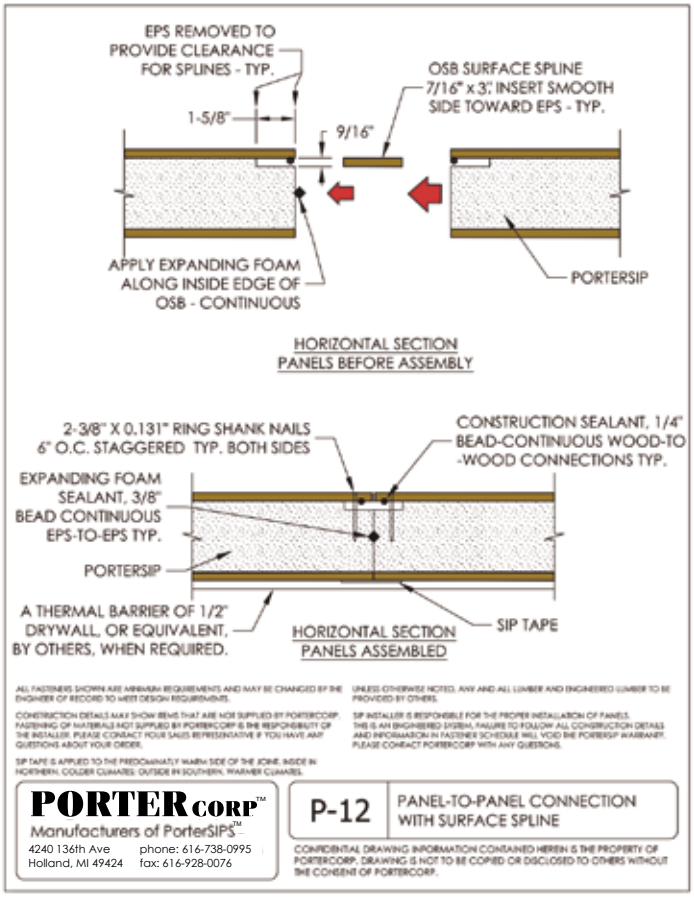
P-11 PANEL-TO-PANEL CONNECTION WITH 5-1/4" X 5-1/4" PSL POST



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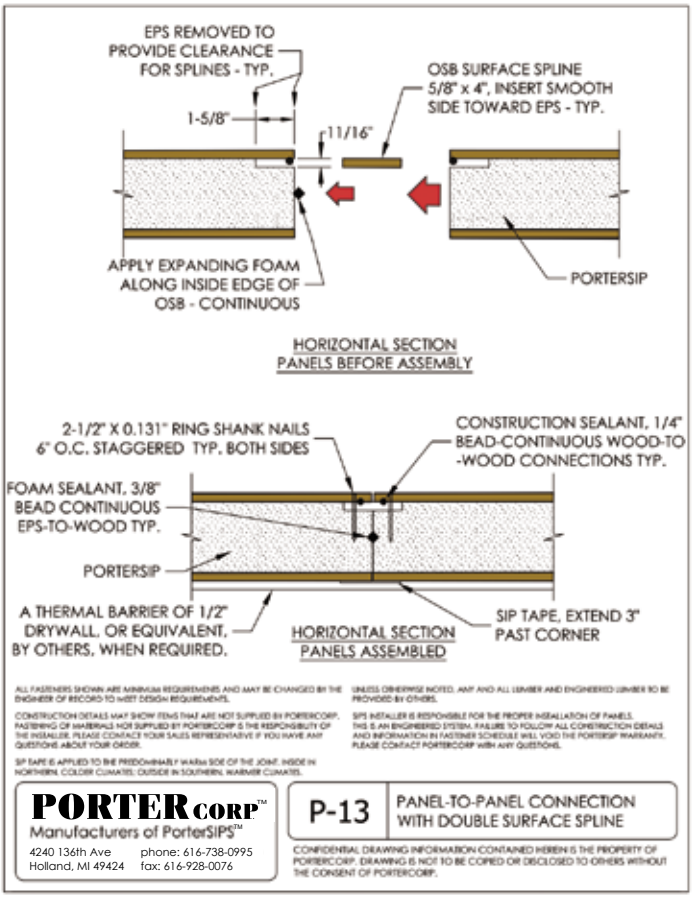
P-12 PANEL-TO-PANEL CONNECTION WITH SURFACE SPLINE



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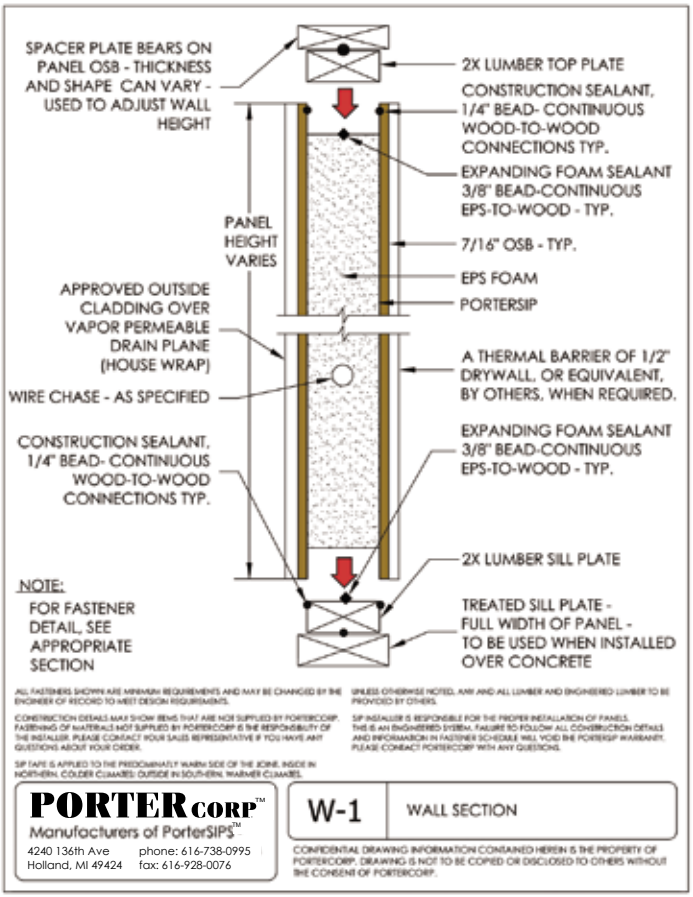
P-13 PANEL-TO-PANEL CONNECTION WITH DOUBLE SURFACE SPLINE



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W-1 WALL SECTION

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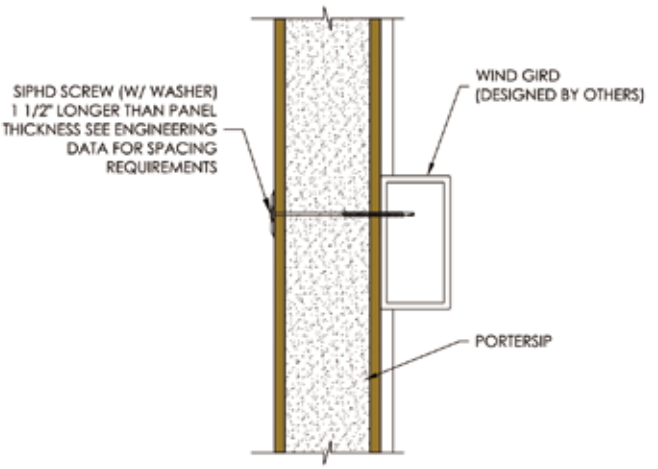

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W-2 PANEL TO WIND GIRD

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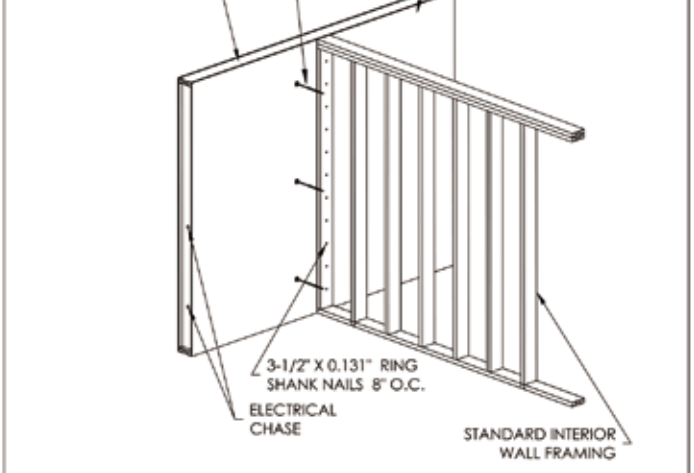

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W-3 ISOMETRIC OF INTERIOR WALL CONNECTION

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Listing Report: **PSC121907-22**

PRODUCT: Structural Insulated Panels (SIPs)
DIVISION: Wood and Plastics (06)
SECTION: Structural Panels (06 12 16)

Report Holder
Structural Insulated Panel Association (SIPA)
PO Box 1699
Gig Harbor, WA 98335

Manufacturing Locations

PorterCorp (NTA Plant #538)
4240 North 136th Avenue
Holland, MI 49424

1. SUBJECT

PorterCorp Structural Insulated Panels. Wall and Roof Panels 8 ft. to 20 ft. long, 4-5/8 in. to 12-1/4 in. thick.

2. SCOPE

2.1. NTA, Inc. has evaluated the above product(s) for compliance with the applicable sections of the following codes:
2.1.1. 2006, 2009, 2012 International Building Code (IBC)
2.1.2. 2006, 2009, 2012 International Residential Code (IRC)

2.2. NTA, Inc. has evaluated the above product(s) in accordance with:
2.2.1. NTA IM 014 Structural Insulated Panel Evaluation
2.2.2. NTA IM 036 Quality System Requirements

2.3. NTA, Inc. has evaluated the following properties of the above product(s):
2.3.1. Structural performance under axial, transverse and in-plane shear loads.

To obtain the most current NTA Listing Report visit https://online.ntainc.com/public/certification/reports/.

3. USES

3.1. General. *PorterCorp Structural Insulated Panels* are used as structural insulated roof and wall panels capable of resisting transverse, axial and in-plane shear loads.

3.2. Construction Types. *PorterCorp Structural Insulated Panels* shall be considered combustible building elements when determining the Type of Construction in accordance with 2009, 2012 IBC Chapter 6. (IM 014 NACU1)

3.3. Fire Resistive Assemblies. *PorterCorp Structural Insulated Panels* shall not be used as part of a fire-rated assembly unless suitable evidence and details are submitted and approved by the authority having jurisdiction. (IM 014 ACU14)

4. DESCRIPTION

4.1. General. *PorterCorp Structural Insulated Panels* are factory-assembled, engineered-wood-faced, structural insulated panels (SIPs) with an expanded polystyrene (EPS) foam core. The panels are intended for use as load-bearing or non-load bearing wall and roof panels. Panels are available in 4-5/8 in. through 12-1/4 in. overall thicknesses. The panels are custom made to the specifications for each use and are assembled under factory-controlled conditions. The maximum panel size is 8 ft. wide and up to 20 ft. in length.

4.2. Materials

4.2.1. Facing. The facing consists of two single-ply oriented strand board (OSB) facings a minimum of 7/16 in. thick conforming to 2009 IRC Table 613.3.2 and DOC PS 2-04, Exposure 1, Rated Sheathing with a span index of 24/16. Panels may be manufactured with the facing strength axis oriented in either direction with respect to the direction of SIP bending provided the appropriate strength values are used.

4.2.2. Core. The core material is EPS Foam conforming to the Type I specification defined in ASTM C578. The foam core, up to 11-3/8 in. thickness, has a flame spread rating not exceeding 75 and a smoke-developed rating not exceeding 450 in compliance with 2009 IBC Section 2603.3 Exception 4.

4.2.3. Adhesive. Facing materials are adhered to the core material using a structural adhesive. The adhesive is applied during the lamination process in accordance with the in-plant quality system documentation.

4.2.4. Material Sources. The facing, core and adhesive used in the construction of *PorterCorp Structural Insulated Panels* shall be composed only of materials from approved sources as identified in the in-plant quality system documentation. A list of material suppliers is provided in Table 9.

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4.2.5. Splines. *PorterCorp Structural Insulated Panels* are interconnected with surface splines or block splines (Figure 1). Connections using dimensional lumber splines or engineered structural splines are not specifically addressed in this report and must be designed in accordance with accepted engineering practice to meet applicable code requirements. (IM 014 ACU 20)

4.2.5.1. Surface Splines. Surface splines (Figure 1) consist of 3 in. wide by 7/16 in. thick or thicker OSB. At each panel joint, one surface spline is inserted into each of two tight-fitting slots in the core. The slots in the core are located just inside the facing.

4.2.5.2. Block Splines. Block splines (Figure 1) are manufactured in the same manner as the SIP except with an overall thickness that is 1 in. less than the overall thickness of the panel to be joined.

5. DESIGN

5.1. Overall Structural System. The scope of this report is limited to the evaluation of the SIP component. Panel connections and other details related to incorporation of the panel into the overall structural system of a building are beyond the scope of this report. (IM 014 NACU3)

5.2. Design Approval. Where required by the authority having jurisdiction, structures using *PorterCorp Structural Insulated Panels* shall be designed by a registered design professional. Construction documents, including engineering calculations and drawings providing floor plans, window details, door details and connector details, shall be submitted to the code official when application is made for a permit. The individual preparing such documents shall possess the necessary qualifications as required by the applicable code and the professional registration laws of the state where the construction is undertaken. Approved construction documents shall be available at all times on the jobsite during installation. (IM 014 NACU4)

5.3. Design Loads. Design loads to be resisted by the SIPs shall be as required under the applicable building code. Loads on the panels shall not exceed the loads noted in this report.

5.4. Allowable Loads. Allowable axial, transverse, and in-plane shear loads may be calculated using the panel properties provided in Tables 1 and 2 or may be selected from Tables 3 through 7. Maximum and minimum panel heights, spans and thicknesses are limited as provided in Table 2 through 7. Unless otherwise noted, all properties and allowable loads apply to panels joined with surface or block splines. Allowable loads for reinforced panel capacities shall be designed by a registered professional. Calculations demonstrating that the loads applied are less than the allowable loads described in this report shall be submitted to the code official for approval. (IM 014 NACU5) For loading conditions not specifically addressed herein, structural members designed in accordance with accepted engineering practice shall be provided to meet applicable code requirements.

5.5. Concentrated Loads. Axial loads shall be applied to the SIP through continuous members such as structural insulated roof or floor panels or repetitive members such as joists, trusses or rafters spaced at regular intervals of 24 in. on center or less. Such members shall be fastened to a rim board or similar member to distribute the load to the SIP. For other loading conditions, reinforcement shall be provided. This reinforcement shall be designed in accordance with accepted engineering practice. (IM 014 ACU12)

5.6. Eccentric and Side Loads. Axial loads shall be applied concentrically to the top of the SIP. Loads shall not be applied eccentrically or through framing attached to one side of the panel (such as balloon framing) except where additional engineering documentation is provided. (IM 014 ACU13)

5.7. Openings. Openings in panels shall be reinforced with wood or steel designed in accordance with accepted engineering practice to resist all loads applied to the opening as required by the adopted code. Details for door and window openings shall be provided to clarify the manner of supporting axial, transverse and/or in-plane shear loads at openings. Such details shall be shown on approved design documents and subject to approval by the local authority having jurisdiction. (IM 014 ACU8)

5.8. In-Plane Shear Design. Shear walls utilizing block or surface splines shall be sized to resist all code required wind and seismic loads without exceeding the allowable loads provided in Tables 6 and 7. Shear wall chords, hold-downs and connections to transfer shear forces between the wall and surrounding structure shall be designed in accordance with accepted engineering practice. Allowable strengths for shear walls with structural splines along each panel edge shall be designed in accordance with accepted engineering practice and subject to the limitations for wood sheathed shear walls.

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5.8.1. Seismic Design Categories A, B and C. The use of the shear wall configurations in Table 6 is limited to structures in Seismic Design Categories A, B and C. Where SIPs are used to resist seismic forces the following factors shall be used for design: Response Modification Coefficient, $R = 2.0$; System Overstrength Factor, $\Omega_0 = 2.5$; Deflection Amplification Factor, $C_d = 2.0$. (IM 014 ACU16) The maximum panel height-to-width ratio shall be 2:1. (IM 014 ACU17)

5.8.2. Seismic Design Categories D, E, and F. The shear wall configurations in Table 7 are permitted in Seismic Design Categories D, E and F. Such walls shall be designed using the seismic design coefficients and limitations provided in ASCE 7-05 for light-framed walls sheathed with wood structural panels rated for shear resistance (SFRS A13). These SIPs shall use the following factors for design: Response Modification Coefficient, $R = 6.5$; System Overstrength Factor, $\Omega_0 = 3.0$; Deflection Amplification Factor, $C_d = 4.0$.(IM 014 ACU16) The maximum panel height-to-width ratio shall be 1:1. (IM 014 ACU17)

5.8.3. Adhesives and Sealants. Adhesives and sealants shall not be applied at wood-to-wood or spline-to-facing interfaces in shear walls in Seismic Design Categories D, E and F. (IM 014 NACU10) Adhesives and sealants may be applied to wood-to-foam or facing-to-foam interfaces. Flexible SIP tape may be applied over panel joints.

5.9. Horizontal Diaphragms. Horizontal diaphragms shall be sized to resist all code required wind and seismic loads without exceeding the allowable loads provided in Table 8. Diaphragm chords and connections to transfer shear forces between the diaphragm and surrounding structure shall be designed in accordance with accepted engineering practice. The maximum diaphragm length-to-width ratio shall not exceed 3:1. (IM 014 ACU18)

5.10. Combined Loads. Panels subjected to any combination of transverse, axial or in-plane shear loads shall be analyzed utilizing a straight line interaction in accordance with *NTA IM014 TIP 01 SIP Design Guide*

6. INSTALLATION

6.1. General. *PorterCorp Structural Insulated Panels* shall be fabricated, identified and erected in accordance with this report, the approved construction documents and the applicable code. In the event of a conflict between the manufacturer's published installation instructions and this report, this report shall govern. Approved construction documents shall be available at all times on the jobsite during installation. (IM 014 NACU7)

6.2. Splines. *PorterCorp Structural Insulated Panels* are interconnected at the panel edges through the use of a spline. The spline type may be of any configuration listed in Section 4.2.5 as required by the specific design. The spline shall be secured in place with not less than 0.131 in. x 2-1/2 in. nails, spaced 6 in. on center on both sides of the panel, or an approved equivalent fastener. All joints shall be sealed in accordance with the SIP manufacturer's installation instructions. Alternate spline connections may be required for panels subjected to in-plane shear forces. Such panels shall be interconnected exactly as required in Table 6 or 7 or as directed by the designer.

6.3. Plates. The top and bottom plates of the panels shall be dimensional or engineered lumber sized to match the core thickness of the panel. The plates shall be secured using not less than 0.131 in. x 2-1/2 in. nails, spaced 6 in. on center on both sides of the panel, or an approved equivalent fastener.

A second plate composed of 1-1/8 in. minimum thickness dimensional or engineered lumber with a specific gravity of 0.42 that is cut to the full thickness of the panel shall be secured to the first top plate using 0.131 in. x 3 in. nails or an approved equivalent fastener.

6.4. Cutting and Notching. No field cutting or routing of the panels shall be permitted except as shown on approved drawings. (IM 014 NACU6)

6.5. Protection from Decay. SIPs that rest on exterior foundation walls shall not be located within 8 in. of exposed earth. SIPs supported by concrete or masonry that is in direct contact with earth shall be protected from the concrete or masonry by a moisture barrier. (IM 014 ACU6)

6.6. Protection from Termites. In areas subject to damage from termites, SIPs shall be protected from termites using an approved method. Panels shall not be installed below grade or in contact with earth. (IM 014 ACU7)

6.7. Heat-Producing Fixtures. Heat-producing fixtures shall not be installed in the panels unless protected by a method approved by the code official or documented in test reports. This limitation shall not be interpreted to prohibit heat-producing elements with suitable protection. (IM 014 NACU9)

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6.8. Voids and Holes

6.8.1. Voids in Core. In lieu of openings designed in accordance with section 5.7, the following voids are permitted. Voids may be provided in the panel core during fabrication at predetermined locations only. Voids parallel to the panel span shall be limited to a single 1 in. maximum diameter hole. Such voids shall be spaced a minimum of 4 ft. on center measured perpendicular to the panel span. Two 1/2 in. diameter holes may be substituted for the single 1 in. hole provided they are maintained parallel and within 2 in. of each other. (IM 014 ACU11)

Voids perpendicular to the panel span shall be limited to a single 1 in. maximum diameter hole placed not closer than 16 in. from the support. Additional voids in the same direction shall be spaced not less than 28 in. on center.

6.8.2. Holes in Panels. Holes may be placed in panels during fabrication at predetermined locations only. Holes shall be limited to 4 in. x 4 in. square. The minimum distance between holes shall not be less than 4 ft. on center measured perpendicular to the panel span and 24 in. on center measured parallel to the panel span. Not more than three holes shall be permitted in a single line parallel to the panel span. The holes may intersect voids permitted elsewhere in this report. (IM 014 ACU15)

6.9. Panel Cladding

6.9.1. Roof Covering. The roof covering, underlayment and flashing shall comply with the applicable code(s). All roofing materials must be installed in accordance with the manufacturer's installation instructions. The use of roof coverings requiring the application of heat during installation shall be reviewed and approved by a registered design professional.

6.9.2. Exterior Wall Covering. Panels shall be covered on the exterior by a water-resistive barrier as required by the applicable code. The water-resistive barrier shall be attached with flashing in such a manner as to provide a continuous water-resistive barrier behind the exterior wall veneer. (IM 014 ACU9) The exterior facing of the SIP wall shall be covered with weather protection as required by the adopted building code or other approved materials. (IM 014 ACU10)

6.9.3. Interior Finish. The SIP foam plastic core shall be separated from the interior of the building by an approved thermal barrier of 1/2 in. gypsum wallboard or equivalent thermal barrier where required by 2009 IBC Section 2603.4.

7. CONDITIONS OF USE

PorterCorp Structural Insulated Panels as described in this report comply with the codes listed in Section 2.0, subject to the following conditions:

7.1. Installation complies with this report and the approved construction documents.

7.2. This report applies only to the panel thicknesses specifically listed herein. (IM 014 ACU3)

7.3. In-use panel heights/spans shall not exceed the values listed herein. Extrapolation beyond the values listed herein is not permitted. (IM 014 ACU2)

7.4. The panels are manufactured in the production facilities noted in this report. (IM 014 NACU8)

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8. EVIDENCE SUBMITTED

NTA, Inc. has examined the following evidence to evaluate this product:

8.1. Review of each manufacturing facility's quality system documentation for conformance to NTA IM 036.

8.2. Qualification test data in accordance with NTA IM 14 *Standard Evaluation Plan 01* (IM 014 SEP 01).

8.3. Periodic quality system audits of the production facilities.

8.4. Periodic testing in accordance with NTA IM 014.

Evaluation evidence and data are on file with NTA, Inc. NTA, Inc. is accredited by the International Accreditation Service (IAS) as follows:

ISO17020 Inspection Agency (AA-682)
ISO17025 Testing Laboratory (TL-259)
ISO Guide 65 Product Certification Agency (PCA-102)

The scope of accreditation related to testing, inspection or product certification pertain only to the test methods and/or standard referenced therein. Design parameters and the application of building code requirements, such as special inspection, have not been reviewed by IAS and are not covered in the accreditation. Product evaluations are performed under the direct supervision of Professional Engineers licensed in all jurisdictions within the United States as required by the building code and state engineering board rules.

9. FINDINGS

All products referenced herein are manufactured under an in-plant quality assurance program to insure that the production quality meets or exceeds the requirements of the codes noted herein and the criteria as established by NTA, Inc. Furthermore, panels must comply with the conditions of this report.

This report is subject to annual renewal.

10. IDENTIFICATION

Each eligible panel shall be permanently marked to provide the following information:

a) The NTA, Inc. listing mark, shown below
b) NTA's Listing No. PSC121907-22
c) In-plant quality assurance stamp
d) Identifier for production facility
e) Project or batch number.

LISTED
PSC121907-22

This listing report is intended to indicate that NTA Inc. has evaluated product described and has found it to be eligible for labeling. Product not labeled as specified herein is not covered by this report. NTA Inc. makes no warranty, either expressed or implied, regarding the product covered by this report.

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Table 1: Basic Properties[1, 2]

Property	Weak-Axis Bending	Strong-Axis Bending
Allowable Tensile Stress, F_t (psi)	245	495
Allowable Compressive Stress, F_c (psi)	340	580
Elastic Modulus (Bending), E_b (psi)	738900	658800
Shear Modulus, G (psi)	270	405
Allowable Core Shear Stress, F_v (psi)	4.5	5.0
Core Compressive Modulus, E_c (psi)	360	360
Reference Depth, h_o (in.)	4.625	4.625
Shear Depth Factor Exponent, m	0.84	0.86

[1] All properties are based on a minimum panel width of 24 in.
[2] Refer to *NTA IM14 TIP 01 SIP Design Guide* for details on engineered design using basic panel properties.

Table 2: Section Properties

Panel Thickness, h (in.)	Core Thickness, c (in.)	Dead Weight, w_d (psf)	Facing Area, A_f (in.^{2}/ft)	Shear Area, A_v (in.^{2}/ft)	Moment of Inertia, I (in.^{4}/ft)	Section Modulus, S (in.^{3}/ft)	Radius of Gyration, r (in.)	Centroid-to-Facing Dist., y_c (in.)
4.625	3.75	3.2	10.5	50.3	46.0	19.9	2.09	2.31
6.50	5.625	3.3	10.5	72.8	96.5	29.7	3.03	3.25
8.25	7.375	3.5	10.5	93.8	160.2	38.8	3.91	4.13
10.25	9.375	3.6	10.5	117.8	252.7	49.3	--	--
12.25	11.375	3.8	10.5	141.8	366.3	59.8	--	--

Figure 1: SIP Spline Types

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Table 3: Allowable Uniform Transverse Loads (psf)[1, 4]

Panel Length (ft)	4-5/8 inch Thick SIP			6-1/2 inch Thick SIP		
	Deflection Limit[2]			Deflection Limit[2]		
	L/180	L/240	L/360	L/180	L/240	L/360
8 WAB[3]	50.8	40.9	27.3	73.8	64.7	43.1
8	68.8	51.6	34.4	80.6	80.6	56.6
10	45.1	33.8	22.5	62.0	57.9	38.6
12	30.8	23.1	15.4	50.4	40.9	27.3
14	21.7	16.3	--	39.6	29.7	19.8
16	--	--	--	29.4	22.1	14.7
18	--	--	--	22.4	16.8	--

See Table 4 for notes.

Table 4: Allowable Uniform Transverse Loads (psf) [1, 4]

Panel Length (ft)	8-1/4 inch Thick SIP			10-1/4 inch Thick SIP			12-1/4 inch Thick SIP		
	Deflection Limit[2]			Deflection Limit[2]			Deflection Limit[2]		
	L/180	L/240	L/360	L/180	L/240	L/360	L/180	L/240	L/360
8 WAB[3]	81.4	81.4	58.3	89.9	89.9	75.9	98.6	98.6	93.6
8	88.5	88.5	78.4	97.3	97.3	97.3	106.4	106.4	106.4
10	67.4	67.4	54.8	73.1	73.1	73.1	78.8	78.8	78.8
12	54.4	54.4	39.6	58.6	58.6	54.6	62.5	62.5	62.5
14	45.6	43.9	29.3	48.8	48.8	41.1	51.9	51.9	51.9
16	39.3	33.2	22.1	41.9	41.9	31.5	44.3	44.3	41.7
18	34.1	25.6	17.1	36.7	36.7	24.6	38.7	38.7	32.9
20	26.7	20.0	13.4	32.6	29.2	19.5	34.3	34.3	26.3

[1] Table values assume a simply supported panel with 1.5 in. of continuous bearing on facing at supports (C_v = 1.0) with solid wood plates at bearing locations. Values do not include the dead weight of the panel. For wall panel capacities (4-5/8 in., 6-1/2 in. and 8-1/4 in. thickness panels only) utilizing a zero bearing configuration (Figure 2), the allowable load shall be determined using C_v = 0.4.
[2] Deflection limit shall be selected by building designer based on the serviceability requirements of the structure and the requirements of adopted building code. Values are based on loads of short duration only and do not consider the effects of creep.
[3] Tabulated values are based on the strong-axis of the facing material oriented parallel to the direction of panel bending. WAB indicates weak-axis bending of the facing material; the strong-axis of the facing material is oriented perpendicular to the direction of panel bending.
[4] Permanent loads, such as dead load, shall not exceed 0.50 times the tabulated load.

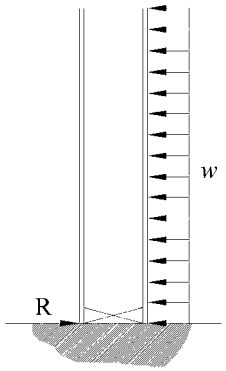

Figure 2: Zero Bearing Support

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Table 5: Allowable Axial Loads (plf)[1,2,3,4]

Lateral Brace Spacing (ft)	Panel Thickness		
	4-5/8 inch	6-1/2 inch	8-1/4 inch
8 WAB[5]	2320	2470	2530
8	3630	4070	4240
10	3260	3890	4130
12	2810	3660	4000
14	--	3390	3830
16	--	3090	3640
18	--	2790	3430
20	--	--	3190

[1] Permanent loads, such as dead load, shall not exceed 0.50 times the tabulated load.
[2] All values are for normal duration and may not be increased for other durations.
[3] Axial loads shall be applied concentrically to the top of the panel through repetitive members spaced not more than 24 in. on center. Such members shall be fastened to a rim board or similar member to distribute along the top of the SIP.
[4] The ends of both facings must bear on the supporting foundation or structure to achieve the tabulated axial loads.
[5] Tabulated values are based on the strong-axis of the facing material oriented parallel to the direction of panel bending. WAB indicates weak-axis bending of the facing material; the strong-axis of the facing material is oriented perpendicular to the direction of panel bending.

Table 6: Allowable In-Plane Shear Strength (Pounds per Foot) for SIP Shear Walls (Wind and Seismic Loads in Seismic Design Categories A, B and C)[1,3]

Spline Type[4]	Nominal SIP Thickness (in.)	Minimum Facing Connections[3,5]			Shear Strength (plf)
		Chord[3]	Plate[3]	Spline[4]	
Block or Surface Spline	4.625	0.131"x 2-1/2" nails, 6" oc	0.131"x 2-1/2" nails, 6" oc	0.131"x 2-1/2" nails, 6" oc	380
	6.625	0.131"x 2-1/2" nails, 6" oc	0.131"x 2-1/2" nails, 6" oc	0.131"x 2-1/2" nails, 6" oc	380
	8.375	0.131"x 2-1/2" nails, 6" oc	0.131"x 2-1/2" nails, 6" oc	0.131"x 2-1/2" nails, 6" oc	400

See Table 7 for notes.

Table 7: Allowable In-Plane Shear Strength (Pounds per Foot) for SIP Shear Walls (Wind and Seismic Loads in Seismic Design Categories D, E and F)[2,3]

Spline Type[4]	Nominal SIP Thickness (in.)	Minimum Facing Connections[3,5]			Shear Strength (plf)
		Chord[3]	Plate[3]	Spline[4]	
Block or Surface Spline	6.5	0.131"x 2-1/2" nails, 3" oc (3/8" edge distance)	0.131"x 2-1/2" nails, 3" oc (3/8" edge distance)	0.131"x 2-1/2" nails, 3" oc (23/32" thick, 3" wide spline)	900

[1] Maximum shear wall dimensions ratio shall not exceed 2:1 (height: width) for resisting wind or seismic loads.
[2] Maximum shear wall dimension ratio shall not exceed 1:1 (height: width) for resisting wind or seismic loads.
[3] Chords, hold downs and connections to other structural elements must be designed by a registered design professional in accordance with accepted engineering practice.
[4] Spline type at interior panel-to-panel joints only. Solid chord members are required at each end of each shear wall segment.
[5] Required connections must be made on each side of the panel. Dimensional or engineered lumber shall have an equivalent specific gravity of 0.42 or greater.

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**Table 8: Allowable In-Plane Shear Strength (Pounds per Foot)
for Horizontal Diaphragms Subjected to Wind or Seismic Loading**

Nominal SIP Thickness (in.)	Minimum Connections			Shear Strength (plf)	Max. Aspect Ratio
	Block Spline[1] (Figure 3a)	Boundary[2] (Figure 3b)			
		Support	Spline		
8.25	0.131” x 2-1/2” nails, 6” oc 7/16” x 3” x 7-3/8” OSB Surface Spline	10” Length, 0.190” shank diameter, 0.255” thread o.d., 2.750” thread length 0.625” head diameter SIP Screw 6” oc	0.131” x 2-1/2” nails, 6” oc	265	3:1
	0.131” x 2-1/2” nails, 4” oc 7/16” x 3” x 7-3/8” OSB Surface Spline	10” Length, 0.190” shank diameter, 0.255” thread o.d., 2.750” thread length 0.625” head diameter SIP Screw 4” oc	0.131” x 2-1/2” nails, 4” oc	330	3:1
	0.131” x 2-1/2” nails, 2” oc staggered 3/8” (Figure 3c) 7/16” x 3” x 7-3/8” OSB Surface Spline	10” Length, 0.190” shank diameter, 0.255” thread o.d., 2.750” thread length 0.625” head diameter SIP Screw 3” oc	0.131” x 2-1/2” nails, 2” oc staggered 3/8” (Figure 3c)	575	3:1

[1]Top spline or block spline only at interior panel-to-panel joints. Specified fasteners are required on both sides of panel joint through the top surface only, as shown in Figure 3a.
[2] Boundary spline shall be solid lumber 1.5 in. wide minimum and have a specific gravity of 0.42 or greater. Specified fasteners are required through both facings as shown in Figure 3b.

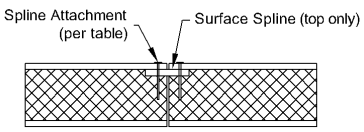

Figure 3a: Surface Spline

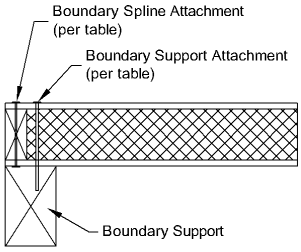

Figure 3b: Boundary

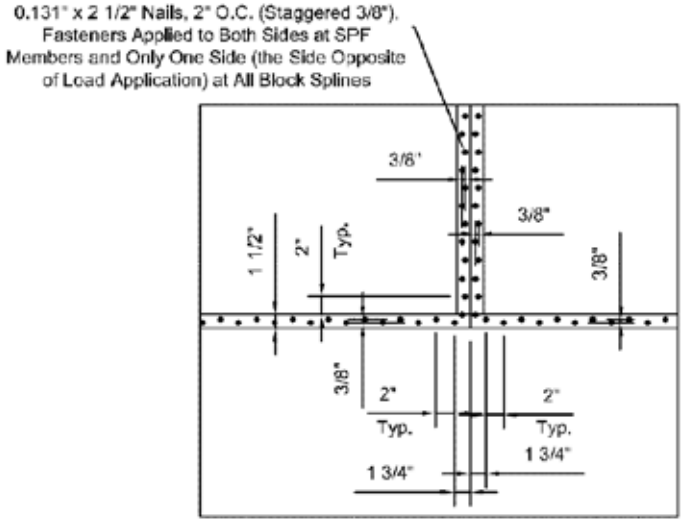

Figure 3c: Boundary Spline

Figure 3: Diaphragm Connection Types

This listing report is intended to indicate that NTA Inc. has evaluated product described and has found it to be eligible for labeling. Product not labeled as specified herein is not covered by this report. NTA Inc. makes no warranty, either expressed or implied, regarding the product covered by this report.

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Listing Report: **PSC121907-22**

Table 9: Component Material Sources

Facing	Core	Adhesive
Ainsworth Group of Companies Suite 3194 Bentall 4 1055 Dunsmuir Street Vancouver BC, Canada V7X 1L3	ACH Corporation Plant U-37 - Fond du Lac, WI	Ashland Specialty Chemical Company 5200 Blazer Parkway Dublin, OH 43017
Georgia-Pacific 9918 Buford Bridge Road Fairfax, SC 29827	Atlas EPS, A Division of Atlas Roofing Corporation 8240 Byron Center Road SW Byron Center, MI 49315	Foam Supplies, Inc. 4387 N. Rider Trail Earth City, MO 63045
Louisiana-Pacific Corporation Sagola, MI Sales and Marketing by: Affiliated Resources, Inc. River Forum 1 4380 SW Macadam Avenue, Suite 200 Portland, OR 97239	Benchmark Foam Inc. 401 Pheasant Ridge Drive Watertown, SD 57201	Rohm and Haas Company 5005 Barnard Mill Road Ringwood, IL 60072
Tolko Industries, Ltd. 3203 30th Avenue Vernon BC, Canada V1T 6M1	Insulfoam, a Carlisle Company 1507 Sunburst Lane Mead, NE 68041 (I-41)	
	Iowa EPS Products, Inc. 5554 N.E. 16th Street Des Moines, IA 50313	
	OPCO, Inc. P.O. Box 101 Latrobe, PA 15650	
	Plymouth Foam 1 Southern Gateway Drive Gnadenhutten, OH 44629	
	Polar Industries, Inc. 32 Gramar Avenue Prospect, CT 06712	

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