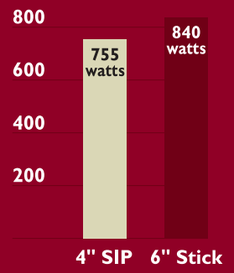
O R N L T E S T R E S U L T S

WHOLE-ROOM ENERGY USE

Lower watts = lower energy cost

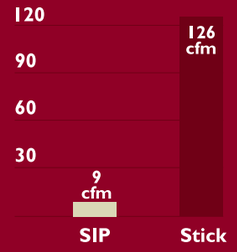


Airtightness relates directly to durability and energy efficiency.

An integral part of the SIP building system is properly sealed joints. One reason for the high performance of the SIP test room is that the joints were properly sealed. When panel joints are sealed properly to prevent air infiltration and exfiltration, moisture is prevented from entering the building envelope and long-term durability and energy efficiency is ensured.

WHOLE-ROOM AIR INFILTRATION

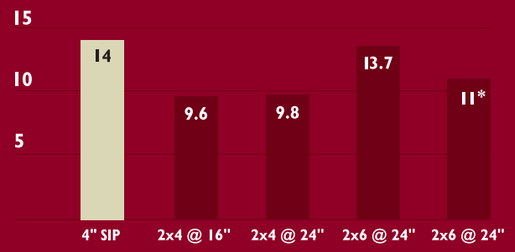
Lower cfm = higher comfort + lower energy cost



Recent tests at Oak Ridge National Laboratory (ORNL) confirm the super airtightness of SIP construction.

Under blower door testing, a room with four-inch SIP walls, a SIP ceiling, a window, a door, pre-routed wiring chases, and electrical outlets showed 90% less air leakage than an otherwise identical room built with 2x6 studs, OSB sheathing, fiberglass insulation, and drywall. At 50 pascals of negative pressure, the wood-framed room leaked 126 cubic feet of air per minute (CFM), while the SIP room was calculated to leak only 9 CFM.

WHOLE-WALL R-VALUE



SIP walls trounce conventional fiberglass methods in "whole-wall R-value" comparisons.

This chart shows a realistic comparison between SIP wall and stud wall thermal performance. Superior design enables even a 4-inch SIP wall to outperform the fatter 2x6 stud wall, despite the stud wall's nominally higher-rated insulation. The 4-inch SIP wall beats the 2x4 stud wall by R-4, providing 40% more thermal resisitance.

Whole Wall R-value comparisons between 3.5 inch EPS core SIP wall and conventional 2 x 4 and 2 x 6 wood frame walls with fiberglass batt insulation.

Source: Jan Kośny, André Desjarlais, and Jeff Christian, ORNL. From Figure 9, Whole Wall Rating/Label for Structural Insulated Panel: Steady-State Thermal Analysis. June 4, 1999.

* Test shows that in the "worst case commonly found of procedures for installing batt insulation" the performance drops to R-11. This is a result of common installation imperfections such as "rounded shoulders, 2% cavity voids, compression around wiring, and paper facers stapled to the inside of studs."

From Table 4, How Imperfections Affect the Whole Wall R-value of 2 x 6 Batt-Insulated Wall. ORNL.

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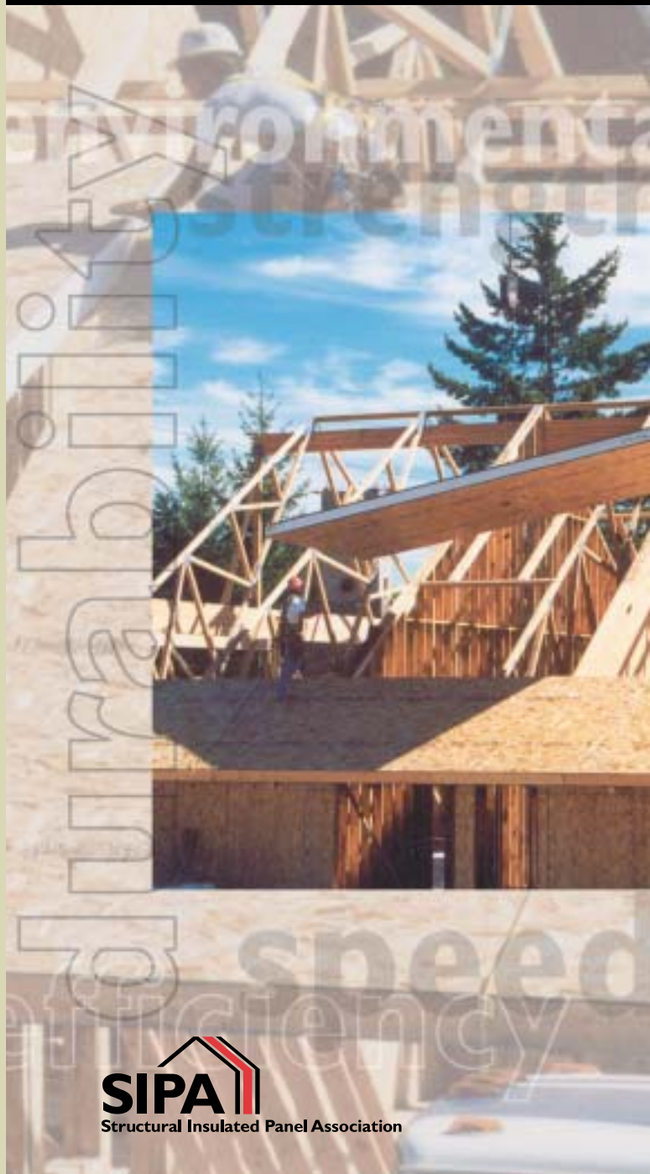
SIP solutions for commercial construction



SIPA
Structural Insulated Panel Association

Building with SIPs solves many of the problems designers, builders, and building owners face every day. Here are a few examples of current concerns heard across the country and some solutions building with SIPs provides.

Speeds Construction Time

As a builder facing escalating costs for workers compensation and insurance premiums, I'm looking for ways to reduce construction time and control my labor costs without compromising the quality I provide for my clients. How can building with SIPs help me control costs and improve my financial performance?


TEWKSBURY COUNTRY CLUB

Building with SIPs speeds up construction time dramatically saving labor costs, reducing loan cost overhead, pilferage, and waste disposal costs. Faster construction with less labor reduced construction time and costs, providing an opportunity to build more projects in a year, resulting in greater profit opportunities for your company.

Since SIPs are extremely energy efficient, you will also pay less for the heating and air conditioning systems. Other savings will result from fewer callbacks, less finishing and trim cost because walls are consistently straight and flat.

Environmentally Friendly

My client wants an environmentally sound, "green" building. What are the green attributes of SIP construction?

In addition to the lower energy use of SIP buildings resulting in fewer carbon emissions, SIPs are made with environmentally safe materials including oriented strand board (OSB), foam insulation and sealants. OSB skins are made using smaller, faster growing tree species such as aspen and southern yellow pine, a renewable resource. The foam core insulation has extremely low vapor permeability, and no physical degradation over time. The SIP system is 15 times more airtight than typical wood-frame construction resulting in much less energy loss. That puts SIP construction on better terms with the environment throughout its total life cycle, making it a key component of sustainable building practices and qualifying SIPs for most green building programs.


WARREN WILSON COLLEGE ECODORM

Other environmental benefits include a reduction in the size and cost of the heating and cooling distribution system, and greatly reduced job site waste.

Saves Energy

My client is very concerned about energy costs. How can building with SIPs ensure low monthly energy bills?


BOY SCOUTS OF AMERICA
PACIFIC HARBOR COUNCIL

Buildings in developed countries are responsible for 40-50% of all delivered energy and the majority of energy use (60% on average) is heating energy. The SIP building system reduces energy consumption by 50%. Ongoing research at Oak Ridge National Laboratory shows that in terms of real performance, a careful comparison of wall systems shows SIPs out perform traditional wood-frame construction in "Whole-Wall R-Value." See nearby tables. Continuous improvement research efforts show that SIP buildings can achieve energy efficiency improvements in the 70% range when combined with other energy-efficient systems such as energy-efficient hot water heaters and well-designed HVAC systems.

SIPs' superior thermal performance significantly limits air infiltration, reducing heating and cooling system costs, while increasing comfort. An added benefit is much lower energy bills for your clients.

Strong and Durable

Our operation is based in a part of the country that gets a lot of snow in the winter and more than our share of storms and high winds year-round. How do SIPs stand up to severe weather conditions?


SCHOOL

SIP buildings can be engineered to meet or exceed building code requirements in all areas of the country susceptible to severe storms and hurricanes.

SIPs can be engineered to meet or exceed just about any building design requirements for severe storm and high wind areas. Structurally, a structural insulated panel is similar to a steel I-beam. The skins are adhesively bonded to a solid foam core over the entire panel surface. The skins act like the flanges of an I-beam, and the rigid core provides the web of the I-beam configuration. This composite assembly results in increased stiffness, shear strength, and predictable performance. During site assembly, the panel edges are fastened to OSB or lumber splines, further strengthening the overall structure.

Not only do test results show panels are stronger than wood-framed construction, but performance during natural disasters has proven it time and again.

Because of the inherent airtightness of the SIP building system, and proper joint sealing, moisture is prevented from entering the building envelope and long-term durability is ensured.

Temperature Control

Temperature control is a key consideration for many commercial buildings. How can building with SIPs help?


KAISER HORSE FACILITY


CRAVE BROTHERS CHEESE

The superior climate control offered by SIPs is a result of high thermal performance and low air infiltration inherent in SIP construction. Using a heat recovery ventilation system will enable precise control of the air that enters your building and is vented. SIP construction also allows for smaller, more efficient HVAC systems that save on first cost and gets the job done using less energy, significantly reducing heating and cooling costs and creates a quiet, draft-free environment that improves employee comfort and productivity.