SIPs and the 2009 IECC

In January 2009, the International Code Council introduced the 2009 International Energy Conservation Code (IECC), boasting a significant 12 to 15 percent increase in residential energy efficiency compared to its 2006 counterpart. Compliance with the 2009 IECC, now adopted by local jurisdictions nationwide, may necessitate adjustments in residential building practices. To meet these heightened standards, an increasing number of builders are turning to structural insulated panels (SIPs) as a straightforward and cost-effective solution for constructing energy-efficient building enclosures. SIPs offer both time and cost savings in meeting the requirements of the 2009 IECC.

Residential Building Enclosures

The 2009 IECC mandates higher insulation and lower fenestration U-factors in specific climate zones (refer to Table 402.1.1). Structural insulated panels (SIPs) offer continuous insulation, aiding builders in meeting these requirements through the total UA alternative method (Section R402.1.4) or the simulated performance alternative (Section R405).

The total UA alternative method adjusts for thermal bridging in wood frame wall assemblies, allowing SIPs with a nominal R-value lower than cavity insulation requirements in some cases (Section R402.1.4). Alternatively, the simulated performance alternative utilizes energy modeling software to compare SIP home energy usage with that of a standard reference design.

2009 IECC RESIDENTIAL CODE COMPLIANCE WITH SIPS

Climate Zone	2009 IECC Wood Frame R-Value	SIP Wall Tickness (EPS/PUR/XPS)	2009 IECC Ceiling R-Value	SIP Roof Tickness (EPS/PUR/XPS)
1	13	4”/4”/4”	30	8” - 10”/6”/6”
2	13	4”/4”/4”	30	8” - 10”/6”/6”
3	13	4”/4”/4”	30	8” - 10”/6”/6”
4 except Marine	13	4”/4”/4”	38	10”/8”/8”
5 and Marine 4	20 or 13 + 5	6”/4”/4”	38	10”/8”/8”
6	20 or 13 + 5	6”/4”/4”	49	12”/8”/10”
7,8	21	6”/4”/4”	49	12”/8”/10”

SIP R-values can vary among manufacturers and based on actual SIP thickness. The provided table reflects minimum R-values. For precise R-value information and code compliance, consult SIP manufacturers. Calculations are derived from the Total UA Alternative method (IECC, Section R402.1.4) using REScheck.

Under the residential performance path, the building enclosure requirements have been elevated in the 2009 IECC. Builders can no longer substitute efficient HVAC equipment for building envelope performance, and the assumed window area of the standard reference design has been reduced to 15 percent of the home's floor area (refer to Table 405.5.2). Embracing the performance path, the continuous insulation and airtightness provided by a SIP building enclosure serve as valuable assets for builders striving to achieve the necessary energy performance standards.

Whole House Air Infiltration

A significant addition to the 2009 IECC involves assessing whole-house air infiltration through either blower door testing or visual inspection of the building enclosure (Section 402.4.2). Builders opting for blower door testing must achieve an air infiltration rate of 7 air changes per hour at 50 Pa (ACH50) or lower. A SIP building enclosure installed to manufacturer specifications readily meets this level of airtightness.

Alternatively, building inspectors can visually confirm proper air sealing at various locations listed in Table R402.4.2. Insulation must align fully with an air barrier and be correctly installed, addressing often overlooked areas such as small cavities, knee walls, and behind showers. SIPs provide continuous insulation fully enclosed with OSB—a code-compliant air barrier. With a full SIP building enclosure, numerous problematic areas are within conditioned space and necessitate no additional effort.

Duct Insulation and Sealing

According to Section R403.2.1, supply ducts require insulation with R-8 duct insulation, while all other ducts need R-6 insulation unless they reside in conditioned space. Avoiding this requirement is possible by placing ducts in the conditioned attic formed by a SIP roof. If ducts and the air handler are within conditioned space, builders can circumvent the need for duct leakage testing (Section R403.2.2).

www.preflexinc.com
3411 3rd Ave. San Diego, CA. 92103, USA
+1 866 784 4462