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SIPs and the 2009 IECC

In January of 2009, the International Code Council released the 2009 International Energy Conservation Code (IECC). The 2009 version of the code marks a 12 to 15 percent increase in residential energy efficiency over the 2006 version. For residential builders, complying with the 2009 IECC may require changes in their current building practices as it is adopted by local jurisdictions across the country. Faced with these additional measures, more and more builders are looking at structural insulated panels (SIPs) as a simple solution for energy-efficient building enclosures. SIPs can save builders time and money when it comes to meeting the 2009 IECC.

Residential Building Enclosures

The prescriptive building enclosure requirements in the 2009 IECC require more insulation and lower fenestration U-factors in some climate zones (Table 402.1.1). SIPs provide continuous insulation that can help builders meet these increased requirements through either the total UA alternative method (Section R402.1.4) or the simulated performance alternative (Section R405).

The total UA alternative method accounts for the thermal bridging in wood frame wall assemblies and in some cases allows builders to use SIPs with a nominal R-value lower than what is specified for cavity insulation (Section R402.1.4). Under the simulated performance alternative, energy modeling software is used to compare the energy use of a SIP home to the standard reference design.

2009 IECC RESIDENTIAL CODE COMPLIANCE WITH SIPS

Climate Zone	2009 IECC Wood Frame Wall R-Value	SIP Wall Thickness (EPS/PUR/XPS)	2009 IECC Ceiling R-Value	SIP Roof Thickness (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 and 8	21	6”/4”/4”	49	12”/8”/10”

R-values may vary by SIP manufacturer and will vary by actual SIP thickness. Table is based on minimum R-values. Please consult SIP manufacturers for individual product R-value information and code compliance. Calculations based on Total UA Alternative method (IECC, Section R402.1.4) using REScheck.

Building enclosure requirements under the residential performance path have also been increased in the 2009 IECC. Builders can no longer trade off efficient HVAC equipment for building envelope performance, and the assumed window area of the standard reference design has been decreased to 15 percent of the home’s floor area (Table 405.5.2). Under the performance path, the continuous insulation and airtightness of a SIP building enclosure offer builders a helpful boost towards meeting the required energy performance.

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Whole House Air Infiltration

A major addition to the 2009 IECC is the examination of whole house air infiltration by either blower door testing or a visual inspection of the building enclosure (Section 402.4.2). Builders opting for blower door testing must reach an air infiltration rate of 7 air changes per hour at 50 Pa (ACH50) or less. A SIP building enclosure that is installed to the manufacturer's specifications will easily meet this level of airtightness.

Alternately, a building inspector can visually verify proper air sealing at a number of locations listed in Table R402.4.2. Insulation must be in full alignment with an air barrier and properly installed in often ignored situations such as small cavities, knee walls, and behind showers. SIPs deliver continuous insulation that is fully enclosed with OSB—a code compliant air barrier. With a full SIP building enclosure, many problem areas are inside conditioned space and do not require any additional effort.

Duct Insulation and Sealing

Supply ducts need to be insulated with R-8 duct insulation, and all other ducts need to be insulated with R-6 insulation unless they are located in conditioned space (Section R403.2.1). Placing ducts in the conditioned attic created by a SIP roof avoids this requirement. If the ducts and air handler are located in conditioned space, the builder can avoid the duct leakage testing requirement as well (Section R403.2.2).

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