

SIPs and the 2012 IECC

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In May of 2011, the International Code Council released the 2012 International Energy Conservation Code (IECC). The 2012 version of the code contains a number of increased energy efficiency requirements, accounting for an approximately 30 percent rise in energy efficiency for residential buildings over the 2006 IECC and 15 percent over the 2009 IECC.

For residential builders, the 2012 IECC may require changes in their current building practices as it is adopted by local jurisdictions across the country. As energy standards increase, 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 2012 IECC.

Insulated building enclosure

The 2012 IECC raises the required insulation levels for some climate zones. In extremely cold climates, exterior insulation is required (Table 402.1.1). 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.

SIPs 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. Under the simulated performance alternative, energy modeling software is used to compare the energy use of a SIP home to the standard reference design.

2012 IECC Residential Code Compliance with SIPs

Climate Zone	2012 IECC Wood Frame Wall R-Value	SIP Wall Thickness (EPS/PUR/XPS)	2012 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"	38	10" / 8" / 8"
3	20 or 13+5	6" / 4" / 4"	38	10" / 8" / 8"
4 except Marine	20 or 13+5	6" / 4" / 4"	49	12" / 8" / 10"
5 and Marine 4	20 or 13+5	6" / 4" / 4"	49	12" / 8" / 10"
6	20+5 or 13+10	6" - 8" / 4" - 6" / 6"	49	12" / 8" / 10"
7 and 8	20+5 or 13+10	6" - 8" / 4" - 6" / 6"	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.



Whole house air infiltration

The 2012 IECC requires that all homes undergo a blower door test to measure air infiltration. In climate zones 1 and 2, homes must test at 5 air changes per hour at 50 Pa (ACH50) or less, and at 3 ACH50 or less in all other climate zones (Section R402.4.1.2).

Whereas wood frame wall systems require extra air sealing measures, a SIP building envelope that is installed to the manufacturer's specifications will easily meet these air infiltration standards.

Complete air barrier

In addition to verifying air infiltration by blower door testing, Table R402.4.1.1 lists a number of locations where the air barrier and insulation are visually inspected. 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.

Duct leakage limits have been reduced in the 2012 IECC (Section R403.2.2). If the ducts and air handler are located in conditioned space, the builder can avoid the duct leakage testing requirement as well.

