

Product Information Bulletin 291

Plasti-Fab EPS Product Solutions - 2012 IECC Requirements

Product Information Bulletin

2012 International Energy Conservation Code

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This bulletin summarizes Plasti-Fab® expanded polystyrene (EPS) product solutions available for energy efficient design of buildings required to comply with the 2012 International Energy Efficiency Code.

The IECC table provides maximum U-factor assemblies and minimum R-value for the thermal insulation component in the wall assembly for various climatic zones throughout Canada and the US. Table 1 provides requirements for residential buildings and Table 2 provides requirements for commercial buildings.

Table 1 – 2012 IECC – U-factor & Thermal Resistance Requirements for Residential Buildings

| Climate Zone | Ceiling | | Wood Frame Wall | | Basement Wall | |
|-----------------|--------------------|---------------------|-----------------------------------------|---------------------|--------------------|---------------------|
| | Insulation R-value | Equivalent U-factor | Insulation R-value | Equivalent U-factor | Insulation R-value | Equivalent U-factor |
| 1 | 30 | 0.035 | 13 | 0.082 | 0 | 0.360 |
| 2 | 38 | 0.030 | 13 | 0.082 | 0 | 0.360 |
| 3 | 38 | 0.030 | 20 or 13+5 ⁴ | 0.057 | 5/13 | 0.091 |
| 4 except Marine | 49 | 0.026 | 20 or 13+5 ⁴ | 0.057 | 10/13 | 0.059 |
| 5 and Marine 4 | 49 | 0.026 | 20 or 13+5 ⁴ | 0.057 | 15/19 | 0.050 |
| 6 | 49 | 0.026 | 20+5 ⁴ or 13+10 ⁴ | 0.048 | 15/19 | 0.050 |
| 7 and 8 | 49 | 0.026 | 20+5 ⁴ or 13+10 ⁴ | 0.048 | 15/19 | 0.050 |

Table 2 – 2012 IECC – U-factor & Thermal Resistance Requirements for Commercial Buildings

| Climate Zone | Ceiling | | Wood Frame Wall | | Basement Wall | |
|-----------------|--------------------|---------------------|---------------------------|---------------------|--------------------|---------------------|
| | Insulation R-value | Equivalent U-factor | Insulation R-value | Equivalent U-factor | Insulation R-value | Equivalent U-factor |
| 1 | 30 | 0.035 | 13+3.8 ⁴ or 20 | 0.082 | 0 | 0.360 |
| 2 | 38 | 0.030 | 13+3.8 ⁴ or 20 | 0.082 | 0 | 0.360 |
| 3 | 38 | 0.030 | 13+3.8 ⁴ or 20 | 0.057 | 5/13 | 0.091 |
| 4 except Marine | 49 | 0.026 | 13+3.8 ⁴ or 20 | 0.057 | 10/13 | 0.059 |
| 5 and Marine 4 | 49 | 0.026 | 13+5 ⁴ or 20 | 0.057 | 15/19 | 0.050 |
| 6 | 49 | 0.026 | 13+7.5 or 20+3.8 | 0.048 | 15/19 | 0.050 |
| 7 and 8 | 49 | 0.026 | 13+15.6 or 20+10 | 0.048 | 15/19 | 0.050 |

Table notes:

1. Equivalent U-factor is the maximum overall heat transfer coefficient through the building component including the warm side and cold side air films in units of Btu/(h·ft²·°F) [multiply by 5.678 to convert to SI units of W/(m²·K)].
2. R-value is the minimum thermal resistance in units of (ft²·hr·°F)/BTU for the insulation component in the assembly only [multiply by 0.176 to convert to SI units of (m²·K)/W].
3. Continuous insulation (c.i.) is continuous across all structural members without thermal bridges other than fasteners and service openings.
4. First value is the minimum cavity insulation and the second value is the minimum continuous insulation.

2012 IECC provides two methods of establishing prescriptive building envelope component compliance.

1. Minimum R-values of insulation of the added insulation in framing cavities and continuous insulation only.
2. Maximum U-factor for the entire assembly.

The requirements for wood-frame wall assemblies meeting 2012 IECC for all Climatic Zones can be met by providing the minimum thermal insulation requirement as noted. PlastiSpan[®], DuroSpan or ENERGREEN[®] insulation can be used to meet the required continuous insulation requirements for wood-frame wall assemblies in Tables 1 and 2.

Maximum U-factor is the inverse of the **overall R-value** of a building assembly calculated as per **ASHRAE 2009 Handbook - Fundamentals**. The overall R-value of an assembly is calculated using the parallel-path flow method per ASHRAE 2009 as described in the equation below.

$$R_{Parallel} = \frac{100\%}{\frac{\% \text{ with Framing}}{R_F} + \frac{\% \text{ Area without Framing}}{R_C}}$$

Plasti-Fab manufactures energy efficient building systems that meet maximum U-factor requirements in Table 1. The Advantage ICF System[®], an insulating concrete forming (ICF) system, provides a continuous layer of expanded polystyrene (EPS) insulation over the interior and exterior face of a solid concrete core. The Insulspan[®] SIP System is a structural insulating panel (SIP) system consisting of a continuous core of expanded polystyrene (EPS) insulation with SIP grade oriented strand board (OSB) structurally laminated to both faces.

Table 3 - Meeting 2012 IECC Requirements with Plasti-Fab Building Systems

| Advantage ICF System | | Insulspan SIP System | | 4 ½" SIP | | 6 ½" SIP | | 12 ¼" SIP | |
|------------------------------|----------------|----------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Component | R _i | Component | R _F | R _i | R _F | R _i | R _F | R _i | R _i |
| Outside Air Film | 0.17 | Outside Air Film | 0.17 | 0.17 | 0.17 | 0.17 | 0.17 | 0.17 | 0.17 |
| Metal Siding | 0.62 | Metal Siding | 0.62 | 0.62 | 0.62 | 0.62 | 0.62 | 0.45 | 0.45 |
| Type 2 EPS Insulation | 10.61 | Sheathing Paper | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 |
| 6" Concrete Wall | 0.35 | Structural OSB Facing | 0.61 | 0.61 | 0.61 | 0.61 | 0.61 | 0.61 | 0.61 |
| Type 2 EPS Insulation | 10.61 | EPS Insulation Core | ---- | 13.59 | ---- | 21.09 | ---- | ---- | 42.66 |
| ½" Gypsum Board | 0.44 | Wood-Framing @ 48" | 4.30 | ---- | 6.74 | ---- | 13.80 | ---- | ---- |
| Inside Air Film | 0.68 | Structural OSB Facing | 0.61 | 0.61 | 0.61 | 0.61 | 0.61 | 0.61 | 0.61 |
| Total R-value | 23.5 | ½" Gypsum Board | 0.44 | 0.44 | 0.44 | 0.44 | 0.44 | 0.44 | 0.44 |
| U-factor | 0.042 | Inside Air Film | 0.68 | 0.68 | 0.68 | 0.68 | 0.68 | 0.62 | 0.62 |
| | | R-value Sub-Totals | 7.49 | 16.79 | 9.94 | 24.29 | 16.77 | 45.63 | |
| | | % Area of Wall | 14% | 86% | 14% | 86% | 9% | 91% | |
| | | Total R-value | 14.3 | | 20.2 | | 39.5 | | |
| | | U-factor | 0.070 | | 0.048 | | 0.025 | | |

Table notes:

1. Overall R-value of a wall assembly built with the Advantage ICF System is calculated using the isothermal planes method since there is a continuous layer of expanded polystyrene (EPS) insulation over the interior and exterior face of a solid concrete core with no thermal bridges.
2. The Advantage ICF System wall meets maximum U-factor requirement for Climate Zones 1 to 8.
3. Maximum U-factors for the Insulspan SIP System assemblies are calculated using the parallel paths method described above and framing percentages are as per NBC 2010, Appendix Table A-9.36.2.4.(1)A.
4. Insulspan SIP System wall assemblies meet maximum U-factor per Tables 1 and 2 as follows:
 - a. The 4 ½" SIP complies for Climate Zones 1 and 2 for residential and commercial buildings.
 - b. The 6 ½" SIP complies for Climate Zone 3 to 8 for residential and commercial residential buildings.
5. Insulspan SIP System roof assemblies meet maximum U-factor per Tables 1 and 2 as follows:
 - a. The 12 ¼" SIP complies for Climate Zone 1 to 8 for residential and commercial residential buildings.