

Product Information Bulletin

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Plasti-Fab EPS Product Solutions - 2012 OBC, MMAH SB-10

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Plasti-Fab manufactures expanded polystyrene (EPS) product solutions that meet energy efficiency requirements in the 2012 Ontario Building Code. This bulletin summarizes energy efficiency requirements applicable to buildings with residential occupancy as per 2012 OBC, Division B, Part 12, **Resource Conservation and Environmental Integrity**.

2012 OBC, Article 12.2.1.1. Energy Efficiency Design Before January 1, 2017:

- 1) This article applies to construction for which a permit has been applied for before January 1, 2017.
- 2) Except as provided in Sentences (3) and (4), the energy efficiency of all buildings shall conform to MMAH Supplementary Standard SB-10, "Energy Efficiency Requirements".
- 3) Except as provided in Sentence (4), the energy efficiency of a *building* or part of a *building of residential occupancy* that is within the scope of Part 9 and is intended for occupancy on a continuing basis during the winter months shall,
 - a) meet the performance level that is equal to a rating of 80 or more when evaluated in accordance with NRCan "EnerGuide for New Houses: Administrative and Technical Procedures", or
 - b) conform to Chapters 1 and 2 of MMAH Supplementary Standard SB-12, "Energy Efficiency of Housing".
- 4) This article does not apply to,
 - a) A *farm building*,
 - b) a *building* that does not use electrical power or fossil fuel,
 - c) a manufactured *building* described in Article 9.1.1.9., or
 - d) a seasonal recreational *building* described in Section 9.36. or 9.38.

2012 OBC, Sentence 12.2.1.1.(2) requires energy efficiency design of all buildings **except** buildings with residential occupancy within the scope of Part 9 and buildings as per Sentence 12.2.1.1.(4) to comply with MMAH Supplementary Standard SB-10, **Energy Efficiency Requirements**, using one of the following compliance options:

- a) Exceed by not less than 25% the energy efficiency levels attained by conforming to the 1997 MNECB.
- b) Exceed by not less than 5% the energy efficiency levels attained by conforming to ANSI/ASHRAE/IES 90.1.
- c) Achieve energy efficiency levels attained by conforming to ANSI/ASHRAE/IES 90.1 and of MMAH SB-10, Division 2, Chapter 2. **Note:** Meeting this option will also meet the requirements of option b) above.
- d) Achieve energy efficiency levels attained by conforming to 2011 NECB and MMAH SB-10, Division 2, Chapter 3.

The table below provides ASHRAE 90.1 requirements as modified in MMAH SB-10, Division 2, Chapter 2.

Table 1 – MMAH SB-10, Division 2, Chapter 2, Tables SB5.5-5 to SB5.5-7

Climate Zone	Walls Above Grade							
	Nonresidential				Residential			
	U-factor - Note 1		R-value - Note 2		U-factor - Note 1		R-value - Note 2	
	Mass	Wood-Frame	Mass	Wood-Frame	Mass	Wood-Frame	Mass	Wood-Frame
5	0.080	0.064	13.3 c.i.	13.0 + 7.5 c.i.	0.071	0.045	15.2 c.i.	13.0 + 10.0 c.i.
6	0.071	0.045	15.2 c.i.	13.0 + 10.0 c.i.	0.060	0.045	20.0 c.i.	13.0 + 10.0 c.i.
7	0.060	0.045	20.0 c.i.	13.0 + 10.0 c.i.	0.060	0.045	20.0 c.i.	13.0 + 10.0 c.i.

Table notes:

1. 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. A mass wall is defined as a wall with a heat capacity (HC) exceeding 7 Btu/(ft²·°F). A 6" concrete core Advantage ICF System[®] wall has a HC of 13 Btu/(ft²·°F) based upon concrete specific heat of 0.18 Btu/(lb_m·°F).

ASHRAE 90.1, clause 5.5.3 provides two methods of establishing prescriptive building envelope component compliance.

1. Minimum rated R-values of insulation for the thermal resistance of the added insulation in framing cavities and continuous insulation only. Specifications listed in Normative Appendix A for each class of construction shall be used to determine compliance.
2. Maximum U-factor; C-factor, or F-factor for the entire assembly. The values for typical construction assemblies listed in Normative Appendix A shall be used to determine compliance.

The requirements for wood-frame wall assemblies meeting the ASHRAE 90.1 for all Climatic Zones can be met by providing the minimum thermal insulation requirement as noted. PlastiSpan® or DuroFoam® insulation can be used to provide the required continuous insulation requirements for wood-frame wall assemblies in Table 1.

The following exception to clause 5.5.3 is also provided: For assemblies significantly different from those in Appendix A, calculations shall be performed in accordance with the procedures required in Appendix A. Appendix Section A9 permits calculation of the maximum U-factor for a wall or roof assemblies different than those provided in Appendix A using the parallel paths method.

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 using the equation below.

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

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 2 - Meeting MMAH SB-10 Requirements with Plasti-Fab Building Systems

Advantage ICF System		Insulspan SIP System		6 ½" SIP		8 ¼" SIP	
Component	R _i	Component	R _F	R _i	R _F	R _i	
Outside Air Film	0.17	Outside Air Film	0.17	0.17	0.17	0.17	
Metal Siding	0.62	Metal Siding	0.62	0.62	0.62	0.62	
Type 2 EPS Insulation	10.61	Sheathing Paper	0.06	0.06	0.06	0.06	
6" Concrete Wall	0.35	Structural OSB Facing	0.61	0.61	0.61	0.61	
Type 2 EPS Insulation	10.61	EPS Insulation Core	----	21.09	----	35.16	
½" Gypsum Board	0.44	Wood-Framing @ 48"	6.74	----	8.89	----	
Inside Air Film	0.68	Structural OSB Facing	0.61	0.61	0.61	0.61	
Total R-value	23.5	½" Gypsum Board	0.44	0.44	0.44	0.44	
U-factor	0.042	Inside Air Film	0.68	0.68	0.68	0.68	
		R-value Sub-Totals	9.94	24.29	12.09	38.35	
		% Area of Wall	14%	86%	14%	86%	
		Total R-value	20.2		25.3		
		U-factor	0.049		0.039		

Table notes:

1. Overall R-value of a wall assembly built with the Advantage ICF System can be 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 meets maximum U-factor for mass wall per Table 1 for Climate Zones 5 to 7.
3. Maximum U-factors for the Insulspan SIP System assemblies are calculated using the parallel paths method described above.
4. The 6 ½" Insulspan SIP System wall assembly above meets maximum U-factor per Table 1 for nonresidential buildings in Climate Zone 5.
5. The 8 ¼" Insulspan SIP System wall assembly above meets maximum U-factor per Table 1 for Climate Zone 5 residential buildings and Climate Zones 6 and 7 for nonresidential and residential buildings.