

**CALIFORNIA ENERGY COMMISSION**1516 Ninth Street  
Sacramento, California 95814Main website: [www.energy.ca.gov](http://www.energy.ca.gov)**NOTIFICATION OF APPROVAL  
OF STANDARD U-FACTORS FOR INSULATED METAL PANEL ROOFS AND  
CEILINGS**

As part of the adoption of the *2005 Building Energy Efficiency Standards*, the California Energy Commission adopted Joint Appendix IV, which contains standard U-factor, C-factor and Thermal Mass data for roof, wall and floor construction assemblies (see page IV-1 of the Joint Appendices at:

[http://www.energy.ca.gov/title24/2005standards/2004-10-06\\_400-03-001-JAF.PDF](http://www.energy.ca.gov/title24/2005standards/2004-10-06_400-03-001-JAF.PDF)).

The data in Joint Appendix IV must be used for all residential and nonresidential compliance approaches, including the mandatory requirements, prescriptive envelope component approach, prescriptive overall envelope approach and performance approach for nonresidential, high-rise residential and hotel/motel buildings, and the mandatory requirements, prescriptive and performance approaches for low-rise residential buildings.

If a construction assembly is not adequately represented in Joint Appendix IV, an applicant may request approval by the Energy Commission's Executive Director for different data for that construction assembly. The approval of the Executive Director is based on the technical justification submitted by the applicant. Approved standard data for the construction assembly will be published as an addendum to Joint Appendix IV for use in all compliance approaches.

This Notice of Approval of Standard U-factor data for Insulated Metal Panel Roofs and Ceilings for use in Low-Rise Residential Buildings and for Type V Nonresidential Buildings authorizes the use of the data shown in the attached Tables IV.7a with the limitations in the description following the table. Table IV.7a is officially added as an addendum to Joint Appendix IV.

Approved by:

A handwritten signature in blue ink, consisting of stylized initials and a long horizontal flourish.

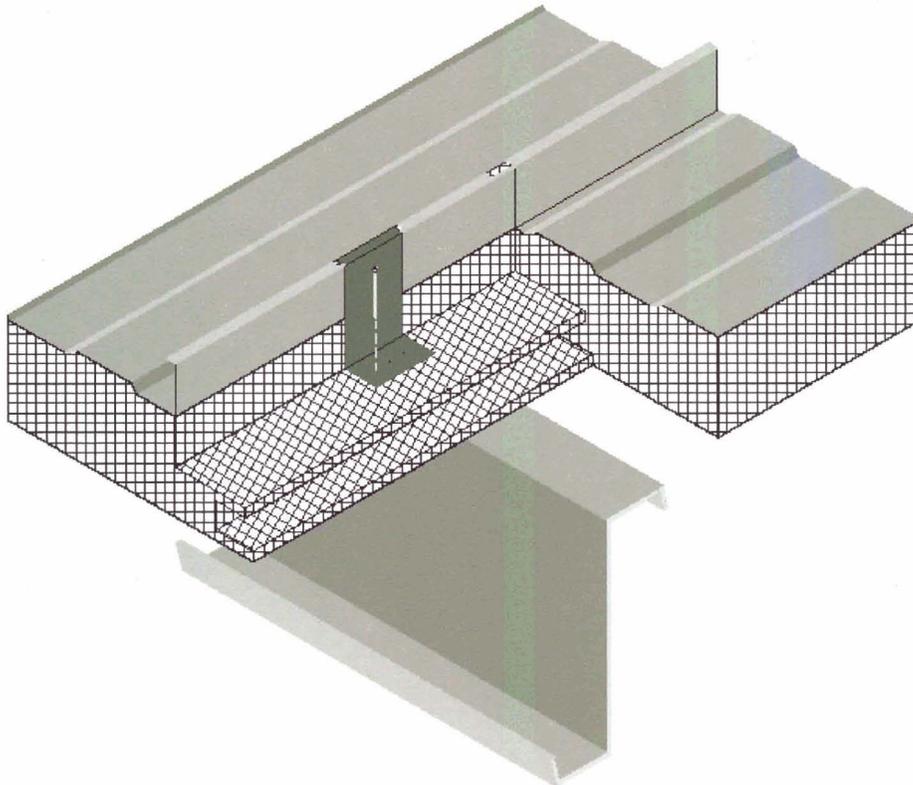
B. B. BLEVINS  
Executive Director

Dated 2-7-07

**Table IV.7a – U-factors of Insulated Metal Panel Roofs and Ceilings**

Panel Thickness	U-factor (Btu <sup>0</sup> F-ft <sup>2</sup> )	
	A	
2"	1	0.079
2 ½"	2	0.064
3"	3	0.054
4"	4	0.041
5"	5	0.033
6"	6	0.028

This table contains thermal performance data (U-factors) for foamed-in-place, insulated metal panel roofs and ceilings consisting of liquid polyurethane or polyisocyanurate injected between metal skins in individual molds or on fully automated production lines. Metal building construction is the most common application for this product where the metal panel is fastened to the frame of the structure. This table can only be used for insulated panels that are factory built. This table does not apply to panels that utilize polystyrene, or to field applied products such as spray applied insulations.



*Figure IV.7a – Insulated Metal Panel Roofs*

**Assumptions.** These data are calculated using the parallel path method documented in the 2001 ASHRAE Fundamentals. These calculations assume an exterior air film of R-0.17, light gauge metal exterior of R-0.0747, continuous insulation R-5.9 per inch, light gauge metal interior R-0.0747 and an interior air film (heat flow up) of R-0.61. The panels are assumed to be continuous with no framing penetration.