News

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Changes Proposed for Standard 90.1 Address Metal Buildings

ATLANTA – Changes to assembly descriptions and U-Factors regarding metal building assemblies are being considered in the 2010 version of Standard 90.1, expected to be published in the fall.

ANSI/ASHRAE/IESNA Standard 90.1-2007, *Energy Standard for Buildings Except Low-Rise Residential Buildings,* provides minimum requirements for the energy-efficient design of buildings except low-rise residential buildings.

The changes regarding metal buildings are among many being proposed for the 2010 standard. Some 43 addenda already have been approved, impacting the standard in a variety of ways from energy recovery to controls to daylighting.

The proposed changes are in Standard 90.1 Appendix A "Rated R-Value of Insulation and Assembly U-Factor, C-Factor and F-Factor Determinations." The revised Appendix A resulted from a Metal Building Task Group investigation of existing metal building stock that revealed that typical installation practices of the single and double-layer assemblies described in Appendix A compress insulation and thereby negatively affects the thermal performance of the assembly. The previously published R-Values/U-Factors did not reflect the thermal performance from such installation methods,

which typically yield lower R-Values and higher U-Factors. The proposed Appendix A adds revised modeling equations to estimate the performance of compressed insulation in metal building assemblies based on these less energy-efficient installation practices, as well as incorporates the modified R-Values/U-Factors for metal building assemblies that reflect these new modeling equations.

The Metal Building Task Group's investigation grew out of an ASHRAE appeals panel recommendation that SSPC 90.1 review expeditiously all available information to determine if the metal building assembly U-Factors in the current 90.1 Standard are appropriate.

The assembly descriptions and U-Factors proposed for inclusion in the new 90.1-2010 Standard appear below. This excerpt contains items from the first public review draft of addendum *bb* to Standard 90.1 that did not change in the second public review draft that was completed in late December. Items that received comments in the second public review draft will be discussed by the standard 90.1 committee at the ASHRAE Winter Conference in Orlando later this month.

ASHRAE, founded in 1894, is an international organization of some 50,000 persons. ASHRAE fulfills its mission of advancing heating, ventilation, air conditioning and refrigeration to serve humanity and promote a sustainable world through research, standards writing, publishing and continuing education.

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Metal Building Roofs

Single Layer. The rated R-value of insulation is for insulation installed perpendicular to and draped over purlins and then compressed when the metal roof panels are attached. A minimum R-3 thermal spacer block between the purlins and the metal roof panels is required, unless compliance is shown by the overall assembly U-factor.

Double Layer. The first rated R-value of insulation is for insulation installed perpendicular to and draped over purlins. The second rated R-value of insulation is for unfaced insulation installed above the first layer and parallel to the purlins and then compressed when the metal roof panels are attached. A minimum R-3 thermal spacer block between the purlins and the metal roof panels is

required, unless compliance is shown by the overall assembly U-factor.

Liner System (Ls). A continuous membrane is installed below the purlins and uninterrupted by framing members. Uncompressed, unfaced insulation rests on top of the membrane between the purlins. For multilayer installations, the last rated R-value of insulation is for unfaced insulation draped over purlins and then compressed when the metal roof panels are attached. A minimum R- 3 thermal spacer block between the purlins and the metal roof panels is required , unless compliance is shown by the overall assembly U- factor.

Insulation System	Rated R-Value of Insulation	Overall U-Factor for Entire Base Roof Assembly
Standing Seam Roofs with R-3 Thermal Spacer Blocks		
Single Layer	R-10	0.115
	R-11	0.107
	R-13	0.101
	R-16	0.096
	R-19	0.082
Double Layer	R-10 + R-10	0.088
	R-10 + R-11	0.086
	R-11 + R-11	0.085
	R-10 + R-13	0.084
	R-11 + R-13	0.082
	R-13 + R-13	0.075
	R-10 + R-19	0.074
	R-11 + R-19	0.072
	R-13 + R-19	0.068
	R-16 + R-19	0.065
	R-19 + R-19	0.060
Liner System	R-19 + R-11	0.035
	R-25 + R-11	0.031
	R-30 + R-11	0.029
	R-25 + R-11 + R-11	0.026
Standing Seam Roof without Thermal Spacer Blocks		
Liner System	R-19 + R-11	0.040
Thru-Fastened Roofs without Thermal Spacer Blocks		

Insulation System	Rated R-Value of Insulation	Overall U-Factor for Entire Base Roof Assembly
Single Layer	R-10	0.184
	R-11	0.182
	R-13	0.174
	R-16	0.157
	R-19	0.151
Liner System	R-19 + R-11	0.044

Metal Building Walls

Single Layer. The first rated R-Value of insulation is for insulation compressed between metal wall panels and the steel structure.

Insulation System	Rated R-Value of Insulation	Overall U-Factor for Entire Base Wall Assembly
Single Layer	R-10	0.186
	R-11	0.185
	R-13	0.162
	R-16	0.155
	R-19	0.147