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Date: December 5, 2006
To: Steve McGuinnes
Advanced Coating Systems, Inc.
From: Heinz Poppendiek
Subject: Erroneous R value representations by some manufactures and/or distributors of roof coatings

Our company has in recent times noted that some trade literature for the k and R values of roof coatings (including elastomeric materials) is seriously false. For example, the following performance characteristics appeared in an advertisement:

Steady State Heat Flux Measurements-Thermal Transmission Properties
ASTM C-177/ASTM C-1045
Roof Coating (at 5 mil thickness): k value .0454, R value = 22

First, we note that no units are listed after the k and R numbers. On the presumption that k is in Btu/hr ft²F, the k is reasonable. However, the definition of the thermal resistance (R value) of a coating having a thickness of δ , in feet is

$$R = \frac{\delta}{k}$$

Upon substituting, $\delta = .005"/12 = 0.000417$ ft and the above k value into this equations, one obtains,

$$R = \frac{.000417}{.0454} = 0.0092 \frac{\text{hr ft}^2\text{F}}{\text{Btu}}$$

a negligible value compared to the other thermal resistances in the thermal circuit.

Secondly, what the advertiser obviously did is to use the reciprocal of the k factor and define it as the R value, namely,

$$\frac{1}{0.0454} = 22$$

This procedure is wrong.

Thirdly, the value of using high solar reflectivity roof coatings is to reduce heat transfer into the building envelope in summertime conditions; in this way coatings can save energy, and not by introducing a coating thermal resistance into the thermal circuit that is negligible.

Regards,

Heinz Poppendiek

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