

# Revising LTTR

## Test method changes could affect polyisocyanurate's LTTR values

by Mark S. Graham

**Faced rigid board** polyisocyanurate insulation is the most popular type of insulation used in low-slope roof systems in the U.S. However, after years of debate, there still is no industry-wide consensus of an appropriate R-value for design purposes.

### PIMA QualityMark<sup>CM</sup>

Since 2004, polyisocyanurate insulation manufacturers in the U.S. have reported R-values using the Polyisocyanurate Insulation Manufacturers Association's (PIMA's) QualityMark certified R-value program. Within this program, R-values are determined and reported

In early 2012, PIMA indicated it would update the QualityMark program to include the new LTTR determination methods by the end of 2012.

But on Oct. 5, 2012, PIMA issued a press release indicating the QualityMark program would continue to follow current LTTR determination procedures (CAN/ULC-S770-03) throughout 2013 followed by implementation of the new multiple procedures Jan. 1, 2014. PIMA indicated this delay is necessary to allow adequate time to harmonize with existing methods and allow additional time for the industry to transition to the new methods.

### What does this mean?

U.S. polyisocyanurate insulation manufacturers' continued reliance on the LTTR method and PIMA's QualityMark program presents challenges and complications for polyisocyanurate insulation users, including roofing contractors, designers, specifiers, and building owners and operators.

With the delay in implementing CAN/ULC-S770-09 or ASTM C1303, it can be interpreted polyisocyanurate insulation does not comply with ASTM C1289's current edition (ASTM C1289-12<sup>e1</sup>) or its two previous editions (-12 and -11a). This especially is a concern if project specifications and contract documents require compliance with ASTM C1289's most recent editions.

Also, once implemented, it remains to be seen whether LTTR values will change from current LTTR values (meaning they will be lower). Another possibility is the new LTTR values could vary among manufacturers. Polyisocyanurate insulation manufacturers also may reformulate their products to offset lower-tested LTTR values, resulting in possible changes in products' physical properties

and Underwriters Laboratories Inc. and FM Global classifications.


This lack of information coming from PIMA and polyisocyanurate insulation manufacturers is of particular concern especially when considering some new construction and reroofing projects to be undertaken in 2014 already are in the preliminary design, specification, bidding or contract phases.

Finally, though the LTTR method of R-value determination and reporting may be considered appropriate for laboratory analysis and research comparisons, NRCA does not consider LTTR to be appropriate for roof system design where actual in-service R-values can be an important aspect of roof system performance.

### NRCA's recommendations

NRCA maintains its recommendation that designers specifying polyisocyanurate insulation determine thermal insulation requirements using an in-service R-value of 5.0 per inch thickness for heating conditions and 5.6 per inch thickness for cooling conditions. Designers should use the recommended in-service R-value for heating or cooling conditions based on the predominant condition for building use and climate where the specific building being considered is located.

Furthermore, NRCA recommends designers specify polyisocyanurate insulation by its desired thickness—not R-value—to avoid possible confusion during procurement.

More information about polyisocyanurate insulation is contained in *The NRCA Roofing Manual: Membrane Roof Systems—2012*. 

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using the long-term thermal resistance (LTTR) method. Currently, LTTR values are determined using CAN/ULC-S770-03, "Standard Test Method for Determination of Long-Term Thermal Resistance of Closed-Cell Thermal Insulating Foams."

The U.S. product standard for polyisocyanurate insulation is ASTM C1289, "Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board." Up until the 2011 edition of ASTM C1289, CAN/ULC-S770-03 also was the method used for LTTR determination in ASTM C1289.

Beginning with ASTM C1289-11a (the "-11a" designates the second revision published in 2011), either CAN/ULC-S770-09 (the standard's 2009 version) or ASTM C1303, "Standard Test Method for Predicting Long Term Thermal Resistance of Closed Cell Foam Insulation," may be used for LTTR determination. This revision was made in recognition of continuing development of LTTR test methods.