

POLYISO PERFORMS: ADVANCED METHOD FOR DETERMINING LONG-TERM THERMAL RESISTANCE (LTTR)

The commercial roof market insists on insulation that is cost-effective and provides superior energy efficiency. These qualities have long been the hallmarks for the success of polyiso foam insulation in the commercial roof insulation market.

Polyiso roof insulation users are primarily interested in R-value – the measure of the product’s thermal performance. Since 1981, the polyiso foam insulation industry has been using PIMA 101 (RIC/TIMA 281-1), a six-month conditioning procedure to report R-value. This practice allows for an “apples to apples” comparison of R-values from different manufacturers.

The polyiso industry has begun a transition to a new methodology to determine the thermal insulation efficiency of their permeably faced products. LTTR represents the most advanced scientific method to describe the Long-Term Thermal Resistance of foam insulation products using blowing agents other than air, including polyiso, polyurethane and extruded polystyrene. This method is based on accelerated aging by conditioning thin slices of foam insulation at a particular temperature for a specified number of days. The method is based on consensus standards in both the United States and Canada and provides a **15-year time-weighted average LTTR**.

Using techniques in ASTM C1303¹, CAN/ULC S770² predicts an R-value that has been shown to be equivalent to the average performance of a permeably faced foam insulation product over 15 years. In Canada, this is used as the design R-value.

LTTR ADVANTAGES

- It provides a technically supported, more descriptive measure of the long-term thermal resistance of polyiso insulation— 15-year time-weighted average.
- It is an advanced test method, based on consensus standards in the United States and Canada.
- It applies to all foam insulation with blowing agents other than air, such as polyiso, extruded polystyrene and polyurethane.
- It provides a better understanding of thermal performance of foam.

TRANSITION TO LTTR VALUES

PIMA and its members believe LTTR is the most appropriate R-value for permeable faced polyiso insulation products and will implement it as the exclusive method for describing R-value. The effective dates for transition to LTTR as the exclusive

method for describing the R-value of permeable faced polyiso products are July 1, 2002 for Canada and January 1, 2003 for the United States.

All permeable faced polyiso roof insulation shipped after the effective dates by PIMA members will use LTRR.

Average LTRR Values for Polyiso with Hydrocarbon Blowing Agents Manufactured in Canada

POLYISO THICKNESS (inches)	LTRR R-VALUE
1	6.0
1.5	9.0
2	12.1
2.5	15.3
2.7	16.6
3	18.5
3.5	21.7
4	25.0

With the addition of LTRR testing in the latest Canadian polyiso product standard³, polyiso manufacturers are continuing to conduct LTRR testing. Average LTRR values (on products randomly selected and tested by an independent third party to CAN/ULC-S770) for polyiso foam insulation containing 3rd generation hydrocarbon blowing agents, manufactured in Canada, are listed in the table to the left.

Since October 2001, PIMA has been working with the ASTM C16 Committee on Thermal Insulation for inclusion of the LTRR method in ASTM C1289, the standard specification for polyiso foam. A revision to ASTM C1289, "Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board," that incorporates LTRR was approved on April 16, 2002. The revision adds a mandatory annex procedure to ASTM C1289 requiring testing for LTRR.

PIMA continues its efforts to educate users, specifiers and designers about the LTRR method and its proper use. PIMA will work closely with a variety of roofing organizations to assure a smooth and orderly transition to using LTRR values in the roofing market.

For updates on this topic, please visit the PIMA web site at www.PIMA.org. PIMA is the national trade organization that advances the use of polyiso insulation. Polyiso is one of the nation's most widely used and cost-effective insulation products. PIMA's membership consists of manufacturers and re-labelers of polyiso insulation as well as suppliers to the industry.

¹ ASTM C1303 Standard Test Method for Estimating the Long-Term Change in the Thermal Resistance of Unfaced Rigid Closed Cell Plastic Foams by Slicing and Scaling Under Controlled Laboratory Conditions

² CAN/ULC-S770-00 Standard Test Method for Determination of Long-Term Thermal Resistance of Closed Cell Thermal Insulating Foams

³ CAN/ULC-S704-01 Standard for Thermal Insulation, Polyurethane and Polyisocyanurate, Boards, Faced



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