Roofing No. 3013

Subject: Long-Term R-value for Polyisocyanurate Insulation

Date: August 2008 (Revised January 2019)

The blowing agents used in polyisocyanurate foams provide for an initial high R-value. During the life of the foam, air from the atmosphere diffuses into the cells of the foam and reduces the R-value. In addition, the blowing agents themselves diffuse out of the foam, further reducing the R-value.

Manufacturers of polyisocyanurate insulation promote the use of the long term R-value techniques in ASTM C1303 and CAN/ULC S770. The ASTM C1303 and ULC/CAN S770 standards provides a long term thermal resistance (LTTR) or R-value underline estimate for the material after 5 years storage. Literature published by PIMA suggests that 2" polyisocyanurate insulation will have an LTTR of 5.7/inch.

Independent testing has been conducted on 2" thick polyisocyanurate insulation that was purchased in May, 2003. At the time of purchase the R-value was 6.4/inch. The samples were subsequently stored under laboratory conditions of 72 °F and 50% humidity. After 1 year, the R-value was 6.1/inch. After 5 years, the R-value was 5.5/inch or it has lost almost 15% of its R-value. As the polyisocyanurate insulation continues to age and off gas blowing agents the R-value will continue to drop.

This independent testing has confirmed that even after only 5 years, the R-value for polyisocyanurate insulation is below the published LTTR or estimated long term thermal resistance.

Architects, specifiers, and building owners should ask their insulation manufacturers for R-values over the life of the building.

In addition, R-value warranties should be examined closely to see if 100% of the R-value is warranted. Unlike other insulations which lose R-value over time and may have limited warranty coverage, ThermaFoam R-Control insulation is warranted for 100% of the R-value for 50 years.

R-values for Polyisocyanurate Insulation	
Age	**R-value/In.**
Purchase	6.4
3 months	6.2
1 year	6.1
5 year	5.5
10 year	5.4

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