

R-Value Testing

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PAGES: 02

*SUPERSEDES EXISTING DOCUMENTS

During the fall and winter months, discussions increase regarding thermal performance of various types of insulations.

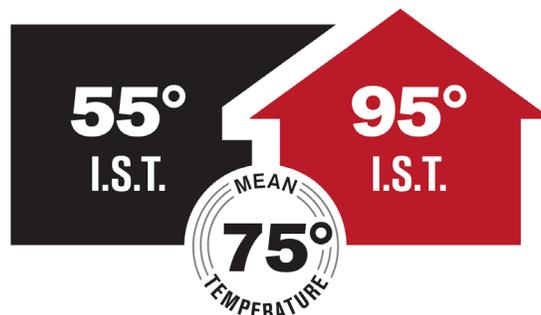
This technical bulletin will provide you with some important insight to assist you in understanding some basic information regarding R-value testing when you are involved in one of those discussions.

First, it's important to have a basic understanding of what R-value means and how products are tested to determine their R-values.

Thermal resistance (R-value) is the temperature difference, at steady state, between two defined surfaces of a material that induces a unit heat flow rate through a unit area, $K \cdot m^2 / W$. Or, it is known as a rating used to measure a materials ability to resist heat flow. The higher the R-value, the greater the insulation properties and the slower heat passes through it.

R-value testing for common insulations is conducted in accordance with the applicable product standard. The R-value of Polyiso, EPS, XPS, and Mineral Fiber is tested using ASTM C518. The appropriate product standard outlines the procedures used for product sampling and conditioning.

The product standards for many of the construction insulations require R-value testing at a 75°F mean reference testing temperature with a 40°F temperature differential. The mean reference testing temperature is the mean (average) of the cold side insulation surface temperature (IST) and the hot side insulation surface temperature (IST).



75°F mean reference testing temperature with a 40°F differential

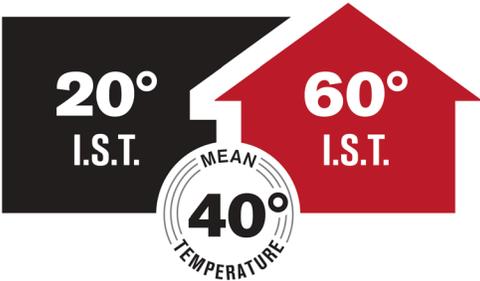
IST represents the temperature of the two defined outermost insulation surfaces

The R-value testing required by a materials product standard is representative of testing conducted at a specific and controlled “moment in time”. This “moment in time” is intended to provide a baseline for consistent and fair product analysis and comparison. Please do not confuse this testing environment with reality.

Some product standards discuss alternate, non-mandatory, mean reference testing temperatures. An example of some of those alternate mean reference testing temperatures are:



25°F mean reference testing temperature with a 40°F differential



40°F mean reference testing temperature with a 40°F differential

It's important to remember when it comes to R-value testing, the mean reference testing temperature is not the outside air temperature. Additionally, the IST's representative on either side of the mean likely does not represent outside or inside ambient temperatures either. Unless otherwise indicated, the applicable product standard requires the thermal resistance value of the material be tested and published with a mean reference testing temperature of 75°F with a cold side IST of 55°F, and a hot side IST of 95°F.