



## What is R-Value?

Why R-Value is important when deciding which insulation is right for your enclosure:

This bulletin is relating to standard construction, not glass or manufactured enclosures, for those, please see U-Value Information.

**R-Value is the measure of how well insulation products resist cold or heat.** R-Value is the result of a laboratory test in which an insulation material is sandwiched between a cool and warm surface (before you install your Vapor Barrier) for your room. The better or higher the R-Value, the better the insulation and lower heating and cooling costs for your room.

## So What's Wrong with the Laboratory Test?

A machine in a lab gives you a RELATIVE NUMBER that can be used to compare products, but a laboratory R-Value does not tell you everything you need to know. Insulation is subjected to a wide range of temperature conditions, depending upon geographic and climate differences where the building is located. Air movement affects the insulation, and the convection forces that develop with the insulation materials also degrade it.

## The Colorado Study

The University of Colorado School of Architecture tested the REAL WORLD performance of cellulose vs. fiberglass batt insulation. They built two structures and insulated one with fiberglass using R-19 in the walls and R-30 in the ceiling. The other structure had the same measured R-Values, but was insulated with a blown in cellulose insulation.

The cellulose insulated building was seven degrees warmer than the fiberglass structure after a nine hour heat loss test. But more importantly, after 3 weeks of monitoring the cellulose building, it used 26.4% less energy than the fiberglass structure. The researchers concluded that cellulose performs 38% better than fiberglass insulated structures. Keep in mind that both structures had the same measured "R-Value" but cellulose has a higher "EFFECTIVE R-Value". This is due to the fact that cellulose, or blown in, blown on, insulation is air tight.

## The Oakridge National Laboratory Test

Researchers at ORNL tested insulation under "real" conditions in a full scale attic simulator. The temperature of this simulator can be varied to reflect different temperature conditions, just like the temperatures a facility experiences. Their research found that fiberglass product



declined as much as 40% in R-Value as the temperature difference between conditioned (inside) air increased and ambient (outside) air decreased. Bottom-line: when the temperature in the attic is 20 degrees, the fiberglass insulation in the attic space has lost 40% of its R-Value. The researchers at ORNL recommended that attic spaces with fiberglass insulation be covered with as little as 3 inches of cellulose to stop the loss of R-Value in fiberglass.

It is extremely important for an indoor pool environment to utilize good insulation and prevent cold air infiltration, so that the heat loss/heat gain is kept to a minimum, and to help prevent condensation from forming on interior of the structure when warm meets cold. Good airtight insulation is important for reducing air infiltration and heating and cooling costs.

It helps to reduce run time of the dehumidification system as well. VeryDry recommends for residential projects a minimum R-19 Wall, R-38 Ceiling. If using fiberglass bat, foam and/or seal all major cracks and crevices where cold air can infiltrate to the warm side of the building. Keep in mind that foam may or may not be considered a proper vapor barrier. Foil faced bat is NOT a vapor barrier.

Be sure to review our *Vapor Barriers* bulletin as well.