



Re: Effective R-Value Calculations in Attic Assemblies: HandiFoam® HVLP LD vs. Fiberglass

Date: May 28, 2020

To Whom it May Concern,

OBJECTIVE

A study was commissioned at the ORNL (Oak Ridge National Laboratory) by an ICP partner to test the actual performance of loose-fill fiberglass against low density open cell polyurethane foam in attic configurations. Thus, a “% effective vs. stated manufacturer’s R-value” was desired.

EXPERIMENTAL SETUP

In separate attic assemblies, fiberglass was installed at 14” on top of the flat ceiling, giving a labeled R-value of 38. The open cell foam was sprayed onto the underside of the roof deck at 5.5 “, with a labeled R-value of 19.8. Testing was conducted according to ASTM C 518 for the individual materials, and ASTM C 1363 for the attic assembly. It should be noted that ASTM C 518 is a static test designed for material manufacturers to test and label their products, while ASTM C 1363 is an attic assembly which undergoes temperature cycling from cold to hot conditions. R-values of the attic assembly insulation materials are measured by a heat flow meter apparatus.

RESULTS

- Fiberglass’s effective performance was an average of 56% of the manufacturer’s stated R-value. Thus, when applying to meet building codes, fiberglass’s thickness must be increased from the labeled value to overcome the 44% less effectiveness it shows in this testing.
 - Not an air barrier
 - Not a vapor barrier
- Low density open cell spray foam showed a consistent 69.5% effective R-value performance. Thus, less material needs to be added to meet a given building code. Additional benefits of open cell spray foam over fiberglass are:
 - Under 2012/15 IRC Section R806.5 is an air impermeable insulation at 3.5”
 - Increased vapor resistance at thicknesses > 3”
- Medium density closed cell spray foam gave a consistent 77% effective R-value performance.
 - Air barrier at 1.0”
 - Vapor barrier at 2” or greater



Note: Codes require the installer to use the manufacturer's stated R-value only. This testing demonstrates that those values can change under realistic test scenarios, depending on type of insulation.

Respectfully,
Tom Fishback, PhD
Senior Vice President
ICP Group
tfishback@icpgroup.com
cell: 234-900-9708