

RESEARCH AND IDEAS

Fixing Fiberglass Convection Problems with Loose-Fill Cellulose

Researchers at Oak Ridge National Laboratory are exploring ways to prevent or fix the problem of air convection in low-density loose-fill attic insulation.

Previous testing at Oak Ridge showed that low-density (0.5 pounds per cubic foot [lb/ft^3]) loose-fill fiberglass suffers up to 50% loss of R-value at very cold attic temperature (-18°F) due to air convection within the insulation. However, laying fiberglass batts over the loose fill effectively stopped the convection problem. What if the low-density material was covered with higher-density loose fill instead of fiberglass batts?

To answer that question, Oak Ridge scientists tried blowing both cellulose and $0.7 \text{ lb}/\text{ft}^3$ fiberglass on top of low-density R-30 loose-fill fiberglass. The results were mixed: cellulose worked, fiberglass didn't.

When approximately two inches of cellulose (R-8) were added over the R-30 low-density fiberglass, the measured overall R-value remained at R-38 down to -18°F , indicating that the cellulose covering effectively prevented convection.

But the higher-density fiberglass apparently failed to stop convection at low temperatures. When an R-8 layer was added over the low-density material, it added R-8 to the overall R-value, but failed to restore the lost R-value due to convection.