Facts You Should Know About Air Sealing vs. R-value

A Practical Fact Sheet for Construction Professionals

Performance Claims: Separating Fact from Fiction

Spray foam insulation is often marketed with claims like:

- *Because spray foam stops air movement, you don't need as much R-value — spray foam delivers performance that goes beyond what the R-value number alone suggests.*
- *R-20 closed-cell spray foam performs like R-38 fiberglass — because stopping air leakage is what really matters.*
- *One product. One step. Spray foam insulates and air seals simultaneously, eliminating the need for separate air barrier materials.*

Fact: Air Sealing and Insulation Are Not Interchangeable

Air sealing controls air leakage; insulation controls conductive heat flow. Eliminating one in favor of the other leads to reduced thermal performance of the building.

Air Sealing Alone Won't Keep a Building Comfortable

There are three ways heat moves through a building: airflow, direct transfer through materials, and radiation. Air sealing tackles the airflow problem, but once that's under control, heat moving directly through walls, ceilings, and floors becomes the main issue — and the only way to stop that is with adequate insulation defined by R-value. A well-sealed but under-insulated wall will still be cold in winter and hot in summer, and no amount of air sealing changes that.

Building Codes Require Both — Not One Or the Other

Energy codes treat air sealing and insulation as two separate requirements because they solve two different problems. If a product claims that its air-sealing ability means you can use less insulation, builders and contractors should be highly skeptical and scrutinize the documentation backing such claims. Standard energy code compliance paths don't allow air sealing to replace minimum insulation levels, and modern building energy codes require low air leakage rates for any type of insulation. Even in a very well-sealed building, using too little insulation leads to cold walls in winter, hot ceilings in summer, higher energy bills, and occupants complaining about discomfort — complaints that often get blamed on drafts even when air sealing is fine.

The Tests That Matter Are Run Separately

R-value and air leakage are measured by completely different tests, and there's no recognized standard that combines them into a single number. In fact, testing showed that all wall assemblies experienced a loss in thermal performance due to air movement through the assembly regardless of insulation type.[1] When a manufacturer blends the two into one "effective R-value" claim, that number isn't something building energy codes recognize. Insulation performance and air-sealing performance must be documented separately to document energy code compliance.

Lstiburek, J., Straube, J., Schumacher, C., Grin, A., & Lepage, R. (2013, October). *RR-0002: "Thermal Metric Summary Report,"* Building Science Corporation, September 23, 2013. https://buildingscience.com/sites/default/files/project/bsc_thermal_metric_summary_report_2013-10-21.pdf

What's the Risk of Buying Into Substitution Claims?

Risk: failing energy code inspections
- △ Inspectors enforce prescriptive R-values, not marketing equivalencies

Risk: liability exposure
- △ Contractors and designers may be held responsible if reduced R-values were justified using unsupported claims

Risk: moisture and durability problems
- △ Cold sheathing and interior surfaces increase condensation potential

Risk: comfort and performance complaints
- △ Occupants feel cold or hot surfaces even in airtight homes

How Can You Verify That the Claims Are Real?

Ask for separate documentation showing:

- Tested R-value per ASTM material standards (e.g. ASTM C518)
- Assembly thermal performance via ASTM C1363
- Air leakage testing results (assembly level)
- Clear explanation of how code compliance is achieved

Do not accept marketing statements that combine air sealing and R-value into a single performance number without third-party verification. The most important thing to verify is the compliance path and what the documentation actually shows:

- R-value path: Confirmed R-values for each assembly component per applicable ASTM standards — not inferred from air sealing performance.
- U-factor path: A U-factor for each individual assembly — not a whole-building average or manufacturer's estimate.
- UA tradeoff path: U-factors listed per assembly, showing how underperforming components are offset — not a checkbox claiming the building "passes"
- Performance path: A complete energy model with documented envelope values and other end uses — not a summary report that simply states the building meets code.

Quick "Jobsite Checklist"

Before downsizing insulation based on air sealing claims, request:

- ✓ Documented R-value compliance for the final assembly
- ✓ Third-party lab reports — not brochures
- ✓ Clear separation of air barrier performance and insulation performance
- ✓ Installation details that can be inspected and verified

Watch for Red Flags

- Claims that "air sealing matters more than R-value"
- Statements equating airtightness with higher R-value
- "Effective" or "equivalent" R-values without ASTM testing
- Marketing language replacing code documentation
- Justifications that cannot be explained to an inspector

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