Evaluating Air Barrier Performance for LEED v5 Projects

On LEED projects, whole-building air leakage testing is no longer unusual. When the building is pressurized, the enclosure either performs as detailed or it doesn't. Differences between the design target and the test result show up quickly in energy models, HVAC behavior, and commissioning reports. LEED v5 places more weight on this kind of field verification.

Air-barrier continuity directly affects building performance after occupancy.

How Air Leakage Influences Building Performance

Air movement affects enclosure performance in ways that directly influence LEED outcomes:

- **Energy use:** Infiltration increases heating and cooling demand and reduces overall thermal efficiency, affecting both modeled and measured energy performance.
- **Moisture transport:** Airflow can carry moisture into assemblies, increasing the risk of condensation and long-term material deterioration.

"LEED v5 emphasizes field verification. Whole-building air leakage testing confirms enclosure performance"

- **Thermal performance:** Air movement within wall cavities can reduce effective R-values and lower actual thermal resistance.
- **Indoor environmental stability:** Drafts, humidity variation, and pressure imbalance are often linked to leakage paths and can affect interior comfort and air quality.

Field testing shows that most leakage occurs at transitions and penetrations such as roof lines, slab edges, curtain wall tie-ins, window openings, and service entries. Performance at these areas depends on execution in the field.

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Air Barriers Within LEED v5

Air leakage affects both modeled and measured energy use. Reduced infiltration lowers heating and cooling loads, helping the building perform as modeled, and whole-building testing provides the quantified results needed for LEED Energy and Atmosphere credit documentation.

LEED v5 also expands enclosure commissioning. Reviews address air-barrier detailing, transition continuity, sequencing, and field verification to confirm that installation aligns with documented design criteria rather than relying solely on product specifications. Field verification carries more weight than specification language alone.

Enclosure performance also influences indoor environmental quality. Air movement affects pressure balance, humidity control, and pollutant migration. A continuous air barrier supports stable interior conditions and limits unintended airflow through wall and roof assemblies.

Over time, air movement within the enclosure can contribute to moisture accumulation, affecting service life and maintenance requirements. Controlling infiltration supports long-term durability, which aligns with LEED v5's emphasis on verified performance.

Verification and Field Evaluation

Specifications define the performance criteria; field testing verifies that the installed enclosure meets those criteria.

Common verification methods include:

- Whole-building air leakage testing under controlled pressure conditions
- Mock-up or component testing before full installation
- Infrared thermography to identify thermal discontinuities
- Smoke testing to visualize leakage paths
- On-site inspection at high-risk transitions

Testing often identifies areas where air-barrier continuity was not fully achieved. Correcting these conditions before turnover reduces rework and supports LEED documentation.

Intertek's Role in Air-Barrier Verification

Intertek provides enclosure testing and commissioning services that support LEED v5 performance documentation, including whole-building air leakage testing, mock-up evaluation, envelope commissioning, and field diagnostics such as infrared thermography and smoke testing.

Air-barrier continuity affects energy use, moisture control, and long-term enclosure durability. Whole-building air leakage testing makes installation quality measurable.

Learn more about Intertek's air-barrier testing and enclosure commissioning services, visit: **Whole-Building Air Barrier, Leakage Testing.**