Why Green Buildings Cannot Be Built Without Air Barrier Systems

Air Barrier Testing And Commissioning

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Commissioning the Building Envelope

The Code of Hammurabi 1750 B.C

If a builder builds a house for someone, and does not construct it properly and the house falls in and kills its owner, then that builder shall be put to death.

If it ruins goods, he shall make compensation for them, and shall re-erect the house at his own expense.
Commissioning the Building

Mechanical
Plumbing systems
HVAC
Fire protection systems
Refrigeration
Control Systems and Integration
Building Automation and Controls

BUILDING ENCLOSURE
Commissioning Phases

Pre-Design Phase
  Owner’s Project Requirements (OPR)
  Basis-of-Design (BOD)
Design Phase
Pre-Construction Phase
Construction Phase
Operations & Maintenance Phase
Commissioning the Building

Air leakage
Rain screen pressure equalization
Water penetration
Moisture content
Thermal performance
Condensation resistance
Acoustic performance
Solar optical performance
Commissioning the Building

Wind uplift testing
Wind load
Security performance
Forced entry
Impact
Blast
Vibration testing
Membrane adhesion performance
Durability
Commissioning the Building

Material testing
System testing
Mock-up
Field review and observations
Compliance testing
Whole building testing
E 2178-03

Standard Test Method for Air Permeance of Building Materials
E 2357–05

Standard Test Method for Determining Air Leakage of Air Barrier Assemblies
Specimen 3 – Roof/Foundation interface and opaque wall (with modifications) (Optional)

Opaque wall with modifications (i.e. brick strapping, brick ties, etc.)

Seal interface with foundation as per manufacturer’s instructions

2500 mm minimum

300 mm

2400 mm minimum

Galvanized steel plate to simulate adhesion to steel structure

i.e., Masonry Ties

Concrete beam to simulate foundation detail or slab-on-grade

Seal interface with roof system
ASTM E2357 Product Installation

Post Applied Brick Ties
Structural (Wind) Loading Schedule

- Positive pressure, Pa

- Deformation test

- Repeated positive pressure n times

- Repeated negative pressure n times

- Sustained loads

- Cyclic loads

- Gust loads

Air leakage rate and deflections to be established after structural loading

FIG. A3.1 Structural (Wind) Loading Schedule
E 283-04

E 783-02

Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors
E 1186-03

Standard Practices for Air Leakage Site Detection in Building Envelopes and Air Barrier Systems
D 4541-02

Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers
D 6132–08

Post-Construction

- Whole building testing
- Air leakage
- Water
- Infrared scanning technique
- Too late to fix
ASTM E 779-03

Standard Test Method for Determining Air Leakage Rate by Fan Pressurization

Whole Building

0.4 / 0.1 CFM/Ft² @ 1.56 Lb/Ft²
THE END

QUESTIONS AND ANSWERS
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