

abaa2024 building enclosure conference

Diagnosing Air Leaks in Building Enclosures

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AIA
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Provider



Diagnosing Air Leaks in Building Enclosures

Diagnostic testing to identify air leaks in building enclosures is described in ASTM E1186 by some of the following methods:

- ✓ Feel Test
- ✓ Tissue or Ribbon
- ✓ Leak Detection Liquids
- ✓ Smoke Tracers
- ✓ Infrared Scanning



Mike Poirier

Vice-President and owner at QED Lab.

- Over 900 commercial blower door tests completed
- Level II Certified Infrared Thermographer
- 20 Years consulting & Testing experience



Learning Objectives

1. Common methods used for locating air leaks
2. Apply the most appropriate technique
3. Adjust and adapt for weather conditions
4. Analyze the test results

Benefits of Airtightness

- ✓ Healthy indoor air
- ✓ Limit vapor which travels with air
- ✓ Odor control
- ✓ Improved sound control
- ✓ Helps prevent energy loss



Air leak detection methods

- ✓ Feel Test
- ✓ Tissue or Ribbon
- ✓ Leak Detection Liquids
- ✓ Smoke Tracers
- ✓ Infrared Scanning



Feel Test



Pros:

- ✓ Simple & Easy
- ✓ No equipment
- ✓ No training

Cons:

- ✓ No proof in a photo or video
- ✓ Not very professional

Feel Test (other senses)

Notice:

- ✓ Whistling
- ✓ Air temperature changes indoors
- ✓ Discoloration around leakage areas



Tissue or Ribbon Test

Pros:

- ✓ Simple
- ✓ Proof of leakage with photos and videos
- ✓ Adaptable

Cons:

- ✓ Partially weather dependent



Tissue or Ribbon Test

Notice:

- ✓ Air velocity and direction
- ✓ Large or small volumes leaking



Leak Detection Liquids



Pros:

- ✓ Reliable, especially with small air leaks
- ✓ Quick and inexpensive
- ✓ Great for penetrations

Cons:

- ✓ Limited to small areas

Leak Detection Liquids



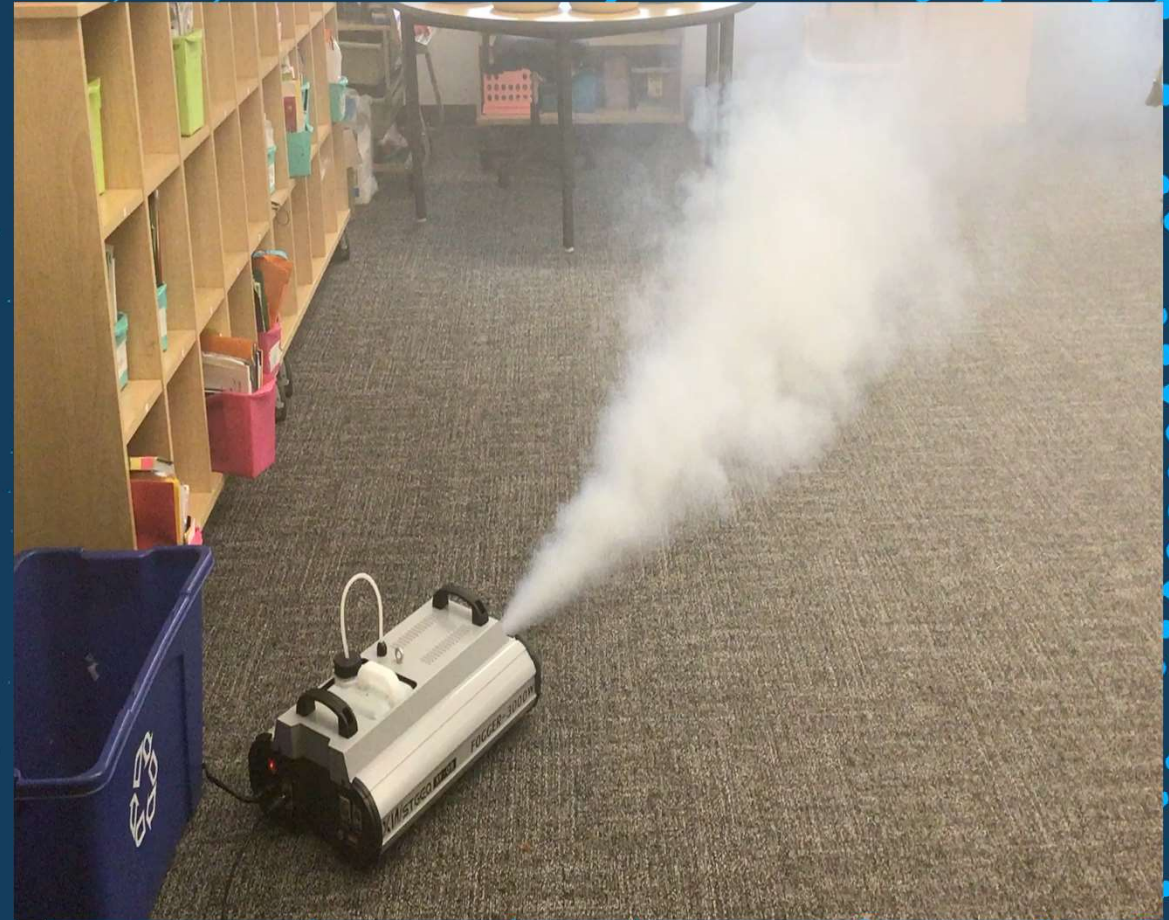
Smoke Tracers

Pros:

- ✓ Makes air leaks visible to the naked eye
- ✓ Confirmation of air leaks
- ✓ Reliable

Cons:

- ✓ Not very effective without a pressure differential



Smoke Tracers

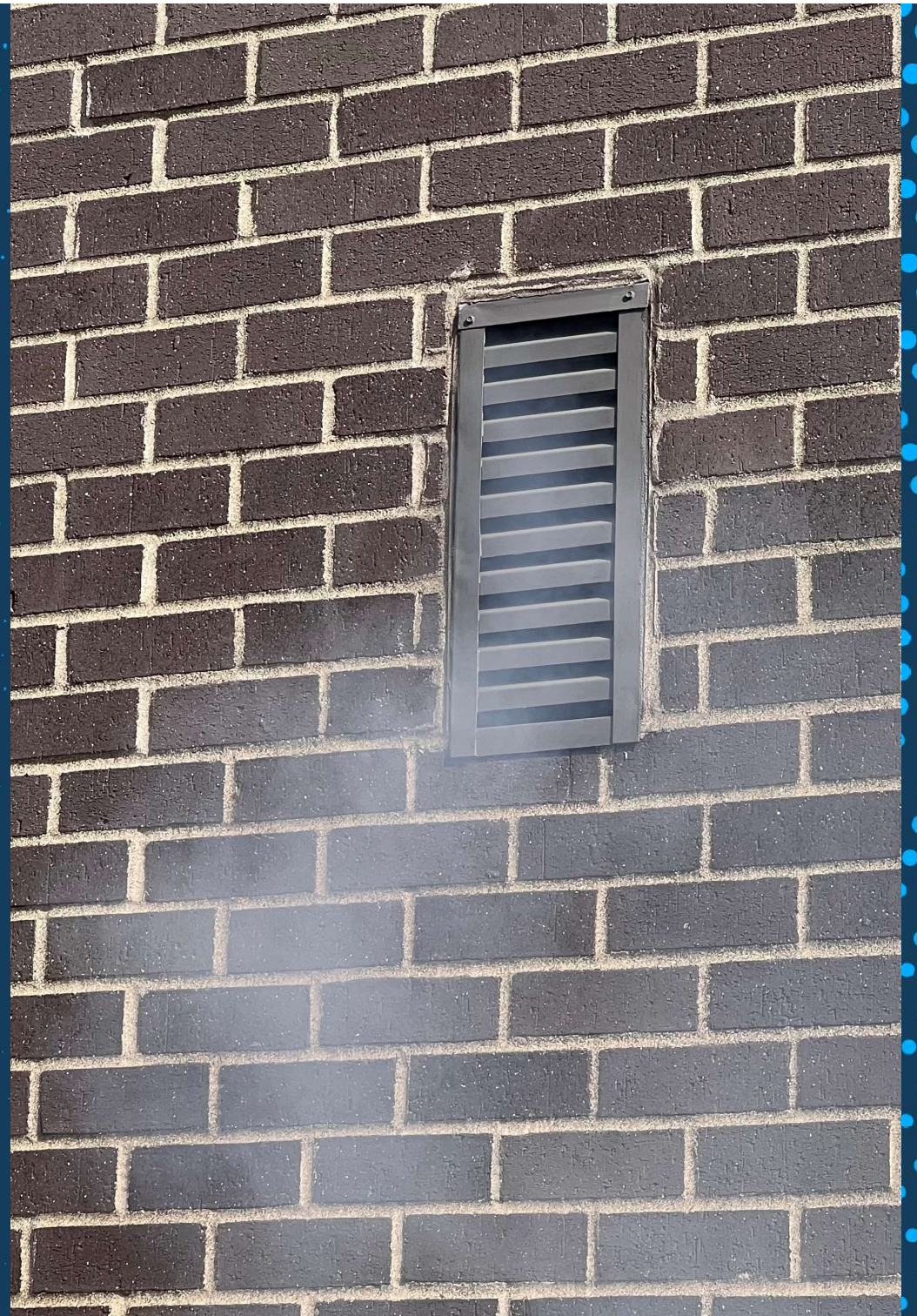


Important:
Smoke tracer testing should be assisted by a blower door fan or other method to achieve a pressure differential.

Smoke Tracers

Smoke can be used for air infiltration and exfiltration

Even with interior vents sealed for testing, access panels and ducts may still leak air!



Smoke Tracers

Air and smoke leakage
to exterior and adjacent
interior space

- Sound problems
- Odor problems



Smoke Tracers

Avoid testing inside the smoked space to limit exposure

Consider fire / smoke alarm systems. **SMOKE TESTING**
WILL SOUND THE ALARM



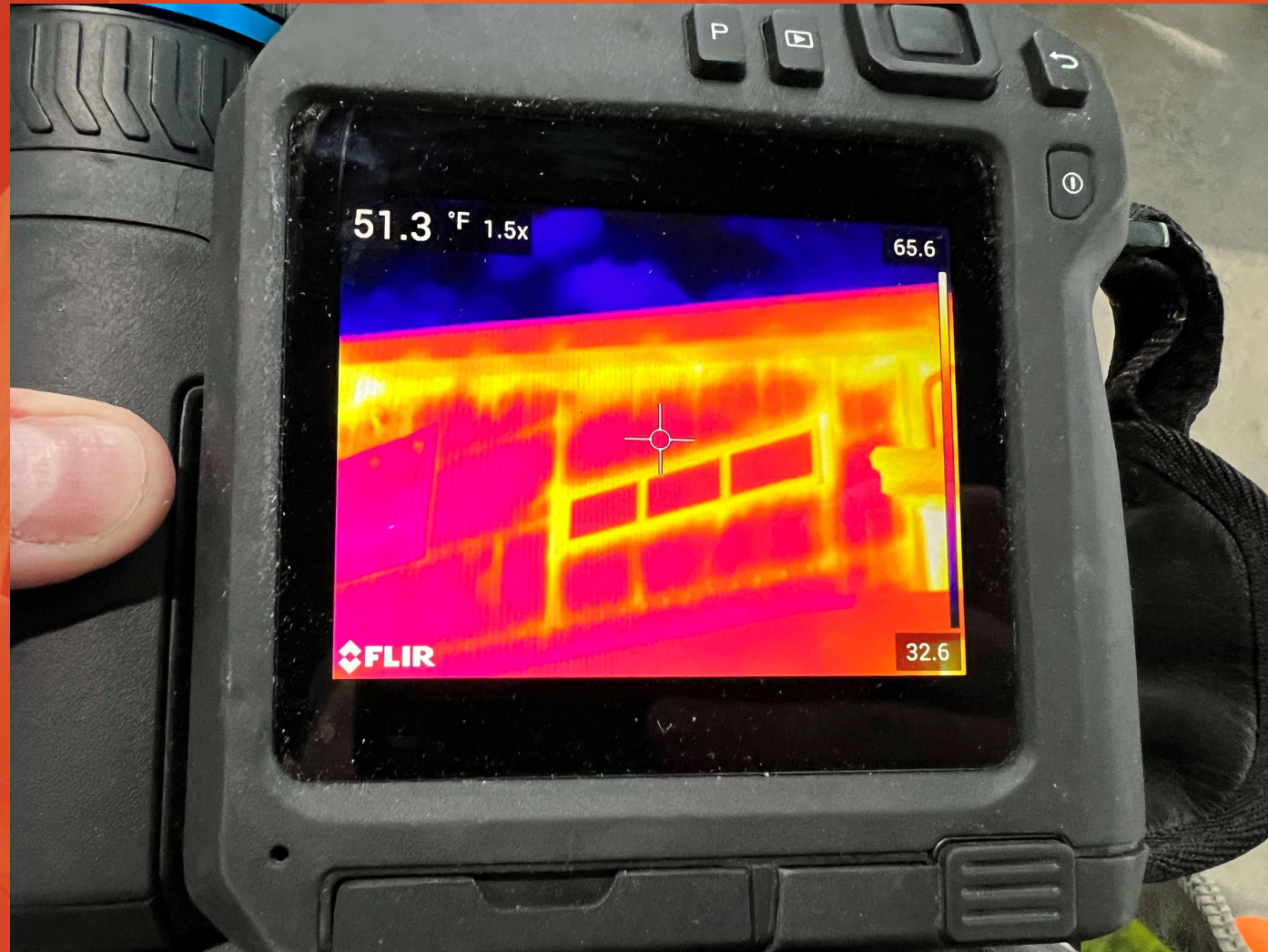
Infrared Scanning / Thermography

Pros:

- ✓ Very accurate to a trained professional
- ✓ Visual representation of an air leak

Cons:

- ✓ Can be expensive
- ✓ Extensive training
- ✓ Dependent on a temperature difference



Infrared Scanning / Thermography

Infrared cameras don't show air leaks, they show surface temperatures

Must have a temperature difference for accurate analysis. ~10 degrees or more

Be aware of other thermal patterns

- Thermal bridging
- Water leaks
- Shiny/reflective surfaces
- Warm electrical / mechanical / plumbing features

Infrared Scanning / Thermography

How does IR work?

Displays radiation energy, which is viewed as different surface temperatures



Infrared Scanning / Thermography

Air leaks typically look like a streaky pattern, fading away from the source



Infrared Scanning / Thermography

Thermographers should:

- ✓ Be trained
- ✓ Ability to operate their camera
- ✓ Have appropriate camera settings
- ✓ Be aware of surrounding weather conditions
- ✓ Ability to analyze the images properly



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