Accurate-Airtight Enclosures

Building Performance. Measured. Verified.

HOW TO UNDERSTAND COMMERCIAL BLOWER DOOR TESTING

ASTM E779 & ASTM E3158 Air Leakage Testing of Commercial Buildings

Measure whole-building airtightness, verify enclosure performance, and improve energy efficiency.

1 WHAT IS ASTM E779 TESTING?

A calibrated blower door system temporarily installs one or more fans into exterior door openings to pressurize and depressurize the entire building.

The test measures:

- Whole-building air leakage
- Building enclosure performance
- Air barrier effectiveness
- Compliance with project specifications
- Baseline for commissioning and diagnostics

2 WHY IT MATTERS

- Energy consumption
- HVAC sizing and performance
- Occupant comfort
- Moisture migration
- Building durability
- Indoor air quality
- LEED and high-performance building goals
- Quality assurance during construction

3 HOW THE TEST WORKS

Building is prepared

- Exterior openings closed
- HVAC systems disabled
- Interior doors opened (unless otherwise specified)
- Intentional openings treated per project requirements

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Multiple calibrated fans are installed.

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The building is pressurized and depressurized over multiple pressure points.

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Airflow required to maintain each pressure is recorded.

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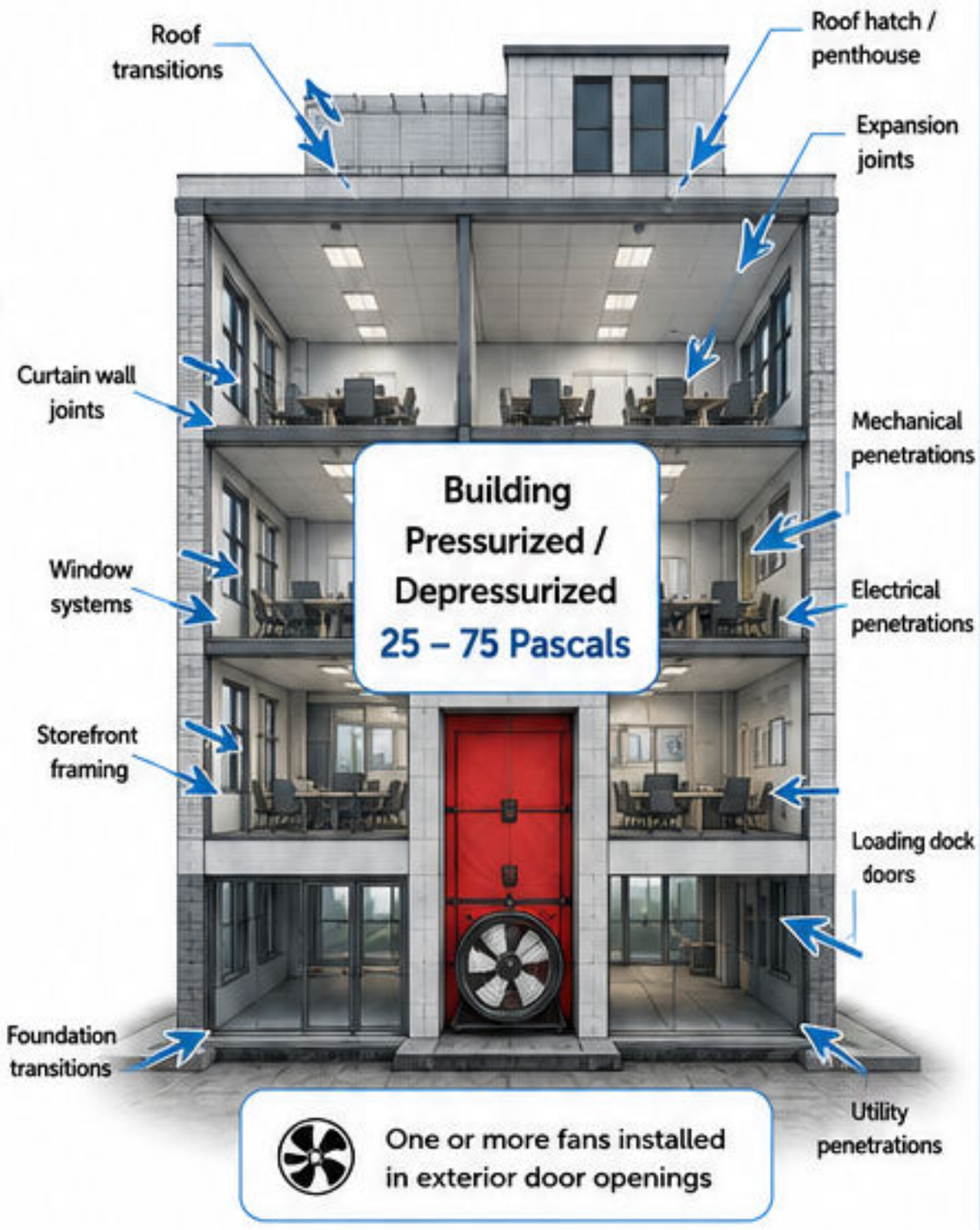
ASTM E779 regression analysis calculates enclosure leakage.



One or more fans installed in exterior door openings

4 WHAT IS CFM_{75}?

Commercial testing often reports airflow at 75 Pascals.

CFM_{75} = Measured airflow needed to maintain a 75 Pa pressure difference.

Higher CFM75 = more leakage
Lower CFM75 = tighter enclosure

5 WHAT IS AIR LEAKAGE RATE?

Commercial projects typically normalize leakage by enclosure area.

$$\text{Air Leakage} = \frac{CFM_{75}}{\text{Envelope Area}}$$

Units:

cfm/ft^2 @ 75 Pa

This allows buildings of different sizes to be compared fairly.

6 ASTM E779 & E3158 TEST STANDARDS

- Multiple pressure measurements
- Baseline pressure correction
- Fan calibration
- Regression analysis
- Pressurization and depressurization testing
- Accurate whole-building leakage determination

ASTM E779 and ASTM E3158 are widely accepted standards for commercial enclosure testing.

7 EXAMPLE CALCULATION

Measured airflow (CFM_{75}):	48,000 CFM
Envelope Area:	96,000 ft^2
Leakage Rate:	48,000 ÷ 96,000

= 0.50 cfm/ft^2 @ 75 Pa

(Project requirements vary by owner, jurisdiction, and building type.)

8 COMMON LEAK LOCATIONS

- Roof membrane transitions
- Curtain wall joints
- Storefront framing
- Window perimeters
- Expansion joints
- Parapets
- Mechanical penetrations
- Electrical penetrations
- Pipe penetrations
- Roof hatches
- Loading dock doors
- Foundation transitions

9 PROFESSIONAL TESTING MAKES A DIFFERENCE

Commercial blower door testing provides more than a pass/fail result. It helps identify enclosure deficiencies, prioritize repairs, validate air barrier installation, support commissioning, and document compliance with owner and project requirements.

TEST **FIND** **FIX** **VERIFY**

Combining ASTM E779 & E3158 testing with infrared imaging and smoke diagnostics provides a complete picture of building airtightness.