Testing to the ABAA Enclosure Airtightness Standard and Common Building Flaws

Torrance Kramer
Paul Morin

A-A Exteriors
The Energy Conservatory

abaa EDUCATION

Air Barrier Association of America (ABAA) is a Registered Provider with The American Institute of Architects Continuing Education Systems. Credit earned on completion of this program will be reported to CES Records for AIA members. Certificates of Completion for non-AIA members are available on request.

This program is registered with the AIA/CES for continuing professional education. As such, it does not include content that may be deemed or construed to be an approval or endorsement by the AIA of any material of construction or any method or manner of handling, using, distributing, or dealing in any material or product.

air barrier
abaa
association of
america

CONTINUING EDUCATION
AIA

Agenda

- Scope of the standard
- Significance and use
- Summary of test method
- Procedure
- Collect and Analyze Data
- Report – what is required
- Informative

air barrier
abaa
association of
america

Scope of the standard

- Field-test procedure and calc method for compliance with an airtightness spec
- Building setup
- Guidelines to identify air barrier boundaries
- Applicable to all building types
- Applicable to typical indoor-outdoor temperatures
- Defines three test options

air barrier
abaa
association of
america

Significance and use

- Goes beyond ASTM E779 and E1827
  - Detailed procedure to determine pass/fail
  - Allows testing under a wider range of temperature conditions
  - Additional guidance for testing various building types
- Tightness of materials / assemblies does not address complexities of buildings

air barrier
abaa
association of
america

Significance and use

- Guidance for testing:
  - Building enclosure only
  - Building enclosure + intentional HVAC openings
- Compliance does not imply that all problematic leaks have been sealed
- This test does not identify location of leaks

air barrier
abaa
association of
america

Summary of test method

- Three allowable test methods:
  - Multipoint (based on ASTM E779)
  - Repeated single point (based on ASTM E1827)
  - Repeated two point (based on ASTM E1827)
- Test Equipment:
  - Calibrated air moving fan +/- 5%
  - Digital pressure gauges +/-1%

air barrier
abaa
association of
america

Procedure

- Create a test plan based on the spec
- Identify the purpose of the test
- Coordinate the test with all involved
- Collect and record building related data
- Review construction documents
- Identify:
  - The test boundary
  - Single zone, multiple guarded or independent
  - List exterior zones – attics ….
  - Fans needed to reach target pressure

air barrier
abaa
association of
america

Procedure

» Identify (cont.) :

- Which test method will be used
- Pressurization, depressurization or both
- Distribution of fans to achieve single zone
- Prep needed to seal intentional openings
  - ABAA standard includes comprehensive charts to guide sealing of HVAC related openings
- Prepare an activity hazard analysis
- Review test plans with client
- Determine if the building is ready of test

air barrier
abaa
association of
america

Test Day Procedure

- Set up the building for the test
- Turn off all exhaust and make-up air fans
- Turn off all air handlers
- Set dampers to proper positions and seal intentional openings per schedule
- Turn off all combustion equipment
- Fill dry plumbing traps
- Deploy and set up test equipment

air barrier
abaa
association of
america

Collect Data

- Pretest baseline data
- Indoor and outdoor temp and wind speed
- Unadjusted enclosure and flow measurements
- Confirm single zone conditions
- Post test baseline
- Pressurization and depressurization

air barrier
abaa
association of
america

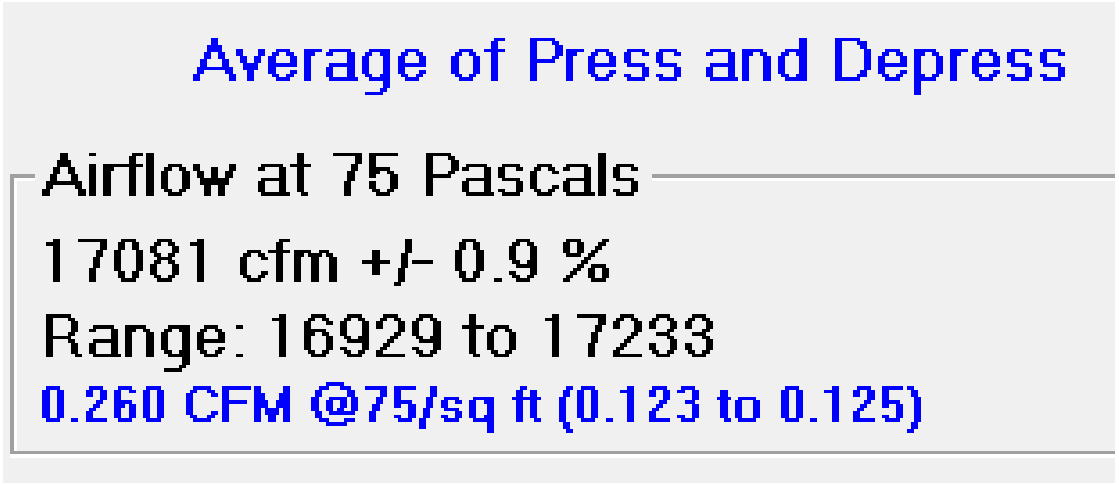
Data Analysis

- If the airflow required is exhausted from the building and the induced pressure is less than 90% of specified pressure, the building is deemed to fail
- Data shall be analyzed according to E779
- If exponent n < 0.45 or > 1.05, test is invalid

air barrier
abaa
association of
america

Pass / Fail procedure

» Greater than tightness spec = fail

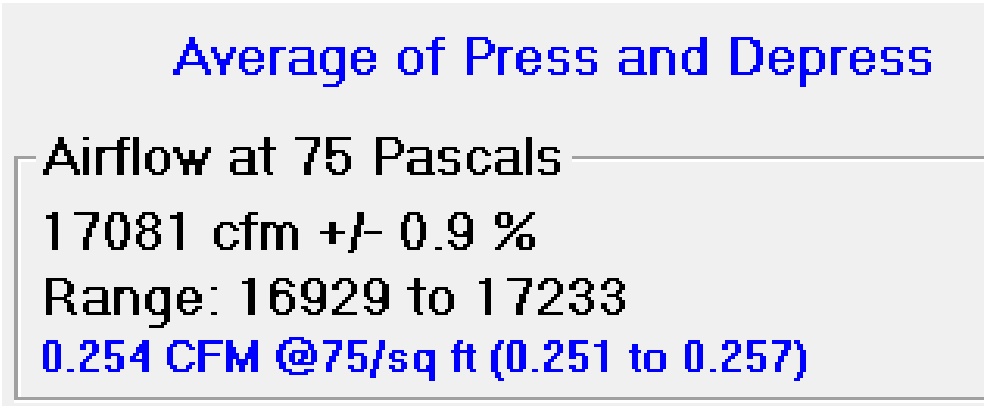


air barrier
abaa
association of
america

Pass / Fail examples

» ≤ tightness spec and

- 95% CI is < 8% and
- Sum of test result and the 95% CI > the tightness spec = **Pass**



air barrier
abaa
association of
america

Pass / Fail examples

» ≤ tightness spec and

- 95% CI is < 8% and
- Sum of test result and the 95% CI > the tightness spec = **Pass**

air barrier
abaa
association of
america

Report – what is required

- Testing agency
  - Name of agency
  - Address
  - Point of contact
  - Person conducting the test
- Test enclosure location
- Surface area or volume calculations and person responsible
- Test results
- ID of test enclosure boundaries
- Configuration of intentional openings
- Test type

air barrier
abaa
association of
america

Report – what is required

- Deviation from standards
- Procedures to ensure single zone conditions
- Test equipment used
- Test conditions
- Measured results in tabular form
- Conclusions

air barrier
abaa
association of
america

Informative

» Detailed information in the Appendix

- Setting up and conducting an airtightness test

air barrier
abaa
association of
america

Additional Resource

Blower Door Applications Guide: Beyond Single Family Residential

By Terry Brennan and Mike Clarkin of Camroden Associates
And
Gary Nelson, Collin Olson and Paul Morin of The Energy Conservatory

air barrier
abaa
association of
america

Questions?

Paul Morin
pmorin@energyconservatory.com
612-254-2162

air barrier
abaa
association of
america

Questions?

Paul Morin
pmorin@energyconservatory.com
612-254-2162

air barrier
abaa
association of
america

air barrier
abaa
association of
america