

## Technical Note 4

### Air Barrier Assemblies

**Abstract:** This Technical Note lists the air barrier assemblies, lists commonly used air barrier assemblies and defines the properties that these assemblies must possess in order to perform their intended functions.

#### Air Barrier Assembly

Air barrier assembly is a combination of air barrier materials, air barrier accessory materials and other materials to create an assembly to be used in constructing a building. Common types of air barrier assemblies are as follows:

- Above Grade Exterior wall assemblies
- Roof assemblies
- Floor assemblies
- Foundation assemblies
- Fenestration assemblies
  - Windows
  - Storefronts
  - Curtainwalls
  - Doors

#### Above Grade Exterior Wall Assemblies

Above grade exterior wall air barrier assembly shall have a maximum air leakage rate of 0.04 cfm/ft<sup>2</sup> at a pressure difference of 1.57 psi [ .2 L/(s·m<sup>2</sup>) ] at a pressure difference of 75 Pa ) when tested in accordance with ASTM E2357. This test requires assemblies that include transitions to foundations, roofs, window frames and other materials that penetrate the air barrier materials in the assembly.

#### Roof Assemblies

Roof air barrier assemblies shall be tested in accordance with the following standards.

1. ASTM D8052 Standard Test Method for Qualification of Air Leakage in Low-Sloped Membrane Roof Assemblies
2. ASTM E1680 Standard Test Method for Rate of Air Leakage Through Exterior Metal Roof Panel System

### **Floor Air Barrier Assemblies**

Floor air barrier assemblies generally consist of concrete slabs on grade, cast in place concrete or concrete slabs on metal decking. Since concrete and metal decking are air barrier materials, no assembly testing is required of them. Careful attention should be paid to penetrations through floor air barrier systems such as shafts, mechanical penetrations, electrical penetrations and plumbing penetrations.

### **Foundation Air Barrier Assemblies**

Foundation air barrier assemblies generally consist of cast in place concrete or concrete masonry units. Since concrete is an air barrier material, no assembly testing is required for cast in place concrete foundation wall air barrier. Concrete masonry unit foundation air barrier assemblies shall be tested in accordance with ASTM E2357 and meet the maximum air leakage requirement for an air barrier assembly. Careful attention should be paid to penetrations through floor air barrier systems such as fenestrations, mechanical penetrations, electrical penetrations and plumbing penetrations.

### **Fenestration Air Barrier Assemblies**

Fenestration air barrier assemblies shall be tested in accordance with NFRC 400-2010 [E1A2] Procedure for Determining Fenestration Product Air Leakage. AAMA/WDMA/CSA 101/I.S.2/A440, NAFS - North American Fenestration Standard/Specification for windows, doors, and skylights (Canadian supplement CSA A440S1-09) was developed for window, door, and skylight performance, including permissible air leakage. This specification is generally consistent with building codes used throughout the United States. Generally, operable products with an infiltration rate of less than 0.3 cfm/square foot are required. Architectural grade products utilizing a compression seal are required to have an infiltration rate of less than 0.1 cfm/square foot. Non-operable products are not expected to have a measurable level of infiltration. <sup>1</sup> These values are not in agreement with the value required by the Air Barrier Association of America (ABAA) for air leakage of an air barrier assembly. The ABAA will work with these organizations to try to align air leakage requirements for fenestration air leakage rates.

### **Non-Ancillary Property Assembly Testing**

If the air barrier material in the assembly is also intended to be the water barrier, the assembly should be tested in accordance with ASTM E331 Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors and Curtainwalls by Uniform Static Air Pressure Difference. The same test assemblies used for the ASTM E2357 testing can be used for this testing.

### **Summary**

This Technical Note contains information about the air barriers. This information may be used to design and build building enclosure assemblies.

The information and suggestions contained in this Technical Note are based on the available data and the experience of the Technical Committee of the Air Barrier Association of America. The information contained herein must be used in conjunction with good technical judgment and a basic understanding of the properties of air barriers. Final decisions on the use of the information contained in this Technical Notes are not within the purview of the Air Barrier Association of America and must rest with project owners, architects, engineers, consultants and contractors.

#### Footnotes

1. Efficient Windows Collaborative, Window Technologies, Air Leakage.