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WALL AND CEILING BUREAU

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# TECHNICAL BULLETIN

## Air Barriers

In recent years there has been an increased focus on the use of "air barriers." particularly for commercial, hotel, institutional and high-rise construction. The heightened awareness of moisture intrusion, mold, and unhealthy indoor air quality on some buildings, has led researchers to re-examine and refine the air movement through exterior walls. Air movement through a building's exterior walls is a concern as the air can carry moisture which impacts water sensitive materials, structural integrity, indoor air quality (air pollutants and microbial reservoirs) and thermal energy.

Understanding the importance of an air barrier and where it should be located, requires knowledge of the climate, building type, design pressure distribution and the building mechanical systems. There are diagnostic protocols to determine the airflow and pressures on a building.

The key to understanding air flow is to understand pressure. This air pressure is an interrelationship between the mechanical air handling system and the building envelope. Commonly employed strategy is to close large holes in the building envelope while controlling air pressure on the interior from HVAC equipment.

The use of an air barrier may be a sealed interior gypsum wallboard system, an exterior product used as a combination water resistant barrier ( like stucco) or a specifically designed product only being used as an air barrier. Fluid applied products have begun to gain popularity as an air barrier, as well as sprayed insulations. An important concept is to be continuous with no breaks or interruptions in the system. When an air barrier is decided to be used, it is recommended that a specialist be contacted to verify proper location in the wall assembly, material selection and installation. Not all buildings will benefit from an air barrier.*

The 2112 IECC (International Energy Conservation Code) has clarified the definition of a continuous air barrier and allows the criteria be met in one of three ways:

## 1. MATERIALS

Air barrier materials are defined by their air permeance. To be defined as a air barrier material the air permeance must be equal to or less than 0.02L/(s•m$^2$) @ 75Pa (0.004 cfm/ft$^2$ @ 1.57 psf) when tested in accordance with ASTM E 2178. The air permeance is the amount of air that migrates through materials and not through holes or gaps. It is possible to have a water-resistant barrier, vapor barrier and air barrier in one product. They shall be deemed to comply with the ICC "provided joints are sealed and materials are installed as air barriers in accordance with the manufacturer's instructions"[i].
Code-approved generic wall materials complying as an air barrier are:

- Minimum 3/8" thick plywood or oriented strand board
- Minimum ½" Extruded polystyrene or foil-back polyisocyanurate insulation board
- Minimum 1 ½" of closed- cell spray foam with a minimum density of 1.5 pcf
- Minimum 4 1/2 " of open cell spray foam with a minimum density between 0.4 and 1.5 pcf
- Minimum ½" exterior or interior gypsum board or cement board
- Cast-in-place and precast concrete
- Fully grouted concrete block masonry
- Sheet steel or aluminum
- Minimum of 5/8" thick of portland cement/sand parge, or gypsum plaster.

Materials meet the criteria set forth by the code when tested in accordance with ASTM E 2357, E 1677 or E 383. Additionally, they must meet the following:

A. The air barrier is continuous and "air barrier joints and sealants shall be sealed including sealing transitions in places and changes in materials"[1]

B. Air barrier penetrations and paths of air leakage "shall be caulked, gasketed or otherwise sealed in a manner compatible with the construction materials and locations."

## 2. ASSEMBLIES

The generic assemblies per the 2012 IECC are:

- CMU walls "coated with one application either of block filler and two applications of a paint or sealer coating.
- Minimum ½" portland cement /sand parge, stucco or plaster.

## 3. WHOLE BUILDING TEST

A completed building can be tested in accordance with ASTM Standard E 779 or an equal method that is approved by the local code official. Additionally local and/or state codes can be more stringent than the national building code-minimum.
**An air barrier "specialist" can be consulted to offer advice on appropriate products, assemblies and/or systems that maybe beneficial to a project while keeping the added expense to a minimum.*

For more information on air barriers visit www.buildingscience.org

[i] 2012 International Energy Conservation Code