THE AIR-BARRIER REQUIREMENTS

The air-leakage provisions of the IECC are mandatory, and specific sections address air barriers and their construction, compliance requirements and options, penetrations, fenestration, air intakes and exhaust, loading dock seals, and vestibules. **[Ref. C402.4]** The requirements cover provisions for a continuous air barrier to be designed, detailed, and specified in the building plan set of documents. *Continuous air barrier* is defined in the IECC: "A combination of materials and assemblies that restrict or prevent the passage of air through the building thermal envelope." **[Ref. C202]** The air barrier may be inside or outside of the thermal envelope, and in all cases must be continuous. An easy test to check for compliance is to trace the air-barrier location in the building sections and details on the construction documents. If this can be done without lifting the pencil off the paper, the air barrier is continuous.

Air-barrier materials cover and seal the joints and assemblies in the building thermal envelope. A single material or a combination of materials is allowed to satisfy the requirement. The materials must be securely installed along the entire length of the joint in the thermal envelope and perform during the pressure changes in the building.

Compliance

Three methods are available to the designer and builder to comply with the air-barrier provisions for the solid portions of the building envelope: (1) compliance with a list of 15 prescriptive materials with a specific air permeability, (2) acceptance of assemblies with a specified average air-leakage rate, or (3) performance of a test of the completed building to verify the actual air-leakage rate. **[Ref. C402.4.1.2]**

In the first method, 15 common building materials are named specifically (Table 7-1). When any of these materials is installed according to the manufacturer's installation instructions and the joints are properly sealed, this requirement is met. Any material not on the list that meets the specified air-leakage rate when tested using the ASTM E 2178 test for air permanence also complies. **[Ref. C402.4.1.2.1]**

The second method relies on the performance of the assemblies versus the individual materials that the first option addressed. This method also includes two assemblies that are deemed to meet the required limits: the specific thicknesses of the parge, stucco, or plaster; or treatments to concrete masonry walls. The referenced tests apply to curtain walls, air-barrier systems, and large window assemblies. **[Ref. C402.4.1.2.2]** Pressure testing of the completed building is the third method to demonstrate air-barrier or air-leakage compliance. **[Ref. C402.4.1.2.3]**

You Should Know

ASTM E 2178 is the testing standard to measure air permeance of air barrier materials. Liquid applied membranes, mechanically fastened commercial building wraps and rigid panel materials are common air barrier materials in commercial construction. The test results of the specific materials are reported and must comply with the IECC. ●

TABLE 7-1 Common building materials that comply with the air leakage requirements

Air-Barrier Material (Prescriptive)	Thickness (minimum)
Plywood	3/8 in.
Oriented strand board	3/8 in.
Extruded polystyrene insulation board	1/2 in.
Foil-faced urethane insulation board	1/2 in.
Closed cell spray foam minimum density of 1.5 pcf	1-1/2 in.
Open cell spray foam density between 0.4 and 1.5 pcf	4.5 in.
Exterior gypsum sheathing or interior gypsum board	1/2 in.
Cement board	1/2 in.
Built-up roofing membrane	Thickness not applicable
Modified bituminous roof membrane	Thickness not applicable
Fully adhered single-ply roof membrane	Thickness not applicable
A Portland cement/sand parge, stucco, or gypsum plaster	5/8 in.
Cast-in-place and precast concrete	Thickness not applicable
Sheet metal or aluminum	Thickness not applicable
Fully grouted concrete block masonry	Thickness not applicable