

Air Barrier Verification

IECC: C103.2, C402.5.1, **C402.5.1.3** (New)

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2018 International Energy Conservation Code

Revise as follows:

C103.2 Information on construction documents. Construction documents shall be drawn to scale on suitable material. Electronic media documents are permitted to be submitted where *approved* by the *code official*. Construction documents shall be of sufficient clarity to indicate the location, nature and extent of the work proposed, and show in sufficient detail pertinent data and features of the building, systems and equipment as herein governed. Details shall include, but are not limited to, the following as applicable:

1. Insulation materials and their *R*-values.
2. Fenestration *U*-factors and solar heat gain coefficients (SHGCs).
3. Area-weighted *U*-factor and solar heat gain coefficient (SHGC) calculations.
4. Mechanical system design criteria.
5. Mechanical and service water heating systems and equipment types, sizes and efficiencies.
6. Economizer description.
7. Equipment and system controls.
8. Fan motor horsepower (hp) and controls.
9. Duct sealing, duct and pipe insulation and location.
10. Lighting fixture schedule with wattage and control narrative.
11. Location of *daylight* zones on floor plans.
12. Air sealing details, barrier and air sealing details, including the location of the air barrier.

C402.5.1 Air barriers. A continuous air barrier shall be provided throughout the building thermal envelope. The air barriers shall be permitted to be located on the inside or outside of the building envelope, located within the assemblies composing the envelope, or any combination thereof. The air barrier shall comply with Sections C402.5.1.1, C402.5.1.2 and C402.5.1.2-C402.5.1.3.

Exception: Air barriers are not required in buildings located in *Climate Zone 2B*.

Add new text as follows:

C402.5.1.3 Building envelope performance verification. The installation of the continuous air barrier shall be verified by a registered design professional or approved agency in accordance with the following:

1. A review of the construction documents and other supporting data shall be conducted to assess compliance with the requirements in Sections C402.5.1.
2. Inspection of continuous air barrier components and assemblies shall be conducted during construction while the air barrier is still accessible for inspection and repair to verify compliance with the requirements of Sections C402.5.1.1 and C402.5.1.
3. A final commissioning report shall be completed by the registered design professional or approved agency and provided to the building owner or owner's authorized agent and the code official. The report shall identify deficiencies found during the review of the construction documents and inspection and details of corrective measures used.

Reason Statement: The testing path for infiltration in the IECC requires a leakage rate of 0.40 CFM/sf @ 75Pa. However, according to "Achieving the 30% Goal: Energy and Cost Savings Analysis of ASHRAE Standard 90.1-2010" prepared by the Pacific Northwest National Lab, the prescriptive air barrier requirements currently used in the IECC only achieve 1.0 CFM/sf @ 75Pa. The prescriptive path is therefore not achieving the level of performance achieved by the testing path. The code requires that air barrier materials meet 0.40 CFM/sf @ 75Pa, so the issue must be with installation and not the materials themselves. This proposal narrows that gap by requiring verification of the air barrier during construction and reporting back to the owner and code official in a manner similar to existing acceptance testing requirements, thereby ensuring better air barrier installation without actually requiring testing.

The proposal includes a sequence of requirements to ensure both effectiveness, ease of implementation and ease of enforcement. Key among these is a requirement that the inspection occur while remediation of errors can still be remedied. Submission of the report to the code official and the owner will ensure that the process has been followed.

The proposal also modifies the charging language in C402.5 and the construction documentation requirements in C103 to enable the new requirements.

According to Evan Mills, PhD, a researcher at Lawrence Berkeley National Laboratory, savings associated with using BECx from both maintenance and energy savings average about 16% for existing buildings and 13% for new construction ("Calculating the ROI of building enclosure commissioning." *Building Design + Construction*. June 28, 2013.)

Cost Impact: The code change proposal will increase the cost of construction

Evan Mills, PhD, a researcher at Lawrence Berkeley National Laboratory studied the benefits of BECx, noting that commissioning only costs about \$1.16/sf for new construction and \$0.30/sf for existing buildings on average, with a payback period of as little as 14 months.