Public Review Draft

Proposed Addendum w to Standard 189.1-2020

Standard for the Design of High-Performance Green Buildings

Except Low-Rise Residential Buildings

Third Public Review Draft (March 2021)
(Draft Shows Proposed Changes to Current Standard)

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Foreword

This addendum modifies the language Standard 189.1-2020. It increases the stringency of the airtightness testing requirement in Standard 90.1 and requires testing in more buildings.

The changes in this addendum provide two benefits. First, the existing requirements related to continuous air barriers and airtightness testing, based on 90.1, are clarified. Second, the reduction in air leakage that the standard will provide serve to both reduce energy consumption through reduced air leakage and improve indoor air quality by reducing uncontrolled airflow and potential for contaminant and moisture transport into and through the building envelope.

Compliance with the provisions in this addendum may result in minor increases in construction costs, although requirements for continuous air barriers already exist in the energy codes. Where such requirements exist, the increased cost is primarily related to additional quality control activities related to air barrier installation and sealing. The addendum also adds airtightness testing requirements to many buildings that do not require testing under Standard 90.1. Buildings constructed with good quality control procedures are expected to achieve required air leakage rates with little difficulty, but additional expense will be incurred by buildings which need to perform corrective actions.

Code authorities will need to include checks of the continuous air barrier design in the plan review process and building inspectors will need to verify installation of the air barrier. Review of test results and reports of corrective actions may be required for some buildings.

Requirements like those in this addendum are already included in Standard 90.1. This addendum simply reduces the acceptable leakage rate for tested buildings and expands the testing requirement to more buildings.

[Note to Reviewers: This addendum makes proposed changes to the language published in 189.1-2020. These changes are indicated in the text by underlining (for additions) and ~~strikethrough~~ (for deletions) except where the reviewer instructions specifically describe some other means of showing the changes. Only these changes to the current standard are open for review and comment at this time. Additional material is provided for context only and is not open for comment except as it relates to the proposed changes.]

Addendum w to 189.1-2020

Add new definitions in Section 3 as follows:

High-rise building: A building with an occupied floor located more than 75 feet (23 m) above the lowest level of fire department vehicle access.

Revise Section 7.3.1 as follows:

7.3.1 **General.** *Building projects* shall be designed to comply with Sections 5.2.1, 6.2.1, 7.2.1, 8.2.1, 9.2.1, and 10.2.1 of ANSI/ASHRAE/IES Standard 90.1, except as modified below.

Replace Section 7.3.1.2 as follows:

~~**7.3.1.2**. **Continuous Air Barrier.** The exceptions to the requirement for a *continuous air barrier* in ANSI/ASHRAE/IES Standard 90.1, Section 5.4.3.1, for specific climate zones and constructions shall not apply. The testing criteria of Section 10.6(a) shall supersede ANSI/ ASHRAE/IES Standard 90.1, Section 5.4.3.1.1.~~

7.3.1.2. Airtightness. Envelopes shall be designed to achieve air leakage less than 0.25 cfm/ft² (1.25L/s m²) under a pressure differential of 0.3 in. of water (75 Pa). Exceptions 1 and 2 to the requirement for a *continuous air barrier* in Section 5.4.3.1 of ANSI/ASHRAE/IES Standard 90.1 shall not apply. Buildings shall comply with airtightness testing requirements in Section 10.6.

Replace Section 10.6 as follows:

10.6 Building Envelope Airtightness Testing. ~~Building envelope airtightness shall comply with ANSI/ASHRAE/IES Standard 90.1, with the following modifications and additions. Air leakage verification shall be determined in accordance with ANSI/ASHRAE/IES Standard 90.1, Section 5.9.1:~~

~~a. When implementing the testing option in ANSI/ASHRAE/IES Standard 90.1, Section 5.4.3.1.1, whole-building pressurization testing shall meet the following requirements:~~

~~1. It shall be conducted in accordance with ASTM E779, ASTM E1827, CAN/CGSB- 149.10, CAN/CGSB-149.15, ISO 9972, or equivalent standard by an independent third party.~~

~~2. The measured air leakage rate of the *building envelope* shall not exceed 0.25 cfm/ft² (1.25 L/s·m²) under a pressure differential of 0.3 in. of water (75 Pa), with this air leakage rate normalized by the sum of the above- and below-grade *building envelope* areas of the *conditioned* and *semiheated space*.~~

~~3. Section 5.4.3.1.1, Exception 1, is not allowed.~~

~~4. Section 5.4.3.1.1, Exception 2, is allowed where the measured air leakage rate exceeds 0.25 cfm/ft² (1.25 L/s·m²) but does not exceed 0.40 cfm/ft² (2.0 L/s·m²).~~

~~b. When implementing the *verification* program option in ANSI/ASHRAE/IES Standard 90.1, Section 5.9.1, the air barrier design review shall be performed by an independent third party.~~

The requirements in this section supersede the requirements in ANSI/ASHRAE Standard 90.1, Section 5.4.3.1.1.

An *approved* third party shall perform whole-building pressurization testing to determine the leakage rate of the building at a reference pressure differential of 0.3 in. of water column (75 Pa), normalized by the sum of the above-grade and below-grade *building envelope* areas of *conditioned space* and *semiheated space*. Such testing shall be in accordance with ASTM E779, ASTM E1827, ASTM E3158, CAN/CGSB-149.10, CAN/CGSB-149.15, or ISO 9972 and performed while the air barrier system is accessible for inspection and sealing.

a. Where the measured air leakage rate of the building is in the range of 0.25 cfm/ft² (1.25 L/s m²) to 0.40 cfm/ft² (2.0 L/s m²), an *approved* third party shall perform a diagnostic evaluation. Permitted methods include but are not limited to visible tracing or infrared imaging in accordance with ASTM E1186 while the building is pressurized. In addition, a visual inspection of the air barrier shall be conducted. Leaks identified by testing or inspection shall be sealed where such sealing can be made without destruction of existing building components. The building shall be retested and a report specifying the corrective actions taken to seal leaks and the resulting leakage rate shall be submitted to the building

owner and made available to the *AHJ.*

b. Where the measured air leakage rate is greater than 0.40 cfm/ft² (2.0 L/s m²), an *approved* third party shall perform corrective actions and repeat the whole-building pressurization testing described in (a) above until the measured air leakage rate is not greater than 0.40 cfm/ft² (2.0 L/s m³).

Exceptions to 10.6:

1. Existing buildings
2. Where an *approved* third party has verified the design and installation of the *continuous air barrier* for *high-rise buildings* and for buildings greater than 100,000 ft² (10,000 m²) of *gross conditioned floor area*, in accordance with ANSI/ASHRAE Standard 90.1, Section 5.9.1.2.

Add the following reference to Section 11:

Reference	Title	Section
ASTM E1186-17	Standard Practices for Air Leakage Site Detection in Building Envelopes and Air Barrier Systems	10.6