



**BSR/ASHRAE/IES Addendum as
to ANSI/ASHRAE/IES Standard 90.1-2019**

Public Review Draft

Proposed Addendum as to Standard 90.1-2019, Energy Standard for Buildings Except Low-Rise Residential Buildings

**First Public Review (November 2021)
(Draft Shows Proposed Changes to Current Standard)**

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ASHRAE, 180 Technology Parkway NW, Peachtree Corners, GA 30092

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(This foreword is not part of this standard. It is merely informative and does not contain requirements necessary for conformance to the standard. It has not been processed according to the ANSI requirements for a standard and may contain material that has not been subject to public review or a consensus process. Unresolved objectors on informative material are not offered the right to appeal at ASHRAE or ANSI.)

FOREWORD

This addendum has two parts. 1) It cleans up language and spelling errors in the Testing and Verification, and Commissioning requirements throughout all the sections and 2) it moves the inspections currently in Section 5.9.3 to Section 4 – administration and enforcement to parallel where inspections are in the IBC. A couple of the inspection items that are specifically related to verification and commissioning (and not general administration and enforcement) are moved from Section 5.9.3 to Section 5.9.1.

This addendum does not add any new criteria and therefore was not subject to a cost effectiveness review.

[Note to Reviewers: This addendum makes proposed changes to the current standard. 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 as to 90.1-2019

Modify the standard as follows (IP and SI Units)

4.2.4 Inspections

All *building construction*, additions or *alterations* work subject to the provisions of this standard shall remain accessible and exposed for inspection purposes until approved in accordance with the procedures specified by the *building official*. The *building official*, upon notification, shall make the inspections set forth in Section 4.2.4.1 through 4.2.4.6.

4.2.4.1 Fenestration Inspections

Fenestration shall be inspected in accordance with the compliance path selected in Section 4.2.1 and approved documentation provided in Section 4.2.2.

4.2.4.2 Opaque Assembly Thermal Insulation Inspections

Opaque Assemblies shall be inspected in accordance with the compliance path selected in Section 4.2.1 and approved documentation provided in Section 4.2.2.

4.2.4.3 Continuous Air Barrier Inspections

Where a *continuous air barrier* is installed as a component of an *opaque roof*, *above-grade walls* and *below-grade walls*, or *floors*, it shall be inspected for compliance in accordance with Section 5.8.3.1. Integration with adjoining *fenestration* and other *continuous air barrier* elements shall be in accordance with Section 5.4.3.1.

4.2.4.4 Operable Fenestration and Door Inspections

Fenestration and door closers inclusive of operating mechanisms shall be installed in accordance with manufacturer's installation instructions. Associated seals and gaskets shall be installed accordance with manufacturer's installation instructions and consistent with the provisions of Section 5.4.3.

4.2.4.5 Loading Dock Weatherseals Inspections

Loading dock weatherseals shall be inspected for installation and to verify that the seals are in good condition.

4.2.4.6 Other Inspections

Other inspections related to mechanical, plumbing, lighting and other equipment or shall be inspected in accordance with the compliance path selected in Section 4.2.1 and approved documentation provided in Section 4.2.2 or as otherwise required by the *building official*.

...

5.9 Verification, Testing, and Commissioning, ~~and Inspection~~

5.9.1 Verification and Testing

5.9.1.1 Building Envelope Performance Verification

The ~~energy performance of the building envelope~~ shall be verified in accordance with ~~this s~~Sections 5.9.1.2 through 5.9.1.3 and Section 4.2.5.1.

5.9.1.2 Verification of the Design and Installation of the Continuous Air Barrier

Verification of the design and installation of the continuous air barrier shall be determined in accordance with the following by an independent third party when using Exception 3 of Section 5.4.3.1.1:

- a. A design review shall be conducted to verify and document compliance with the requirements in Sections 5.4.3 and 5.8.3.2.
- b. Periodic field inspection of the continuous air barrier materials and assemblies shall be conducted during construction while the *continuous air barrier* is still accessible for inspection and repair to verify and document compliance with the requirements of Sections 5.4.3.1.2 and 5.8.3.
- c. Reporting Verification and FPT documentation shall comply with Section 4.2.5.1.2

5.9.1.3 Dynamic Glazing

Dynamic glazing operation shall be tested for conformance with the *manufacturer's* installation instructions.

5.9.1.4 Air Curtains

Air curtains shall comply with Section 10.4.5.

5.9.2 Commissioning

The *energy performance of the building envelope* shall be *commissioned* in accordance with Section 4.2.5.2. *Commissioning* reporting shall comply with Section 4.2.5.2.2.

5.9.3 Inspections

~~In addition to the requirements of Section 4.2.4, building envelope components and assemblies shall be inspected in accordance with Sections 5.9.13.1 through 5.9.13.4.~~

5.9.3.1 Fenestration and Door Requirements

~~Fenestration and doors shall be inspected to verify compliance with the requirements of Sections 5.4.3.2, 5.8.2.1, 5.8.2.2, and 5.8.2.3. Where testing is required to demonstrate compliance with the air leakage~~

requirements, it shall be conducted by an independent third party. Operation of the *door* and closers or operating mechanisms shall be inspected for conformance with the *manufacturer's* instructions, and that the seals or gaskets are installed and in accordance with the *manufacturer's* instructions.

~~5.9.3.2 Inspection of Loading Dock Weatherseals~~

~~Where there is a loading dock, weatherseals shall be inspected for proper installation and to verify that the seals are in good condition.~~

~~5.9.3.3 Inspection of Opaque Building Envelope Air Tightness Requirements~~

~~*Opaque roof, above grade walls and below grade walls, and floors, shall be subject to the following inspections during construction:*~~

- ~~a. Use of compliant materials and assemblies as indicated in Section 5.8.3.1.~~
- ~~b. Integration with adjoining *fenestration* and *continuous air barrier* elements.~~

~~5.9.3.4 Fenestration Inspections~~

~~Fenestration shall be subject to the following inspections during *construction*:~~

- ~~a. *Skylights* size and location in relation to the designed *primary sidelighted area* and *secondary sidelighted area* below.~~
- ~~b. *Roof monitor* size and location in relation to the designed *primary sidelighted area* and *secondary sidelighted area* below.~~
- ~~c. *Dynamic glazing* compliance with SHGC and U factor in accordance with Sections 5.5.4.4.1 and 5.5.4.4.2, and testing of the operation for conformance with the *manufacturer's* instructions.~~
- ~~d. Permanent *fenestration* projections installation and performance in accordance with Section 5.5.4.4.1 and the *construction documents*.~~

...

6.9 Verification, Testing, and Commissioning

6.9.1 Verification and Testing

HVAC *control systems* shall be tested in accordance with this section and ~~provisions of~~ Section 4.2.5.1. Testing shall verify that systems and control elements are calibrated, adjusted, configured, and operating in accordance with applicable requirements of Sections 6.3, 6.4, and 6.5. Verification and ~~FTP~~ FPT documentation shall comply with Section 4.2.5.1.2.

6.9.2 Commissioning

The performance of the *mechanical systems* shall be commissioned in accordance with Section 4.2.5.2. ~~Detailed instructions for *commissioning HVAC systems* shall be provided in the *construction documents*.~~ *Commissioning* reporting shall comply with Section 4.2.5.2.2.

...

7.9 Verification, Testing, and Commissioning

7.9.1 Verification and Testing

Service hot-water controls shall be verified and tested in accordance with this section and ~~provisions of~~ Section 4.2.5.1. Testing shall verify that *systems* and *controls* are configured and operating in accordance with applicable requirements of:

- a. *service water heating system* temperature controls (Sections 7.4.4.1 and 7.4.4.3),
- b. recirculation pump or *heat trace* controls (Section 7.4.4.2), or
- c. *pool* time switch controls (Section 7.4.5.3).

Verification and ~~FTP~~ FPT documentation shall comply with Section 4.2.5.1.2.

7.9.2 Commissioning

The *energy* performance of the *service water heating systems* shall be *commissioned* in accordance with Section 4.2.5.2, and reporting shall comply with Section 4.2.5.2.2.

...

8.9 Verification, Testing, and Commissioning

8.9.1 Verification and Testing

~~*Building power distribution systems* and *applicable equipment* *Automatic receptacles controls* (Section 8.4.2) and *energy monitoring* (Section 8.4.3) shall be verified and tested in accordance with this section and provisions of Section 4.2.5.1. Testing shall verify that control elements are configured and operating in accordance with applicable requirements of:~~

- ~~a. *automatic receptacles controls* (Sections 8.4.2) and.~~
- ~~b. *energy monitoring* (8.4.3).~~

Verification and *FPT* documentation shall comply with Section 4.2.5.1.

8.9.2 Commissioning

The *energy* performance of the *power systems* shall be *commissioned* in accordance with Section 4.2.5.2, and reporting shall comply with Section 4.2.5.2.2.

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9.9 Verification, Testing, and Commissioning

9.9.1 Verification and Testing

Lighting control devices and *control systems* shall be tested in accordance with this section and Section 4.2.5.1 to verify that *control* hardware and software are calibrated, adjusted, programmed, and in proper working condition in accordance with the *construction documents* and *manufacturer's* installation instructions. When *occupancy sensors*, time switches, programmable schedule controls, or *photosensors* are installed, at a minimum, the following procedures shall be performed:

...

Verification and ~~*FTPFPT*~~ documentation shall comply with Section 4.2.5.1.2.

9.9.2 Commissioning

The *energy* performance of the *lighting systems* shall be *commissioned* in accordance with Section 4.2.5.2, and reporting shall comply with Section 4.2.5.2.2.

...

10.9 Verification, Testing, and Commissioning

10.9.1 Verification and Testing

~~*Other applicable equipment* *Service water pressure booster system controls*, *elevator standby mode* and *whole building energy monitoring* shall be ~~*commissioned*~~ or verified and tested in accordance with this section and Section 4.2.5.1. Testing shall to verify that *control* elements and monitoring *systems* are configured and operating in accordance with ~~Sections~~ the applicable requirements of:~~

- ~~a. *Service water pressure-booster system controls* 10.4.2,~~
- ~~b. *elevator standby mode* 10.4.3.3,~~
- ~~c. *air curtains* 10.4.5, and 4.2.5.2.~~
- ~~d. *whole building energy monitoring* 10.4.6~~
- ~~e. *pumps* 10.4.7~~

Verification and *FPT* documentation shall comply with Section 4.2.5.1.1~~2~~.

FOR REFERENCE ONLY

The following is what this addendum would look like when combined with the in-process addendum t.

4.2.4 Inspections

All *building construction*, additions or *alterations* work subject to the provisions of this standard shall remain accessible and exposed for inspection purposes until approved in accordance with the procedures specified by the *building official*. The *building official*, upon notification, shall make the inspections set forth in Section 4.2.4.1 through 4.2.4.6.

4.2.4.1 Fenestration Inspections

Fenestration shall be inspected for conformance with the applicable requirements of Section 5.5.4 in accordance with the approved plans and specifications and, at a minimum, shall include inspection of *U-factor*, *SHGC*, and *VT*.

4.2.4.2 Opaque Assembly Thermal Insulation Inspections

Opaque Assemblies shall be inspected for conformance with the applicable requirements of Section 5.2 and the approved plans and specifications for *U-factor* or *R-value* and that *building envelope* insulation is installed in accordance with Section 5.8.

4.2.4.3 Continuous Air Barrier Inspections

Opaque roof, *above-grade walls* and *below-grade walls*, and *floors*, shall be inspected for compliance with the approved plans and specifications with regard to use of compliant air barrier materials and assemblies as indicated in Section 5.8.3.1 and their integration with adjoining *fenestration* and other *continuous air barrier* elements in accordance with Section 5.4.3.1.

4.2.4.4 Operable Fenestration and Door Inspections

Fenestration and *door* closers or operating mechanisms shall be inspected for conformance with the *manufacturer's* instructions, and that the seals or gaskets are installed and in accordance with the *manufacturer's* instructions.

4.2.4.5 Loading Dock Weatherseals Inspections

Loading dock weatherseals shall be inspected for proper installation and to verify that the seals are in good condition.

4.2.4.6 Other Inspections

Other inspections related to mechanical, plumbing, lighting or other equipment as required by the *building official*.

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5.9 Verification, Testing, and Commissioning

5.9.1 Verification and Testing

5.9.1.1 Building Envelope Performance Verification

The *building envelope* shall be verified in accordance with Sections 5.9.1.2 through 5.9.1.3 and Section 4.2.5.1.

5.9.1.2 Verification of the Design and Installation of the Continuous Air Barrier

Where verification of the design and installation of the *continuous air barrier* is used for compliance in Section 5.4.3.1, it shall be determined in accordance with the following:

- a. Requirements for a field inspection plan shall be included in the construction documents and shall include as a minimum the following:

1. Schedule for periodic inspection(s),
 2. Continuous air barrier scope of work,
 3. List of critical inspection items,
 4. Inspection document requirements, and
 5. Provisions for corrective actions when needed.
- b. An independent third-party V&T provider in accordance with 4.2.5.1 shall conduct reviews and inspections as follows:
1. A design review shall be conducted to verify and document compliance with the requirements in Sections 5.4.3 and 5.8.3.2.
 2. Periodic field inspection of the continuous air barrier materials and assemblies shall be conducted during construction while the continuous air barrier is still accessible for inspection and repair to verify and document compliance with the requirements of Sections 5.4.3.1.2 and 5.8.3.
 3. Verification and *FPT* Documentation shall comply with Section 4.2.5.1.2

5.9.1.3 Dynamic Glazing

Dynamic glazing operation shall be tested for conformance with the *manufacturer's* instructions.

5.9.1.4 Air Curtains

Air curtains shall be tested in accordance with the provisions in Section 10.

5.9.2 Commissioning

The *energy* performance of the *building envelope* shall be *commissioned* in accordance with Section 4.2.5.2. *Commissioning* reporting shall comply with Section 4.2.5.2.2.