

ADDENDA

**ANSI/ASHRAE/IES Addendum bj to
ANSI/ASHRAE/IES Standard 90.1-2019**

Energy Standard for Buildings Except Low-Rise Residential Buildings

Approved by the ASHRAE Standards Committee on June 25, 2022; by the ASHRAE Board of Directors on June 29, 2022; by the Illuminating Engineering Society on June 17, 2022; and by the American National Standards Institute on July 29, 2022.

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FOREWORD

Addendum bj clarifies the scope and applicability of Standard 90.1 Normative Appendix A, improving format and structure to make provisions easier to understand and use and thereby enforce. It also updates the many alternative options available to standards users in order to demonstrate compliance. Changes include revisions to facilitate review of calculations, tests, and modeling, including places where there was confusion and ambiguity around application of the $\pm R-2$ tolerance as used in current Section A1.2. Two additional informative references are added to guide users. Addendum bj does not have an impact on the energy savings of the standard.

Note: In this addendum, changes to the current standard are indicated in the text by underlining (for additions) and ~~striking through~~ (for deletions) unless the instructions specifically mention some other means of indicating the changes.

Addendum bj to Standard 90.1-2019

Modify Section 5.5.3 as shown (I-P and SI).

5.5.3 Opaque Elements Areas. For all opaque elements surfaces except doors, compliance with Tables 5.5-0 through 5.5-8 for each class of construction as described in Normative Appendix A, Sections A2 through A8 shall be demonstrated by one of the following two methods:

- a. Providing a Minimum-rated R-value of insulation added to the assembly equal to or greater than the insulation minimum R-value required of each insulation component. for the thermal resistance of the added insulation in framing cavities and continuous insulation only. Specifications listed in Normative Appendix A for each class of construction shall be used to determine compliance.
- b. Providing insulation such that the mMaximum U-factor, C-factor, or F-factor for the entire assembly. is not exceeded as determined by one of the following:
 1. Precalculated values in accordance with Normative Appendix A Section A1.1. The values for typical construction assemblies listed in Normative Appendix A shall be used to determine compliance.
 2. Applicant-determined values in accordance with Normative Appendix A Section A1.2 where such values are approved by the code official.

Exceptions to 5.5.3:

1. For opaque assemblies not complying with the classes of construction as described in significantly different than those in Normative Appendix A Sections A2 through A8, compliance with the maximum U-factors for the “attic and other” or “wood frame and other” opaque element conditions in Tables 5.5-0 through 5.5-8 shall be demonstrated by testing or calculations representative of the designed assembly shall be performed in accordance with the procedures required in Normative Appendix A Section A9.1 where approved by the code official.
2. For multiple assemblies within a single class of construction for a single space conditioning category, compliance shall be shown for either (a) the most restrictive requirement or (b) an area-weighted average U-factor, C-factor, or F-factor.

[. . .]

Modify Normative Appendix A as shown (I-P and SI).

A1. GENERAL

Where using Normative Appendix A to demonstrate compliance with Section 5.5, the thermal performance of building envelopes shall be determined in accordance with Section A1.1 or A1.2.

A1.1 Precalculated Assembly U-Factors, C-Factors, F Factors, or Heat Capacities. Precalculated The U-factors, C-factors, F-factors, and heat capacities for typical construction-building

envelope assemblies shall be used for assemblies consistent with the specifications are included in Sections A2 through A8. These values shall be used for all calculations unless otherwise allowed by Section A1.2. These precalculated values shall be permitted to be used to demonstrate compliance for a building envelope assembly with any type of exterior covering or interior finish.

Interpolation between values in a particular table in Normative Appendix A shall be permitted ~~is allowed~~ for rated R-values of insulation, including insulated sheathing. Extrapolation beyond values in a table in Normative Appendix A is not allowed.

A1.2 Applicant-Determined Assembly U-Factors, C-Factors, F-Factors, or Heat Capacities. Testing, calculation, and modeling procedures in Section A9 shall be used to determine U-factors, C-factors, F-factors or heat capacities for assemblies that are not addressed by or are different from the assembly specifications listed in Sections A2 through A8 and the associated precalculated values.

~~If the building official determines that the proposed construction assembly is not adequately represented in Sections A2 through A8, the applicant shall determine appropriate values for the assembly using the assumptions in Section A9. An assembly is deemed to be adequately represented if~~

- a. ~~the interior structure, hereafter referred to as the base assembly, for the class of construction is the same as described in Sections A2 through A8 and~~
- b. ~~changes in exterior or interior surface building materials added to the base assembly do not increase or decrease the R-value by more than 2 from that indicated in the descriptions in Sections A2 through A8.~~

~~Insulation, including insulated sheathing, is not considered a building material.~~

[...]

A9. DETERMINATION OF ALTERNATE ALTERNATIVE ASSEMBLY U-FACTORS, C-FACTORS, F-FACTORS, OR HEAT CAPACITIES

A9.1 General. Alternative assembly U-factors, C-factors, F-factors or heat capacities ~~Component U-factors for other opaque assemblies shall be determined in accordance with Section A9 only if approved by the building official in accordance with Section A1.2.~~ The procedures required for each class of construction are specified in Section A9.2. Testing shall be performed in accordance with Section A9.3. Calculations shall be performed in accordance with Section A9.4.

[...]

A9.4 Calculation Procedures and Assumptions. The following procedures and assumptions shall be used for all calculations. R-values for air films, air spaces, insulation, and building materials shall be taken from Sections A9.4.1 through A9.4.4, respectively. In addition, applicable ~~the appropriate~~ assumptions listed in Sections A2 through A8, including framing factors, shall be used.

[...]

Modify Informative Appendix E as shown (I-P and SI).

Subsection No.	Reference	Title/Source
[...]		
A1.1	Hogan, J.F. 1995. Approach for opaque envelope U-factors for ASHRAE/IESNA 90.1-1989R. <i>ASHRAE Transactions</i> 101(2).	
A9.4	ASHRAE. 2021. <i>ASHRAE Handbook—Fundamentals</i> . Peachtree Corners, GA: ASHRAE.	
[...]		

POLICY STATEMENT DEFINING ASHRAE'S CONCERN FOR THE ENVIRONMENTAL IMPACT OF ITS ACTIVITIES

ASHRAE is concerned with the impact of its members' activities on both the indoor and outdoor environment. ASHRAE's members will strive to minimize any possible deleterious effect on the indoor and outdoor environment of the systems and components in their responsibility while maximizing the beneficial effects these systems provide, consistent with accepted Standards and the practical state of the art.

ASHRAE's short-range goal is to ensure that the systems and components within its scope do not impact the indoor and outdoor environment to a greater extent than specified by the Standards and Guidelines as established by itself and other responsible bodies.

As an ongoing goal, ASHRAE will, through its Standards Committee and extensive Technical Committee structure, continue to generate up-to-date Standards and Guidelines where appropriate and adopt, recommend, and promote those new and revised Standards developed by other responsible organizations.

Through its *Handbook*, appropriate chapters will contain up-to-date Standards and design considerations as the material is systematically revised.

ASHRAE will take the lead with respect to dissemination of environmental information of its primary interest and will seek out and disseminate information from other responsible organizations that is pertinent, as guides to updating Standards and Guidelines.

The effects of the design and selection of equipment and systems will be considered within the scope of the system's intended use and expected misuse. The disposal of hazardous materials, if any, will also be considered.

ASHRAE's primary concern for environmental impact will be at the site where equipment within ASHRAE's scope operates. However, energy source selection and the possible environmental impact due to the energy source and energy transportation will be considered where possible. Recommendations concerning energy source selection should be made by its members.

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