ADDENDA

ANSI/ASHRAE/IES Addendum ce to
ANSI/ASHRAE/IES Standard 90.1-2019

Energy Standard for Buildings Except Low-Rise Residential Buildings

Approved by ASHRAE and the American National Standards Institute on April 29, 2022, and by the Illuminating Engineering Society on April 27, 2022.

This addendum was approved by a Standing Standard Project Committee (SSPC) for which the Standards Committee has established a documented program for regular publication of addenda or revisions, including procedures for timely, documented, consensus action on requests for change to any part of the standard. Instructions for how to submit a change can be found on the ASHRAE® website (https://www.ashrae.org/continuous-maintenance).

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FOREWORD

Addendum ce modifies Normative Appendix A, Section A3.3, "Steel-Framed Walls" by referencing ANSI/AISI S250 and modifying the related provision accordingly. The reference to ANSI/AISI S250 is intended to overcome a barrier within Standard 90.1 where the accepted framing spacing for cold-formed steel framed walls is limited to 16 and 24 in. (400 and 600 mm) on center only.

ANSI/AISI S250 covers cold-formed steel-wall-framing spacings from 6 in. to 24 in. (152 to 600 mm), covers member sizes from 3.5 to 12 in. (89 to 305 mm) wide, and covers member thicknesses from 33 mils (0.0329 in. thick) (0.836 mm) to 68 mils (0.0677 in. thick) (1.720 mm). This provides a great deal of latitude for users of Standard 90.1 and mitigates the necessity of having to submit for approval under alternate means and methods, such as in Section A9, "Determination of Alternate Assembly U-Factor, C-Factor, F-Factors, or Heat Capacities." ANSI/AISI S250 also includes provisions for evaluation of wall assemblies where all of the insulation is located outside the wall cavity, which is an option Standard 90.1 does not currently offer.

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

Addendum ce to Standard 90.1-2019

Modify the standard as shown (I-P and SI).

A2.5 Attic Roofs with Steel Joists

A2.5.1 General. For the purpose of Section A1.2, the base assembly is a *roof* supported by *steel joists* with insulation between the joists. The assembly represents a *roof* in many ways similar to a *roof with insulation entirely above deck* and a *metal building roof*. It is distinguished from the *metal building roof* category in that there is no metal exposed to the exterior. It is distinguished from the *roof with insulation entirely above deck* in that the insulation is located below the deck and is interrupted by metal trusses that provide thermal bypasses to the insulation. The *U-factors* include R-0.17 for exterior air film, R-0 for metal deck, and R-0.61 for interior air film heat flow up. The performance of the insulation/framing layer is calculated using the values in Table A9.2-1.

A2.5.2 *U-factors* for attic *roofs* with *steel joists* shall be taken from Table A2.5.2. It is acceptable to use these *U-factors* for any attic *roof* with *steel joists*.

A2.5.3 *U-factors* for attic *roofs* constructed of cold-formed-steel conventional C-shape framing or cold-formed steel trusses, where the insulation is located at the ceiling joist or the bottom chord, and where the framing spacing does not exceed 24 in. (600 mm) on-center, shall be determined in accordance with AISI S250.

[. . .]

A3.3 Steel-Framed Walls

A3.3.1 General. For the purpose of Section A1.2, the base assembly is a *wall* where the insulation is installed within the cavity of the cold-formed steel stud framing ~~but where there is not a metal exterior surface-spanning member~~. The steel stud framing ~~is a minimum uncoated~~ thickness ~~of 0.043 in.(1.1 mm) for 18 gage or 0.054 in.(1.4 mm) for 16 gage~~ is up to 54 mils (0.0538 in. minimum base steel thickness) (1.36 mm). The *U-factors* include R-0.17 (R-0.03) for exterior air film, R-0.08 (R-0.01) for stucco, R-0.56 (0.10) for 0.625 in.(16 mm) gypsum board on the exterior, R-0.56 (R-0.10) for 0.625 in. (16 mm) gypsum board on the interior, and R-0.68 (R-0.12) for interior vertical surfaces air film. The performance of the insulation/framing layer is calculated using the values in Table A9.2-2. Additional assemblies include *continuous insulation* uncompressed and uninterrupted by framing. ~~*U-factors* are provided for the following configurations:~~

~~a. Standard framing: Steel stud framing at 16 in. (400 mm) on center with cavities filled with 16 in. (400 m) wide insulation for both 3.5 in. (89 mm) deep and 6.0 in. (152 mm) deep *wall* cavities.~~

~~b. Advanced framing: Steel stud framing at 24 in. (600 mm) on center with cavities filled with 24 in. (600 mm) wide insulation for both 3.5 in. (89 mm) deep and 6.0 in. (152 mm) deep *wall* cavities.~~

A3.3.2 Rated R-Value of Insulation for Steel-Framed Walls

A3.3.2.1 Steel stud framing spaced at 16 in. (400 mm) on-center with cavities filled with 16 in. (400 mm) wide insulation for both 3.5 in (89 mm) deep and 6.0 in. (152 mm) deep wall cavities serve as the basis for the *R-value* compliance values in Tables 5.5-0 through 5.5-8.

~~**A3.3.2.1**~~ **A3.3.2.2** The first *rated R-value of insulation* is for uncompressed insulation installed in the cavity between steel studs. It is acceptable for this insulation to also be *continuous insulation* uninterrupted by framing.

~~**A3.3.2.2**~~ **A3.3.2.3** If there are two values, the second *rated R-value of insulation* is for *continuous insulation* uninterrupted by framing, etc., to be installed in addition to the first insulation.

~~**A3.3.2.3**~~ **A3.3.2.4** *Opaque* mullions in spandrel glass shall be covered with insulation complying with the *steel-framed wall* requirements.

A3.3.3 U-Factors for Steel-Framed Walls

A3.3.3.1 *U-factors* for *steel-framed walls* shall be determined from one of the following methods: ~~taken from Table A3.3.3.1.~~

a. Table A3.3.3.1
b. Testing or calculation methods listed in Section A9.2(b)(3)

A3.3.3.2 ~~For *steel framed walls* with framing at less than 24 in. (600 mm) on center, use the standard framing values as described in Section A3.3.1(a).~~ Where *steel-framed wall* framing is spaced greater than 24 in. (600 mm) on center, the *U-factor* shall be permitted to be determined based on the 24 in. (600 mm) on-center spacing options from Section A3.3.3.1 or based on ASTM C1363 testing at the actual frame spacing used.

A3.3.3.3 ~~For *steel framed walls* with framing from 24 in. on center to 32 in. on center, use the advanced framing values as described in Section A3.3.1 (b).~~ Where *steel framed wall* assemblies contain no cavity insulation, and where the *building envelope* assembly uses continuous insulation to satisfy the minimum *R-value* for the relevant climate zone in Tables 5.5-0 through 5.5-8, the on-center framing spacing is permitted to be at any dimension.

~~**A3.3.3.4** For *steel framed walls* with framing greater than 32 in. on center, use the *metal building wall* values in Table A3.2.3.~~

[. . .]

A9.2 Required Procedures. Two- or three-dimensional finite difference and finite volume computer models shall be an acceptable alternative method to calculating the thermal performance values for all assemblies and constructions listed below. The following procedures shall also be permitted to determine all alternative *U-factors*, *F-factors*, and *C-factors*:

[. . .]

3. *Steel-framed walls*: Determined by t~~T~~esting, ~~or parallel~~ series path calculation method using the cavity insulation/framing layer adjustment factors in Table A9.2-2, or ~~the modified zone method~~ in accordance with AISI S250 as modified herein:
   i. Where the *steel-framed wall* contains no cavity insulation and uses continuous insulation to satisfy the U-factor maximum, the *steel-framed wall* member spacing is permitted to be installed at any on-center spacing.
   ii. Where the *steel-framed wall* contains framing at 24 inch (600 mm) on center with a 23% framing factor or framing at 16 inch (400 mm) on-center with a 25% framing factor, the next lower framing member spacing input values shall be used when calculating using AISI S250.
   iii. Where the *steel-framed wall* contains less than 23% framing factors, AISI S250 shall be used without any modifications.
   iv. Where the *steel-framed wall* contains other than standard C-shape framing members, the AISI S250 calculation option for other than standard C-shape framing is permitted to be used.

[. . .]

Modify Section 12 as shown.

Reference	Title
[. . .]	
American Iron and Steel Institute (AISI) 25 Massachusetts Avenue, NW, Suite 800 Washington, DC 20001	
ANSI/AISI S250-2021	North American Standard for Thermal Transmittance of Building Envelopes with Cold-Formed Steel Framing
[. . .]	

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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.

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