

**ANSI/ASHRAE/ICC/USGBC/IES Addendum ad to  
ANSI/ASHRAE/ICC/USGBC/IES Standard 189.1-2017**

# **Standard for the Design of High-Performance Green Buildings**

## **Except Low-Rise Residential Buildings**

*A Compliance Option of the International Green Construction Code®*

Approved by the ASHRAE Standards Committee on October 16, 2019; by the ASHRAE Board of Directors on November 1, 2019; by the International Code Council on October 10, 2019; by the U.S. Green Building Council and the Illuminating Engineering Society on November 5, 2019; and by the American National Standards Institute on November 4, 2019.

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## FOREWORD

*Addendum ad deletes the requirements specific to Standard 189.1 for SHGC multipliers for permanent projections, including Table 7.4.2.7. As a result, Standard 189.1 reverts to the table in Standard 90.1-2016, which is more up-to-date. With the deletion of Table 7.4.2.7, the definition for “north-oriented,” which does not appear elsewhere in the standard, is also be deleted from Section 3.*

*Section 7.4.2.7 also allowed a relaxation of the SHGC requirements by 0.1 for north-oriented (within 45 degrees of due north) vertical fenestration for all climate zones. A series of EnergyPlus simulations found that this relaxation of SHGC resulted in increased energy costs except in Climate Zones 4C and 5 through 8 and only for glazing oriented within 22.5 degrees of true north. As a result, the criteria for the SHGC relaxation have been tightened accordingly.*

*This addendum also deletes the duct insulation Section 7.4.3.9. Standard 189.1 users must comply with the requirements of Standard 90.1-2016. The 2016 edition has revised duct insulation requirements that generally save more energy than the requirements in Standard 189.1.*

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

### Addendum ad to Standard 189.1-2017

*Delete the Section 3 definition of “north-oriented.”*

~~**north-oriented:** facing within 45 degrees of true north within the northern hemisphere (however, facing within 45 degrees of true south in the southern hemisphere).~~

*Revise Section 7.4.2.7 as shown and Delete Table 7.4.2.7.*

**7.4.2.7 SHGC of North-Facing Vertical Fenestration.** For SHGC compliance, the methodology in ANSI/ASHRAE/IES Standard 90.1, Section 5.5.4.4.1, Exception 2, is allowed, provided that the SHGC multipliers in Table 7.4.2.7 of this standard are used. This requirement supersedes the requirement in ANSI/ASHRAE/IES Standard 90.1, Table 5.5.4.4.1; that table shall not apply. In Climate Zones 4C and 5 through 8, vertical fenestration that is oriented within 22.5 degrees of true north oriented in the Northern Hemisphere, or is oriented within 22.5 degrees of true south in the Southern Hemisphere, shall be allowed to have a maximum SHGC of 0.10 greater than that specified in ANSI/ASHRAE/IES Standard 90.1, Tables 5.5-1 through 5.5-8. When this provision is used, separate calculations shall be performed for these sections of the building envelope, and these values shall not be averaged with any others for compliance purposes.

*Delete Section 7.4.3.9 and renumber subsequent sections.*

~~**7.4.3.9 Duct Insulation.** Duct insulation shall comply with the minimum requirements in Normative Appendix A, Tables A-2 and A-3. These requirements supersede the requirements in ANSI/ASHRAE/IES Standard 90.1, Table 6.8.2.~~

**Table 7.4.2.7 SHGC Multipliers for Permanent Projections**

| PF            | SHGC Multiplier          | SHGC Multiplier  |
|---------------|--------------------------|------------------|
|               | (All Other Orientations) | (North-Oriented) |
| 0 to 0.60     | 1.00                     | 1.00             |
| >0.60 to 0.70 | 0.92                     | 0.96             |
| >0.70 to 0.80 | 0.84                     | 0.94             |
| >0.80 to 0.90 | 0.77                     | 0.93             |
| >0.90 to 1.00 | 0.72                     | 0.90             |

**Delete Tables A-2 and A-3 (both I-P and SI; only I-P are shown here) in Normative Appendix A.**

**Table A-2 (Supersedes Table 6.8.2 in ANSI/ASHRAE/IES Standard 90.1)–  
Minimum Duct Insulation R-Value<sup>a</sup> Heating- and Cooling-Only Supply Ducts and Return Ducts (I-P)**

| Climate-Zone              | -Duct Location- |                  |  |  |                                  |   |        |
|---------------------------|-----------------|------------------|--|--|----------------------------------|---|--------|
|                           | Exterior        | Ventilated Attic | Unvented Attic above Insulated-Ceiling | Unvented Attic with Roof Insulation <sup>a</sup> | Unconditioned Space <sup>b</sup> | Indirectly Conditioned Space <sup>c</sup> | Buried |
| <b>Heating-Only Ducts</b> |                 |                  |  |  |                                  |   |        |
| 0, 1, 2                   | None            | None             | None                                   | None   | None                             | None                                      | None   |
| 3                         | R-6             | None             | None                                   | None   | R-6                              | None                                      | None   |
| 4                         | R-6             | None             | None                                   | None   | R-6                              | None                                      | None   |
| 5                         | R-8             | R-6              | None                                   | None   | R-6                              | None                                      | R-6    |
| 6                         | R-8             | R-8              | R-6                                    | None   | R-6                              | None                                      | R-6    |
| 7                         | R-10            | R-8              | R-8                                    | None   | R-6                              | None                                      | R-6    |
| 8                         | R-10            | R-10             | R-8                                    | None   | R-8                              | None                                      | R-8    |
| <b>Cooling-Only Ducts</b> |                 |                  |  |  |                                  |   |        |
| 0, 1                      | R-6             | R-8              | R-10                                   | R-6  | R-6                              | None                                      | R-6    |
| 2                         | R-6             | R-8              | R-10                                   | R-6  | R-6                              | None                                      | R-6    |
| 3                         | R-6             | R-8              | R-8                                    | R-6  | R-3.5                            | None                                      | None   |
| 4                         | R-3.5           | R-6              | R-8                                    | R-3.5  | R-3.5                            | None                                      | None   |
| 5, 6                      | R-3.5           | R-3.5            | R-6                                    | R-3.5  | R-3.5                            | None                                      | None   |
| 7, 8                      | R-1.9           | R-3.5            | R-3.5                                  | R-3.5  | R-3.5                            | None                                      | None   |
| <b>Return Ducts</b>       |                 |                  |  |  |                                  |   |        |
| 0 to 8                    | R-6             | R-6              | R-6                                    | None   | None                             | None                                      | None   |

a. Insulation R-values, measured in (h-ft<sup>2</sup>-°F)/Btu, are for the insulation as installed and do not include film resistance. The required minimum thicknesses do not consider water vapor transmission and possible surface condensation. Where exterior walls are used as plenum walls, wall insulation shall be as required by the most restrictive condition of this table or Section 7.4.2. Insulation resistance is measured on a horizontal plane in accordance with ASTM C518 at a mean temperature of 75°F at the installed thickness.

b. Includes crawlspaces, both ventilated and nonventilated.

c. Includes return air plenums with or without exposed roofs above.

**Table A-3 (Supersedes Table 6.8.2 in ANSI/ASHRAE/IES Standard 90.1)**  
**Minimum Duct Insulation R-Value<sup>a</sup> Combined Heating and Cooling Supply Ducts and Return Ducts (I-P)**

| Climate Zone        | Duct Location |                  |  |  |                                  |   |        |
|---------------------|---------------|------------------|--|--|----------------------------------|---|--------|
|                     | Exterior      | Ventilated Attic | Unvented Attic above Insulated Ceiling | Unvented Attic with Roof Insulation <sup>a</sup> | Unconditioned Space <sup>b</sup> | Indirectly Conditioned Space <sup>c</sup> | Buried |
| <b>Supply Ducts</b> |               |                  |  |  |                                  |   |        |
| 0, 1                | R-8           | R-8              | R-10                                   | R-6  | R-6                              | None                                      | R-6    |
| 2                   | R-8           | R-8              | R-8                                    | R-6  | R-8                              | None                                      | R-6    |
| 3                   | R-8           | R-8              | R-8                                    | R-6  | R-8                              | None                                      | R-6    |
| 4                   | R-8           | R-8              | R-8                                    | R-6  | R-8                              | None                                      | R-6    |
| 5                   | R-8           | R-8              | R-8                                    | R-3.5  | R-8                              | None                                      | R-6    |
| 6                   | R-10          | R-8              | R-8                                    | R-3.5  | R-8                              | None                                      | R-6    |
| 7                   | R-10          | R-8              | R-8                                    | R-3.5  | R-8                              | None                                      | R-6    |
| 8                   | R-10          | R-11             | R-11                                   | R-3.5  | R-8                              | None                                      | R-8    |
| <b>Return Ducts</b> |               |                  |  |  |                                  |   |        |
| 0 to 8              | R-6           | R-6              | R-6                                    | None   | None                             | None                                      | None   |

a. Insulation R-values, measured in (h·ft<sup>2</sup>·°F)/Btu, are for the insulation as installed and do not include film resistance. The required minimum thicknesses do not consider water vapor transmission and possible surface condensation. Where exterior walls are used as plenum walls, wall insulation shall be as required by the most restrictive condition of this table or Section 7.4.2. Insulation resistance is measured on a horizontal plane in accordance with ASTM C518 at a mean temperature of 75°F at the installed thickness.

b. Includes crawlspaces, both ventilated and non-ventilated.

c. Includes return air plenums with or without exposed roofs above.



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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.

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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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