ADDENDA

ANSI/ASHRAE/IES Addendum dk to
ANSI/ASHRAE/IES Standard 90.1-2022

Energy Standard for Sites and Buildings Except Low-Rise Residential Buildings

Approved by ASHRAE and by the American National Standards Institute on November 28, 2025; and by the Illuminating Engineering Society on November 13, 2025.

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 dk provides an option for HERVs serving spaces other than nontransient dwelling units to use CAN/CSA C439 energy performance ratings to comply with the requirements of Section 6.5.6.1.2. Just as performance ratings in accordance with AHRI 1060 are permitted for HERVs serving nontransient dwelling units, performance ratings in accordance with CAN/CSA C439 should be permitted for HERVs serving other spaces. HERVs rated in accordance with CAN/CSA C439 are smaller units and are not typically certified to AHRI 1060; in some "other spaces" applications, they may be more practical to use. There is nothing in the scope of either standard that would restrict their use based on the type of space that is served, and reciprocating the recognition of both AHRI 1060 and CAN/CSA C439 for "other spaces" should increase specifier choice, avoid doubling the testing burden for manufacturers certifying to CAN/CSA C439 (as is required for small HERVs by the IECC-R, Canada's Energy Efficiency Regulations, Canada's ENERGY STAR HERV program, etc.), and ultimately reduce costs for consumers. This addendum also updates ASHRAE's reference to CAN/CSA C439 to the 2024 (latest) edition. A free copy of the standard can be accessed through the CSA Communities page (https://community.csagroup.org/login.jspa?referer=%252Findex.jspa, select "Standards View Access," select "View all Energy Efficiency standards," enter "439" in the "Type to filter by text" box, select the 2024 version of the C439 standard from the results).

This change provides an alternate compliance path for exhaust air energy recovery in spaces other than nontransient dwelling units. As the other path has been shown cost effective, it is not necessary to prove this path is cost effective.

Informative 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 dk to Standard 90.1-2022

Revise Section 6.5.6.1 as shown (I-P and SI).

6.5.6.1 Exhaust Air to Outdoor Air Energy Recovery. *Nontransient dwelling units* shall comply with Section 6.5.6.1.1. All other spaces shall comply with Section 6.5.6.1.2.

6.5.6.1.1 Nontransient Dwelling Units. *Nontransient dwelling units* shall have a *ventilation system* with *energy* recovery to transfer *energy* between the *system* exhaust air and *outdoor air* at not less than the *design minimum outdoor air rate* and comply with one of the following:

a. The exhaust air energy recovery performance of the heat exchanger shall be determined in accordance with AHRI 1060 (AHRI 1061), ~~and at the heating *design condition*,~~ the heat exchanger shall comply with the following:
   1. In Climate Zones 0 through 3 at the cooling design condition, the *enthalpy recovery ratio* at the *design minimum outdoor air rate* shall be not less than 50%.
   2. In Climate Zones 3 through 8, where active humidification is provided to spaces served by the system, the heat exchanger's enthalpy recovery ratio at the heating design condition at the *design minimum outdoor air rate* shall be not less than 60%.
   3. In Climate Zones 3 through 8, when active humidification is not provided to *spaces* served by the *system*, the heat exchanger's *sensible energy recovery ratio* at the heating *design condition* at the *design minimum outdoor air rate* shall be not less than 60%.

b. The *equipment*'s energy recovery performance shall be determined in accordance with CAN/CSA C439 and shall comply with the following:
   1. In Climate Zones 4 through 8, the *equipment's* sensible recovery efficiency rating at the 32°F (0°C) outdoor air heating mode test condition shall not be less than 65%.
   2. In Climate Zones 0A, 1A, 2A, and 3A, the *equipment's* total recovery efficiency rating at the 95°F (35°C) outdoor air cooling mode test condition shall not be less than 50%.
   3. In Climate Zones other than 0A, 1A, 2A, and 3A, where active humidification is provided to spaces served by the system, the *equipment's* net moisture transfer ratio rating at the 32°F (0°C) outdoor air heating mode test condition shall not be less than 0.40.

4. The *equipment's* sensible recovery *efficiency* and net moisture transfer shall be determined from a rated value, or interpolation of rated values, at an airflow rate not less than the *design minimum outdoor air rate*.

Exceptions to 6.5.6.1.1:

1. *Nontransient dwelling units* in Climate Zone 3C.
2. *Nontransient dwelling units* with not more than 500 ft^2 of *gross conditioned floor area* in Climate Zones 0, 1, 2, 3, 4C, and 5C.

6.5.6.1.2 Other Spaces. Each fan *system* serving other *spaces* shall have an *energy* recovery *system* where the design supply fan airflow rate exceeds the value listed in Tables 6.5.6.1.2-1 and 6.5.6.1.2-2, based on the climate zone and percentage of *design minimum outdoor air rate* at design airflow conditions. Table 6.5.6.1.2-1 shall be used for all *ventilation systems* that operate less than 8000 hours per year, and Table 6.5.6.1.2-2 shall be used for all *ventilation systems* that operate 8000 or more hours per year.

Exceptions to 6.5.6.1.2:

1. Laboratory *systems* meeting Section 6.5.7.3.
2. *Systems* serving *spaces* that are not cooled and that are heated to less than 60°F (16°C).
3. Heating *energy* recovery where more than 60% of the *outdoor air* heating *energy* is provided from *site recovered energy* or *on-site renewable energy* in Climate Zones 5 through 8.
4. ~~*Enthalpy recovery ratio* requirements at heating design condition in Climate Zones 0, 1, and 2.~~
5. ~~*Enthalpy recovery ratio* requirements at cooling design condition in Climate Zones 3C, 4C, 5B, 5C, 6B, 7, and 8.~~
6. 4. Where the sum of the airflow rates exhausted and relieved within 20 ft (6 m) of each other is less than 75% of the *design minimum outdoor air rate*, excluding exhaust air that is
   a. used for another *energy* recovery *system*,
   b. not allowed by ASHRAE/ASHE Standard 170 for use in *energy* recovery *systems* with leakage potential, or
   c. of Class 4 as defined in ASHRAE Standard 62.1.
7. 5. *Systems* in Climate Zones 0 through 4 requiring dehumidification that employ *series energy recovery* and have a minimum *SERR* of 0.40 at 75.0°F (23.9°C) dry-bulb, 63.0°F (17.2°C) wet-bulb entering air condition, and at the design airflow.
8. 6. *Systems* expected to operate less than 20 hours per week at the *design minimum outdoor air rate* percentage covered by Table 6.5.6.1.2-1.
9. 7. *Indoor pool dehumidifiers* meeting Section 6.5.6.4.

6.5.6.1.2.1 Energy Recovery Performance. The exhaust air energy recovery performance ~~of the heat exchanger~~ shall be determined in accordance with one of the following:

a. The exhaust air energy recovery performance of the heat exchanger shall be determined in accordance with AHRI 1060 (AHRI 1061) and shall comply with the following:~~.~~
   1. In Climate Zones 0A, 0B, 1A, 1B, 2A, 2B, 3A, 3B, 4A, 4B, 5A, and 6A, ~~A~~at the cooling *design condition*, the *enthalpy recovery ratio* at the *design minimum outdoor air rate* shall be not less than 50% ~~and at the heating *design condition*, the heat exchanger shall comply with the following:~~.
   2. In Climate Zones 3 through 8, at the heating *design condition*:
      i. Where active humidification is provided to *spaces* served by the *system*, the heat exchanger's *enthalpy recovery ratio* at the *design minimum outdoor air rate* shall be not less than 50%.
      ii. Where active humidification is not provided to *spaces* served by the *system*, the heat exchanger's *sensible energy recovery ratio* at the *design minimum outdoor air rate* shall be not less than 50%.

~~The *energy* recovery *system* shall provide the required *enthalpy recovery ratio* or *sensible energy recovery ratio* at both heating and cooling *design conditions* unless one mode is not required for the climate zone by the exceptions to Section 6.5.6.1.2.~~

b. The *equipment*'s energy recovery performance shall be determined in accordance with CAN/CSA C439 and shall comply with the following:
   1. The *equipment*'s sensible recovery efficiency rating at the 32°F (0°C) outdoor air heating mode test condition shall not be less than 65%. This requirement shall not apply in Climate Zones 0 through 2.
   2. The *equipment*'s total recovery efficiency rating at the 95°F (35°C) outdoor air cooling mode test condition shall not be less than 50%. This requirement shall not apply in Climate Zones 3C, 4C, 5B, 5C, 6B, 7, and 8.

3. Where active humidification is provided to spaces served by the system, the *equipment*'s net moisture transfer ratio rating at the 32°F (0°C) outdoor air heating mode test condition shall not be less than 0.40. This requirement shall not apply in Climate Zones 0 through 2.
4. The *equipment*'s sensible recovery efficiency and net moisture transfer shall be determined from a rated value, or interpolation of rated values, at an airflow rate not less than the *design minimum outdoor air rate*.

[. . .]

Revise Section 11.5.2.2.6 as shown (I-P and SI).

11.5.2.2.6 H06: Dedicated Outdoor Air System with Zone Fan Control. Credits for this measure are only allowed where single-zone HVAC units are not required to have multispeed or variable-speed fans in accordance with Section 6.5.3.2.1. HVAC controls and *ventilation systems* shall include all of the following:

a. Zone controls shall cycle the heating/cooling-unit fans off when not providing required heating and cooling or shall limit fan power to 0.12 W/cfm of air delivered to the zone by the unit.
b. *Outdoor air* shall be supplied by an independent *ventilation system* designed to provide no more than 110% of the minimum *outdoor air* to each individual occupied space as specified by Standard 62.1.
c. The *ventilation system* shall have exhaust air *energy* recovery complying with Section 11.5.2.2.6(c)(1) or (c)(2), or any combination thereof. Where *energy* recovery effectiveness is less than the value required for full credit, adjust the credits from Section 11.5.3 by the factors in Table 11.5.2.2.6.
   1. The heat exchanger's exhaust air energy recovery performance shall be determined in accordance with AHRI 1060 (AHRI 1061) and shall have ~~with~~ an *enthalpy recovery ratio* (*ERR*) of 65% or more at heating *design conditions* in Climate Zones 3 through 8 and an *ERR* of 65 percent or more at cooling design conditions in Climate Zones 0, 1, 2, 3A, 3B, 4A, 4B, 5A and 6A. In "A" climate zones, *energy* recovery shall include latent recovery. Where no humidification is provided, heating *energy* recovery effectiveness is permitted to be based on *sensible energy recovery ratio*. ~~Where *energy* recovery effectiveness is less than the 65% require for full credit, adjust the credits from Section 11.5.3 by the factors in Table 11.5.2.2.6.~~
   2. The equipment's exhaust air *energy recovery* performance shall be determined in accordance with CAN/CSA C439 and shall comply with the following:
      i. In Climate Zones 4 through 8, the *equipment*'s sensible recovery efficiency rating at the 32°F (0°C) outdoor-air heating mode test condition shall not be less than 75%.
      ii. In Climate Zones 0A, 1A, 2A, and 3A, the *equipment*'s total recovery efficiency rating at the 95°F (35°C) outdoor-air cooling mode test condition shall not be less than 60%.
      iii. In Climate Zones other than 0A, 1A, 2A, and 3A, where active humidification is provided to spaces served by the system, the *equipment*'s net moisture transfer ratio rating at the 32°F (0°C) outdoor-air heating mode test condition shall not be less than 0.50.
      iv. The *equipment*'s sensible recovery efficiency and net moisture transfer shall be determined from a rated value, or interpolation of rated values, at an airflow rate not less than the *design minimum outdoor air rate.*

[. . .]

Table 11.5.2.2.6 DOAS Energy Recovery Adjustments

ERE_{adj} Based on Lower of Actual Heating or Cooling Energy ~~Recovery Effectiveness~~ Performance where Required					
Performance Determined by AHRI 1060 (AHRI 1061)		Performance Determined by CAN/CSA C439			
Cooling *ERR* Is ≥	Heating ~~Enthalpy Recovery Ratio (*ERR*)~~ or Sensible Energy Recovery Ratio Is ≥	Total Recovery Efficiency at 95°F (35°C) Is ≥	Sensible Recovery Efficiency at 32°F (0°C) Is ≥	Net Moisture Transfer Ratio at 32°F (0°C) Is ≥	Energy Recovery Effectiveness Adjustment (ERE_{adj})
65%	65%	60%	75%	0.50	1.00
60%	60%	57%	72%	0.47	0.67
55%	55%[a]	53%	68%	0.43	0.33
50%	50%[a]	50%	65%	0.40	0.25

a. In climate zones where heating recovery is required for this measure, for multifamily buildings heating energy recovery effectiveness below 60% is not allowed.

Revise Section 13 as shown (I-P).

Reference		Section
[. . .]		
Air Conditioning, Heating and Refrigeration Institute (AHRI) 2311 Wilson Blvd., Arlington, VA 22201		
AHRI 1060 (I-P/~~2018~~2023)	Performance Rating of Air-to-Air Exchangers for Energy Recovery Ventilation Equipment	6.5.6.1.1(a), 6.5.6.1.2.1
[. . .]		
CSA Group 178 Rexdale Blvd., Toronto, ON, Canada M9W 1R3		
CSA C439-~~2018~~2024	Laboratory Methods of Test for Rating the Performance of Heat/Energy-Recovery Ventilators	6.5.6.1.1(b)
[. . .]		

Revise Section 13 as shown below. (SI)

Reference		Section
[. . .]		
Air Conditioning, Heating and Refrigeration Institute (AHRI) 2311 Wilson Blvd., Arlington, VA 22201		
AHRI 1060 (SI/~~2018~~2023)	Performance Rating of Air-to-Air Exchangers for Energy Recovery Ventilation Equipment	6.5.6.1.1(a), 6.5.6.1.2.1, 11.5.2.2.6
[. . .]		
CSA Group 178 Rexdale Blvd., Toronto, ON, Canada M9W 1R3		
CSA C439-~~2018~~2024	Laboratory Methods of Test for Rating the Performance of Heat/Energy-Recovery Ventilators	6.5.6.1.1(b), 11.5.2.2.6
[. . .]		

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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