

# ADDENDA

**ANSI/ASHRAE/IES Addendum m to  
ANSI/ASHRAE/IES Standard 90.1-2022**

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

Approved by ASHRAE and the American National Standards Institute on February 29, 2024, and by the Illuminating Engineering Society on January 26, 2024.

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 ([www.ashrae.org/continuous-maintenance](http://www.ashrae.org/continuous-maintenance)).

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ASHRAE obtains consensus through participation of its national and international members, associated societies, and public review.

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- offering constructive criticism for improving the Standard, or
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## FOREWORD

*Addendum m adds requirements that hydronic and direct-exchange (DX) fin-and-tube coils be rated according to AHRI 410-2023 (SI/I-P), Performance Rating of Forced-Circulation Air-Cooling and Air-Heating Coils, and exhaust-air energy recovery heat exchangers be rated according to AHRI 1060 (I-P/2018), Performance Rating of Air-to-Air Exchangers for Energy Recovery Ventilation Equipment. The existing rating requirement for liquid-to-liquid heat exchangers remains.*

*Exceptions are provided for coils and liquid-to-liquid heat exchangers in equipment listed in Section 6.8 that is rated to overall performance standards, and exhaust-air energy recovery systems rated under CSA C439-2018, Laboratory Methods of Test for Rating the Performance of Heat/Energy-Recovery Ventilators. There is also an exception for installations outside the United States and Canada where other acceptable performance rating standards may exist. Other equipment exempt from rating includes DX coils, condensing coils, and steam coils, as well as coils in units already rated in accordance with other AHRI standards (440 or 840 for hydronic units).*

*Rating to AHRI 400 has resulted in significantly more accurate performance ratings for liquid-to-liquid heat exchangers, which results in systems that are more likely to perform as designed. The committee believes that the addition of fin-and-tube coils and exhaust-air energy recovery components will have a similar effect.*

*This change does not add to the cost of construction, as many manufacturers already rate to these standards.*

**Informative 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 m to Standard 90.1-2022

**Modify Section 3.2 as shown (I-P and SI).**

EPCA                      U.S. Energy Policy and Conservation Act

**Revise Section 6.4.1.4 as shown (I-P and SI).**

**6.4.1.4 Verification of Equipment Efficiencies.** Equipment efficiency information supplied by manufacturers shall be verified by one of the following:

- Equipment covered under ~~EPACT~~ EPCA shall comply with U.S. Department of Energy certification requirements.

[ . . . ]

**Revise Section 6.4.7 as shown (I-P).**

**Table 6.4.7 Performance Rating Procedures for System Components (I-P)**

<u>Equipment</u>	<u>Rating Procedure</u>
<u>Plate-type liquid-to-liquid heat exchangers</u>	<u>AHRI 400</u>
<u>Fin-and-tube heating and cooling coils (hydronic and DX)</u>	<u>AHRI 410</u>
<u>Exhaust air energy recovery heat exchangers</u>	<u>AHRI 1060</u>
<u>Hydronic fan coils</u>	<u>AHRI 440</u>
<u>Hydronic fan-coil-unit ventilators</u>	<u>AHRI 840</u>

**6.4.7 ~~Liquid-to-Liquid Heat Exchangers~~ Performance Rating Requirements for System Components.** ~~Plate-type liquid-to-liquid heat exchangers shall be rated in accordance with AHRI 400. The equip-~~

ment listed in Table 6.4.7 shall be rated in accordance with the rating procedure listed. Section 12 contains a complete specification of the referenced test procedure.

**Exceptions to 6.4.7:**

1. Heating and cooling coils and plate-type liquid-to-liquid heat exchangers that are part of equipment with minimum efficiency requirements listed in any table in Section 6.8.1.
2. Exhaust air energy recovery heat exchangers in DX-DOAS units in Table 6.8.1-14 tested to AHRI 920 Test Option 1 with no adjustment to the entering outdoor air temperatures.
3. Coils in equipment covered under EPCA that comply with U.S. DOE certification requirements.
4. Components of exhaust air energy recovery devices rated to CAN/CSA-C439.
5. Equipment to be installed outside the United States and Canada rated in accordance with a rating procedure approved by the authority having jurisdiction.
6. Components that fall outside the scope of the listed rating procedure.
7. Direct-expansion refrigerant and condensing coils other than heat pipes that fall under the scope of AHRI 1060.
8. Steam coils.
9. Coils in hydronic fan-coil units rated in accordance with AHRI 440 and hydronic fan-coil-unit ventilators rated in accordance with AHRI 840 are not required to be rated in accordance with AHRI 410.

**Revise Section 6.4.7 as shown (SI).**

**Table 6.4.7 Performance Rating Procedures for System Components (SI)**

<b><u>Equipment</u></b>	<b><u>Rating Procedure</u></b>
<u>Liquid-to-liquid heat exchangers</u>	<u>AHRI 401</u>
<u>Fin-and-tube heating and cooling coils (hydronic and DX)</u>	<u>AHRI 410</u>
<u>Exhaust air energy recovery heat exchangers</u>	<u>AHRI 1061</u>
<u>Hydronic fan coils</u>	<u>AHRI 441</u>
<u>Hydronic fan-coil-unit ventilators</u>	<u>AHRI 841</u>

**6.4.7 Liquid-to-Liquid Heat Exchangers Performance Rating Requirements for System Components.** Plate-type liquid-to-liquid heat exchangers shall be rated in accordance with AHRI 400. The equipment listed in Table 6.4.7 shall be rated in accordance with the rating procedure listed. Section 12 contains a complete specification of the referenced test procedure.

**Exceptions to 6.4.7:**

1. Heating and cooling coils and liquid-to-liquid heat exchangers that are part of equipment with minimum efficiency requirements listed in any table in Section 6.8.1.
2. Exhaust air energy recovery heat exchangers in DX-DOAS units in Table 6.8.1-14 tested to AHRI 921 Test Option 1 with no adjustment to the entering outdoor air temperatures.
3. Coils in equipment covered under EPCA that comply with U.S. DOE certification requirements.
4. Components of exhaust air energy recovery devices rated to CAN/CSA-C439.
5. Equipment to be installed outside the United States and Canada rated in accordance with a rating procedure approved by the authority having jurisdiction.
6. Components that fall outside the scope of the listed rating procedure.
7. Direct-expansion refrigerant and condensing coils other than heat pipes that fall under the scope of AHRI 1061.
8. Steam coils.
9. Coils in hydronic fan-coil units rated in accordance with AHRI 441 and hydronic fan-coil-unit ventilators rated in accordance with AHRI 841 are not required to be rated in accordance with AHRI 410.

***Modify Section 13 as shown (I-P).***

Reference		Section
<b>Air Conditioning, Heating and Refrigeration Institute (AHRI)</b> <b>2311 Wilson Blvd., Arlington, VA 22201</b>		
[ ... ]		
<u>AHRI 410-2023 (SI/I-P)</u>	<u>Performance Rating of Forced-Circulation Air-Cooling and Air-Heating Coils</u>	<u>Table 6.4.7</u>
<u>AHRI 440 (I-P/2019)</u>	<u>Performance Rating of Fan-Coil Units</u>	<u>Table 6.4.7</u>
<u>ANSI/AHRI 840-2021 (I-P)</u>	<u>Performance Rating of Unit Ventilators</u>	<u>Table 6.4.7</u>
<u>AHRI 1060 (I-P/2018)</u>	<u>Performance Rating of Air-to-Air Exchangers for Energy Recovery Ventilation Equipment</u>	<u>Table 6.4.7</u>
[ ... ]		
<b>CSA Group</b> <b>178 Rexdale Blvd., Toronto, ON, Canada M9W 1R3</b>		
<u>CSA C439-2018</u>	<u>Laboratory Methods of Test for Rating the Performance of Heat/Energy-Recovery Ventilators</u>	<u>6.4.7</u>
[ ... ]		

***Modify Section 13 as shown (SI).***

Reference		Section
<b>Air Conditioning, Heating and Refrigeration Institute (AHRI)</b> <b>2311 Wilson Blvd., Arlington, VA 22201</b>		
[ ... ]		
<u>ANSI/AHRI <del>400401</del> (I-PSI/2015)</u>	<u>Performance Rating of Liquid-to-Liquid Heat Exchangers</u>	<u>Table 6.4.7</u>
<u>AHRI 410-2023 (SI/I-P)</u>	<u>Performance Rating of Forced-Circulation Air-Cooling and Air-Heating Coils</u>	<u>Table 6.4.7</u>
<u>AHRI 441 (SI/2019)</u>	<u>Performance Rating of Fan-Coil Units</u>	<u>Table 6.4.7</u>
<u>ANSI/AHRI 841-2021 (SI)</u>	<u>Performance Rating of Unit Ventilators</u>	<u>Table 6.4.7</u>
<u>AHRI 1061 (SI/2018)</u>	<u>Performance Rating of Air-to-Air Exchangers for Energy Recovery Ventilation Equipment</u>	<u>Table 6.4.7</u>
[ ... ]		
<b>CSA Group</b> <b>178 Rexdale Blvd., Toronto, ON, Canada M9W 1R3</b>		
<u>CSA C439-2018</u>	<u>Laboratory Methods of Test for Rating the Performance of Heat/Energy-Recovery Ventilators</u>	<u>6.4.7</u>
[ ... ]		

## **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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As an industry leader in research, standards writing, publishing, certification, and continuing education, ASHRAE and its members are dedicated to promoting a healthy and sustainable built environment for all, through strategic partnerships with organizations in the HVAC&R community and across related industries.

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