



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

Public Review Draft

Proposed Addendum m to Standard 90.1-2022, Energy Standard for Sites and Buildings Except Low- Rise Residential Buildings

**Second Public Review (November 2023)
(Draft Shows Proposed Independent Substantive
Changes to the Previous Public Review Draft)**

This draft has been recommended for public review by the responsible project committee. To submit a comment on this proposed standard, go to the ASHRAE website at www.ashrae.org/standards-research-technology/public-review-drafts and access the online comment database. The draft is subject to modification until it is approved for publication by the Board of Directors and ANSI. Until this time, the current edition of the standard (as modified by any published addenda on the ASHRAE website) remains in effect. The current edition of any standard may be purchased from the ASHRAE Online Store at www.ashrae.org/bookstore or by calling 404-636-8400 or 1-800-727-4723 (for orders in the U.S. or Canada).

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ASHRAE, 180 Technology Parkway NW, Peachtree Corners, GA 30092

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(This foreword is not part of this standard. It is merely informative and does not contain requirements necessary for conformance to the standard. It has not been processed according to the ANSI requirements for a standard and may contain material that has not been subject to public review or a consensus process. Unresolved objectors on informative material are not offered the right to appeal at ASHRAE or ANSI.)

FOREWORD

This second independent substantive change public review responds to comments submitted during the first public review.

Volatile refrigerant (DX) coils are exempted from the requirement to be rated in accordance with AHRI 410. The safety requirements for testing coils with A2L low-flammability refrigerants are incomplete, which may impact manufacturers' capability to obtain independent test data. Condensing coils are excluded because they are not in the scope of AHRI 410

Hydronic fan coil units tested in accordance with AHRI 410 and hydronic fan-coil unit ventilators in accordance with AHRI 840 have been added to the list, and the coils in those units are exempted from rating in accordance with AHRI 410.

The exemption for coils equipment tested under a procedure in 10 CFR Part 430 has been changed to parallel the equipment verification requirements in Section 6.4.1.4. In addition, the reference in that section to EPACT has been updated to EPCA (Energy Policy and Conservation Act).

Finally, the exemption for exhaust air energy recovery components in DX-DOAS units rated to AHRI 920 has been modified to only apply to DX-DOAS units where the equipment was tested using Test Option 1 in AHRI 920 where the test is conducted with actual exhaust air, rather than Test Option 2 where energy recovery performance in accordance with AHRI 1060 is simulated.

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

[Note to Reviewers: This addendum makes proposed changes to the current standard. These changes are indicated in the text by underlining (for additions) and ~~striketrough~~ (for deletions) except where the reviewer instructions specifically describe some other means of showing the changes. Only these changes to the current standard are open for review and comment at this time. Additional material is provided for context only and is not open for comment except as it relates to the proposed changes.]

Addendum m to 90.1-2022

Add to Section 3.2 (I-P and SI):

EPCA U.S. Energy Policy and Conservation Act

Revise Section 6.4.14 as follows (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:

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

Revise Section 6.4.7 as follows (I-P):

6.4.7 Performance Rating Requirements for System Components. The *equipment* listed in Table 6.4.7 shall be rated in accordance with the rating procedure listed.

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 under 10 CFR Part 430, Subpart B
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 follows (SI):

6.4.7 Performance Rating Requirements for System Components. The *equipment* listed in Table 6.4.7 shall be rated in accordance with the rating procedure listed.

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 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 under 10 CFR Part 430, Subpart B
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.

Revise Table 6.4.7 as follows (I-P):

Table 6.4.7 Performance Rating Procedures for System Components

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

Revise Table 6.4.7 as follows (SI):

Table 6.4.7 Performance Rating Procedures for System Components

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

Add to Section 13 as follows (I-P):

Reference		Section
Air Conditioning, Heating and Refrigeration Institute (AHRI) 2311 Wilson Blvd., Arlington, VA 22201		
<u>AHRI Standard 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>

Add to Section 13 as follows (SI):

Reference		Section
Air Conditioning, Heating and Refrigeration Institute (AHRI) 2311 Wilson Blvd., Arlington, VA 22201		
<u>AHRI Standard 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>

FOR REFERENCE ONLY

The following shows how the combined first public review and second would look as published if there are no additional changes. It is provided for informative purposes only. Public comments are limited to the

Add to Section 3.2 (I-P and SI):

EPCA U.S. Energy Policy and Conservation Act

Revise Section 6.4.14 as follows (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:

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

Revise Section 6.4.7 as follows (I-P and SI):

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 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 follows (SI):

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 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 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.

Add to Section 13 as follows (I-P):

Reference	Section
Air Conditioning, Heating and Refrigeration Institute (AHRI) 2311 Wilson Blvd., Arlington, VA 22201	
<u>AHRI 410-2023 (SI/I-P)</u>	<u>Table 6.4.7</u>
<u>AHRI 1060 (I-P/2018)</u>	<u>Table 6.4.7</u>
<u>AHRI Standard 440 (I-P/2019)</u>	<u>Table 6.4.7</u>
<u>ANSI/AHRI 840-2021 (I-P)</u>	<u>Table 6.4.7</u>
<u>CSA Group</u>	
<u>178 Rexdale Blvd., Toronto, ON, Canada M9W 1R3</u>	
<u>CSA C439-2018</u>	<u>6.4.7</u>

Add to Section 13 as follows (SI):

Reference		Section
Air Conditioning, Heating and Refrigeration Institute (AHRI) 2311 Wilson Blvd., Arlington, VA 22201		
<u>ANSI/AHRI 400 401 (I-PSI/2015)</u>	Performance Rating of Liquid-to-Liquid Heat Exchangers	<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 1061 (SI/2018)</u>	<u>Performance Rating of Air-to-Air Exchangers for Energy Recovery Ventilation Equipment</u>	<u>Table 6.4.7</u>
<u>AHRI Standard 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>CSA Group</u> <u>178 Rexdale Blvd., Toronto, ON, Canada M9W 1R3</u>		
<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>