



ADDENDA

**ANSI/ASHRAE Addendum a to
ANSI/ASHRAE Standard 206-2013**

Method of Test for Rating of Multi-Purpose Heat Pumps for Residential Space Conditioning and Water Heating

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FOREWORD

Addendum a changes the intermediate compressor speed for the intermediate heating test from 1/2 of the speed between minimum capacity ($k = 1$) and the speed for maximum capacity ($k = 2$) to 1/3 for variable capacity systems. This change brings the testing for variable-capacity air source systems under Standard 206 into agreement with ANSI/ASHRAE Standard 116-2010, Methods of Testing for Rating Seasonal Efficiency of Unitary Air-Conditioners and Heat Pumps. It also changes the intermediate compressor speed for the intermediate heating test from 1/2 to 1/3 for variable-capacity liquid-source and variable-capacity direct geexchange systems to keep them consistent with the variable-capacity air source systems. The entering water temperature for ground-loop variable-capacity equipment and the entering refrigerant temperature for direct geexchange variable-capacity equipment is changed from 2.5°C (36.5°F) to 1.7°C (35.0°F) for the intermediate speed heating test to make them consistent with the change in speed. These changes are reflected in Tables 10.7a, 10.7b, and 10.7c.

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 a to Standard 206-2013

Modify Tables 10.7a, 10.7b, and 10.7c as shown. Note: This addendum modifies a version of Table 10.7a that is corrected by a previously published erratum, which can be downloaded at <https://www.ashrae.org/standards-research-technology/standards-errata>.

TABLE 10.7a Variable Capacity Air-Source Systems

| Operating Mode | Compressor Test | Compressor Speed <i>k</i> = | ID Air Volume | Indoor (C) | | Outdoor (C) | | Water Test | Required/Optional | | |
|----------------------------------------------------------------------|-----------------------------------------------------------------|-----------------------------|----------------------|-------------------|------------------|---------------|-----------------|--------------------------|-------------------|--------------------------|--------------|
| | | | | DB, °C (°F) | WB, °C (°F) | DB, °C (°F) | WB, °C (°F) | | | | |
| Mode A, (normal SHR, space conditioning only) | C35.0 (C95.0)-2 | 2 | Cooling Full-Load | 26.7 (80.0) | 19.4 (67.0) | 35.0 (95.0) | 23.9 (75.0) (D) | S.S. Cooling | None | Required | |
| | C30.6 (C87.0)-int | int (H) | Cooling Minimum | 26.7 (80.0) | 19.4 (67.0) | 27.8 (82.0) | 18.3 (65.0) (D) | S.S. Cooling | None | Required | |
| | C27.8 (C82.0)-1 | 2 | Cooling Full-Load | 26.7 (80.0) | 19.4 (67.0) | 27.8 (82.0) | 18.3 (65.0) (D) | S.S. Cooling | None | Required | |
| | C27.8 (C82.0)-1 | 1 | Cooling Minimum | 26.7 (80.0) | 19.4 (67.0) | 27.8 (82.0) | 18.3 (65.0) (D) | S.S. Cooling | None | Required | |
| | C27.8 (C82.0)-1 dry coil | 1 | Cooling Minimum | 26.7 (80.0) | ≤13.9 (≤57.0)(E) | 27.8 (82.0) | | S.S. Cooling dry coil | None | Conditional (I) | |
| | C27.8 (C82.0)-1 dry coil - cyclic | 1 | Cooling Minimum | 26.7 (80.0) | ≤13.9 (≤57.0)(E) | 27.8 (82.0) | | Cyclic Cooling, dry coil | None | Conditional (I) | |
| | C19.4 (C67.0)-1 | 1 | Cooling Minimum | 26.7 (80.0) | ≤13.9 (≤57.0)(E) | 19.4 (67.0) | 11.9 (53.5) (D) | S.S. Cooling | None | Required | |
| | H16.7 (H62.0)-1 | 1 | Heating Minimum | 21.1 (70.0) | ≤15.6 (≤60.0) | 16.7 (62.0) | 13.6 (56.5) | S.S. Heating | None | Required | |
| | H16.7 (H62.0)-1 cyclic | 1 | Heating Minimum | 21.1 (70.0) | ≤15.6 (≤60.0) | 16.7 (62.0) | 13.6 (56.5) | Cyclic Heating | None | Conditional (I) | |
| | H8.33 (H47.0)-2 | 2 | Heating Full-Load | 21.1 (70.0) | ≤15.6 (≤60.0) | 8.33 (47.0) | 6.11 (43.0) | S.S. Heating | None | Required | |
| | H8.33 (H47.0)-C2 | C2 | Heating Normal | 21.1 (70.0) | ≤15.6 (≤60.0) | 8.33 (47.0) | 6.11 (43.0) | S.S. Heating | None | Conditional (M) | |
| | H8.33 (H47.0)-1 | 1 | Heating Minimum | 21.1 (70.0) | ≤15.6 (≤60.0) | 8.33 (47.0) | 6.11 (43.0) | S.S. Heating | None | Required | |
| | H1.67 (H35.0)-2 Frost Acc. | 2 | Heating Full-Load | 21.1 (70.0) | ≤15.6 (≤60.0) | 1.67 (35.0) | 0.56 (33.0) | Defrost | None | Optional (J) | |
| | H1.67 (H35.0)-int Frost Acc. | int (K) | Heating Intermediate | 21.1 (70.0) | ≤15.6 (≤60.0) | 1.67 (35.0) | 0.56 (33.0) | Defrost | None | Required | |
| | H-8.33 (H17.0)-2 | 2 | Heating Full-Load | 21.1 (70.0) | ≤15.6 (≤60.0) | -8.33 (17.0) | -9.44 (15.0) | S.S. Heating | None | Required | |
| | Mode B, (normal SHR w water heating), (notes A, F, and G) | C35.0 (C95.0)-2 | 2 | Cooling Full-Load | 26.7 (80.0) | 19.4 (67.0) | 35.0 (95.0) | 23.9 (75.0) (D) | S.S. Cooling | Table 10.8 | Required (N) |
| C27.8 (C82.0)-2 | | 2 | Cooling Full-Load | 26.7 (80.0) | 19.4 (67.0) | 27.8 (82.0) | 18.3 (65.0) (D) | S.S. Cooling | Table 10.8 | Required (N) | |
| C27.8 (C82.0)-1 | | 1 | Cooling Minimum | 26.7 (80.0) | 19.4 (67.0) | 27.8 (82.0) | 18.3 (65.0) (D) | S.S. Cooling | Table 10.8 | Required | |
| C19.4 (C67.0)-1 | | 1 | Cooling Minimum | 26.7 (80.0) | 19.4 (67.0) | 19.4 (67.0) | 11.9 (53.5) (D) | S.S. Cooling | Table 10.8 | Required | |
| H16.7 (H62.0)-1 | | 1 | Heating Minimum | 21.1 (70.0) | ≤15.6 (≤60.0) | 16.7 (62.0) | 13.6 (56.5) | S.S. Heating | Table 10.8 | Required | |
| H8.33 (H47.0)-2 | | 2 | Heating Full-Load | 21.1 (70.0) | ≤15.6 (≤60.0) | 8.33 (47.0) | 6.11 (43.0) | S.S. Heating | Table 10.8 | Required (N) | |
| H8.33 (H47.0)-1 | | 1 | Heating Minimum | 21.1 (70.0) | ≤15.6 (≤60.0) | 8.33 (47.0) | 6.11 (43.0) | S.S. Heating | Table 10.8 | Required | |
| H-8.33 (H17.0)-2 | | 2 | Heating Full-Load | 21.1 (70.0) | ≤15.6 (≤60.0) | -8.33 (17.0) | -8.33 (15.0) | S.S. Heating | Table 10.8 | Required (N) | |
| Mode C, (dedicated water heating), (notes A, F, and G) | | W35.0 (W95.0) | Per unit controls | Per unit controls | 26.7 (80.0) | 19.4 (67.0) | 35.0 (95.0) | 23.9 (75.0) (D) | Demand Cooling | Table 10.9 | Optional (L) |
| | | W19.4 (W67.0) | Per unit controls | Per unit controls | 26.7 (80.0) | 19.4 (67.0) | 19.4 (67.0) | 11.9 (53.5) (D) | Demand Cooling | Table 10.9 | Required |
| | | W16.7 (W62.0) | Per unit controls | Per unit controls | 21.1 (70.0) | ≤15.6 (≤60.0) | 16.7 (62.0) | 13.6 (56.5) | S.S. Heating | Table 10.9 | Optional (J) |
| | W8.33 (W47.0) | Per unit controls | Per unit controls | 21.1 (70.0) | ≤15.6 (≤60.0) | 8.33 (47.0) | 6.11 (43.0) | Demand Heating | Table 10.9 | Required | |
| | W-8.33 (W17.0) | Per unit controls | Per unit controls | 26.7 (80.0) | ≤15.6 (≤60.0) | -8.33 (17.0) | -8.33 (15.0) | Demand Heating | Table 10.9 | Conditional (J) | |
| Mode D, (medium SHR, space conditioning only), (notes B and F) | C19.4 (C67.0)-2 | 2 | Per unit controls | 26.7 (80.0) | 19.4 (67.0) | 19.4 (67.0) | 11.9 (53.5) (D) | S.S. Cooling | Table 10.8 | Conditional/Optional (J) | |
| Mode E, (lowest SHR, space conditioning only), (notes B and F) | C19.4 (C67.0)-2 | 2 | Per unit controls | 26.7 (80.0) | 19.4 (67.0) | 19.4 (67.0) | 11.9 (53.5) (D) | S.S. Cooling | Table 10.8 | Conditional/Optional (J) | |

TABLE 10.7a Variable Capacity Air-Source Systems (Continued)

| Operating Mode | Compressor Speed $k =$ | ID Air Volume | Indoor (C) | | Outdoor (C) | | Water Operation | Water Test | Required/Optional | |
|--------------------------------------------------------------|---------------------------|---------------|-------------------|-------------|-------------|-------------|-----------------|--------------|-------------------|----------|
| | | | DB, °C (°F) | WB, °C (°F) | DB, °C (°F) | WB, °C (°F) | | | | |
| Mode F, Medium SHR w water heating, (notes B and F) | C19.4 (C67.0)-2 | 2 | Per unit controls | 26.7 (80.0) | 19.4 (67.0) | 19.4 (67.0) | 11.9 (53.5) (D) | S.S. Cooling | Table 10.8 | Required |
| Mode G, Lowest SHR w water heating, (notes B and F) | C19.4 (C67.0)-2 | 2 | Per unit controls | 26.7 (80.0) | 19.4 (67.0) | 19.4 (67.0) | 11.9 (53.5) (D) | S.S. Cooling | Table 10.8 | Required |

- (A) Heating and/or cooling tests not required if heating and/or cooling portion respectively of the mode does not exist.
- (B) Tests not required if the mode does not exist.
- (C) Values shown are original suggested values, refer to applicable AHRI standards or federal rules and regulations for updated values.
- (D) For units that reject condensate to the outdoor condenser coil.
- (E) Wet bulb at least $\leq 13.9^{\circ}\text{C}$ ($\leq 57.0^{\circ}\text{F}$) and sufficiently low so that no condensate forms on the evaporator coil.
- (F) Mode A Cd values used for all other modes.
- (G) Mode A defrost degradation percentage used for all other heating modes.
- (H) Compressor speed = $k1 + (k2 - k1)/3$.
- (I) Default value of 0.25 used for Cd if tests are not performed.
- (J) See Section 11.8.4.4.1 for explanation.
- (K) Compressor speed = $k1 + (k2 - k1)/23$.
- (L) See Section 11.7.4.4.1 for explanation.
- (M) Test required if maximum compressor speed in heating exceeds the maximum compressor speed in cooling, see Section 11.8.2.2 For explanation.
- (N) Compressor speeds $k = 2$ for Mode B do not have to be the same as for $k = 2$ Mode A.

TABLE 10.7b Variable Capacity Water-Source Systems

| Operating Mode | Compressor Speed Test $k =$ | ID Air Volume | Indoor (C) | | Water-Loop | Ground-Water | Ground-Loop | Operation | Water Test | Required/Optional | |
|---------------------------------------------------------------|--------------------------------|-------------------|----------------------|-------------|------------------------|------------------------|------------------------|--------------------------------|----------------|-------------------|--------------------------|
| | | | DB, °C (°F) | WB, °C (°F) | EWT (C) DB, °C (°F) | EWT (C) DB, °C (°F) | EWT (C) DB, °C (°F) | | | | |
| Mode A, (normal SHR, space conditioning only) | C2 | 2 | Cooling Full-Load | 26.7 (80.0) | 19.4 (67.0) | 30.0 (86.0) | 15.0 (59.0) | 25.0 (77.0) (D) | S.S. Cooling | None | Required |
| | C _{int} | int (H) | Cooling Intermediate | 26.7 (80.0) | 19.4 (67.0) | 30.0 (86.0) | 15.0 (59.0) (F) | 21.7 (71.0) | S.S. Cooling | None | Required |
| | C1 | 1 | Cooling Minimum | 26.7 (80.0) | 19.4 (67.0) | 30.0 (86.0) | 15.0 (59.0) | 20.0 (68.0) (D) | S.S. Cooling | None | Required |
| | H2 | 2 | Heating Full-Load | 21.1 (70.0) | | 20.0 (68.0) | 10.0 (50.0) (E) | 0.0 (32.0) | S.S. Heating | None | Required |
| | H _{int} | int (I) | Heating Intermediate | 21.1 (70.0) | | 20.0 (68.0) | 10.0 (50.0) (G) | 2.5 1.7 (36.5-35.0) | S.S. Heating | None | Required |
| | H1 | 1 | Heating Minimum | 21.1 (70.0) | | 20.0 (68.0) | 10.0 (50.0) (E) | 5.0 (41.0) | S.S. Heating | None | Required |
| Mode B, (normal SHR w water heating), (note A) | C2 | 2 | Cooling Full-Load | 26.7 (80.0) | 19.4 (67.0) | 30.0 (86.0) | 15.0 (59.0) | 25.0 (77.0) (D) | S.S. Cooling | Table 10.8 | Required |
| | C1 | 1 | Cooling Minimum | 26.7 (80.0) | 19.4 (67.0) | 30.0 (86.0) | 15.0 (59.0) | 20.0 (68.0) (D) | S.S. Cooling | Table 10.8 | Required |
| | H2 | 2 | Heating Full-Load | 21.1 (70.0) | | 20.0 (68.0) | 10.0 (50.0) (E) | 0.0 (32.0) | S.S. Heating | Table 10.8 | Required |
| | H1 | 1 | Heating Minimum | 21.1 (70.0) | | 20.0 (68.0) | 10.0 (50.0) (E) | 5.0 (41.0) | S.S. Heating | Table 10.8 | Required |
| Mode C, (dedicated water heating), (note A) | W _s | Per unit controls | Per unit controls | 26.7 (80.0) | | 30.0 (86.0) | 15.0 (59.0) | 20.0 (68.0) (D) | Demand Cooling | Table 10.9 | Required |
| | W _w | Per unit controls | Per unit controls | 21.1 (70.0) | 19.4 (67.0) | 20.0 (68.0) | 10.0 (50.0) (E) | 0.0 (32.0) | Demand Cooling | Table 10.9 | Required |
| Mode D, (medium SHR, space conditioning only), (note B) | C2 | 2 | Per unit controls | 26.7 (80.0) | | 30.0 (86.0) | 15.0 (59.0) | 25.0 (77.0) (D) | S.S. Cooling | Table 10.8 | Conditional/Optional (F) |
| Mode E, (lowest SHR, space conditioning only), (note B) | C2 | 2 | Per unit controls | 26.7 (80.0) | 19.4 (67.0) | 30.0 (86.0) | 15.0 (59.0) | 25.0 (77.0) (D) | S.S. Cooling | Table 10.8 | Conditional/Optional (F) |
| Mode F, (medium SHR w water heating), (note B) | C2 | 2 | Per unit controls | 26.7 (80.0) | 19.4 (67.0) | 30.0 (86.0) | 15.0 (59.0) | 25.0 (77.0) (D) | S.S. Cooling | Table 10.8 | Required |
| Mode G, (lowest SHR w water heating), (note B) | C2 | 2 | Per unit controls | 26.7 (80.0) | 19.4 (67.0) | 30.0 (86.0) | 15.0 (59.0) | 25.0 (77.0) (D) | S.S. Cooling | Table 10.8 | Required |

(A) Heating and/or cooling tests not required if heating and/or cooling portion respectively of the mode does not exist.
 (B) Tests not required if the mode does not exist.
 (C) Values shown are original suggested values, refer to applicable AHRI standards or federal rules and regulations for updated values.
 (D) For units tested at EWTs of 30.0°C (86.0°F) and 15.0°C (59.0°F), capacity and power values for the 20.0°C (68.0°F) and 25.0°C (77.0°F) points may be interpolated.
 (E) For units tested at EWTs of 20.0°C (68.0°F) and 0.0°C (32.0°F) or 5.0°C (41.0°F), capacity and power values for the 10.0°C (50.0°F) point may be interpolated.
 (F) For units tested at EWTs of 20.0°C (68.0°F) and 0.0°C (32.0°F) or 5.0°C (41.0°F), capacity and power values for the 10.0°C (50.0°F) point may be interpolated.
 (G) For units tested at EWTs of 20.0°C (68.0°F) and 0.0°C (32.0°F) or 5.0°C (41.0°F), capacity and power values for the 10.0°C (50.0°F) point may be interpolated.
 (H) Compressor speed = $k1 + (k2 - k1)3$.
 (I) Compressor speed = $k1 + (k2 - k1)23$.
 (J) See Section 11.7.5.4.1 for explanation.
 (K) Compressor speeds $k = 2$ for Mode B do not have to be the same as for $k =$ Mode A.

TABLE 10.7c Dual Capacity Direct GeoExchange Systems

| Operating Mode | Compressor Test | Compressor Speed $k =$ | ID Air Volume | Indoor (C) | | ERT (C) | | Water Test | Required/Optional |
|-------------------------------------------------------------------------|------------------|------------------------|----------------------|-------------|-------------|------------------------------|----------------|------------|------------------------------|
| | | | | DB, °C (°F) | WB, °C (°F) | DB, °C (°F) | Operation | | |
| Mode A, (normal SHR, space conditioning only) | C2 | 2 | Cooling Full-Load | 26.7 (80.0) | 19.4 (67.0) | 25.0 (77.0) | S.S. Cooling | None | Required |
| | C _{int} | int (D) | Cooling Intermediate | 26.7 (80.0) | 19.4 (67.0) | 22.4 (72.3) | S.S. Cooling | None | Required |
| | C1 | 1 | Cooling Minimum | 26.7 (80.0) | 19.4 (67.0) | 21.1 (70.0) | S.S. Cooling | None | Required |
| | H2 | 2 | Heating Full-Load | 21.1 (70.0) | | 0.0 (32.0) | S.S. Heating | None | Required |
| | H _{int} | int (E) | Heating Intermediate | 21.1 (70.0) | | 2.51.7 (36.535.0) | S.S. Heating | None | Required |
| | H1 | 1 | Heating Minimum | 21.1 (70.0) | | 5.0 (41.0) | S.S. Heating | None | Required |
| Mode B, (normal SHR w water heating, (note A)) | C2 | 2 | Cooling Full-Load | 26.7 (80.0) | 19.4 (67.0) | 25.0 (77.0) | S.S. Cooling | Table 10.8 | Required (G) |
| | C1 | 1 | Cooling Minimum | 26.7 (80.0) | 19.4 (67.0) | 21.1 (70.0) | S.S. Cooling | Table 10.8 | Required |
| | H2 | 2 | Heating Full-Load | 21.1 (70.0) | 15.6 (60.0) | 0.0 (32.0) | S.S. Heating | Table 10.8 | Required (G) |
| | H1 | 1 | Heating Minimum | 21.1 (70.0) | 15.6 (60.0) | 5.0 (41.0) | S.S. Heating | Table 10.8 | Required |
| Mode C, (dedicated water heating), (note A)) | W _s | Per unit controls | Per unit controls | 26.7 (80.0) | 19.4 (67.0) | 25.0 (77.0) | Demand Cooling | Table 10.9 | Required |
| | W _w | Per unit controls | Per unit controls | 21.1 (70.0) | | 0.0 (32.0) | Demand Cooling | Table 10.9 | Required |
| Mode D, (medium SHR, space conditioning only), (note B)) | C2 | 2 | Per unit controls | 26.7 (80.0) | 19.4 (67.0) | 30.0 (86.0) | S.S. Cooling | Table 10.8 | Conditional/ Optional (F) |
| Mode E, (lowest SHR, space conditioning only), (note B)) | C2 | 2 | Per unit controls | 26.7 (80.0) | 19.4 (67.0) | 30.0 (86.0) | S.S. Cooling | Table 10.8 | Conditional/ Optional (F) |
| Mode F, (medium SHR w water heating), (note B)) | C2 | 2 | Per unit controls | 26.7 (80.0) | 19.4 (67.0) | 30.0 (86.0) | S.S. Cooling | Table 10.8 | Required |
| Mode G, (lowest SHR w water heating), (note B)) | C2 | 2 | Per unit controls | 26.7 (80.0) | 19.4 (67.0) | 30.0 (86.0) | S.S. Cooling | Table 10.8 | Required |

(A) Heating and/or cooling tests not required if heating and/or cooling portion respectively of the mode does not exist.

(B) Tests not required if the mode does not exist.

(C) Values shown are original suggested values, refer to applicable AHRI standards or federal rules and regulations for updated values.

(D) Compressor speed = $k1 + (k2 - k1)3$.

(E) Compressor speed = $k1 + (k2 - k1)23$.

(F) See Section 11.7.5.4.1 for explanation.

(G) Compressor speeds $k = 2$ for Mode B do not have to be the same as for $k =$ Mode A.

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.

