

# ADDENDA

**ANSI/ASHRAE/IES Addendum ae 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 December 16, 2025, and by the Illuminating Engineering Society on December 12, 2025.

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## FOREWORD

*This addendum makes revisions to ANSI/ASHRAE/IES Standard 90.1 Tables 6.8.1-1 and 6.8.1-2. In addition, Table F-1 for DOE regulated products with capacity <65,000 Btu/h is moved into the Tables 6.8.1-1 and 6.8.1-2 so that all information for unitary products is included in one table for easier use and reference.*

*The following items were addressed during the advisory public review:*

- *Air-cooled commercial unitary packaged cooling and heat-pump air conditioners and splits systems (CUACs and CUHPs) >65,000 Btu/h and ≤760,000 Btu/h, which are regulated by DOE to add the new IVEC and IVHE efficiency metrics with improved efficiency levels. Note that these new metrics are referenced in a final DOE rule that was released with an effective date of 1/1/2029.*
- *Air-cooled commercial unitary packaged cooling and heat-pump air conditioners and split systems (CUACs and CUHPs) ≥760,000 Btu/h products also covered by Standard 90.1 but not under DOE regulatory control to also add the new IVEC and IVHE efficiency metrics.*
- *The addendum also adds the cold climate IVHE<sub>C</sub>, which was not defined by DOE ASRAC negotiations and is not a DOE regulated metric. The IVHE<sub>C</sub> minimum levels were based on a crosswalk of the IVHE metrics to the rating conditions for IVHE<sub>C</sub>.*
- *All sizes of water-cooled commercial package air conditioners (WCUACs), including DOE regulated products <760,000 Btu/h and DOE nonregulated products ≥760,000 Btu/h to add the new IVEC metric. Note there are no heat-pump water-cooled products. Water-source heat pumps covered in Table 6.8.1-15 and the AHRI 600 standard. Note there were significant changes to the water-cooled test and rating procedure.*
- *All sizes of evaporatively cooled commercial package air conditioners (ECUACs), including DOE regulated products <760,000 Btu/h and DOE nonregulated products ≥760,000 Btu/h to add the new IVEC efficiency metrics. Note there are no evaporatively cooled heat pumps.*
- *Commercial double-duct cooling and heat-pump air conditioners >65,000 Btu/h and ≤300,000 Btu/h to add efficiency requirements to Standard 90.1 and to add the new IVEC and IVHE efficiency metrics as well as requirements for cold-climate IVHE<sub>C</sub>. DOE defined minimum EER efficiencies for double-duct, which are documented in 10 CFR Part 431 Table 5 but were never added to Standard 90.1 Tables 6.8.1-1 or 6.8.1-2. The DOE did not change metrics to IEER. The ratings are based on zero external static and the new ratings with EER<sub>2</sub>, IVEC, IVHE, and COP<sub>2H</sub> will include the external static for the condenser and increased indoor static as defined in AHRI 1340. Note that <65,000 Btu/h double-duct products are rated per AHRI 210/240 and do not include the condenser external static. Addendum ae includes minimum cooling mode efficiency levels for IVEC and EER<sub>2</sub>, minimum heating efficiency levels for IVHE and COP<sub>2H17</sub>, and minimum heating cold climate levels for IVHE<sub>C</sub>, COP<sub>2H17</sub>, and COP<sub>2H5</sub>.*

*In addition to the changes included in the advisory public review, and to address comments received, the full public review version of this addendum was expanded to include the following additional changes:*

- *Add efficiency requirements and updates for large commercial condensing units with a capacity >135,000 Btu/h to reflect the new AHRI 1365 standard. The AHRI 1365 standard was updated to add the new IVEC and heat-pump IVHE and IVHE<sub>C</sub> metrics similar to what was done for AHRI 1340. This also includes adding requirements for larger commercial HP condensing units that are currently not addressed by Standard 90.1 and AHRI 365.*
- *Currently in Standard 90.1, the <65,000 Btu/h residential single-phase product efficiency requirements are listed in Informative Appendix F Table F-1 for cooling products and heat pumps, but after review it was decided to move them into Tables 6.8.1-1 and 6.8.1-2 to locate all efficiency requirements for related products in one location. Addendum cj moves Tables F-2 through F-6 into existing or new tables in Section 6.*
- *In Table 6.8.1-2 for heat pumps, the cooling and heating efficiencies are separated, which requires scrolling up and down to get the cooling and heating efficiency requirements for heat pumps, so the table has been reformatted to show cooling and heating performance together to simplify use.*
- *Other formatting changes were made to improve the readability of tables.*
- *The new IVHE and IVHE<sub>C</sub> metrics include auxiliary heat in the metric when the heat-pump capacity can not satisfy the building load. The DOE final rule also set minimum IVHE efficiencies for heat-pump units*

with gas heat. But the current AHRI 1340 requires that the capacity not satisfied by the heat pump is then satisfied by adding in electric heat energy in kW as defined by Equation 31 for operation with the compressor on, or Equation 29, 32, or 38 when the compressor is off, and did not address gas heat.

$$P_{aux} = \frac{q_{H,BLi} - q_H}{3.412} \text{ Equation 31 (heat-pump compression operating)}$$

$$P_{aux} = \frac{q_{H,BLi}}{3.412} - P_{IF,H17H} \text{ Equation 29, 32, or 38 (heat-pump compression is off)}$$

The AHRI 1340 standard and DOE final rule test procedure included the requirements for minimum efficiency for units with gas heat but failed to provide calculation procedures for auxiliary gas heat and currently only allows for electric heat. Per the AHRI 1340 standard, auxiliary heat is defined as “Electric, natural gas, propane, steam, or hot water heat used to supplement or be used at low ambient to assist the capacity delivered by a vapor compression heat-pump cycle.” Interest is growing in dual fuel heat pumps (gas heat), and there have been requests from users to address dual fuel heat-pump efficiency. The rating calculations can easily be modified to allow for gas heat to be used in place of the electric heat. For dual fuel units that have gas heat, the equations can be modified by using the gas heat input capacity converted to kW by using the following modified equations. In the process of evaluating the metrics, we found an error in the AHRI 1340 heat-pump IVHE test procedure, so the standard will have to be modified with an addendum. As the metrics do not go into effect until 1/1/2029 there should be sufficient time to update the AHRI 1340 standard and for DOE to reference, but to get this into Standard 90.1, we have implemented a footnote.

$$P_{aux} = \frac{(q_{H,BLi} - q_H)}{E_t} \text{ modified Equation 31 (heat-pump compression operating)}$$

$$P_{aux} = \frac{(q_{H,BLi} - q_H)}{3.412} - P_{IF,H17H} \text{ modified Equations 29, 32, or 38 (heat-pump compression is off)}$$

where

- $q_{H,BLi}$  = building load calculated in Section 6.3.4 for the heating bin, Btu/h
- $q_H$  = capacity calculated in Section 6.3.6 for the highest operating level in this cooling bin (that is, boost or high), Btu/h
- $P_{IF,H17H}$  = indoor fan power determined for the H17H test, W
- $P_{aux}$  = auxiliary heat, kW
- $E_t$  = combustion thermal efficiency

Analysis using the modified equation with gas heat with a minimum thermal efficiency of 81% as per Table 6.8.1-5 shows a negligible impact on the IVHE with only  $-0.01$  for IVHE and  $-0.03$  for IVHE<sub>C</sub>.

A new residential rating standard, AHRI 1600, will introduce a new <65,000 Btu/h SCORE cooling metric to replace SEER2 and new SHORE heat-pump metric to replace HSPF2, but the crosswalk has not been completed and will not be ready for the publication of Standard 90.1-2025 but will be addressed in the 2028 edition.

For the air-cooled commercial unitary cooling and heat-pump air conditions and split systems (CUACs and CUHPs) >65,000 Btu/h, DOE, industry manufacturers, and advocates recently concluded and published an Appliance Standards Regulatory Advisory Committee (ASRAC) Working Group negotiated standard and crosswalk. DOE published the term sheet for the negotiations as well as the final rule and technical support document. AHRI has also completed a new Standard AHRI 1340 that documents the IVEC and IVHE rating procedure. Because of the significant changes to the test procedure, AHRI 1340 replaces current standard AHRI 340/360 when the new metrics go into effect on 1/1/2029. AHRI also recently completed a new standard AHRI 1365 for large commercial condensing units, which will replace AHRI 365/366 to also adopt the new IVEC and IVHE metrics and rating procedures with some changes to allow for rating and testing of only the large condensing unit. The following documents provide further information on the test procedures and new efficiency metrics:

- *DOE Appliance Standards Regulatory Advisory Committee (ASRAC) Working Group term sheet*  
<https://www.regulations.gov/document/EERE-2022-BT-STD-0015-0065>
- *DOE Final Rule*  
<http://www.regulations.gov/docket/EERE-2022-BT-STD-0015>
- *DOE Technical Support Document*  
<https://public-inspection.federalregister.gov/2024-22081.pdf>
- *AHRI 1340-2024 (I-P) Standard*
- *AHRI 1365-2024 (SI/I-P) standard has also been completed and approved by the AHRI committee and is proceeding to publication. The standard was modified to align with AHRI 1340 and uses the new IVEC and IVHE metrics.*

*The ASRAC negotiation included the development of a new metric for annualized cooling efficiency called integrated ventilation, economizer, and cooling metric (IVEC) and a new annualized efficiency metric for heat-pump heating operation called integrated ventilation, heating efficiency (IVHE). The new metrics and minimum efficiencies are documented in this addendum and are proposed to go into effect on 1/1/2029. Because of DOE rules for approval and implementation, the addenda for <135,000 Btu/h will show an implementation date of 2027 and a compliance date of 2029 because DOE rules require that the federal requirements go into effect two years after the date listed in Standard 90.1. For ≥135,000 Btu/h to 760,000 Btu/h products, the effective date will be 2026 with a compliance date of 2029 because the DOE rules for are three years for these products.*

*The heat-pump heating metric includes a U.S. average metric (IVHE) and a colder climate metric (IVEC<sub>C</sub>). The U.S. average is regulated by DOE, and minimum efficiencies were defined by the ASRAC negotiation, but the cold climate is not regulated by DOE, and Addendum ae includes minimum efficiencies for all the metrics. Addendum ae expands metrics to cover the >760,000 Btu/h products and other products mentioned above that DOE ASRAC negotiation did not address.*

*These commercial unitary products are currently covered by the AHRI 340/360-2024 test and rating procedure and supporting certification program. Due to significant changes to the test and ratings procedures and the development of new cooling and heating metrics, an AHRI Standards Technical Committee comprising a diverse group of stakeholders took the requirements of the ASRAC term sheet and produced a new standard, AHRI 1340-2023, Performance Rating of Commercial and Industrial Unitary Air-Conditioning and Heat Pump Equipment (available at [www.ahrinet.org/system/files/2024-06/AHRI%20Standard%201340-2024%20%28I-P%29.pdf](http://www.ahrinet.org/system/files/2024-06/AHRI%20Standard%201340-2024%20%28I-P%29.pdf)). The new test procedure makes significant changes to the cooling and heating metrics, including both full-load metrics and annualized metrics. The full-load cooling metric named will be changed to EER<sub>2</sub> because of the increased external rating static pressure. For heat-pump heating, a new annualized metric has been developed where previously there were only full-load metrics for heating at 47°F and 17°F in Table 6.8.1-2. There is a U.S. average IVHE and a colder climate IVHE<sub>C</sub>. The full-load heat-pump metric also has been expanded to include a 5°F colder climate metric to support expanded use of heat pumps and electrification. Like the cooling metric, the full-load heating metric will be changed to COP<sub>2H</sub> because of the increased external rating static pressure.*

The objective of the test procedure and rating standards change and new metrics was to establish metrics that are more representative of the total operational energy, and included the following changes:

- **Increased External Rating Static (see Figure 1).** As part of the ASRAC negotiation, studies were conducted to evaluate the external ratings static. As shown in the table below, the rating external static pressure increased to be more representative for typical applications. This results in increased fan power and will have a negative impact on the efficiency metric values, including IVEC, IVHE, IVHE<sub>C</sub>, EER<sub>2</sub>, and COP<sub>2H</sub>. Note that static also includes an allowance for economizers.

| Capacity Categories            | Capacity        | AHRI 340                            | AHRI 1340                                      |   |
|--------------------------------|-----------------|-------------------------------------|--|---|
|                                | KBtu/h          | External static in H <sub>2</sub> O | External static (w/ econo) in H <sub>2</sub> O | External static (w/o econo) in H <sub>2</sub> O |
| <65 kBtu/h                     | 0K to 28.8K     | 0.10                                | 0.50   | 0.60  |
|                                | 29K to 42.5K    | 0.15                                | 0.50   | 0.60  |
|                                | 43K TO 64.5K    | 0.20                                | 0.50   | 0.60  |
| 65-135 kBtu/h                  | 65K TO 70K      | 0.20                                | 0.75   | 0.85  |
|                                | 71K TO 105K     | 0.25                                | 0.75   | 0.85  |
|                                | 106K TO 134K    | 0.30                                | 0.75   | 0.85  |
| 135-240 kBtu/h                 | 135K TO 210K    | 0.35                                | 1.00   | 1.10  |
|                                | 211K TO 280K    | 0.40                                | 1.00   | 1.10  |
| 240K-760 kBtu/h<br>>760 kBtu/h | 281K TO 350K    | 0.45                                | 1.50   | 1.60  |
|                                | 351K TO 400K    | 0.55                                | 1.50   | 1.60  |
|                                | 401K TO 500K    | 0.65                                | 1.50   | 1.60  |
|                                | 501 and greater | 0.75                                | 1.50   | 1.60  |

Figure 1

As part of the static pressure evaluation, the test procedure development work also included creating a new product category called “double duct,” as double ducts are often applied with ducted condenser airflow. AHRI 1340 included a requirement to rate the commercial double duct products with 0.5 in. of water condenser external static. This increased static was also included in the current published AHRI 340/360. AHRI 210/240 also includes the double-duct product category, but the standard requires ratings to be established with no external static and residential double-duct products are required to comply with the packaged product rating category.

- **Inclusion of Ventilation Fan.** For commercial buildings, the indoor fan is often used for ventilation during occupied operation. Ventilation run hours during occupied mode can be high and are now included in the new IVEC and IVHE metrics. The new metrics are based on ten buildings and 17 U.S. climate zones weighted average of 338 hours of ventilation on fan operation.
- **Inclusion of Air Economizers.** Commercial unitary products often include air-side economizers, which are a very efficient means of providing cooling. With the new IVEC metric, the benefits of an average air-side economizer have been included in the new IVEC cooling metric to make the metric more representative of the applied equipment efficiency. The IVEC metric was based on ten buildings and 17 U.S. climate zones, resulting in a weighted-average 1880 hours of economizer-only fan operation power and cooling benefit and 278 hours of integrated economizer (economizer plus mechanical cooling).
- **Inclusion of Standby Power.** Compressor lubrication systems are often protected from oil dilution by refrigerant using a crankcase heater. The new cooling (IVEC) and heat-pump heating (IVHE) annualized metrics include the crankcase heat energy at part load (for multiple compressor units) and off mode standby periods. For cooling-only units and units with gas heat, all annual crankcase heat energy is included in the IVEC metric. For heat pumps, just the cooling-mode hours standby power above a 49°F changeover is included in the cooling IVEC metric and, for heating IVHE, below 49°F in the heating heat-pump metric. The IVEC metric uses 4202 hours of standby power (crankcase heaters and controls) for cooling-only CUAC units, 1297 hours for HP IVEC, and 645 hours for IVHE metric.

For cooling efficiency, the current annualized IEER metric will be replaced with integrated ventilation, economizer and cooling (IVEC). The metric is similar to IEER with a weighted average of rating points but with the inclusion of ventilation, economizers, integrated economizer, and off-mode power plus the increased rating static. It is an average metric based on a weighted average of ten commercial buildings for all 17 U.S. climate zones. The new IVEC, as well as IVHE, factors in a 15% oversizing of equipment, which was considered for the IEER.

The impact of these changes for the value of the new metrics was considered in the crosswalk from IEER to IVEC and also EER to EER2. Also note the IEER, which was only for mechanical cooling (did not include economizer, ventilation, and off-mode power). The IEER was based on three commercial building types, whereas the new IVEC is based on ten commercial buildings.

The overall IVEC equation in Figure 2 using the equation defined in the term sheet. The equation in AHRI 1340 has been simplified and terms combined, but Figure 2 better explains the new metric.

$$IVEC = \frac{\text{annual cooling capacity}}{\frac{q_{FL(test)} \times (h_B \times \%Load_B + h_C \times \%Load_C + h_D \times \%Load_D) + \sum_{i=B}^D (h_{i,MO} + h_{i,IE}) \times (q_{i,test} - q_{i,mech})}{\sum_{i=B}^D [h_{i,EO} \times (P_{IF,EO} + P_{CT}) + h_{i,IE} \times P_{Tot,IE} + h_{i,MO} \times P_{Tot,MO}] + h_V \times (P_{IF,V} + P_{CT}) + h_{CCH} \times P_{CCH}} \text{ Btu/w}}$$

economizer only power
Integrated economizer power
Mechanical only power
cooling ventilation only fan, controls and crankcase heater power
off mode crankcase heater and control power

**where**

- i and n represent test points B, C, D
- h = "bin" hours
- q = capacity (Btu/h)
- P = power (W)
- %Load = target load percentage for bin across all modes (note the % load for the capacity is different than the % load for mechanical power determination)

**Subscripts:**

- EO = economizer-only cooling
- IE = integrated economizing
- MO = mechanical-only cooling (i.e., no economizer contribution)
- V = fan-only ventilation (cooling fan only)
- IF = indoor fan
- CT = controls (includes CCH power during active cooling)
- Tot = Total
- FL = full-load (test)
- CCH = crankcase heater
- measured = test measurement value
- test = test or rating
- mech = mechanical

**Figure 2**

The cooling IVEC metric uses three defined mechanical cooling test points for the IVEC as defined by test points B, C, and D. Due to the use of a 15% oversizing assumption, the IVEC metric will not use the full-load rating test point A and will use a weighted average of the B (73% capacity), C (48% capacity), and D (13% capacity) mechanical cooling ratings plus calculated economizer, ventilation, and off-mode power as shown in the equation above. The weighting of the points was revised based on the ten buildings and revised test procedure. Crankcase heater power is included and crankcase heater power will be provided by manufacturers. The full-load rating test point A will be used for the full-load capacity and EER2 rating as well as determination of the testing points for B, C, and D. The new IVEC cooling bins and test points are shown in Figure 3 with the current IEER bins and test points.

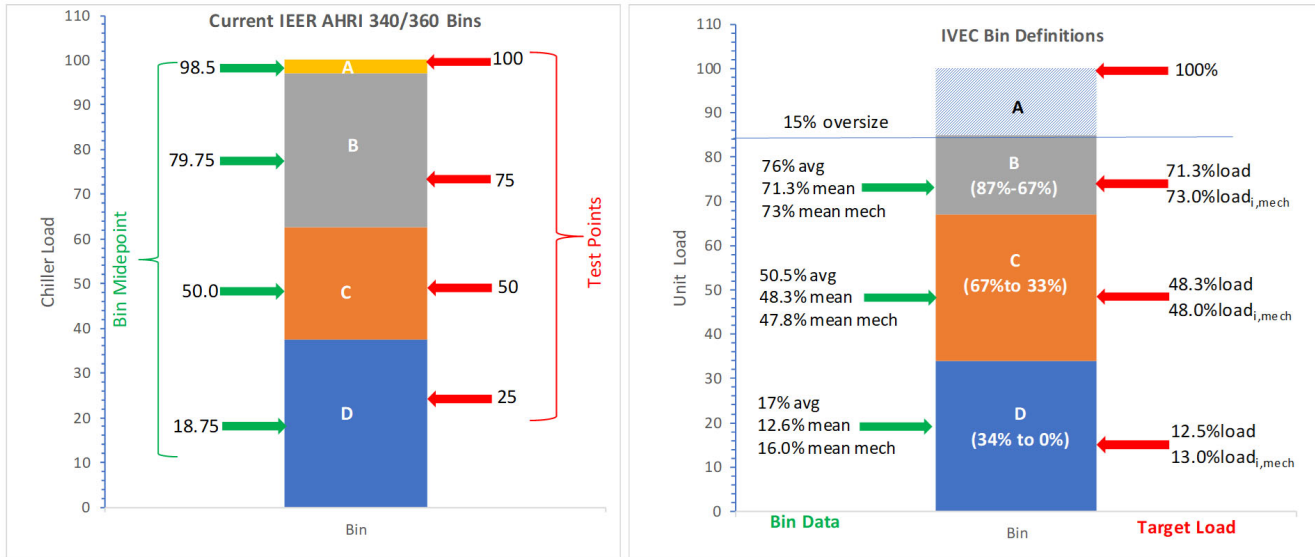


Figure 3

In addition to the change to the annualized metric, the full-load cooling efficiency metric will change from EER to EER2, which reflects the impact of the increased rating static mentioned above. As the focus is on annualized efficiency, the EER2 metric is used as a backstop to control full-load efficiency. No improvements have been proposed for full load and the EER2 values other than to reflect the crosswalk impact of the increased external static.

For heat-pump heating efficiency, Standard 90.1-2022 Table 6.8.1-2 currently defines minimum efficiency for 47°F full load and 17°F full load. The new AHRI 1340 standard and ASRAC negotiations included development of a new annualized metric for heating, which is similar to the HSPF2 for residential but is based on a weighted average of ten commercial buildings and 17 U.S. climate zones. The new annualized heating metric is called integrated ventilation heating efficiency (IVHE). The calculation details are shown in Figure 4. AHRI 1340 has a simplified equation that looks somewhat different but is equivalent. Figure 4 better explains the details of the equation and added power included in the metric.

$$IVHE = \frac{\sum_{i=1}^{10} h_i \times \dot{q}_{BLi}}{\underbrace{h_v \times (P_{IF} + P_{CT})_v}_{\text{Ventilation Energy}} + \underbrace{h_{CCH} \times P_{CCH}}_{\text{Crankcase Heating Energy}} + \underbrace{\sum_{i=1}^{10} h_i \times (P_C^a + P_{CD}^a + P_{IF} + P_{CT} + P_A)_i}_{\text{Heat Pump Operational Energy}}}$$

where;

hi = load-based bin hours  
 q̇ = capacity (Btu/h)  
 P = power (W)

Subscripts:

i represent test points  
 BL = building load  
 IF = indoor fan  
 CT = controls  
 C = compressor  
 CD = condenser  
 A = auxiliary electric heat  
 V = ventilation  
 CCH = Crankcase heat

Superscript:

a = adjusted

where building load is less than low-stage or low-speed capacity

$$(P_C^a + P_{CD}^a)_i = \frac{X_i \times \delta_i \times (P_C + P_{CD})_i}{PLF_i}$$

$$PLF_i = 1 - C_d \times (1 - X_i); C_d = 0.25$$

$$X_i = \max(LF \text{ or } 1)$$

$$LF = \frac{\dot{q}_{BLi}}{\dot{q}_{hLi}}$$

$$\delta_i = \begin{cases} 0 & \text{if } T_i \text{ is less than low - temp cut - out} \\ 0.5 & \text{if } T_i \text{ is between low - temp cut - out and cut - in} \\ 1 & \text{if } T_i \text{ is greater than low - temp cut - in} \end{cases}$$

Where:

C<sub>d</sub> = cyclic degradation  
 PLF = part load factor  
 X = duty cycle  
 δ = low-temperature cut-out factor

Figure 4

The new heating annualized metric includes the energy of the heat-pump mechanical heating, auxiliary electric heat power, ventilation fan power, and off mode standby power. It also includes auxiliary electric heat when the heat pump cannot satisfy the load. It does not currently include auxiliary gas heat, but dual fuel heat-pump metrics are being worked on and will likely be added in the future. IVHE is a bin-weighted average based on same ten buildings that were used for IVEC. For the U.S., the weighted average is based on the 17 ASHRAE Standard 169 U.S. climate zones. Using the same ten buildings, a colder climate metric has also been defined based on Climate Zones 5 through 8 and will be called IVHE<sub>C</sub>.

The IVHE metric is similar to HSPF2 but is based on commercial buildings load profiles, which are different than residential due to different internal loads and occupancy schedules. The figure below shows the overall rating approach for the IVHE metric. The IVHE rating and test procedure method is based on a building load and ambient curve as shown, which is based on a weighted average of the ten buildings. At each of the ten bins, performance is determined by interpolating the performance from a 47°F and 17°F point with an optional rating at 5°F. Additional tests can be run at part load and boost mode with overspeed compression. The performance is based on instantaneous performance, but then a default defrosts curve is used. For now, this defrost curve is based on time and temperature logic, but demand defrost is being considered for the future. Using instantaneous performance allows for better interpolation than using nonlinear integrated ratings and it greatly simplifies testing. The approach also includes auxiliary electric heat if the heat pump cannot satisfy the building load as shown in Figure 5. In the future, more advanced defrost curves may be added after testing to develop the curves.

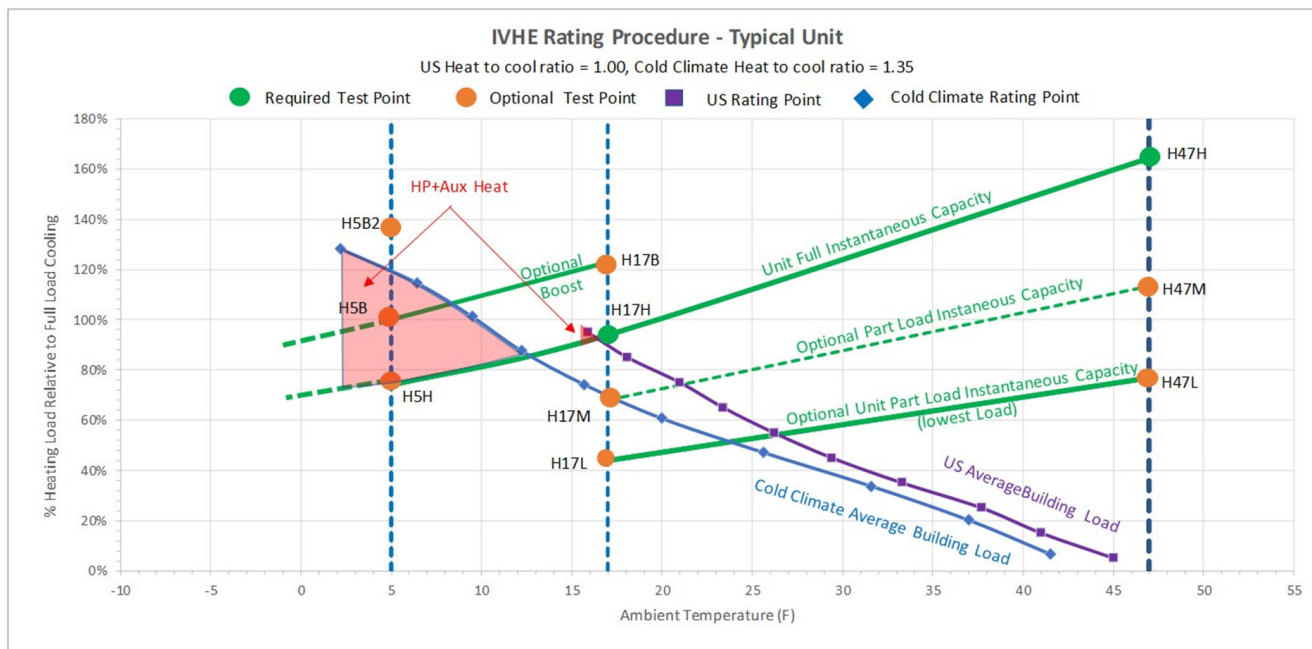


Figure 5

In addition to the new annualized metric, the new AHRI 1340 standard and test procedure also includes the current full-load metric for  $COP_H$ , which will change from  $COP_H$  to  $COP_{2H}$  to reflect the increased static. Due to growing interest in cold-climate heat pumps, the full-load  $COP_{2H}$  metrics have been expanded in addition to  $COP_{2H}$  at 47°F to include  $COP_{2H}$  at 17°F, which is currently included in Table 6.8.1-2 to also include a  $COP_{2H}$  at 5°F.  $COP_{H47}$  is currently included in Standard 90.1 Table 6.8.1-2 as well as  $COP_{2H17}$ . With the growing interest in electrification and cold-climate heat pumps, a  $COP_{2H5}$  has been added as a rating metric. Addendum ae eliminates the minimum requirements for  $COP_{2H47}$  as it is not an important metric for commercial buildings. The addendum requires two metrics for compliance:

- For ASHRAE Standard 169 Climate Zones 0A, 0B, 1A, 1B, 2A, 2B, 3A, 3B, 3C, 4A, 4B, and 4C, compliance with IVHE and  $COP_{2H17}$  will be required.
- For cold Climate Zones 5A, 5B, 5C, 6A, 6B, 7, and 8, compliances should be determined with IVHE<sub>C</sub> and  $COP_{2H5}$ , but, for all U.S. DOE applications, compliance with IVHE for  $\geq 65,000$  Btu/h to  $< 760,000$  Btu/h products will still be required because of DOE requirements.

The  $COP_{2H47}$  minimum efficiency metric compliance and minimum will no longer be required by Standard 90.1 after 1/1/2029 but is still required as one of the test points by AHRI 1340.

In addition to the ASRAC negotiations for the test procedure and definition of the new metrics, a cross-walk was done as well as negotiations to improve efficiencies. The ASRAC negotiations were limited to just the IVEC and IVHE U.S. average for air-cooled cooling units and air-source HPs with a capacity greater than or equal to 65,000 Btu/h to 760,000 Btu/h, but AHRI 1340-2024 also includes the following products

and capacity categories that were not defined by ASRAC negotiations and are defined as part of this addendum:

- Unitary air-cooled products with a capacity  $\geq 760,000$  Btu/h
- Unitary heat-pump products with a capacity  $\geq 760,000$  Btu/h
- Water-cooled products for all sizes
- Evaporatively cooled products for all sizes (includes  $< 65,000$  Btu/h)
- Double-duct products  $\geq 65,000$  Btu/h
- Cold climate  $IVHE_C$  for all sizes.

The ASRAC negotiations were focused on improvements to the IVEC and IVHE metrics, as they are representative of annual energy efficiency. The negotiations did not address the full-load  $EER_2$  and  $COP_2H$  that are currently defined by Standard 90.1 Tables 6.8.1-1 and 6.8.1-2. Therefore, levels are included in this addendum that reflect the increased external rating static and other test procedure changes. The full-load efficiencies have not increased but are adjusted for the static and test procedure change. The focus on efficiency improvements is with the annualized IVEC and IVHE metrics, and the full-load  $EER_2$  is being used to provide a backstop to ensure warm climate energy efficiency and peak power use for cooling and  $COP_2H$  to provide a backstop for heat-pump full-load energy and power.

For the water-cooled, the  $EER_2$  and IVEC metrics were also adjusted to include power allowances to account for tower power. AHRI 340/360 included a tower power allowance for  $< 135,000$  Btu/h, but AHRI 1340 has expanded the allowance to all sizes and also made some changes in the power allowance. Note that for water-cooled, the ambient rebalance at part load is also more gradual than air-cooled.

For air-cooled commercial package air conditioners and heat pumps with a rated cooling capacity greater than or equal to 65,000 Btu/h and less than 760,000 Btu/h (ACUACs and ACUHPs), the ASRAC defined the minimum efficiencies shown in Table 1.

**Table 1**

| <b>Air-Cooled Commercial Unitary Air Conditioners and Heat Pumps with a Cooling Capacity Greater Than or Equal to 65,000 Btu/h (Excluding Double-Duct Air-Conditioners and Heat Pumps)</b> |                    |   |                                    |
|--|--------------------|---|------------------------------------|
| <b>Cooling capacity</b>  | <b>Subcategory</b> | <b>Supplementary Heating type</b>         | <b>Minimum Efficiency (Btu/Wh)</b> |
| $\geq 65,000$ Btu/h and $< 135,000$ Btu/h  | AC                 | Electric Resistance Heating or No Heating | $IVEC = 14.3$                      |
| $\geq 65,000$ Btu/h and $< 135,000$ Btu/h  | AC                 | All Other Types of Heating                | $IVEC = 13.8$                      |
| $\geq 65,000$ Btu/h and $< 135,000$ Btu/h  | HP                 | All Types of Heating or No Heating        | $IVEC = 13.4$<br>$IVHE = 6.2$      |
| $\geq 135,000$ Btu/h and $< 240,000$ Btu/h   | AC                 | Electric Resistance Heating or No Heating | $IVEC = 13.8$                      |
| $\geq 135,000$ Btu/h and $< 240,000$ Btu/h   | AC                 | All Other Types of Heating                | $IVEC = 13.3$                      |
| $\geq 135,000$ Btu/h and $< 240,000$ Btu/h   | HP                 | All Types of Heating or No Heating        | $IVEC = 13.1$<br>$IVHE = 6.0$      |
| $\geq 240,000$ Btu/h and $< 760,000$ Btu/h   | AC                 | Electric Resistance Heating or No Heating | $IVEC = 12.9$                      |
| $\geq 240,000$ Btu/h and $< 760,000$ Btu/h   | AC                 | All Other Types of Heating                | $IVEC = 12.2$                      |
| $\geq 240,000$ Btu/h and $< 760,000$ Btu/h   | HP                 | All Types of Heating or No Heating        | $IVEC = 12.1$<br>$IVHE = 5.8$      |

The negotiations resulted in significant increases in efficiency as shown below relative to the current IEER levels that were recently increased in 2023.

- 65,000 to 135,000—36.1% efficiency increase relative to 2023 IEER levels
- 135,000 to 240,000—17.9% efficiency increase relative to 2023 IEER levels
- 240,000 to 760,000—29.1% efficiency increase relative to 2023 IEER levels

Because of the metric and test procedure changes, the values decrease. Figure 6 shows a typical product waterfall of the test procedure impact on the numeric value of the IVEC metric vs. the IEER metric for an air-cooled product using example 6 from the AHRI 340/360 standard.

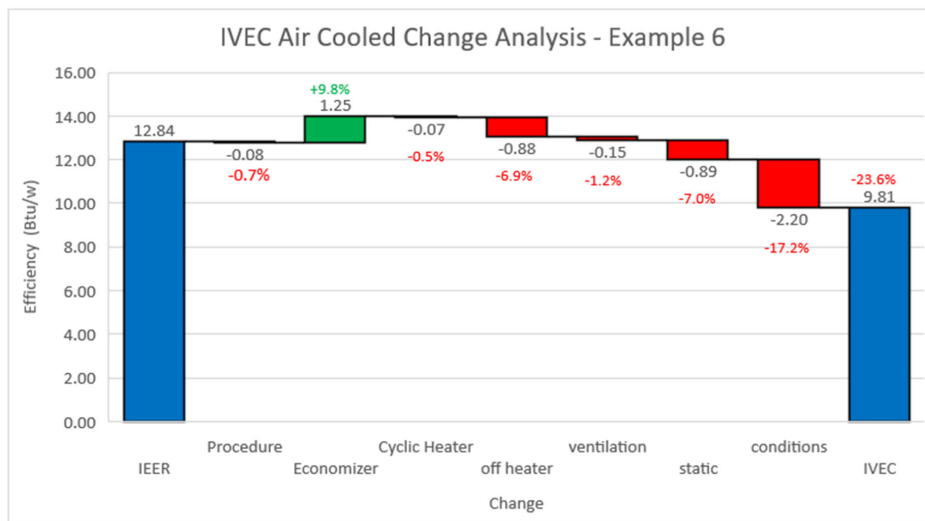


Figure 6

For water-cooled products, significant changes were made to the test and rating procedure for water-cooled and evaporatively cooled (see Figure 7). Like air-cooled, the procedure was expanded to include ventilation, air-side economizers, and crankcase heater power. The use of a default tower fan and pumping power was also expanded to cover all products and not just the <135,000 Btu/h products per the current AHRI 340/360 test procedure. The rating conditions were also changed include re-evaluation of the condenser conditions, and they are different than the air-cooled.

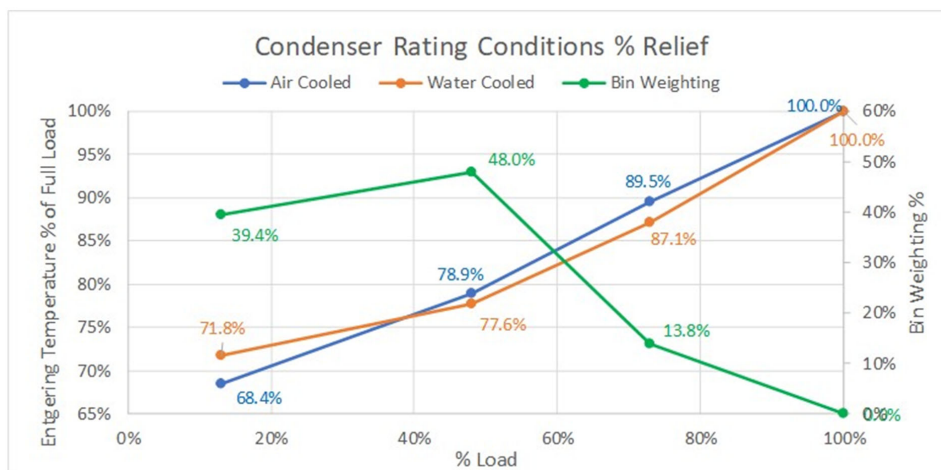


Figure 7

Comparing air-cooled and water-cooled IVEC is not appropriate due to the following:

- The condenser conditions at part-load are not aligned between air-cooled and water-cooled, which results in some differences in crosswalked metrics.
- The part-load bin weighting has changed between IEER and IVEC to be more part-load focused, but with the changes in condenser rating conditions the impact is different for air-cooled and water-cooled.

- The water-cooled tower power allowance is fixed and is not an option for improving water-cooled efficiencies like air-cooled, and the tower power allowance is 11.1% of the total; whereas the air-cooled condenser fan power is 4.4%

Figure 8 shows a typically crosswalk for water-cooled using example 7 from AHRI 340/360 where the test procedure reduced the IEER by 34% vs. 23.6% for air-cooled.

Also, the significant change in bin weighting and use of 15% oversizing also impact the IVEC vs. IEER as shown in Figure 9.

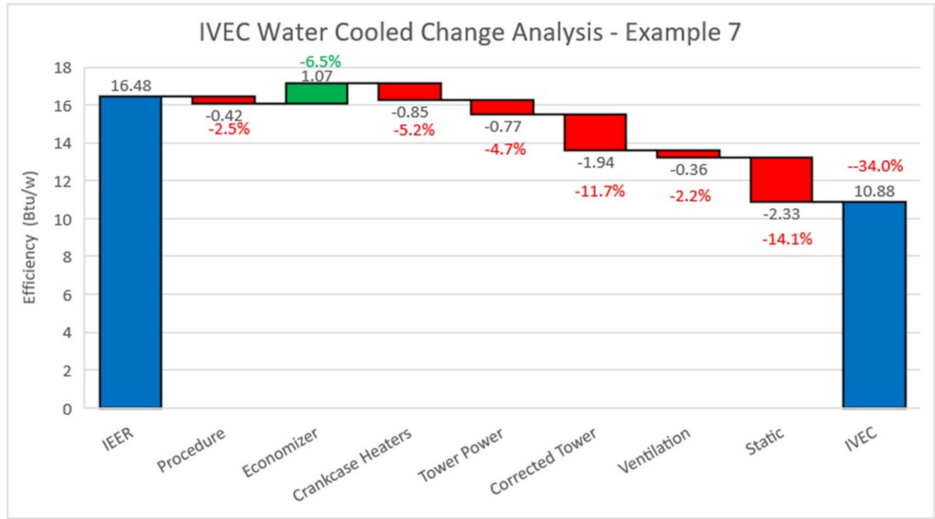


Figure 8

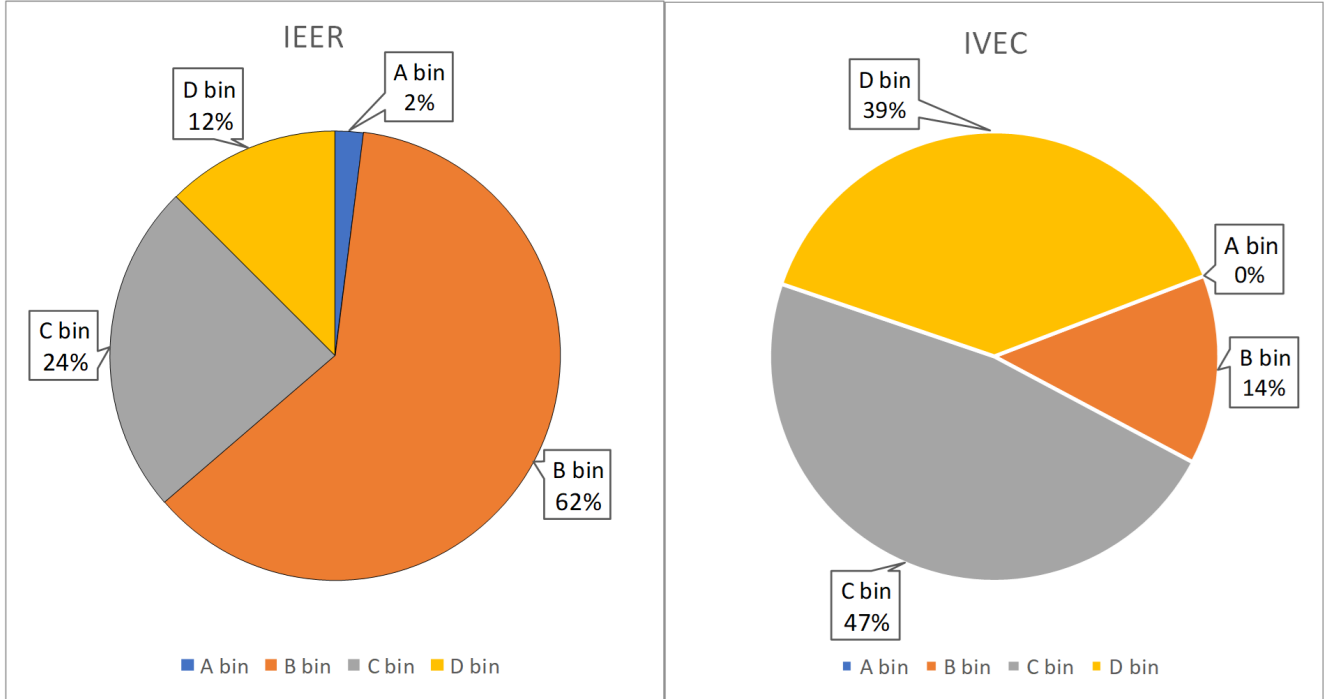


Figure 9

Using the air- and water-cooled examples, Figure 10 shows typical power use distribution and explains the differences between air and water cooled.

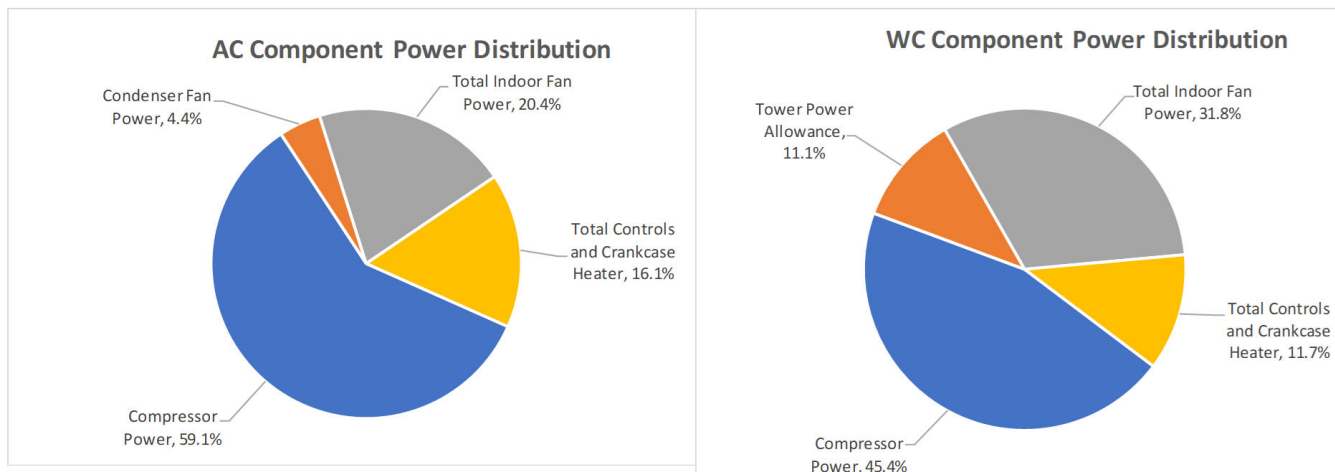


Figure 10

For evaporatively cooled, there is very little industry data and products. The current IEER for evaporatively cooled includes the fan power and recirculation pumping power. For the water-cooled products, the condenser fan power and pumping power, along with fan power, were revised, which is reflected in the EER2 and IVEC. There are no heat pumps for water-cooled and evaporatively cooled. Water-to-air heat pumps fall under Table 6.8.1-15 for WSHPs.

Advisory public review did not cover the large commercial condensing units greater than 135,000 Btu/h because the AHRI 1365 standard was still in development. Considerable work has been done, and the AHRI 1365 standard was developed to align with the AHRI 1340 test procedure for IVEC cooling metrics test procedures and also expanded to include heat-pump condensing units, which were not covered by the current Table 6.8.1-2. To make the condensing units equivalent to AHRI 1340 products, the test procedure was updated to include an indoor fan power allowance, so that ventilation and economizer could be part of the metric, and expanded to cover the part-load rating B, C, and D test points. The fan power allowance was based on VAV systems and survey data from manufactures and the same part-load fan power reduction used for AHRI 1340 default fan power. The testing will be done using a defined midpoint saturated suction temperature that was developed by AHRI surveys of existing equipment. Based on this work and the completion of AHRI 1365, the minimum efficiency requirements for large condensing units has been added to the table for cooling units and heat pumps and set at the same levels as packaged units.

### Cost-Effective Analysis

A significant energy efficiency increase is being made, and a detailed cost-effectiveness analysis has been conducted using the ten reference buildings used to develop the IVEC and IVHE metrics and a weighted average of the 19 climate zones. Per the requirements of Standard 90.1, the analysis used the scalar cost-effectiveness procedure, and scalars were calculated using average electric rates of 0.1122 \$/kW for energy cost and again with cost of carbon using an electric rate of 0.1772 \$/kW. The scalar limit for these products and equipment lives of 15, 18, and 20 years is shown in Table 2. Industry and DOE studies over the years have used different product lives.

Table 2

| Design Life | Scalar Limit Energy Cost | Scalar Limit with Cost of Carbon |
|-------------|--------------------------|----------------------------------|
| 15          | 11.4                     | 11.5                             |
| 18          | 13.1                     | 13.3                             |
| 20          | 14.1                     | 14.4                             |

For those not familiar with the Standard 90.1 scalar cost-effectiveness analysis, the scalar is a simple payback of the increase in product cost, including shipping and installation, relative to the annual energy

savings. The scalar limit is the maximum scalar ratio that will be justified based on a net present value of the energy cost savings or energy cost savings plus the cost of carbon.

Table 3 shows the cost-effective analysis for the air-cooled products, which are the dominate volume segment. We have assumed the water-cooled and air-cooled would use similar scalars. The values are weighted averages of all 17 U.S. climate zones for the ten reference buildings.

**Table 3**

|                    | Scalar Ratio  |            |               |            |
|--------------------|---------------|------------|---------------|------------|
|                    | Cooling Units | Heat Pumps | Cooling Units | Heat Pumps |
| 65K to 135K Btu/h  | 18.38         | 13.90      | 11.64         | 8.80       |
| 135K to 240K Btu/h | 3.21          | 7.12       | 2.03          | 4.51       |
| 240K to 760K Btu/h | 17.98         | 13.91      | 11.39         | 8.81       |
| Weighted average   | 13.39         |            | 8.48          |            |

The energy cost scalar is marginally cost effective for an equipment life of 20 years but gets better when including the social cost of carbon. Manufacturers have agreed to the efficiency improvements for air-cooled as part of the ASRAC negotiations. The IVEC and IVHE metrics are new, and manufacturers likely will find ways to optimize the designs before the compliance date in 2029.

**Informative 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 ae to Standard 90.1-2022**

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

**coefficient of performance ( $COP_H$  or  $COP2_H$ ), heat pump—heating:** the ratio of the rate of heat delivered to the rate of energy input, in consistent units, for a complete heat-pump system, including the compressor and, if applicable, auxiliary heat, under designated operating conditions. **(Informative Note:  $COP2_H$  reflects the new higher static effective 1/1/2023 for products covered by AHRI 210/240 and effective 1/1/2029 for products covered by AHRI 1340)**

**energy efficiency ratio ( $EER$  or  $EER2$ ):** the ratio of net cooling capacity (Btu/h) to total rate of electric input in watts under designated operating conditions. **(Informative Note:  $EER2$  reflects the new higher static effective 1/1/2023 and for products covered by AHRI 210/240 and effective 1/1/2029 for products covered by AHRI 1340)**

*Add the following definitions to Section 3.2 as shown (I-P and SI).*

**integrated ventilation, economizing, and cooling efficiency ( $IVEC$ ):** total annual cooling capacity divided by total annual energy including mechanical cooling, economizer, cooling mode ventilation fan energy and off mode control energy and crankcase heat energy for an average building and average climate zone as defined in AHRI 1340 Section 6.2.

**integrated ventilation and heating efficiency ( $IVHE$  and  $IVHE_C$ ):** total annual heating capacity for a heat pump including vapor compression heating capacity and auxiliary heating capacity divided by total heating model energy including mechanical vapor compression heating, auxiliary heat energy, heating mode ventilation fan energy and heating mode control power, and crankcase heat power as defined in Section 6.3 and expressed in Btu/W h.  $IVHE_C$  is for colder climates and uses a colder climate zone weighted average load profile and is based on ANSI/ASHRAE Standard 169 Climate Zones 5 to 8.

*Add the following abbreviations and acronyms to Section 3.3 as shown (I-P and SI).*

|                                  |   |
|----------------------------------|---|
| <b><math>IVEC</math></b>         | <b>integrated ventilation, economizing, and cooling efficiency</b>          |
| <b><math>IVHE</math></b>         | <b>integrated ventilation and heating efficiency</b>                        |
| <b><math>IVHE_C</math></b>       | <b>integrated ventilation and heating efficiency for cold climate zones</b> |
| <b><math>COP_C/COP2_C</math></b> | <b>coefficient of performance</b>   |
| <b><math>COP_H/COP2_H</math></b> | <b>coefficient of performance, heat pump - heating</b>                      |

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

|                                |  |   |
|--------------------------------|--|---|
| <b>AHRI 1340-2024 (I-P)</b>    | <b>Performance Rating of Commercial and Industrial Unitary Air-conditioning and Heat Pump Equipment</b>        | <b>Table 6.8.1-1,<br/>Table 6.8.1-2</b> |
| <b>AHRI 1365-2024 (SI/I-P)</b> | <b>Performance Rating of Commercial and Industrial Unitary Air-conditioning and Heat Pump Condensing Units</b> | <b>Table 6.8.1-1,<br/>Table 6.8.1-2</b> |

**Delete current Tables 6.8.1-1, 6.8.1-2, and F-1 and replace with new Tables 6.8.1-1 and 6.8.1-2 as shown (I-P and SI). Note, deleted tables are not shown.**

**Table 6.8.1-1 Electrically Operated Unitary Air Conditioners and Condensing Units—Minimum Efficiency Requirements (I-P)**

| Equipment Type  | Size Category                   | Heating Section Type | Subcategory  | Minimum Efficiency <sup>g</sup>   | Test Procedure <sup>a</sup> |
|---|---------------------------------|----------------------|--|---|-----------------------------|
| Air-Cooled <i>Single-Phase</i> Split-System Products <65,000 Btu/h <sup>b</sup> |                                 |                      |  |   |                             |
| Split-system air-cooled air conditioners  | <45,000 Btu/h                   | All                  | For U.S. applications National Standard                | 13.4 <i>SEER2</i><br>$P_{w,off} \leq 30$ W  | AHRI 210/240-2024           |
|   |                                 |                      | For U.S. applications Southeastern Region <sup>c</sup> | 14.3 <i>SEER2</i><br>$P_{w,off} \leq 30$ W  |                             |
|   |                                 |                      | For U.S. applications Southwestern Region <sup>d</sup> | 11.7 <i>EER2</i> , <sup>e</sup> 14.3 <i>SEER2</i> <sup>e</sup><br>$P_{w,off} \leq 30$ W<br>or<br>9.8 <i>EER2</i> , 15.2 <i>SEER2</i> <sup>e</sup><br>$P_{w,off} \leq 30$ W              |                             |
|   |                                 |                      | Outside U.S. Applications                              | 13.4 <i>SEER2</i>   |                             |
|   | ≥45,000 Btu/h and <65,000 Btu/h |                      | For U.S. applications National Standard                | 13.4 <i>SEER2</i><br>$P_{w,off} \leq 30$ W  |                             |
|   |                                 |                      | For U.S. applications Southeastern Region <sup>c</sup> | 13.8 <i>SEER2</i><br>$P_{w,off} \leq 30$ W  |                             |
|   |                                 |                      | For U.S. applications Southwestern Region <sup>d</sup> | 11.2 <i>EER2</i> , <sup>f</sup> 13.8 <i>SEER2</i> <sup>f</sup><br>$P_{w,off} \leq 30$ W<br>or<br>9.8 <i>EER2</i> , <sup>f</sup> 15.2 <i>SEER2</i> <sup>f</sup><br>$P_{w,off} \leq 30$ W |                             |
|   |                                 |                      | Outside U.S. applications                              | 13.4 <i>SEER2</i>   |                             |

a. Section 13 contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure.

b. *Single-phase* U.S. air-cooled air conditioners <65,000 Btu/h are regulated as consumer products by the U.S. Code of Federal Regulations 10 CFR 430. *SEER2* values for *single-phase* products are set by the U.S. Department of Energy.

c. The Southeastern region for central air conditioners contains the following States: Alabama, Arkansas, Delaware, Florida, Georgia, Hawaii, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, and Virginia, and the District of Columbia.

d. The Southwestern region for central air conditioners contains the States of Arizona, California, Nevada, and New Mexico.

e. The 11.7 *EER2* standard applies to products with a certified *SEER2* less than 15.2. The 9.8 *EER2* standard applies to products with a certified *SEER2* greater than or equal to 15.2.

f. The 11.2 *EER2* standard applies to products with a certified *SEER2* less than 15.2. The 9.8 *EER2* standard applies to products with a certified *SEER2* greater than or equal to 15.2.

g. For definition of efficiency metrics see the reference standards. The metrics have the following units: Btu/W-h—*EER*, *EER2*, *SEER2*, *IEER*, *IVEC*, *IVHE*, *IVHE<sub>C</sub>*, *HSPF2*.

h. All double-duct units with capacities ≥65,000 Btu/h should be rated per AHRI 1340, which requires an additional 0.5 in. of water external static pressure for the condenser, and double duct units with capacities <65,000 Btu/h should be rated per AHRI 210/240 with 0.0 in. of water external static pressure for the condenser and shall comply with packaged air conditioner requirements.

**Table 6.8.1-1 Electrically Operated Unitary Air Conditioners and Condensing Units—Minimum Efficiency Requirements (I-P)**

| Equipment Type  | Size Category              | Heating Section Type | Subcategory   | Minimum Efficiency <sup>g</sup>   | Test Procedure <sup>a</sup> |
|---|----------------------------|----------------------|---|---|-----------------------------|
| <i>Air-Cooled Single-Phase Single-Package Air Conditioners &lt;65,000 Btu/h<sup>b</sup></i> |                            |                      |   |   |                             |
| Single-package air-cooled air conditioners <sup>h</sup>                                     | <65,000 Btu/h <sup>b</sup> | All                  | For U.S. applications<br>National Standard                | 13.4 <i>SEER2</i> ,<br><i>P<sub>w,Off</sub></i> ≤ 30 W                    | AHRI 210/240-2024           |
|   |                            |                      | For U.S. applications<br>Southeastern Region <sup>c</sup> |   |                             |
|   |                            |                      | For U.S. applications<br>Southwestern Region <sup>d</sup> | 10.6 <i>EER2</i> , 13.4 <i>SEER2</i> ,<br><i>P<sub>w,Off</sub></i> ≤ 30 W |                             |
|   |                            |                      | Outside U.S. applications                                 |   |                             |
| <i>Air-Cooled Single-Phase Small-Duct High-Velocity Systems<sup>b</sup></i>                 |                            |                      |   |   |                             |
| Small-duct high-velocity split-system air-cooled air conditioners                           | <65,000 Btu/h <sup>b</sup> | All                  | All U.S. applications                                     | 12.0 <i>SEER2</i> ,<br><i>P<sub>w,Off</sub></i> ≤ 30 W                    | AHRI 210/240-2024           |
|   |                            |                      | Outside U.S. applications                                 |   |                             |
| <i>Air-Cooled Single-Phase Space-Constrained Air Conditioners<sup>b</sup></i>               |                            |                      |   |   |                             |
| Space-constrained air-cooled air conditioners   | <30,000 Btu/h <sup>b</sup> | All                  | All U.S. applications                                     | 11.7 <i>SEER2</i> ,<br><i>P<sub>w,Off</sub></i> ≤ 30 W                    | AHRI 210/240-2024           |
|   |                            |                      | Outside U.S. applications                                 |   |                             |
| <i>Air-Cooled Three-Phase Small-Duct High-Velocity Systems</i>                              |                            |                      |   |   |                             |
| Small-duct high-velocity air-cooled air conditioners  | <65,000 Btu/h <sup>b</sup> | All                  | All U.S. and outside U.S. applications                    | 13.0 <i>SEER2</i>   | AHRI 210/240-2024           |
| <i>Air-Cooled Three-Phase Space-Constrained Air Conditioners</i>                            |                            |                      |   |   |                             |
| Split-system space-constrained air-cooled air conditioners                                  | <30,000 Btu/h <sup>b</sup> | All                  | All U.S. and outside U.S. applications                    | 12.7 <i>SEER2</i>   | AHRI 210/240-2024           |
| Single-package space-constrained air-cooled air conditioners                                | <30,000 Btu/h <sup>b</sup> | All                  | All U.S. and outside U.S. applications                    | 13.9 <i>SEER2</i>   | AHRI 210/240-2024           |

a. Section 13 contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure.

b. *Single-phase* U.S. air-cooled air conditioners <65,000 Btu/h are regulated as consumer products by the U.S. Code of Federal Regulations 10 CFR 430. *SEER2* values for *single-phase* products are set by the U.S. Department of Energy.

c. The Southeastern region for central air conditioners contains the following States: Alabama, Arkansas, Delaware, Florida, Georgia, Hawaii, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, and Virginia, and the District of Columbia.

d. The Southwestern region for central air conditioners contains the States of Arizona, California, Nevada, and New Mexico.

e. The 11.7 *EER2* standard applies to products with a certified *SEER2* less than 15.2. The 9.8 *EER2* standard applies to products with a certified *SEER2* greater than or equal to 15.2.

f. The 11.2 *EER2* standard applies to products with a certified *SEER2* less than 15.2. The 9.8 *EER2* standard applies to products with a certified *SEER2* greater than or equal to 15.2.

g. For definition of efficiency metrics see the reference standards. The metrics have the following units: Btu/W·h—*EER*, *EER2*, *SEER2*, *IEER*, *IVEC*, *IVHE*, *IVHE<sub>c</sub>*, *HSPF2*.

h. All double-duct units with capacities ≥65,000 Btu/h should be rated per AHRI 1340, which requires an additional 0.5 in. of water external static pressure for the condenser, and double duct units with capacities <65,000 Btu/h should be rated per AHRI 210/240 with 0.0 in. of water external static pressure for the condenser and shall comply with packaged air conditioner requirements.

**Table 6.8.1-1 Electrically Operated Unitary Air Conditioners and Condensing Units—Minimum Efficiency Requirements (I-P)**

| Equipment Type                                       | Size Category                      | Heating Section Type                 | Subcategory                            | Minimum Efficiency <sup>g</sup>  | Test Procedure <sup>a</sup>   |
|--|------------------------------------|--------------------------------------|--|--|---|
| Air-Cooled Three-Phase Double-Duct Air Conditioners  |                                    |                                      |  |  |   |
| Double-duct air-cooled air conditioners <sup>h</sup> | <65,000 Btu/h                      | All                                  | All U.S. and outside U.S. applications | 13.4 <i>SEER</i> <sup>2h</sup>   | AHRI 210/240-2024   |
|  |                                    | <i>Electric resistance</i> (or none) |  | 11.2 <i>EER</i> before 1/1/2029<br>10.0 <i>EER</i> <sup>2,h</sup> 13.6 <i>IVEC</i> <sup>h</sup> on or after 1/1/2029             | AHRI 340/360 before 1/1/2029<br>AHRI 1340 on or after 1/1/2029  |
|  | All other                          |                                      |  | 11.0 <i>EER</i> before 1/1/2029<br>9.8 <i>EER</i> <sup>2,h</sup> 13.1 <i>IVEC</i> <sup>h</sup> on or after 1/1/2029              |   |
|  | ≥65,000 Btu/h and <135,000 Btu/h   | <i>Electric resistance</i> (or none) |  | 11.0 <i>EER</i> <sup>h</sup> before 1/1/2029<br>9.7 <i>EER</i> <sup>2,h</sup> 13.0 <i>IVEC</i> <sup>h</sup> on or after 1/1/2029 |   |
|  |                                    |                                      |  | All other  | 10.8 <i>EER</i> before 1/1/2029<br>9.5 <i>EER</i> <sup>2,h</sup> 12.5 <i>IVEC</i> <sup>h</sup> on or after 1/1/2029 |
|  | ≥135,000 Btu/h and <240,000 Btu/h  | <i>Electric resistance</i> (or none) |  | 10.0 <i>EER</i> before 1/1/2029<br>8.5 <i>EER</i> <sup>2,h</sup> 12.3 <i>IVEC</i> <sup>h</sup> on or after 1/1/2029              |   |
|  |                                    |                                      |  | All other  | 9.8 <i>EER</i> before 1/1/2029<br>8.3 <i>EER</i> <sup>2,h</sup> 11.8 <i>IVEC</i> <sup>h</sup> on or after 1/1/2029  |
|  | ≥240,000 Btu/h and < 300,000 Btu/h | <i>Electric resistance</i> (or none) |  |  |   |
| All other  |                                    |                                      |  |  |   |

a. Section 13 contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure.  
b. *Single-phase* U.S. air-cooled air conditioners <65,000 Btu/h are regulated as consumer products by the U.S. Code of Federal Regulations 10 CFR 430. *SEER*<sup>2</sup> values for *single-phase* products are set by the U.S. Department of Energy.  
c. The Southeastern region for central air conditioners contains the following States: Alabama, Arkansas, Delaware, Florida, Georgia, Hawaii, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, and Virginia, and the District of Columbia.  
d. The Southwestern region for central air conditioners contains the States of Arizona, California, Nevada, and New Mexico.  
e. The 11.7 *EER*<sup>2</sup> standard applies to products with a certified *SEER*<sup>2</sup> less than 15.2. The 9.8 *EER*<sup>2</sup> standard applies to products with a certified *SEER*<sup>2</sup> greater than or equal to 15.2.  
f. The 11.2 *EER*<sup>2</sup> standard applies to products with a certified *SEER*<sup>2</sup> less than 15.2. The 9.8 *EER*<sup>2</sup> standard applies to products with a certified *SEER*<sup>2</sup> greater than or equal to 15.2.  
g. For definition of efficiency metrics see the reference standards. The metrics have the following units: Btu/W·h—*EER*, *EER*<sup>2</sup>, *SEER*<sup>2</sup>, *IEER*, *IVEC*, *IVHE*, *IVHE*<sub>C</sub>, *HSPF*<sup>2</sup>.  
h. All double-duct units with capacities ≥65,000 Btu/h should be rated per AHRI 1340, which requires an additional 0.5 in. of water external static pressure for the condenser, and double duct units with capacities <65,000 Btu/h should be rated per AHRI 210/240 with 0.0 in. of water external static pressure for the condenser and shall comply with packaged air conditioner requirements.

**Table 6.8.1-1 Electrically Operated Unitary Air Conditioners and Condensing Units—Minimum Efficiency Requirements (I-P)**

| Equipment Type   | Size Category                     | Heating Section Type                 | Subcategory                            | Minimum Efficiency <sup>g</sup>   | Test Procedure <sup>a</sup>                                    |
|--|-----------------------------------|--------------------------------------|--|---|--|
| Air-Cooled Unitary Three-Phase Air Conditioners              |                                   |                                      |  |   |  |
| Split-system air-cooled air conditioners                     | <65,000 Btu/h <sup>b</sup>        | All                                  | All U.S. and outside U.S. applications | 13.4 <i>SEER2</i>   | AHRI 210/240-2024  |
| Single-package air-cooled conditioners                       | <65,000 Btu/h <sup>b</sup>        | All                                  | All U.S. and outside U.S. applications | 13.4 <i>SEER2</i>   |  |
| Split-systems and single-package air-cooled air conditioners | ≥65,000 Btu/h and <135,000 Btu/h  | <i>Electric resistance</i> (or none) | All U.S. and outside U.S. applications | 11.2 <i>EER</i> , 14.8, <i>IEER</i> before 1/1/2029<br>10.6 <i>EER2</i> , 14.3 <i>IVEC</i> on or after 1/1/2029 | AHRI 340/360 before 1/1/2029<br>AHRI 1340 on or after 1/1/2029 |
|  |                                   | All other                            |  | 11.0 <i>EER</i> , 14.6 <i>IEER</i> before 1/1/2029<br>10.4 <i>EER2</i> , 13.8 <i>IVEC</i> on or after 1/1/2029  |  |
|  | ≥135,000 Btu/h and <240,000 Btu/h | <i>Electric resistance</i> (or none) |  | 11.0 <i>EER</i> , 14.2 <i>IEER</i> before 1/1/2029<br>10.2 <i>EER2</i> , 13.8 <i>IVEC</i> on or after 1/1/2029  |  |
|  |                                   | All other                            |  | 10.8 <i>EER</i> , 14.0 <i>IEER</i> before 1/1/2029<br>10.0 <i>EER2</i> , 13.3 <i>IVEC</i> on or after 1/1/2029  |  |
|  | ≥240,000 Btu/h and <760,000 Btu/h | <i>Electric resistance</i> (or none) |  | 10.0 <i>EER</i> , 13.2 <i>IEER</i> before 1/1/2029<br>9.2 <i>EER2</i> , 12.9 <i>IVEC</i> on or after 1/1/2029   |  |

- a. Section 13 contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure.
- b. *Single-phase* U.S. air-cooled air conditioners <65,000 Btu/h are regulated as consumer products by the U.S. Code of Federal Regulations 10 CFR 430. *SEER2* values for *single-phase* products are set by the U.S. Department of Energy.
- c. The Southeastern region for central air conditioners contains the following States: Alabama, Arkansas, Delaware, Florida, Georgia, Hawaii, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, and Virginia, and the District of Columbia.
- d. The Southwestern region for central air conditioners contains the States of Arizona, California, Nevada, and New Mexico.
- e. The 11.7 *EER2* standard applies to products with a certified *SEER2* less than 15.2. The 9.8 *EER2* standard applies to products with a certified *SEER2* greater than or equal to 15.2.
- f. The 11.2 *EER2* standard applies to products with a certified *SEER2* less than 15.2. The 9.8 *EER2* standard applies to products with a certified *SEER2* greater than or equal to 15.2.
- g. For definition of efficiency metrics see the reference standards. The metrics have the following units: Btu/W·h—*EER*, *EER2*, *SEER2*, *IEER*, *IVEC*, *IVHE*, *IVHE<sub>C</sub>*, *HSPF2*.
- h. All double-duct units with capacities ≥65,000 Btu/h should be rated per AHRI 1340, which requires an additional 0.5 in. of water external static pressure for the condenser, and double duct units with capacities <65,000 Btu/h should be rated per AHRI 210/240 with 0.0 in. of water external static pressure for the condenser and shall comply with packaged air conditioner requirements.

**Table 6.8.1-1 Electrically Operated Unitary Air Conditioners and Condensing Units—Minimum Efficiency Requirements (I-P)**

| Equipment Type   | Size Category                     | Heating Section Type                 | Subcategory                            | Minimum Efficiency <sup>g</sup>  | Test Procedure <sup>a</sup>                                    |
|--|-----------------------------------|--------------------------------------|--|--|--|
| Split-systems and single-package air-cooled air conditioners | ≥240,000 Btu/h and <760,000 Btu/h | All other                            | All U.S. and outside U.S. applications | 9.8 <i>EER</i> , 13.0 <i>IEER</i> before 1/1/2029<br>9.0 <i>EER2</i> , 12.2 <i>IVEC</i> on or after 1/1/2029   | AHRI 340/360 before 1/1/2029<br>AHRI 1340 on or after 1/1/2029 |
|  | ≥760,000 Btu/h                    | <i>Electric resistance</i> (or none) |  | 9.7 <i>EER</i> , 12.5 <i>IEER</i> before 1/1/2029<br>8.9 <i>EER2</i> , 11.7 <i>IVEC</i> on or after 1/1/2029   |  |
|  |                                   | All other                            |  | 9.5 <i>EER</i> , 12.3 <i>IEER</i> before 1/1/2029<br>8.7 <i>EER2</i> , 11.0 <i>IVEC</i> on or after 1/1/2029   |  |
| <i>Air-Cooled Condensing Unit</i> ≥135,000 Btu/h             |                                   |                                      |  |  |  |
| <i>Condensing units</i> , air-cooled                         | ≥135,000 Btu/h and <240,000 Btu/h | All                                  | All U.S. and outside U.S. applications | 10.5 <i>EER</i> , 11.8 <i>IEER</i> before 1/1/2029<br>10.2 <i>EER2</i> , 13.8 <i>IVEC</i> on or after 1/1/2029 | AHRI 365 before 1/1/2029<br>AHRI 1365 on or after 1/1/2029     |
|  | ≥240,000 Btu/h and <760,000 Btu/h |                                      |  | 10.5 <i>EER</i> , 11.8 <i>IEER</i> before 1/1/2029<br>9.2 <i>EER2</i> , 12.9 <i>IVEC</i> on or after 1/1/2029  |  |
|  | ≥760,000 Btu/h                    |                                      |  | 10.5 <i>EER</i> , 11.8 <i>IEER</i> before 1/1/2029<br>8.9 <i>EER2</i> , 11.7 <i>IVEC</i> on or after 1/1/2029  |  |

a. Section 13 contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure.  
b. *Single-phase* U.S. air-cooled air conditioners <65,000 Btu/h are regulated as consumer products by the U.S. Code of Federal Regulations 10 CFR 430. *SEER2* values for *single-phase* products are set by the U.S. Department of Energy.  
c. The Southeastern region for central air conditioners contains the following States: Alabama, Arkansas, Delaware, Florida, Georgia, Hawaii, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, and Virginia, and the District of Columbia.  
d. The Southwestern region for central air conditioners contains the States of Arizona, California, Nevada, and New Mexico.  
e. The 11.7 *EER2* standard applies to products with a certified *SEER2* less than 15.2. The 9.8 *EER2* standard applies to products with a certified *SEER2* greater than or equal to 15.2.  
f. The 11.2 *EER2* standard applies to products with a certified *SEER2* less than 15.2. The 9.8 *EER2* standard applies to products with a certified *SEER2* greater than or equal to 15.2.  
g. For definition of efficiency metrics see the reference standards. The metrics have the following units: Btu/W-h—*EER*, *EER2*, *SEER2*, *IEER*, *IVEC*, *IVHE*, *IVHE<sub>C</sub>*, *HSPF2*.  
h. All double-duct units with capacities ≥65,000 Btu/h should be rated per AHRI 1340, which requires an additional 0.5 in. of water external static pressure for the condenser, and double duct units with capacities <65,000 Btu/h should be rated per AHRI 210/240 with 0.0 in. of water external static pressure for the condenser and shall comply with packaged air conditioner requirements.

**Table 6.8.1-1 Electrically Operated Unitary Air Conditioners and Condensing Units—Minimum Efficiency Requirements (I-P)**

| Equipment Type  | Size Category                     | Heating Section Type                 | Subcategory                            | Minimum Efficiency <sup>g</sup>  | Test Procedure <sup>a</sup>  |
|---|-----------------------------------|--------------------------------------|--|--|--|
| Water-Cooled <i>Single-Phase</i> and Three-Phase Air Conditioners |                                   |                                      |  |  |  |
| Split-system and single-package air conditioners, water-cooled    | <65,000 Btu/h                     | <i>Electric resistance</i> (or none) | All U.S. and outside U.S. applications | 12.1 <i>EER</i> , 12.3 <i>IEER</i> before 1/1/2029<br>11.5 <i>EER2</i> , 13.7 <i>IVEC</i> on or after 1/1/2029 | AHRI 340/360 before 1/1/2029<br><br>AHRI 1340 on or after 1/1/2029 |
|   |                                   | All other                            |  | 12.1 <i>EER</i> , 12.3 <i>IEER</i> before 1/1/2029<br>11.3 <i>EER2</i> , 13.2 <i>IVEC</i> on or after 1/1/2029 |  |
|   | ≥65,000 Btu/h and <135,000 Btu/h  | <i>Electric resistance</i> (or none) |  | 12.1 <i>EER</i> , 13.9 <i>IEER</i> before 1/1/2029<br>11.3 <i>EER2</i> , 13.0 <i>IVEC</i> on or after 1/1/2029 |  |
|   |                                   | All other                            |  | 11.9 <i>EER</i> , 13.7 <i>IEER</i> before 1/1/2029<br>11.1 <i>EER2</i> , 12.5 <i>IVEC</i> on or after 1/1/2029 |  |
|   | ≥135,000 Btu/h and <240,000 Btu/h | <i>Electric resistance</i> (or none) |  | 12.5 <i>EER</i> , 13.9 <i>IEER</i> before 1/1/2029<br>10.3 <i>EER2</i> , 12.4 <i>IVEC</i> on or after 1/1/2029 |  |
|   |                                   | All other                            |  | 12.3 <i>EER</i> , 13.7 <i>IEER</i> before 1/1/2029<br>10.1 <i>EER2</i> , 11.9 <i>IVEC</i> on or after 1/1/2029 |  |

- a. Section 13 contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure.
- b. *Single-phase* U.S. air-cooled air conditioners <65,000 Btu/h are regulated as consumer products by the U.S. Code of Federal Regulations 10 CFR 430. *SEER2* values for *single-phase* products are set by the U.S. Department of Energy.
- c. The Southeastern region for central air conditioners contains the following States: Alabama, Arkansas, Delaware, Florida, Georgia, Hawaii, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, and Virginia, and the District of Columbia.
- d. The Southwestern region for central air conditioners contains the States of Arizona, California, Nevada, and New Mexico.
- e. The 11.7 *EER2* standard applies to products with a certified *SEER2* less than 15.2. The 9.8 *EER2* standard applies to products with a certified *SEER2* greater than or equal to 15.2.
- f. The 11.2 *EER2* standard applies to products with a certified *SEER2* less than 15.2. The 9.8 *EER2* standard applies to products with a certified *SEER2* greater than or equal to 15.2.
- g. For definition of efficiency metrics see the reference standards. The metrics have the following units: Btu/W·h—*EER*, *EER2*, *SEER2*, *IEER*, *IVEC*, *IVHE*, *IVHE<sub>C</sub>*, *HSPF2*.
- h. All double-duct units with capacities ≥65,000 Btu/h should be rated per AHRI 1340, which requires an additional 0.5 in. of water external static pressure for the condenser, and double duct units with capacities <65,000 Btu/h should be rated per AHRI 210/240 with 0.0 in. of water external static pressure for the condenser and shall comply with packaged air conditioner requirements.

**Table 6.8.1-1 Electrically Operated Unitary Air Conditioners and Condensing Units—Minimum Efficiency Requirements (I-P)**

| Equipment Type   | Size Category                                      | Heating Section Type   | Subcategory                            | Minimum Efficiency <sup>g</sup>  | Test Procedure <sup>a</sup>                                    |  |  |  |
|--|--|--|--|--|--|--|--|--|
| Split-system and single-package air conditioners, water-cooled | ≥240,000 Btu/h and <760,000 Btu/h                  | Electric resistance (or none)  | All U.S. and outside U.S. applications | 12.4 <i>EER</i> , 13.6 <i>IEER</i> before 1/1/2029<br>10.1 <i>EER2</i> , 11.3 <i>IVEC</i> on or after 1/1/2029 | AHRI 340/360 before 1/1/2029<br>AHRI 1340 on or after 1/1/2029 |  |  |  |
|  |  | All other  |  | 12.2 <i>EER</i> , 13.4 <i>IEER</i> before 1/1/2029<br>9.9 <i>EER2</i> , 10.6 <i>IVEC</i> on or after 1/1/2029  |  |  |  |  |
|  | >760,000 Btu/h                                     | <i>Electric resistance</i> (or none)   |  | 12.2 <i>EER</i> , 13.5 <i>IEER</i> before 1/1/2029<br>9.9 <i>EER2</i> , 11.3 <i>IVEC</i> on or after 1/1/2029  |  |  |  |  |
|  |  | All other  |  | 12.0 <i>EER</i> , 13.3 <i>IEER</i> before 1/1/2029<br>9.7 <i>EER2</i> , 10.5 <i>IVEC</i> on or after 1/1/2029  |  |  |  |  |
|  | <i>Water-Cooled Condensing Unit</i> ≥135,000 Btu/h |  |  |  |  |  |  |  |
|  | <i>Condensing units</i> , water-cooled             | ≥135,000 Btu/h and <240,000 Btu/h  |  | All  |  | All U.S. and outside U.S. applications | 13.5 <i>EER</i> , 14.0 <i>IEER</i> before 1/1/2029<br>10.3 <i>EER2</i> , 12.4 <i>IVEC</i> on or after 1/1/2029 | AHRI 365 before 1/1/2029<br>AHRI 1365 on or after 1/1/2029 |
| ≥240,000 Btu/h and <760,000 Btu/h                              |  | 13.5 <i>EER</i> , 14.0 <i>IEER</i> before 1/1/2029<br>10.1 <i>EER2</i> , 11.3 <i>IVEC</i> on or after 1/1/2029 |  |  |  |  |  |  |
| ≥760,000 Btu/h   |  | 13.5 <i>EER</i> , 14.0 <i>IEER</i> before 1/1/2029<br>9.9 <i>EER2</i> , 11.3 <i>IVEC</i> on or after 1/1/2029  |  |  |  |  |  |  |

a. Section 13 contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure.  
b. *Single-phase* U.S. air-cooled air conditioners <65,000 Btu/h are regulated as consumer products by the U.S. Code of Federal Regulations 10 CFR 430. *SEER2* values for *single-phase* products are set by the U.S. Department of Energy.  
c. The Southeastern region for central air conditioners contains the following States: Alabama, Arkansas, Delaware, Florida, Georgia, Hawaii, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, and Virginia, and the District of Columbia.  
d. The Southwestern region for central air conditioners contains the States of Arizona, California, Nevada, and New Mexico.  
e. The 11.7 *EER2* standard applies to products with a certified *SEER2* less than 15.2. The 9.8 *EER2* standard applies to products with a certified *SEER2* greater than or equal to 15.2.  
f. The 11.2 *EER2* standard applies to products with a certified *SEER2* less than 15.2. The 9.8 *EER2* standard applies to products with a certified *SEER2* greater than or equal to 15.2.  
g. For definition of efficiency metrics see the reference standards. The metrics have the following units: Btu/W-h—*EER*, *EER2*, *SEER2*, *IEER*, *IVEC*, *IVHE*, *IVHE<sub>C</sub>*, *HSPF2*.  
h. All double-duct units with capacities ≥65,000 Btu/h should be rated per AHRI 1340, which requires an additional 0.5 in. of water external static pressure for the condenser, and double duct units with capacities <65,000 Btu/h should be rated per AHRI 210/240 with 0.0 in. of water external static pressure for the condenser and shall comply with packaged air conditioner requirements.

**Table 6.8.1-1 Electrically Operated Unitary Air Conditioners and Condensing Units—Minimum Efficiency Requirements (I-P)**

| Equipment Type  | Size Category                     | Heating Section Type                    | Subcategory                            | Minimum Efficiency <sup>g</sup>  | Test Procedure <sup>a</sup>  |
|---|-----------------------------------|---|--|--|--|
| Evaporatively Cooled Unitary <i>Single-Phase</i> and Three-Phase Air Conditioners |                                   |   |  |  |  |
| Split-system and single-package air conditioners, evaporatively cooled            | <65,000 Btu/h <sup>b</sup>        | <i>Electric resistance</i><br>(or none) | All U.S. and outside U.S. applications | 12.1 <i>EER</i> , 12.3 <i>IEER</i><br>before 1/1/2029<br>11.5 <i>EER2</i> , 13.7 <i>IVEC</i><br>on or after 1/1/2029 | AHRI 340/360<br>before 1/1/2029<br><br>AHRI 1340<br>on or after 1/1/2029 |
|   |                                   | All other                               |  | 12.1 <i>EER</i> , 12.3 <i>IEER</i><br>before 1/1/2029<br>11.3 <i>EER2</i> , 13.2 <i>IVEC</i><br>on or after 1/1/2029 |  |
|   | ≥65,000 Btu/h and <135,000 Btu/h  | <i>Electric resistance</i><br>(or none) |  | 12.1 <i>EER</i> , 12.3 <i>IEER</i><br>before 1/1/2029<br>11.3 <i>EER2</i> , 13.0 <i>IVEC</i><br>on or after 1/1/2029 |  |
|   |                                   | All other                               |  | 11.9 <i>EER</i> , 12.1 <i>IEER</i><br>before 1/1/2029<br>11.1 <i>EER2</i> , 12.5 <i>IVEC</i><br>on or after 1/1/2029 |  |
|   | ≥135,000 Btu/h and <240,000 Btu/h | <i>Electric resistance</i><br>(or none) |  | 12.0 <i>EER</i> , 12.2 <i>IEER</i><br>before 1/1/2029<br>10.3 <i>EER2</i> , 12.4 <i>IVEC</i><br>on or after 1/1/2029 |  |
|   |                                   | All other                               |  | 11.8 <i>EER</i> , 12.0 <i>IEER</i><br>before 1/1/2029<br>10.1 <i>EER2</i> , 11.9 <i>IVEC</i><br>on or after 1/1/2029 |  |
|   | ≥240,000 Btu/h and <760,000 Btu/h | <i>Electric resistance</i><br>(or none) |  | 11.9 <i>EER</i> , 12.1 <i>IEER</i><br>before 1/1/2029<br>10.1 <i>EER2</i> , 11.3 <i>IVEC</i><br>on or after 1/1/2029 |  |

a. Section 13 contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure.  
b. *Single-phase* U.S. air-cooled air conditioners <65,000 Btu/h are regulated as consumer products by the U.S. Code of Federal Regulations 10 CFR 430. *SEER2* values for *single-phase* products are set by the U.S. Department of Energy.  
c. The Southeastern region for central air conditioners contains the following States: Alabama, Arkansas, Delaware, Florida, Georgia, Hawaii, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, and Virginia, and the District of Columbia.  
d. The Southwestern region for central air conditioners contains the States of Arizona, California, Nevada, and New Mexico.  
e. The 11.7 *EER2* standard applies to products with a certified *SEER2* less than 15.2. The 9.8 *EER2* standard applies to products with a certified *SEER2* greater than or equal to 15.2.  
f. The 11.2 *EER2* standard applies to products with a certified *SEER2* less than 15.2. The 9.8 *EER2* standard applies to products with a certified *SEER2* greater than or equal to 15.2.  
g. For definition of efficiency metrics see the reference standards. The metrics have the following units: Btu/W·h—*EER*, *EER2*, *SEER2*, *IEER*, *IVEC*, *IVHE*, *IVHE<sub>c</sub>*, *HSPF2*.  
h. All double-duct units with capacities ≥65,000 Btu/h should be rated per AHRI 1340, which requires an additional 0.5 in. of water external static pressure for the condenser, and double duct units with capacities <65,000 Btu/h should be rated per AHRI 210/240 with 0.0 in. of water external static pressure for the condenser and shall comply with packaged air conditioner requirements.

**Table 6.8.1-1 Electrically Operated Unitary Air Conditioners and Condensing Units—Minimum Efficiency Requirements (I-P)**

| Equipment Type   | Size Category                     | Heating Section Type                 | Subcategory                            | Minimum Efficiency <sup>g</sup>  | Test Procedure <sup>a</sup>                                    |
|--|-----------------------------------|--------------------------------------|--|--|--|
| Split- <i>system</i> and single-package air conditioners, evaporatively cooled | ≥240,000 Btu/h and <760,000 Btu/h | All other                            | All U.S. and outside U.S. applications | 11.7 <i>EER</i> , 11.9 <i>IEER</i> before 1/1/2029<br>9.9 <i>EER2</i> , 10.6 <i>IVEC</i> on or after 1/1/2029  | AHRI 340/360 before 1/1/2029<br>AHRI 1340 on or after 1/1/2029 |
|  | >760,000 Btu/h                    | <i>Electric resistance</i> (or none) |  | 11.7 <i>EER</i> , 11.9 <i>IEER</i> before 1/1/2029<br>9.9 <i>EER2</i> , 11.3 <i>IVEC</i> on or after 1/1/2029  |  |
|  |                                   | All other                            |  | 11.5 <i>EER</i> , 11.7 <i>IEER</i> before 1/1/2029<br>9.7 <i>EER2</i> , 10.5 <i>IVEC</i> on or after 1/1/2029  |  |
| Evaporatively Cooled <i>Condensing Unit</i> ≥135,000 Btu/h                     |                                   |                                      |  |  |  |
| <i>Condensing units</i> , evaporatively cooled                                 | ≥135,000 Btu/h and <240,000 Btu/h | All                                  | All U.S. and outside U.S. applications | 13.5 <i>EER</i> , 14.0 <i>IEER</i> before 1/1/2029<br>10.3 <i>EER2</i> , 12.4 <i>IVEC</i> on or after 1/1/2029 | AHRI 365 before 1/1/2029<br>AHRI 1365 on or after 1/1/2029     |
|  | ≥240,000 Btu/h and <760,000 Btu/h |                                      |  | 13.5 <i>EER</i> , 14.0 <i>IEER</i> before 1/1/2029<br>10.1 <i>EER2</i> , 11.3 <i>IVEC</i> on or after 1/1/2029 |  |
|  | ≥760,000 Btu/h                    |                                      |  | 13.5 <i>EER</i> , 14.0 <i>IEER</i> before 1/1/2029<br>9.9 <i>EER2</i> , 11.3 <i>IVEC</i> on or after 1/1/2029  |  |

- a. Section 13 contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure.
- b. *Single-phase* U.S. air-cooled air conditioners <65,000 Btu/h are regulated as consumer products by the U.S. Code of Federal Regulations 10 CFR 430. *SEER2* values for *single-phase* products are set by the U.S. Department of Energy.
- c. The Southeastern region for central air conditioners contains the following States: Alabama, Arkansas, Delaware, Florida, Georgia, Hawaii, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, and Virginia, and the District of Columbia.
- d. The Southwestern region for central air conditioners contains the States of Arizona, California, Nevada, and New Mexico.
- e. The 11.7 *EER2* standard applies to products with a certified *SEER2* less than 15.2. The 9.8 *EER2* standard applies to products with a certified *SEER2* greater than or equal to 15.2.
- f. The 11.2 *EER2* standard applies to products with a certified *SEER2* less than 15.2. The 9.8 *EER2* standard applies to products with a certified *SEER2* greater than or equal to 15.2.
- g. For definition of efficiency metrics see the reference standards. The metrics have the following units: Btu/W·h—*EER*, *EER2*, *SEER2*, *IEER*, *IVEC*, *IVHE*, *IVHE<sub>C</sub>*, *HSPF2*.
- h. All double-duct units with capacities ≥65,000 Btu/h should be rated per AHRI 1340, which requires an additional 0.5 in. of water external static pressure for the condenser, and double duct units with capacities <65,000 Btu/h should be rated per AHRI 210/240 with 0.0 in. of water external static pressure for the condenser and shall comply with packaged air conditioner requirements.

**Table 6.8.1-2 Electrically Operated Air-Source Unitary Heat Pumps—Minimum Efficiency Requirements (I-P)**

| Equipment Type   | Size Category              | Heating Section Type | Subcategory                                | Minimum Efficiency <sup>d</sup>                               | Test Procedure <sup>a</sup> |
|--|----------------------------|----------------------|--|---|-----------------------------|
| HP Air-Source <i>Single-Phase</i> Split-System Products <65,000 Btu/h <sup>b</sup>           |                            |                      |  |   |                             |
| Split-system air-source HP air conditioners  | <65,000 Btu/h              | All                  | For U.S. applications<br>National Standard | 14.3 <i>SEER2</i> , 7.5 <i>HSPF2</i><br>$P_{W,Off} \leq 33$ W | AHRI 210/240-2024           |
|  |                            |                      | Outside U.S. applications                  | 14.3 <i>SEER2</i> , 7.5 <i>HSPF2</i>                          |                             |
| HP Air-Source <i>Single-Phase</i> Single-Package Air Conditioners <65,000 Btu/h <sup>b</sup> |                            |                      |  |   |                             |
| Single-package air-source HP air conditioners <sup>f</sup>                                   | <65,000 Btu/h <sup>b</sup> | All                  | For U.S. applications<br>National Standard | 13.4 <i>SEER2</i> , 6.7 <i>HSPF2</i><br>$P_{W,Off} \leq 33$ W | AHRI 210/240-2024           |
|  |                            |                      | Outside U.S. applications                  | 13.4 <i>SEER2</i> , 6.7 <i>HSPF2</i>                          |                             |
| HP Air-Source <i>Single-Phase</i> Small-Duct High-Velocity Systems <sup>b</sup>              |                            |                      |  |   |                             |
| Small-duct high-velocity air-source HP air conditioners                                      | <65,000 Btu/h <sup>b</sup> | All                  | All U.S. applications                      | 12.0 <i>SEER2</i> , 6.1 <i>HSPF2</i><br>$P_{W,Off} \leq 30$ W | AHRI 210/240-2024           |
|  |                            |                      | Outside U.S. applications                  | 12.0 <i>SEER2</i> , 6.1 <i>HSPF2</i>                          |                             |
| HP Air-Source <i>Single-Phase</i> Space-Constrained Air Conditioners <sup>b</sup>            |                            |                      |  |   |                             |
| Space-constrained air-source HP air conditioners   | <30,000 Btu/h <sup>b</sup> | All                  | All U.S. applications                      | 11.9 <i>SEER2</i> , 6.3 <i>HSPF2</i><br>$P_{W,Off} \leq 33$ W | AHRI 210/240-2024           |
|  |                            |                      | Outside U.S. applications                  | 11.9 <i>SEER2</i> , 6.3 <i>HSPF2</i>                          |                             |
| HP Air-Source Three-Phase Small-Duct High-Velocity Systems <sup>b</sup>                      |                            |                      |  |   |                             |
| Small-duct high velocity air-source HP air conditioners                                      | <65,000 Btu/h <sup>b</sup> | All                  | All U.S. and outside U.S. applications     | 14.0 <i>SEER2</i> , 6.9 <i>HSPF2</i>                          | AHRI 210/240-2024           |
| HP Air-Source Three-Phase Space-Constrained Air Conditioners                                 |                            |                      |  |   |                             |
| Split-system space-constrained air-source HP air conditioners                                | <30,000 Btu/h <sup>b</sup> | All                  | All U.S. and outside U.S. applications     | 13.9 <i>SEER2</i> , 7.0 <i>HSPF2</i>                          | AHRI 210/240-2024           |
| Single-package space-constrained air-source HP air conditioners                              | <30,000 Btu/h <sup>b</sup> | All                  | All U.S. and outside U.S. applications     | 13.9 <i>SEER2</i> , 7.0 <i>HSPF2</i>                          | AHRI 210/240-2024           |

a. Section 13 contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure.

b. *Single-phase* U.S. air-cooled air conditioners <65,000 Btu/h are regulated as consumer products by the U.S. Code of Federal Regulations 10 CFR 430. *SEER2* values for *single-phase* products are set by the U.S. Department of Energy.

c. For heating efficiency requirement, compliance with  $COP_{H17}$  and *IVHE* is required for ASHRAE Standard 169 Climate Zones 0A, 0B, 1A, 1B, 2A, 2B, 3A, 3B, 3C, 4A, 4B, and 4C, and compliance with  $COP_{H15}$ ,  $COP_{H5}$ , and *IVHE<sub>C</sub>* is required for Climate Zones 5A, 5B, 5C, 6A, 6B, 7, and 8; for all, U.S. DOE requires compliance with *IVHE* for  $\geq 65,000$  Btu/h to <760,000 Btu/h products, which includes Climate Zones 1A, 1B, 2A, 2B, 3A, 3B, 3C, 4A, 4B, 4C, 5A, 5B, 5C, 6A, 6B, 7, and 8.

d. For definition of efficiency metrics see the reference standards. The metrics have the following units: Btu/W·h—*EER*, *EER2*, *SEER2*, *IEER*, *IVEC*, *IVHE*, *IVHE<sub>C</sub>*, *HSPF2* W/W— $COP_{H17}$ ,  $COP_{H5}$ . Note, the number in  $COP_{Hj}$  is the I-P rating ambient.

e. All double-duct units with capacities  $\geq 65,000$  Btu/h should be rated per AHRI 1340, which requires an additional 0.5 in. of water external static pressure for the condenser, and double duct units with capacities <65,000 Btu/h should be rated per AHRI 210/240 with 0.0 in. of water external static pressure for the condenser and shall comply with packaged air conditioner requirements.

f. Dual fuel heat pumps with gas heat shall comply with the *IVHE*, but, instead of using electric auxiliary heat as defined in Equations 29, 31, 32, and 38 of AHRI 1340, for the *IVHE* and *IVHE<sub>C</sub>* calculations shall replace the calculated electric auxiliary heat required with the output gas heat (input divided by thermal efficiency) converted to *kW*.

**Table 6.8.1-2 Electrically Operated Air-Source Unitary Heat Pumps—Minimum Efficiency Requirements (I-P)**

| Equipment Type  | Size Category   | Heating Section Type   | Subcategory                            | Minimum Efficiency <sup>d</sup>   | Test Procedure <sup>a</sup>                                    |
|---|---|--|--|---|--|
| HP Air-Source Three-Phase Air-Cooled Double-Duct Air Conditioners |   |  |  |   |  |
| Double-duct air-source HP air conditioners <sup>e</sup>           | <65,000 Btu/h   | All  | All U.S. and outside U.S. applications | 14.3 <i>SEER</i> <sub>2</sub> , 7.5 <i>HSPF</i> <sub>2</sub>  | AHRI 210/240-2024  |
|   |   | <i>Electric resistance</i> (or none)   |  | 11.0 <i>EER</i> , 3.3 <i>COP</i> <sub>H47</sub> , before 1/1/2029<br>9.9 <i>EER</i> <sub>2</sub> , 14.0 <i>IVEC</i> ,<br>2.06 <i>COP</i> <sub>2H17</sub> , 1.65 <i>COP</i> <sub>2H5</sub> , <sup>c</sup><br>5.98 <i>IVHE</i> , 5.67 <i>IVHE</i> <sub>C</sub> , <sup>c</sup><br>on or after 1/1/2029 | AHRI 340/360 before 1/1/2029<br>AHRI 1340 on or after 1/1/2029 |
|   | All other including dual fuel heat pumps <sup>f</sup> | 10.8 <i>EER</i> , 3.30 <i>COP</i> <sub>H47</sub> before 1/1/2029<br>9.7 <i>EER</i> <sub>2</sub> , 14.0 <i>IVEC</i> ,<br>2.06 <i>COP</i> <sub>2H17</sub> , 1.65 <i>COP</i> <sub>2H5</sub> , <sup>c</sup><br>5.98 <i>IVHE</i> , 5.67 <i>IVHE</i> <sub>C</sub> , <sup>c</sup><br>on or after 1/1/2029 |  |   |  |
|   | ≥135,000 Btu/h and <240,000 Btu/h                     | <i>Electric resistance</i> (or none)   |  | 10.6 <i>EER</i> , 3.30 <i>COP</i> <sub>H47</sub> before 1/1/2029<br>9.3 <i>EER</i> <sub>2</sub> , 13.5 <i>IVEC</i> ,<br>1.89 <i>COP</i> <sub>2H17</sub> , 1.45 <i>COP</i> <sub>2H5</sub> , <sup>c</sup><br>5.72 <i>IVHE</i> , 5.44 <i>IVHE</i> <sub>C</sub> , <sup>c</sup><br>on or after 1/1/2029  |  |
|   |   | All other including dual fuel heat pumps <sup>f</sup>  |  | 10.4 <i>EER</i> , 3.30 <i>COP</i> <sub>H47</sub> before 1/1/2029<br>9.1 <i>EER</i> <sub>2</sub> , 13.5 <i>IVEC</i> ,<br>1.89 <i>COP</i> <sub>2H17</sub> , 1.45 <i>COP</i> <sub>2H5</sub> , <sup>c</sup><br>5.72 <i>IVHE</i> , 5.44 <i>IVHE</i> <sub>C</sub> , <sup>c</sup><br>on or after 1/1/2029  |  |

- a. Section 13 contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure.
- b. *Single-phase* U.S. air-cooled air conditioners <65,000 Btu/h are regulated as consumer products by the U.S. Code of Federal Regulations 10 CFR 430. *SEER*<sub>2</sub> values for *single-phase* products are set by the U.S. Department of Energy.
- c. For heating efficiency requirement, compliance with *COP*<sub>2H17</sub> and *IVHE* is required for ASHRAE Standard 169 Climate Zones 0A, 0B, 1A, 1B, 2A, 2B, 3A, 3B, 3C, 4A, 4B, and 4C, and compliance with *COP*<sub>2H5</sub>, *COP*<sub>2H5</sub>,<sup>c</sup> and *IVHE*<sub>C</sub> is required for Climate Zones 5A, 5B, 5C, 6A, 6B, 7, and 8; for all, U.S. DOE requires compliance with *IVHE* for ≥65,000 Btu/h to <760,000 Btu/h products, which includes Climate Zones 1A, 1B, 2A, 2B, 3A, 3B, 3C, 4A, 4B, 4C, 5A, 5B, 5C, 6A, 6B, 7, and 8.
- d. For definition of efficiency metrics see the reference standards. The metrics have the following units: Btu/W·h—*EER*, *EER*<sub>2</sub>, *SEER*<sub>2</sub>, *IEER*, *IVEC*, *IVHE*, *IVHE*<sub>C</sub>, *HSPF*<sub>2</sub> W/W—*COP*<sub>2H17</sub>, *COP*<sub>2H5</sub>. Note, the number in *COP*<sub>2H</sub> is the I-P rating ambient.
- e. All double-duct units with capacities ≥65,000 Btu/h should be rated per AHRI 1340, which requires an additional 0.5 in. of water external static pressure for the condenser, and double duct units with capacities <65,000 Btu/h should be rated per AHRI 210/240 with 0.0 in. of water external static pressure for the condenser and shall comply with packaged air conditioner requirements.
- f. Dual fuel heat pumps with gas heat shall comply with the *IVHE*, but, instead of using electric auxiliary heat as defined in Equations 29, 31, 32, and 38 of AHRI 1340, for the *IVHE* and *IVHE*<sub>C</sub> calculations shall replace the calculated electric auxiliary heat required with the output gas heat (input divided by thermal efficiency) converted to *kW*.

**Table 6.8.1-2 Electrically Operated Air-Source Unitary Heat Pumps—Minimum Efficiency Requirements (I-P)**

| Equipment Type  | Size Category                      | Heating Section Type                                  | Subcategory                            | Minimum Efficiency <sup>d</sup>   | Test Procedure <sup>a</sup>                                    |
|---|------------------------------------|---|--|---|--|
| Double-duct air-source HP air conditioners <sup>c</sup>         | ≥240,000 Btu/h and < 300,000 Btu/h | <i>Electric resistance</i> (or none)                  | All U.S. and outside U.S. applications | 9.5 <i>EER</i> <sub>2</sub> , 3.20 <i>COP</i> <sub>H47</sub> before 1/1/2029<br>8.0 <i>EER</i> <sub>2</sub> , 12.8 <i>IVEC</i> , 1.88 <i>COP</i> <sub>2H17</sub> , 1.47 <i>COP</i> <sub>2H5</sub> , <sup>c</sup> 5.47 <i>IVHE</i> , 5.19 <i>IVHE</i> <sub>C</sub> <sup>c</sup> on or after 1/1/2029   | AHRI 340/360 before 1/1/2029<br>AHRI 1340 on or after 1/1/2029 |
|   |                                    | All other including dual fuel heat pumps <sup>f</sup> |  | 9.3 <i>EER</i> <sub>2</sub> , 3.20 <i>COP</i> <sub>H47</sub> before 1/1/2029<br>7.8 <i>EER</i> <sub>2</sub> , 12.8 <i>IVEC</i> , 1.88 <i>COP</i> <sub>2H17</sub> , 1.47 <i>COP</i> <sub>2H5</sub> , <sup>c</sup> 5.47 <i>IVHE</i> , 5.16 <i>IVHE</i> <sub>C</sub> <sup>c</sup> on or after 1/1/2029   |  |
| HP Air-Source Unitary Three-Phase Air-Cooled Air Conditioners   |                                    |   |  |   |  |
| Split-system air-source HP air conditioners                     | <65,000 Btu/h <sup>b</sup>         | All   | All U.S. and outside U.S. applications | 14.3 <i>SEER</i> <sub>2</sub> , 7.50 <i>HSPF</i> <sub>2</sub>   | AHRI 210/240-2024  |
| Single-package air-source HP air conditioners                   | <65,000 Btu/h <sup>b</sup>         | All   | All U.S. and outside U.S. applications | 13.4 <i>SEER</i> <sub>2</sub> , 6.70 <i>HSPF</i> <sub>2</sub>   |  |
| Split-systems and single-package air-source HP air conditioners | ≥65,000 Btu/h and <135,000 Btu/h   | <i>Electric resistance</i> (or none)                  | All U.S. and outside U.S. applications | 11.0 <i>EER</i> <sub>2</sub> , 14.1 <i>IEER</i> , 3.40 <i>COP</i> <sub>H47</sub> , 2.25 <i>COP</i> <sub>H17</sub> before 1/1/2029<br>10.4 <i>EER</i> <sub>2</sub> , 13.4 <i>IVEC</i> , 2.20 <i>COP</i> <sub>2H17</sub> , 1.76 <i>COP</i> <sub>2H5</sub> , <sup>c</sup> 6.20 <i>IVHE</i> , 5.92 <i>IVHE</i> <sub>C</sub> <sup>c</sup> on or after 1/1/2029 | AHRI 340/360 before 1/1/2029<br>AHRI 1340 on or after 1/1/2029 |

a. Section 13 contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure.  
b. *Single-phase* U.S. air-cooled air conditioners <65,000 Btu/h are regulated as consumer products by the U.S. Code of Federal Regulations 10 CFR 430. *SEER*<sub>2</sub> values for *single-phase* products are set by the U.S. Department of Energy.  
c. For heating efficiency requirement, compliance with *COP*<sub>2H17</sub> and *IVHE* is required for ASHRAE Standard 169 Climate Zones 0A, 0B, 1A, 1B, 2A, 2B, 3A, 3B, 3C, 4A, 4B, and 4C, and compliance with *COP*<sub>2H5</sub>, and *IVHE*<sub>C</sub> is required for Climate Zones 5A, 5B, 5C, 6A, 6B, 7, and 8; for all, U.S. DOE requires compliance with *IVHE* for ≥65,000 Btu/h to <760,000 Btu/h products, which includes Climate Zones 1A, 1B, 2A, 2B, 3A, 3B, 3C, 4A, 4B, 4C, 5A, 5B, 5C, 6A, 6B, 7, and 8.  
d. For definition of efficiency metrics see the reference standards. The metrics have the following units: Btu/W·h—*EER*, *EER*<sub>2</sub>, *SEER*<sub>2</sub>, *IEER*, *IVEC*, *IVHE*, *IVHE*<sub>C</sub>, *HSPF*<sub>2</sub> W/W—*COP*<sub>2H17</sub>, *COP*<sub>2H5</sub>. Note, the number in *COP*<sub>2H</sub> is the I-P rating ambient.  
e. All double-duct units with capacities ≥65,000 Btu/h should be rated per AHRI 1340, which requires an additional 0.5 in. of water external static pressure for the condenser, and double duct units with capacities <65,000 Btu/h should be rated per AHRI 210/240 with 0.0 in. of water external static pressure for the condenser and shall comply with packaged air conditioner requirements.  
f. Dual fuel heat pumps with gas heat shall comply with the *IVHE*, but, instead of using electric auxiliary heat as defined in Equations 29, 31, 32, and 38 of AHRI 1340, for the *IVHE* and *IVHE*<sub>C</sub> calculations shall replace the calculated electric auxiliary heat required with the output gas heat (input divided by thermal efficiency) converted to *kW*.

**Table 6.8.1-2 Electrically Operated Air-Source Unitary Heat Pumps—Minimum Efficiency Requirements (I-P)**

| Equipment Type  | Size Category                     | Heating Section Type                                  | Subcategory                            | Minimum Efficiency <sup>d</sup>   | Test Procedure <sup>a</sup>  |
|---|-----------------------------------|---|--|---|--|
| Split-systems and single-package air-source HP air conditioners | ≥65,000 Btu/h and <135,000 Btu/h  | All other including dual fuel heat pumps <sup>f</sup> | All U.S. and outside U.S. applications | 10.8 <i>EER</i> , 13.9 <i>IEER</i> ,<br>3.40 <i>COP</i> <sub>H47</sub> , 2.25 <i>COP</i> <sub>H17</sub><br>before 1/1/2029<br><br>10.2 <i>EER</i> <sub>2</sub> , 13.4 <i>IVEC</i> ,<br>2.20 <i>COP</i> <sub>2H17</sub> , 1.76 <i>COP</i> <sub>2H5</sub> <sup>c</sup> ,<br>6.20 <i>IVHE</i> , 5.89 <i>IVHE</i> <sub>C</sub> <sup>c</sup><br>on or after 1/1/2029 | AHRI 340/360<br>before 1/1/2029<br><br>AHRI 1340<br>on or after 1/1/2029 |
|   | ≥135,000 Btu/h and <240,000 Btu/h | <i>Electric resistance</i><br>(or none)               |  | 10.6 <i>EER</i> , 13.5 <i>IEER</i> ,<br>3.30 <i>COP</i> <sub>H47</sub> , 2.05 <i>COP</i> <sub>H17</sub><br>before 1/1/2029<br><br>9.9 <i>EER</i> <sub>2</sub> , 13.1 <i>IVEC</i> ,<br>1.99 <i>COP</i> <sub>2H17</sub> , 1.52 <i>COP</i> <sub>2H5</sub> <sup>c</sup> ,<br>6.00 <i>IVHE</i> , 5.71 <i>IVHE</i> <sub>C</sub> <sup>c</sup><br>on or after 1/1/2029  |  |
|   |                                   | All other including dual fuel heat pumps <sup>f</sup> |  | 10.4 <i>EER</i> , 13.3 <i>IEER</i> ,<br>3.30 <i>COP</i> <sub>H47</sub> , 2.05 <i>COP</i> <sub>H17</sub><br>before 1/1/2029<br><br>9.7 <i>EER</i> <sub>2</sub> , 13.1 <i>IVEC</i> ,<br>1.99 <i>COP</i> <sub>2H17</sub> , 1.52 <i>COP</i> <sub>2H5</sub> <sup>c</sup> ,<br>6.00 <i>IVHE</i> , 5.68 <i>IVHE</i> <sub>C</sub> <sup>c</sup><br>on or after 1/1/2029  |  |
|   | ≥240,000 Btu/h and <760,000 Btu/h | <i>Electric resistance</i><br>(or none)               |  | 9.5 <i>EER</i> , 12.5 <i>IEER</i> ,<br>3.20 <i>COP</i> <sub>H47</sub> , 2.05 <i>COP</i> <sub>H17</sub><br>before 1/1/2029<br><br>8.8 <i>EER</i> <sub>2</sub> , 12.1 <i>IVEC</i> ,<br>1.98 <i>COP</i> <sub>2H17</sub> , 1.55 <i>COP</i> <sub>2H5</sub> <sup>c</sup> ,<br>5.80 <i>IVHE</i> , 5.71 <i>IVHE</i> <sub>C</sub> <sup>c</sup><br>on or after 1/1/2029   |  |

- a. Section 13 contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure.
- b. *Single-phase* U.S. air-cooled air conditioners <65,000 Btu/h are regulated as consumer products by the U.S. Code of Federal Regulations 10 CFR 430. *SEER*<sub>2</sub> values for *single-phase* products are set by the U.S. Department of Energy.
- c. For heating efficiency requirement, compliance with *COP*<sub>2H17</sub> and *IVHE* is required for ASHRAE Standard 169 Climate Zones 0A, 0B, 1A, 1B, 2A, 2B, 3A, 3B, 3C, 4A, 4B, and 4C, and compliance with *COP*<sub>2H17</sub>, *COP*<sub>2H5</sub>, and *IVHE*<sub>C</sub> is required for Climate Zones 5A, 5B, 5C, 6A, 6B, 7, and 8; for all, U.S. DOE requires compliance with *IVHE* for ≥65,000 Btu/h to <760,000 Btu/h products, which includes Climate Zones 1A, 1B, 2A, 2B, 3A, 3B, 3C, 4A, 4B, 4C, 5A, 5B, 5C, 6A, 6B, 7, and 8.
- d. For definition of efficiency metrics see the reference standards. The metrics have the following units: Btu/W·h—*EER*, *EER*<sub>2</sub>, *SEER*<sub>2</sub>, *IEER*, *IVEC*, *IVHE*, *IVHE*<sub>C</sub>, *HSPF*<sub>2</sub> W/W—*COP*<sub>2H17</sub>, *COP*<sub>2H5</sub>. Note, the number in *COP*<sub>2H</sub> is the I-P rating ambient.
- e. All double-duct units with capacities ≥65,000 Btu/h should be rated per AHRI 1340, which requires an additional 0.5 in. of water external static pressure for the condenser, and double duct units with capacities <65,000 Btu/h should be rated per AHRI 210/240 with 0.0 in. of water external static pressure for the condenser and shall comply with packaged air conditioner requirements.
- f. Dual fuel heat pumps with gas heat shall comply with the *IVHE*, but, instead of using electric auxiliary heat as defined in Equations 29, 31, 32, and 38 of AHRI 1340, for the *IVHE* and *IVHE*<sub>C</sub> calculations shall replace the calculated electric auxiliary heat required with the output gas heat (input divided by thermal efficiency) converted to *kW*.

**Table 6.8.1-2 Electrically Operated Air-Source Unitary Heat Pumps—Minimum Efficiency Requirements (I-P)**

| Equipment Type  | Size Category                     | Heating Section Type                                  | Subcategory                            | Minimum Efficiency <sup>d</sup>   | Test Procedure <sup>a</sup>  |
|---|-----------------------------------|---|--|---|--|
| Split-systems and single-package air-source HP air conditioners | ≥240,000 Btu/h and <760,000 Btu/h | All other including dual fuel heat pumps <sup>f</sup> | All U.S. and outside U.S. applications | 9.3 <i>EER</i> , 12.3 <i>IEER</i> ,<br>3.20 <i>COP</i> <sub>H47</sub> , 2.05 <i>COP</i> <sub>H17</sub><br>before 1/1/2029<br><br>8.6 <i>EER</i> <sub>2</sub> , 12.1 <i>IVEC</i> ,<br>1.98 <i>COP</i> <sub>2H17</sub> , 1.55 <i>COP</i> <sub>2H5</sub> , <sup>c</sup><br>5.80 <i>IVHE</i> , 5.68 <i>IVHE</i> <sub>C</sub> <sup>c</sup><br>on or after 1/1/2029 | AHRI 340/360<br>before 1/1/2029<br><br>AHRI 1340<br>on or after 1/1/2029 |
|   | ≥760,000 Btu/h                    | <i>Electric resistance</i><br>(or none)               |  | 9.5 <i>EER</i> , 10.6 <i>IEER</i> ,<br>3.20 <i>COP</i> <sub>H47</sub> , 2.05 <i>COP</i> <sub>H17</sub><br>before 1/1/2029<br><br>8.8 <i>EER</i> <sub>2</sub> , 11.7 <i>IVEC</i> ,<br>1.98 <i>COP</i> <sub>2H17</sub> , 1.55 <i>COP</i> <sub>2H5</sub> , <sup>c</sup><br>5.80 <i>IVHE</i> , 5.52 <i>IVHE</i> <sub>C</sub> <sup>c</sup><br>on or after 1/1/2029 |  |
|   |                                   | All other including dual fuel heat pumps <sup>f</sup> |  | 9.3 <i>EER</i> , 10.4 <i>IEER</i> ,<br>3.20 <i>COP</i> <sub>H47</sub> , 2.05 <i>COP</i> <sub>H17</sub><br>before 1/1/2029<br><br>8.6 <i>EER</i> <sub>2</sub> , 11.7 <i>IVEC</i> ,<br>1.98 <i>COP</i> <sub>2H17</sub> , 1.55 <i>COP</i> <sub>2H5</sub> , <sup>c</sup><br>5.80 <i>IVHE</i> , 5.49 <i>IVHE</i> <sub>C</sub> <sup>c</sup><br>on or after 1/1/2029 |  |
| <b>HP Air-Source Air-Cooled Condensing Unit ≥135,000 Btu/h</b>  |                                   |   |  |   |  |
| HP condensing units, air-source                                 | ≥135,000 Btu/h and <240,000 Btu/h | All   | All U.S. and outside U.S. applications | No requirements before 1/1/2029<br><br>9.9 <i>EER</i> <sub>2</sub> , 13.1 <i>IVEC</i> ,<br>1.99 <i>COP</i> <sub>2H17</sub> , 1.52 <i>COP</i> <sub>2H5</sub> , <sup>c</sup><br>6.00 <i>IVHE</i> , 5.68 <i>IVHE</i> <sub>C</sub> <sup>c</sup><br>on or after 1/1/2029   | AHRI 365<br>before 1/1/2029<br><br>AHRI 1365<br>on or after 1/1/2029     |

a. Section 13 contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure.  
b. *Single-phase* U.S. air-cooled air conditioners <65,000 Btu/h are regulated as consumer products by the U.S. Code of Federal Regulations 10 CFR 430. *SEER*<sub>2</sub> values for *single-phase* products are set by the U.S. Department of Energy.  
c. For heating efficiency requirement, compliance with *COP*<sub>2H17</sub> and *IVHE* is required for ASHRAE Standard 169 Climate Zones 0A, 0B, 1A, 1B, 2A, 2B, 3A, 3B, 3C, 4A, 4B, and 4C, and compliance with *COP*<sub>2H17</sub>, *COP*<sub>2H5</sub>, and *IVHE*<sub>C</sub> is required for Climate Zones 5A, 5B, 5C, 6A, 6B, 7, and 8; for all, U.S. DOE requires compliance with *IVHE* for ≥65,000 Btu/h to <760,000 Btu/h products, which includes Climate Zones 1A, 1B, 2A, 2B, 3A, 3B, 3C, 4A, 4B, 4C, 5A, 5B, 5C, 6A, 6B, 7, and 8.  
d. For definition of efficiency metrics see the reference standards. The metrics have the following units: Btu/W·h—*EER*, *EER*<sub>2</sub>, *SEER*<sub>2</sub>, *IEER*, *IVEC*, *IVHE*, *IVHE*<sub>C</sub>, *HSPF*<sub>2</sub> W/W—*COP*<sub>2H17</sub>, *COP*<sub>2H5</sub>. Note, the number in *COP*<sub>2H</sub> is the I-P rating ambient.  
e. All double-duct units with capacities ≥65,000 Btu/h should be rated per AHRI 1340, which requires an additional 0.5 in. of water external static pressure for the condenser, and double duct units with capacities <65,000 Btu/h should be rated per AHRI 210/240 with 0.0 in. of water external static pressure for the condenser and shall comply with packaged air conditioner requirements.  
f. Dual fuel heat pumps with gas heat shall comply with the *IVHE*, but, instead of using electric auxiliary heat as defined in Equations 29, 31, 32, and 38 of AHRI 1340, for the *IVHE* and *IVHE*<sub>C</sub> calculations shall replace the calculated electric auxiliary heat required with the output gas heat (input divided by thermal efficiency) converted to *kW*.

**Table 6.8.1-2 Electrically Operated Air-Source Unitary Heat Pumps—Minimum Efficiency Requirements (I-P)**

| Equipment Type                             | Size Category                        | Heating Section Type | Subcategory                               | Minimum Efficiency <sup>d</sup>   | Test Procedure <sup>a</sup>  |
|--|--------------------------------------|----------------------|---|---|--|
| HP <i>condensing units</i> ,<br>air-source | ≥240,000 Btu/h and<br><760,000 Btu/h | All                  | All U.S. and<br>outside U.S. applications | No requirements before 1/1/2029<br>8.8 <i>EER</i> <sub>2</sub> , 12.1 <i>IVEC</i><br>1.98 <i>COP</i> <sub>2H17</sub> , 1.55 <i>COP</i> <sub>2H5</sub> , <sup>c</sup><br>5.80 <i>IVHE</i> , 5.68 <i>IVHE</i> <sub>C</sub> <sup>c</sup><br>on or after 1/1/2029   | AHRI 365<br>before 1/1/2029<br><br>AHRI 1365<br>on or after 1/1/2029 |
|  | ≥760,000 Btu/h                       |                      |   | No requirements before 1/1/2029<br>8.8 <i>EER</i> <sub>2</sub> , 11.7 <i>IVEC</i> ,<br>1.98 <i>COP</i> <sub>2H17</sub> , 1.55 <i>COP</i> <sub>2H5</sub> , <sup>c</sup><br>5.80 <i>IVHE</i> , 5.49 <i>IVHE</i> <sub>C</sub> <sup>c</sup><br>on or after 1/1/2029 |  |

- a. Section 13 contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure.
- b. *Single-phase* U.S. air-cooled air conditioners <65,000 Btu/h are regulated as consumer products by the U.S. Code of Federal Regulations 10 CFR 430. *SEER*<sub>2</sub> values for *single-phase* products are set by the U.S. Department of Energy.
- c. For heating efficiency requirement, compliance with *COP*<sub>2H17</sub> and *IVHE* is required for ASHRAE Standard 169 Climate Zones 0A, 0B, 1A, 1B, 2A, 2B, 3A, 3B, 3C, 4A, 4B, and 4C, and compliance with *COP*<sub>2H17</sub>, *COP*<sub>2H5</sub>, and *IVHE*<sub>C</sub> is required for Climate Zones 5A, 5B, 5C, 6A, 6B, 7, and 8; for all, U.S. DOE requires compliance with *IVHE* for ≥65,000 Btu/h to <760,000 Btu/h products, which includes Climate Zones 1A, 1B, 2A, 2B, 3A, 3B, 3C, 4A, 4B, 4C, 5A, 5B, 5C, 6A, 6B, 7, and 8.
- d. For definition of efficiency metrics see the reference standards. The metrics have the following units: Btu/W·h—*EER*, *EER*<sub>2</sub>, *SEER*<sub>2</sub>, *IEER*, *IVEC*, *IVHE*, *IVHE*<sub>C</sub>, *HSPF*<sub>2</sub> W/W—*COP*<sub>2H17</sub>, *COP*<sub>2H5</sub>. Note, the number in *COP*<sub>2H</sub> is the I-P rating ambient.
- e. All double-duct units with capacities ≥65,000 Btu/h should be rated per AHRI 1340, which requires an additional 0.5 in. of water external static pressure for the condenser, and double duct units with capacities <65,000 Btu/h should be rated per AHRI 210/240 with 0.0 in. of water external static pressure for the condenser and shall comply with packaged air conditioner requirements.
- f. Dual fuel heat pumps with gas heat shall comply with the *IVHE*, but, instead of using electric auxiliary heat as defined in Equations 29, 31, 32, and 38 of AHRI 1340, for the *IVHE* and *IVHE*<sub>C</sub> calculations shall replace the calculated electric auxiliary heat required with the output gas heat (input divided by thermal efficiency) converted to *kW*.

**Table 6.8.1-1 Electrically Operated Unitary Air Conditioners and Condensing Units—Minimum Efficiency Requirements (SI)**

| Equipment Type  | Size Category        | Heating Section Type | Subcategory   | Minimum Efficiency <sup>g</sup>  | Test Procedure <sup>a</sup> |
|---|----------------------|----------------------|---|--|-----------------------------|
| <i>Air-Cooled Single-Phase Split-System Products &lt;65,000 Btu/h<sup>b</sup></i>           |                      |                      |   |  |                             |
| Split-system air-cooled air conditioners  | <13 kW               | All                  | For U.S. applications<br>National Standard                | 3.93 SCOP <sub>2C</sub><br>$P_{W,Off} \leq 30 \text{ W}$   | AHRI 210/240-2024           |
|   |                      |                      | For U.S. applications<br>Southeastern Region <sup>c</sup> | 4.19 SCOP <sub>2C</sub><br>$P_{W,Off} \leq 30 \text{ W}$   |                             |
|   |                      |                      | For U.S. applications<br>Southwestern Region <sup>d</sup> | 3.43 COP <sub>2C</sub> , <sup>e</sup> 4.19 SCOP <sub>2C</sub> <sup>e</sup><br>$P_{W,Off} \leq 30 \text{ W}$<br>or<br>2.87 COP <sub>2C</sub> , 4.45 SCOP <sub>2C</sub> <sup>e</sup><br>$P_{W,Off} \leq 30 \text{ W}$              |                             |
|   |                      |                      | Outside U.S. Applications                                 | 3.93 SCOP <sub>2C</sub>  |                             |
|   | ≥13 kW and<br><19 kW | All                  | For U.S. applications<br>National Standard <sup>c</sup>   | 3.93 SCOP <sub>2C</sub><br>$P_{W,Off} \leq 30 \text{ W}$   |                             |
|   |                      |                      | For U.S. applications<br>Southeastern Region <sup>d</sup> | 4.04 SCOP <sub>2C</sub><br>$P_{W,Off} \leq 30 \text{ W}$   |                             |
|   |                      |                      | For U.S. applications<br>Southwestern Region              | 3.28 COP <sub>2C</sub> , <sup>f</sup> 4.04 SCOP <sub>2C</sub> <sup>f</sup><br>$P_{W,Off} \leq 30 \text{ W}$<br>or<br>2.87 COP <sub>2C</sub> , <sup>f</sup> 4.45 SCOP <sub>2C</sub> <sup>f</sup><br>$P_{W,Off} \leq 30 \text{ W}$ |                             |
|   |                      |                      | Outside U.S. applications                                 | 3.93 SCOP <sub>2C</sub>  |                             |
| <i>Air-Cooled Single-Phase Single-Package Air Conditioners &lt;65,000 Btu/h<sup>b</sup></i> |                      |                      |   |  |                             |
| Single-package air-cooled air conditioners <sup>h</sup>                                     | <19 kW <sup>b</sup>  | All                  | For U.S. applications<br>National Standard                | 3.93 SCOP <sub>2C</sub><br>$P_{W,Off} \leq 30 \text{ W}$   | AHRI 210/240-2024           |
|   |                      |                      | For U.S. applications<br>Southeastern Region <sup>c</sup> |  |                             |
|   |                      |                      | For U.S. applications<br>Southwestern Region              | 3.11 COP <sub>2C</sub> , 3.93 SCOP <sub>2C</sub><br>$P_{W,Off} \leq 30 \text{ W}$  |                             |
|   |                      |                      | Outside U.S. applications                                 | 3.93 SCOP <sub>2C</sub>  |                             |

a. Section 13 contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure.

b. *Single-phase* U.S. air-cooled air conditioners <19 kW are regulated as consumer products by the U.S. Code of Federal Regulations 10 CFR 430. SCOP<sub>2C</sub> values for *single-phase* products are set by the U.S. Department of Energy.

c. The Southeastern region for central air conditioners contains the following States: Alabama, Arkansas, Delaware, Florida, Georgia, Hawaii, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, and Virginia, and the District of Columbia.

d. The Southwestern region for central air conditioners contains the States of Arizona, California, Nevada, and New Mexico.

e. The 3.43 COP<sub>2C</sub> standard applies to products with a certified SCOP<sub>2C</sub> less than 4.45. The 2.87 COP<sub>2C</sub> standard applies to products with a certified SCOP<sub>2C</sub> greater than or equal to 4.45.

f. The 3.28 COP<sub>2C</sub> standard applies to products with a certified SCOP<sub>2C</sub> less than 4.45. The 2.87 COP<sub>2C</sub> standard applies to products with a certified SCOP<sub>2C</sub> greater than or equal to 4.45.

g. For definition of efficiency metrics see the reference standards. The cooling metrics have the following units: W/W—COP<sub>C</sub>, COP<sub>2C</sub>, SCOP<sub>2C</sub>, ICOP<sub>C</sub>, IVEC, IVHE, IVHE<sub>C</sub>.

h. All double-duct units with capacities ≥19 kW should be rated per AHRI 1340, which requires an additional 0.12 kPa external static pressure for the condenser, and double-duct units with capacities <19 kW should be rated per AHRI 210/240 with 0.0 kPa external static pressure for the condenser and shall comply with packaged air-conditioner requirements.

**Table 6.8.1-1 Electrically Operated Unitary Air Conditioners and Condensing Units—Minimum Efficiency Requirements (SI)**

| Equipment Type  | Size Category       | Heating Section Type                 | Subcategory                            | Minimum Efficiency <sup>g</sup>  | Test Procedure <sup>a</sup>                                    |
|---|---------------------|--------------------------------------|--|--|--|
| <i>Air-Cooled Single-Phase Small-Duct High-Velocity Systems<sup>b</sup></i>   |                     |                                      |  |  |  |
| Small-duct high-velocity split-system air-cooled air conditioners             | <19 kW <sup>b</sup> | All                                  | All U.S. applications                  | 3.52 SCOP <sub>2C</sub><br><i>P<sub>W,Off</sub></i> ≤ 30 W   | AHRI 210/240-2024  |
|   |                     |                                      | Outside U.S. applications              | 3.52 SCOP <sub>2C</sub>  |  |
| <i>Air-Cooled Single-Phase Space-Constrained Air Conditioners<sup>b</sup></i> |                     |                                      |  |  |  |
| Space-constrained air-cooled air conditioners                                 | <9 kW <sup>b</sup>  | All                                  | All U.S. applications                  | 3.43 SCOP <sub>2C</sub><br><i>P<sub>W,Off</sub></i> ≤ 30 W   | AHRI 210/240-2024  |
|   |                     |                                      | Outside U.S. applications              | 3.43 SCOP <sub>2C</sub>  |  |
| <i>Air-Cooled Three-Phase Small-Duct High-Velocity Systems</i>                |                     |                                      |  |  |  |
| Small-duct high-velocity air-cooled air conditioners                          | <19 kW <sup>b</sup> | All                                  | All U.S. and outside U.S. applications | 3.81 SCOP <sub>2C</sub>  | AHRI 210/240-2024  |
| <i>Air-Cooled Three-Phase Space-Constrained Air Conditioners</i>              |                     |                                      |  |  |  |
| Split-system space-constrained air-cooled air conditioners                    | <9 kW <sup>b</sup>  | All                                  | All U.S. and outside U.S. applications | 3.72 SCOP <sub>2C</sub>  | AHRI 210/240-2024  |
| Single-package space-constrained air-cooled air conditioners                  | <9 kW <sup>b</sup>  | All                                  | All U.S. and outside U.S. applications | 4.07 SCOP <sub>2C</sub>  | AHRI 210/240-2024  |
| <i>Air-Cooled Three-Phase Double-Duct Air Conditioners</i>                    |                     |                                      |  |  |  |
| Double-duct air-cooled air conditioners <sup>h</sup>                          | <19 kW              | All                                  | All U.S. and outside U.S. applications | 3.93 SCOP <sub>2C</sub> <sup>h</sup>   | AHRI 210/240-2024  |
|   | ≥19 kW and <40 kW   | <i>Electric resistance (or none)</i> |  | 3.28 COP <sub>C</sub> before 1/1/2029<br>2.93 COP <sub>2C</sub> <sup>h</sup> 3.99 IVEC <sup>h</sup> on or after 1/1/2029 | AHRI 340/360 before 1/1/2029<br>AHRI 1340 on or after 1/1/2029 |

a. Section 13 contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure.

b. *Single-phase* U.S. air-cooled air conditioners <19 kW are regulated as consumer products by the U.S. Code of Federal Regulations 10 CFR 430. SCOP<sub>2C</sub> values for *single-phase* products are set by the U.S. Department of Energy.

c. The Southeastern region for central air conditioners contains the following States: Alabama, Arkansas, Delaware, Florida, Georgia, Hawaii, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, and Virginia, and the District of Columbia.

d. The Southwestern region for central air conditioners contains the States of Arizona, California, Nevada, and New Mexico.

e. The 3.43 COP<sub>2C</sub> standard applies to products with a certified SCOP<sub>2C</sub> less than 4.45. The 2.87 COP<sub>2C</sub> standard applies to products with a certified SCOP<sub>2C</sub> greater than or equal to 4.45.

f. The 3.28 COP<sub>2C</sub> standard applies to products with a certified SCOP<sub>2C</sub> less than 4.45. The 2.87 COP<sub>2C</sub> standard applies to products with a certified SCOP<sub>2C</sub> greater than or equal to 4.45.

g. For definition of efficiency metrics see the reference standards. The cooling metrics have the following units: W/W—COP<sub>C</sub>, COP<sub>2C</sub>, SCOP<sub>2C</sub>, ICOP<sub>C</sub>, IVEC, IVHE, IVHE<sub>C</sub>.

h. All double-duct units with capacities ≥19 kW should be rated per AHRI 1340, which requires an additional 0.12 kPa external static pressure for the condenser, and double-duct units with capacities <19 kW should be rated per AHRI 210/240 with 0.0 kPa external static pressure for the condenser and shall comply with packaged air-conditioner requirements.

**Table 6.8.1-1 Electrically Operated Unitary Air Conditioners and Condensing Units—Minimum Efficiency Requirements (SI)**

| Equipment Type                                       | Size Category                                   | Heating Section Type          | Subcategory                            | Minimum Efficiency <sup>g</sup>   | Test Procedure <sup>a</sup>  |
|--|---|-------------------------------|--|---|--|
| Double-duct air-cooled air conditioners <sup>h</sup> | ≥19 kW and <40 kW                               | All other                     | All U.S. and outside U.S. applications | 3.22 COP <sub>C</sub><br>before 1/1/2029<br>2.87 COP <sub>2C</sub> <sup>h</sup> 3.84 IVEC <sup>h</sup><br>on or after 1/1/2029              | AHRI 340/360<br>before 1/1/2029<br>AHRI 1340<br>on or after 1/1/2029 |
|  | ≥40 kW and <70 kW                               | Electric resistance (or none) |  | 3.22 COP <sub>C</sub> <sup>h</sup><br>before 1/1/2029<br>2.84 COP <sub>2C</sub> <sup>h</sup> 3.81 IVEC <sup>h</sup><br>on or after 1/1/2029 |  |
|  |   | All other                     |  | 3.17 COP <sub>C</sub><br>before 1/1/2029<br>2.78 COP <sub>2C</sub> <sup>h</sup> 3.66 IVEC <sup>h</sup><br>on or after 1/1/2029              |  |
|  | ≥70 kW and < 88 kW                              | Electric resistance (or none) |  | 2.93 COP <sub>C</sub><br>before 1/1/2029<br>2.49 COP <sub>2C</sub> <sup>h</sup> 3.60 IVEC <sup>h</sup><br>on or after 1/1/2029              |  |
|  |   | All other                     |  | 2.87 COP <sub>C</sub><br>before 1/1/2029<br>2.43 COP <sub>2C</sub> <sup>h</sup> 3.46 IVEC <sup>h</sup><br>on or after 1/1/2029              |  |
|  | Air-Cooled Unitary Three-Phase Air Conditioners |                               |  |   |  |
| Split-system air-cooled air conditioners             | <19 kW <sup>b</sup>                             | All                           | All U.S. and outside U.S. applications | 3.93 SCOP <sub>2C</sub>   | AHRI 210/240-2024  |
| Single-package air-cooled conditioners               | <19 kW <sup>b</sup>                             | All                           | All U.S. and outside U.S. applications | 3.93 SCOP <sub>2C</sub>   | AHRI 210/240-2024  |

a. Section 13 contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure.  
b. *Single-phase* U.S. air-cooled air conditioners <19 kW are regulated as consumer products by the U.S. Code of Federal Regulations 10 CFR 430. SCOP<sub>2C</sub> values for *single-phase* products are set by the U.S. Department of Energy.  
c. The Southeastern region for central air conditioners contains the following States: Alabama, Arkansas, Delaware, Florida, Georgia, Hawaii, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, and Virginia, and the District of Columbia.  
d. The Southwestern region for central air conditioners contains the States of Arizona, California, Nevada, and New Mexico.  
e. The 3.43 COP<sub>2C</sub> standard applies to products with a certified SCOP<sub>2C</sub> less than 4.45. The 2.87 COP<sub>2C</sub> standard applies to products with a certified SCOP<sub>2C</sub> greater than or equal to 4.45.  
f. The 3.28 COP<sub>2C</sub> standard applies to products with a certified SCOP<sub>2C</sub> less than 4.45. The 2.87 COP<sub>2C</sub> standard applies to products with a certified SCOP<sub>2C</sub> greater than or equal to 4.45.  
g. For definition of efficiency metrics see the reference standards. The cooling metrics have the following units: W/W—COP<sub>C</sub>, COP<sub>2C</sub>, SCOP<sub>2C</sub>, ICOP<sub>C</sub>, IVEC, IVHE, IVHE<sub>C</sub>.  
h. All double-duct units with capacities ≥19 kW should be rated per AHRI 1340, which requires an additional 0.12 kPa external static pressure for the condenser, and double-duct units with capacities <19 kW should be rated per AHRI 210/240 with 0.0 kPa external static pressure for the condenser and shall comply with packaged air-conditioner requirements.

**Table 6.8.1-1 Electrically Operated Unitary Air Conditioners and Condensing Units—Minimum Efficiency Requirements (SI)**

| Equipment Type   | Size Category      | Heating Section Type          | Subcategory                            | Minimum Efficiency <sup>g</sup>  | Test Procedure <sup>a</sup>                                    |
|--|--------------------|-------------------------------|--|--|--|
| Split-systems and single-package air-cooled air conditioners | ≥19 kW and <40 kW  | Electric resistance (or none) | All U.S. and outside U.S. applications | 3.28 COP <sub>C</sub> , 4.34, ICOP <sub>C</sub> before 1/1/2029<br>3.11 COP <sub>2C</sub> , 4.19 IVEC on or after 1/1/2029 | AHRI 340/360 before 1/1/2029<br>AHRI 1340 on or after 1/1/2029 |
|  |                    | All other                     |  | 3.22 COP <sub>C</sub> , 4.28 ICOP <sub>C</sub> before 1/1/2029<br>3.05 COP <sub>2C</sub> , 4.04 IVEC on or after 1/1/2029  |  |
|  | ≥40 kW and <70 kW  | Electric resistance (or none) |  | 3.22 COP <sub>C</sub> , 4.16 ICOP <sub>C</sub> before 1/1/2029<br>2.99 COP <sub>2C</sub> , 4.04 IVEC on or after 1/1/2029  |  |
|  |                    | All other                     |  | 3.17 COP <sub>C</sub> , 4.10 ICOP <sub>C</sub> before 1/1/2029<br>2.93 COP <sub>2C</sub> , 3.90 IVEC on or after 1/1/2029  |  |
|  | ≥70 kW and <223 kW | Electric resistance (or none) |  | 2.93 COP <sub>C</sub> , 3.87 ICOP <sub>C</sub> before 1/1/2029<br>2.70 COP <sub>2C</sub> , 3.78 IVEC on or after 1/1/2029  |  |
|  |                    | All other                     |  | 2.87 COP <sub>C</sub> , 3.81 ICOP <sub>C</sub> before 1/1/2029<br>2.64 COP <sub>2C</sub> , 3.58 IVEC on or after 1/1/2029  |  |
|  | ≥223 kW            | Electric resistance (or none) |  | 2.84 COP <sub>C</sub> , 3.66 ICOP <sub>C</sub> before 1/1/2029<br>2.61 COP <sub>2C</sub> , 3.43 IVEC on or after 1/1/2029  |  |

- a. Section 13 contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure.
- b. Single-phase U.S. air-cooled air conditioners <19 kW are regulated as consumer products by the U.S. Code of Federal Regulations 10 CFR 430. SCOP<sub>2C</sub> values for single-phase products are set by the U.S. Department of Energy.
- c. The Southeastern region for central air conditioners contains the following States: Alabama, Arkansas, Delaware, Florida, Georgia, Hawaii, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, and Virginia, and the District of Columbia.
- d. The Southwestern region for central air conditioners contains the States of Arizona, California, Nevada, and New Mexico.
- e. The 3.43 COP<sub>2C</sub> standard applies to products with a certified SCOP<sub>2C</sub> less than 4.45. The 2.87 COP<sub>2C</sub> standard applies to products with a certified SCOP<sub>2C</sub> greater than or equal to 4.45.
- f. The 3.28 COP<sub>2C</sub> standard applies to products with a certified SCOP<sub>2C</sub> less than 4.45. The 2.87 COP<sub>2C</sub> standard applies to products with a certified SCOP<sub>2C</sub> greater than or equal to 4.45.
- g. For definition of efficiency metrics see the reference standards. The cooling metrics have the following units: W/W—COP<sub>C</sub>, COP<sub>2C</sub>, SCOP<sub>2C</sub>, ICOP<sub>C</sub>, IVEC, IVHE, IVHE<sub>C</sub>.
- h. All double-duct units with capacities ≥19 kW should be rated per AHRI 1340, which requires an additional 0.12 kPa external static pressure for the condenser, and double-duct units with capacities <19 kW should be rated per AHRI 210/240 with 0.0 kPa external static pressure for the condenser and shall comply with packaged air-conditioner requirements.

**Table 6.8.1-1 Electrically Operated Unitary Air Conditioners and Condensing Units—Minimum Efficiency Requirements (SI)**

| Equipment Type  | Size Category      | Heating Section Type          | Subcategory                            | Minimum Efficiency <sup>g</sup>                                   | Test Procedure <sup>a</sup>  |
|---|--------------------|-------------------------------|--|---|--|
| Split-systems and single-package air-cooled air conditioners      | ≥223 kW            | All other                     | All U.S. and outside U.S. applications | 2.78 COP <sub>C</sub> , 3.60 ICOP <sub>C</sub><br>before 1/1/2029 | AHRI 340/360<br>before 1/1/2029  |
|   |                    |                               |  | 2.55 COP <sub>2C</sub> , 3.22 IVEC<br>on or after 1/1/2029        | AHRI 1340<br>on or after 1/1/2029  |
| <i>Air-Cooled Condensing Unit ≥135,000 Btu/h</i>                  |                    |                               |  |   |  |
| Condensing units, air-cooled                                      | ≥40 kW and <70 kW  | All                           | All U.S. and outside U.S. applications | 3.08 COP <sub>C</sub> , 3.46 ICOP <sub>C</sub><br>before 1/1/2029 | AHRI 365<br>before 1/1/2029<br><br>AHRI 1365<br>on or after 1/1/2029     |
|   | ≥70 kW and <223 kW |                               |  | 2.99 COP <sub>2C</sub> , 4.04 IVEC<br>on or after 1/1/2029        |  |
|   | ≥223 kW            |                               |  | 3.08 COP <sub>C</sub> , 3.46 ICOP <sub>C</sub><br>before 1/1/2029 |  |
|   |                    |                               |  | 2.70 COP <sub>2C</sub> , 3.78 IVEC<br>on or after 1/1/2029        |  |
|   |                    |                               |  | 3.08 COP <sub>C</sub> , 3.46 ICOP <sub>C</sub><br>before 1/1/2029 |  |
|   |                    |                               |  | 2.61 COP <sub>2C</sub> , 3.43 IVEC<br>on or after 1/1/2029        |  |
| <i>Water-Cooled Single-Phase and Three-Phase Air Conditioners</i> |                    |                               |  |   |  |
| Split-system and single-package air conditioners, water-cooled    | <19 kW             | Electric resistance (or none) | All U.S. and outside U.S. applications | 3.55 COP <sub>C</sub> , 3.60 ICOP <sub>C</sub><br>before 1/1/2029 | AHRI 340/360<br>before 1/1/2029<br><br>AHRI 1340<br>on or after 1/1/2029 |
|   |                    | All other                     |  | 3.37 COP <sub>2C</sub> , 4.02 IVEC<br>on or after 1/1/2029        |  |
|   |                    |                               |  | 3.55 COP <sub>C</sub> , 3.60 ICOP <sub>C</sub><br>before 1/1/2029 |  |
|   |                    |                               |  | 3.31 COP <sub>2C</sub> , 3.87 IVEC<br>on or after 1/1/2029        |  |

a. Section 13 contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure.  
 b. *Single-phase* U.S. air-cooled air conditioners <19 kW are regulated as consumer products by the U.S. Code of Federal Regulations 10 CFR 430. SCOP<sub>2C</sub> values for *single-phase* products are set by the U.S. Department of Energy.  
 c. The Southeastern region for central air conditioners contains the following States: Alabama, Arkansas, Delaware, Florida, Georgia, Hawaii, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, and Virginia, and the District of Columbia.  
 d. The Southwestern region for central air conditioners contains the States of Arizona, California, Nevada, and New Mexico.  
 e. The 3.43 COP<sub>2C</sub> standard applies to products with a certified SCOP<sub>2C</sub> less than 4.45. The 2.87 COP<sub>2C</sub> standard applies to products with a certified SCOP<sub>2C</sub> greater than or equal to 4.45.  
 f. The 3.28 COP<sub>2C</sub> standard applies to products with a certified SCOP<sub>2C</sub> less than 4.45. The 2.87 COP<sub>2C</sub> standard applies to products with a certified SCOP<sub>2C</sub> greater than or equal to 4.45.  
 g. For definition of efficiency metrics see the reference standards. The cooling metrics have the following units: W/W—COP<sub>C</sub>, COP<sub>2C</sub>, SCOP<sub>2C</sub>, ICOP<sub>C</sub>, IVEC, IVHE, IVHE<sub>C</sub>.  
 h. All double-duct units with capacities ≥19 kW should be rated per AHRI 1340, which requires an additional 0.12 kPa external static pressure for the condenser, and double-duct units with capacities <19 kW should be rated per AHRI 210/240 with 0.0 kPa external static pressure for the condenser and shall comply with packaged air-conditioner requirements.

**Table 6.8.1-1 Electrically Operated Unitary Air Conditioners and Condensing Units—Minimum Efficiency Requirements (SI)**

| Equipment Type   | Size Category      | Heating Section Type          | Subcategory                            | Minimum Efficiency <sup>g</sup>   | Test Procedure <sup>a</sup>                                    |
|--|--------------------|-------------------------------|--|---|--|
| Split-system and single-package air conditioners, water-cooled | ≥19 kW and <40 kW  | Electric resistance (or none) | All U.S. and outside U.S. applications | 3.55 COP <sub>C</sub> , 4.07 ICOP <sub>C</sub> before 1/1/2029<br>3.31 COP <sub>2C</sub> , 3.81 IVEC on or after 1/1/2029 | AHRI 340/360 before 1/1/2029<br>AHRI 1340 on or after 1/1/2029 |
|  |                    | All other                     |  | 3.49 COP <sub>C</sub> , 4.02 ICOP <sub>C</sub> before 1/1/2029<br>3.25 COP <sub>2C</sub> , 3.66 IVEC on or after 1/1/2029 |  |
|  | ≥40 kW and <70 kW  | Electric resistance (or none) |  | 3.66 COP <sub>C</sub> , 4.07 ICOP <sub>C</sub> before 1/1/2029<br>3.02 COP <sub>2C</sub> , 3.63 IVEC on or after 1/1/2029 |  |
|  |                    | All other                     |  | 3.60 COP <sub>C</sub> , 4.02 ICOP <sub>C</sub> before 1/1/2029<br>2.96 COP <sub>2C</sub> , 3.49 IVEC on or after 1/1/2029 |  |
|  | ≥70 kW and <223 kW | Electric resistance (or none) |  | 3.63 COP <sub>C</sub> , 3.99 ICOP <sub>C</sub> before 1/1/2029<br>2.96 COP <sub>2C</sub> , 3.31 IVEC on or after 1/1/2029 |  |
|  |                    | All other                     |  | 3.58 COP <sub>C</sub> , 3.93 ICOP <sub>C</sub> before 1/1/2029<br>2.90 COP <sub>2C</sub> , 3.11 IVEC on or after 1/1/2029 |  |
|  | >223 kW            | Electric resistance (or none) |  | 3.58 COP <sub>C</sub> , 3.96 ICOP <sub>C</sub> before 1/1/2029<br>2.90 COP <sub>2C</sub> , 3.31 IVEC on or after 1/1/2029 |  |

- a. Section 13 contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure.
- b. Single-phase U.S. air-cooled air conditioners <19 kW are regulated as consumer products by the U.S. Code of Federal Regulations 10 CFR 430. SCOP<sub>2C</sub> values for single-phase products are set by the U.S. Department of Energy.
- c. The Southeastern region for central air conditioners contains the following States: Alabama, Arkansas, Delaware, Florida, Georgia, Hawaii, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, and Virginia, and the District of Columbia.
- d. The Southwestern region for central air conditioners contains the States of Arizona, California, Nevada, and New Mexico.
- e. The 3.43 COP<sub>2C</sub> standard applies to products with a certified SCOP<sub>2C</sub> less than 4.45. The 2.87 COP<sub>2C</sub> standard applies to products with a certified SCOP<sub>2C</sub> greater than or equal to 4.45.
- f. The 3.28 COP<sub>2C</sub> standard applies to products with a certified SCOP<sub>2C</sub> less than 4.45. The 2.87 COP<sub>2C</sub> standard applies to products with a certified SCOP<sub>2C</sub> greater than or equal to 4.45.
- g. For definition of efficiency metrics see the reference standards. The cooling metrics have the following units: W/W—COP<sub>C</sub>, COP<sub>2C</sub>, SCOP<sub>2C</sub>, ICOP<sub>C</sub>, IVEC, IVHE, IVHE<sub>C</sub>.
- h. All double-duct units with capacities ≥19 kW should be rated per AHRI 1340, which requires an additional 0.12 kPa external static pressure for the condenser, and double-duct units with capacities <19 kW should be rated per AHRI 210/240 with 0.0 kPa external static pressure for the condenser and shall comply with packaged air-conditioner requirements.

**Table 6.8.1-1 Electrically Operated Unitary Air Conditioners and Condensing Units—Minimum Efficiency Requirements (SI)**

| Equipment Type   | Size Category                                      | Heating Section Type          | Subcategory                            | Minimum Efficiency <sup>g</sup>   | Test Procedure <sup>a</sup>                                    |
|--|--|-------------------------------|--|---|--|
| Split-system and single-package air conditioners, water-cooled         | >223 kW  | All other                     | All U.S. and outside U.S. applications | 3.52 COP <sub>C</sub> , 3.90 ICOP <sub>C</sub> before 1/1/2029<br>2.84 COP <sub>2C</sub> , 3.08 IVEC on or after 1/1/2029 | AHRI 340/360 before 1/1/2029<br>AHRI 1340 on or after 1/1/2029 |
|  | <i>Water-Cooled Condensing Unit ≥135,000 Btu/h</i> |                               |  |   |  |
| Condensing units, water cooled   | ≥40 kW and <70 kW                                  | All                           | All U.S. and outside U.S. applications | 3.96 COP <sub>C</sub> , 4.10 ICOP <sub>C</sub> before 1/1/2029<br>3.02 COP <sub>2C</sub> , 3.63 IVEC on or after 1/1/2029 | AHRI 365 before 1/1/2029<br>AHRI 1365 on or after 1/1/2029     |
|  | ≥70 kW and <223 kW                                 |                               |  | 3.96 COP <sub>C</sub> , 4.10 ICOP <sub>C</sub> before 1/1/2029<br>2.96 COP <sub>2C</sub> , 3.31 IVEC on or after 1/1/2029 |  |
|  | ≥223 kW  |                               |  | 3.96 COP <sub>C</sub> , 4.10 ICOP <sub>C</sub> before 1/1/2029<br>2.90 COP <sub>2C</sub> , 3.31 IVEC on or after 1/1/2029 |  |
| <i>Evaporatively Cooled Unitary Three-Phase Air Conditioners</i>       |  |                               |  |   |  |
| Split-system and single-package air conditioners, evaporatively cooled | <19 kW <sup>b</sup>                                | Electric resistance (or none) | All U.S. and outside U.S. applications | 3.55 COP <sub>C</sub> , 3.60 ICOP <sub>C</sub> before 1/1/2029<br>3.37 COP <sub>2C</sub> , 4.02 IVEC on or after 1/1/2029 | AHRI 340/360 before 1/1/2029<br>AHRI 1340 on or after 1/1/2029 |
|  |  | All other                     |  | 3.55 COP <sub>C</sub> , 3.60 ICOP <sub>C</sub> before 1/1/2029<br>3.31 COP <sub>2C</sub> , 3.87 IVEC on or after 1/1/2029 |  |

a. Section 13 contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure.

b. *Single-phase* U.S. air-cooled air conditioners <19 kW are regulated as consumer products by the U.S. Code of Federal Regulations 10 CFR 430. SCOP<sub>2C</sub> values for *single-phase* products are set by the U.S. Department of Energy.

c. The Southeastern region for central air conditioners contains the following States: Alabama, Arkansas, Delaware, Florida, Georgia, Hawaii, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, and Virginia, and the District of Columbia.

d. The Southwestern region for central air conditioners contains the States of Arizona, California, Nevada, and New Mexico.

e. The 3.43 COP<sub>2C</sub> standard applies to products with a certified SCOP<sub>2C</sub> less than 4.45. The 2.87 COP<sub>2C</sub> standard applies to products with a certified SCOP<sub>2C</sub> greater than or equal to 4.45.

f. The 3.28 COP<sub>2C</sub> standard applies to products with a certified SCOP<sub>2C</sub> less than 4.45. The 2.87 COP<sub>2C</sub> standard applies to products with a certified SCOP<sub>2C</sub> greater than or equal to 4.45.

g. For definition of efficiency metrics see the reference standards. The cooling metrics have the following units: W/W—COP<sub>C</sub>, COP<sub>2C</sub>, SCOP<sub>2C</sub>, ICOP<sub>C</sub>, IVEC, IVHE, IVHE<sub>C</sub>.

h. All double-duct units with capacities ≥19 kW should be rated per AHRI 1340, which requires an additional 0.12 kPa external static pressure for the condenser, and double-duct units with capacities <19 kW should be rated per AHRI 210/240 with 0.0 kPa external static pressure for the condenser and shall comply with packaged air-conditioner requirements.

**Table 6.8.1-1 Electrically Operated Unitary Air Conditioners and Condensing Units—Minimum Efficiency Requirements (SI)**

| Equipment Type   | Size Category      | Heating Section Type          | Subcategory                            | Minimum Efficiency <sup>g</sup>   | Test Procedure <sup>a</sup>                                    |
|--|--------------------|-------------------------------|--|---|--|
| Split- <i>system</i> and single-package air conditioners, evaporatively cooled | ≥19 kW and <40 kW  | Electric resistance (or none) | All U.S. and outside U.S. applications | 3.55 COP <sub>C</sub> , 3.60 ICOP <sub>C</sub> before 1/1/2029<br>3.31 COP <sub>2C</sub> , 3.81 IVEC on or after 1/1/2029 | AHRI 340/360 before 1/1/2029<br>AHRI 1340 on or after 1/1/2029 |
|  |                    | All other                     |  | 3.49 COP <sub>C</sub> , 3.55 ICOP <sub>C</sub> before 1/1/2029<br>3.25 COP <sub>2C</sub> , 3.66 IVEC on or after 1/1/2029 |  |
|  | ≥40 kW and <70 kW  | Electric resistance (or none) |  | 3.52 COP <sub>C</sub> , 3.58 ICOP <sub>C</sub> before 1/1/2029<br>3.02 COP <sub>2C</sub> , 3.63 IVEC on or after 1/1/2029 |  |
|  |                    | All other                     |  | 3.46 COP <sub>C</sub> , 3.52 ICOP <sub>C</sub> before 1/1/2029<br>2.96 COP <sub>2C</sub> , 3.49 IVEC on or after 1/1/2029 |  |
|  | ≥70 kW and <223 kW | Electric resistance (or none) |  | 3.49 COP <sub>C</sub> , 3.55 ICOP <sub>C</sub> before 1/1/2029<br>2.96 COP <sub>2C</sub> , 3.31 IVEC on or after 1/1/2029 |  |
|  |                    | All other                     |  | 3.43 COP <sub>C</sub> , 3.49 ICOP <sub>C</sub> before 1/1/2029<br>2.90 COP <sub>2C</sub> , 3.11 IVEC on or after 1/1/2029 |  |
|  | >223 kW            | Electric resistance (or none) |  | 3.43 COP <sub>C</sub> , 3.49 ICOP <sub>C</sub> before 1/1/2029<br>2.90 COP <sub>2C</sub> , 3.31 IVEC on or after 1/1/2029 |  |

- a. Section 13 contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure.
- b. *Single-phase* U.S. air-cooled air conditioners <19 kW are regulated as consumer products by the U.S. Code of Federal Regulations 10 CFR 430. SCOP<sub>2C</sub> values for *single-phase* products are set by the U.S. Department of Energy.
- c. The Southeastern region for central air conditioners contains the following States: Alabama, Arkansas, Delaware, Florida, Georgia, Hawaii, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, and Virginia, and the District of Columbia.
- d. The Southwestern region for central air conditioners contains the States of Arizona, California, Nevada, and New Mexico.
- e. The 3.43 COP<sub>2C</sub> standard applies to products with a certified SCOP<sub>2C</sub> less than 4.45. The 2.87 COP<sub>2C</sub> standard applies to products with a certified SCOP<sub>2C</sub> greater than or equal to 4.45.
- f. The 3.28 COP<sub>2C</sub> standard applies to products with a certified SCOP<sub>2C</sub> less than 4.45. The 2.87 COP<sub>2C</sub> standard applies to products with a certified SCOP<sub>2C</sub> greater than or equal to 4.45.
- g. For definition of efficiency metrics see the reference standards. The cooling metrics have the following units: W/W—COP<sub>C</sub>, COP<sub>2C</sub>, SCOP<sub>2C</sub>, ICOP<sub>C</sub>, IVEC, IVHE, IVHE<sub>C</sub>.
- h. All double-duct units with capacities ≥19 kW should be rated per AHRI 1340, which requires an additional 0.12 kPa external static pressure for the condenser, and double-duct units with capacities <19 kW should be rated per AHRI 210/240 with 0.0 kPa external static pressure for the condenser and shall comply with packaged air-conditioner requirements.

**Table 6.8.1-1 Electrically Operated Unitary Air Conditioners and Condensing Units—Minimum Efficiency Requirements (SI)**

| Equipment Type   | Size Category                                       | Heating Section Type | Subcategory                            | Minimum Efficiency <sup>g</sup>   | Test Procedure <sup>a</sup>                                    |
|--|---|----------------------|--|---|--|
| Split-system and single-package air conditioners, evaporatively cooled | >223 kW   | All other            | All U.S. and outside U.S. applications | 3.37 COP <sub>C</sub> , 3.43 ICOP <sub>C</sub> before 1/1/2029<br>2.84 COP <sub>2C</sub> , 3.08 IVEC on or after 1/1/2029 | AHRI 340/360 before 1/1/2029<br>AHRI 1340 on or after 1/1/2029 |
|  | Evaporatively Cooled Condensing Unit ≥135,000 Btu/h |                      |  |   |  |
| Condensing units, evaporatively cooled                                 | ≥40 kW and <70 kW                                   | All                  | All U.S. and outside U.S. applications | 3.96 COP <sub>C</sub> , 4.10 ICOP <sub>C</sub> before 1/1/2029<br>3.02 COP <sub>2C</sub> , 3.63 IVEC on or after 1/1/2029 | AHRI 365 before 1/1/2029<br>AHRI 1365 on or after 1/1/2029     |
|  | ≥70 kW and <223 kW                                  |                      |  | 3.96 COP <sub>C</sub> , 4.10 ICOP <sub>C</sub> before 1/1/2029<br>2.96 COP <sub>2C</sub> , 3.31 IVEC on or after 1/1/2029 |  |
|  | ≥223 kW   |                      |  | 3.96 COP <sub>C</sub> , 4.10 ICOP <sub>C</sub> before 1/1/2029<br>2.90 COP <sub>2C</sub> , 3.31 IVEC on or after 1/1/2029 |  |

- a. Section 13 contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure.
- b. Single-phase U.S. air-cooled air conditioners <19 kW are regulated as consumer products by the U.S. Code of Federal Regulations 10 CFR 430. SCOP<sub>2C</sub> values for single-phase products are set by the U.S. Department of Energy.
- c. The Southeastern region for central air conditioners contains the following States: Alabama, Arkansas, Delaware, Florida, Georgia, Hawaii, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, and Virginia, and the District of Columbia.
- d. The Southwestern region for central air conditioners contains the States of Arizona, California, Nevada, and New Mexico.
- e. The 3.43 COP<sub>2C</sub> standard applies to products with a certified SCOP<sub>2C</sub> less than 4.45. The 2.87 COP<sub>2C</sub> standard applies to products with a certified SCOP<sub>2C</sub> greater than or equal to 4.45.
- f. The 3.28 COP<sub>2C</sub> standard applies to products with a certified SCOP<sub>2C</sub> less than 4.45. The 2.87 COP<sub>2C</sub> standard applies to products with a certified SCOP<sub>2C</sub> greater than or equal to 4.45.
- g. For definition of efficiency metrics see the reference standards. The cooling metrics have the following units: W/W—COP<sub>C</sub>, COP<sub>2C</sub>, SCOP<sub>2C</sub>, ICOP<sub>C</sub>, IVEC, IVHE, IVHE<sub>C</sub>.
- h. All double-duct units with capacities ≥19 kW should be rated per AHRI 1340, which requires an additional 0.12 kPa external static pressure for the condenser, and double-duct units with capacities <19 kW should be rated per AHRI 210/240 with 0.0 kPa external static pressure for the condenser and shall comply with packaged air-conditioner requirements.

**Table 6.8.1-2 Electrically Operated Air-Source Unitary Heat Pumps—Minimum Efficiency Requirements (SI)**

| Equipment Type   | Size Category       | Heating Section Type | Subcategory                                | Minimum Efficiency <sup>d</sup>  | Test Procedure <sup>a</sup> |
|--|---------------------|----------------------|--|--|-----------------------------|
| HP Air-Source <i>Single-Phase Split-System</i> Products <65,000 Btu/h <sup>b</sup>           |                     |                      |  |  |                             |
| Split-system air-source HP air conditioners  | <19 kW              | All                  | For U.S. applications<br>National Standard | 4.19 SCOP <sub>2C</sub> , 2.20 SCOP <sub>2H</sub><br><i>P<sub>W,Off</sub></i> ≤ 33 W | AHRI 210/240-2024           |
|  |                     |                      | Outside U.S. applications                  | 4.19 SCOP <sub>2C</sub> , 2.20 SCOP <sub>2H</sub>                                    |                             |
| HP Air-Source <i>Single-Phase Single-Package</i> Air Conditioners <65,000 Btu/h <sup>b</sup> |                     |                      |  |  |                             |
| Single-package air-source HP air conditioners  | <19 kW              | All                  | For U.S. applications<br>National Standard | 3.93 SCOP <sub>2C</sub> , 1.96 SCOP <sub>2H</sub><br><i>P<sub>W,Off</sub></i> ≤ 33 W | AHRI 210/240-2024           |
|  |                     |                      | Outside U.S. applications                  | 3.93 SCOP <sub>2C</sub> , 1.96 SCOP <sub>2H</sub>                                    |                             |
| HP Air Source <i>Single-Phase Small-Duct High Velocity</i> Systems <sup>b</sup>              |                     |                      |  |  |                             |
| Small-duct high-velocity air-source HP air conditioners                                      | <19 kW              | All                  | All U.S. applications                      | 3.52 SCOP <sub>2C</sub> , 1.79 SCOP <sub>2H</sub><br><i>P<sub>W,Off</sub></i> ≤ 30 W | AHRI 210/240-2024           |
|  |                     |                      | Outside U.S. applications                  | 3.52 SCOP <sub>2C</sub> , 1.79 SCOP <sub>2H</sub>                                    |                             |
| HP Air-Source <i>Single-Phase Space-Constrained</i> Air Conditioners <sup>b</sup>            |                     |                      |  |  |                             |
| Space-constrained air-source HP air conditioners   | <9 kW               | All                  | All U.S. applications                      | 3.49 SCOP <sub>2C</sub> , 1.85 SCOP <sub>2H</sub><br><i>P<sub>W,Off</sub></i> ≤ 33 W | AHRI 210/240-2024           |
|  |                     |                      | Outside U.S. applications                  | 3.49 SCOP <sub>2C</sub> , 1.85 SCOP <sub>2H</sub>                                    |                             |
| HP Air-Source <i>Three-Phase Small-Duct High-Velocity</i> Systems <sup>b</sup>               |                     |                      |  |  |                             |
| Small-duct high-velocity air-source HP air conditioners                                      | <19 kW <sup>b</sup> | All                  | All U.S. and outside U.S. applications     | 4.10 SCOP <sub>2C</sub> , 2.02 SCOP <sub>2H</sub>                                    | AHRI 210/240-2024           |
| HP Air-Source <i>Three-Phase Space-Constrained</i> Air Conditioners                          |                     |                      |  |  |                             |
| Split-system space constrained air-source HP air conditioners                                | <9 kW <sup>b</sup>  | All                  | All U.S. and outside U.S. applications     | 4.07 SCOP <sub>2C</sub> , 2.05 SCOP <sub>2H</sub>                                    | AHRI 210/240-2024           |
| Single-package space-constrained air-source HP air conditioners                              | <9 kW <sup>b</sup>  | All                  | All U.S. and outside U.S. applications     | 4.07 SCOP <sub>2C</sub> , 2.05 SCOP <sub>2H</sub>                                    | AHRI 210/240-2024           |

- a. Section 13 contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure.
- b. *Single-phase* U.S. air-cooled air conditioners <19 kW are regulated as consumer products by the U.S. Code of Federal Regulations 10 CFR 430. SCOP<sub>2C</sub> values for *single-phase* products are set by the U.S. Department of Energy.
- c. For heating efficiency requirement, compliance with COP<sub>2H17</sub> and IVHE is required for ASHRAE Standard 169 Climate Zones 0A, 0B, 1A, 1B, 2A, 2B, 3A, 3B, 3C, 4A, 4B, and 4C, and compliance with COP<sub>2H17</sub>, COP<sub>2H5</sub>, and IVHE<sub>C</sub> is required for Climate Zones 5A, 5B, 5C, 6A, 6B, 7, and 8; for all, U.S. DOE requires compliance with IVHE for ≥19 kW to <223 kW products, which includes Climate Zones 1A, 1B, 2A, 2B, 3A, 3B, 3C, 4A, 4B, 4C, 5A, 5B, 5C, 6A, 6B, 7, and 8.
- d. For definition of efficiency metrics see the reference standards. The metrics have the following units: Cooling Metrics W/W—COP<sub>C</sub>, COP<sub>2C</sub>, SCOP<sub>2C</sub>, ICOP, IVEC; Heating Metrics W/W—IVHE, IVHE<sub>C</sub>, SCOP<sub>2H</sub>, COP<sub>2H17</sub>, COP<sub>2H5</sub>. Note, the number in COP<sub>2H</sub> is the I-P rating ambient.
- e. All double-duct units with capacities ≥19 kW should be rated per AHRI 1340, which requires an additional 0.12 kPa external static pressure for the condenser, and double-duct units with capacities <19 kW should be rated per AHRI 210/240 with 0.0 kPa external static pressure for the condenser and shall comply with packaged air-conditioner requirements.
- f. Dual fuel heat pumps with gas heat shall comply with the IVHE, but, instead of using electric auxiliary heat as defined in Equations 29, 31, 32, and 38 of AHRI 1340 for the IVHE and IVHE<sub>C</sub>, calculations shall replace the calculated electric auxiliary heat required with the output gas heat (input divided by thermal efficiency) converted to kW.

**Table 6.8.1-2 Electrically Operated Air-Source Unitary Heat Pumps—Minimum Efficiency Requirements (SI)**

| Equipment Type  | Size Category     | Heating Section Type                                  | Subcategory                            | Minimum Efficiency <sup>d</sup>  | Test Procedure <sup>a</sup>                                    |
|---|-------------------|---|--|--|--|
| HP Air-Source Three-Phase Air-Cooled Double-Duct Air Conditioners |                   |   |  |  |  |
| Double-duct air-source HP air conditioners <sup>f</sup>           | <19 kW            | All   | All U.S. and outside U.S. applications | 4.19 $SCOP_{2C}$ , 2.20 $SCOP_{2H}$  | AHRI 210/240-2024  |
|   | ≥19 kW and <40 kW | Electric resistance (or none)                         |  | 3.22 $COP_C$ , 3.30 $COP_{H47}$ before 1/1/2029<br>2.90 $COP_{2C}$ , 4.10 $IVEC$ , 2.06 $COP_{H17}$ , 1.65 $COP_{H5}^c$ , 1.75 $IVHE$ , 1.66 $IVHE_C^c$ on or after 1/1/2029   | AHRI 340/360 before 1/1/2029<br>AHRI 1340 on or after 1/1/2029 |
|   |                   | All other including dual fuel heat pumps <sup>f</sup> |  | 3.17 $COP_C$ , 3.30 $COP_{H47}$ before 1/1/2029<br>2.84 $COP_{2C}$ , 4.10 $IVEC$ , 2.06 $COP_{H17}$ , 1.65 $COP_{H5}^c$ , 1.75 $IVHE$ , 1.66 $IVHE_C^c$ on or after 1/1/2029   |  |
|   | ≥40 kW and <70 kW | Electric resistance (or none)                         |  | 3.11 $COP_C$ , 3.30 $COP_{H47}$ , before 1/1/2029<br>2.73 $COP_{2C}$ , 3.96 $IVEC$ , 1.89 $COP_{H17}$ , 1.45 $COP_{H5}^c$ , 1.68 $IVHE$ , 1.59 $IVHE_C^c$ on or after 1/1/2029 |  |
|   |                   | All other including dual fuel heat pumps <sup>f</sup> |  | 3.05 $COP_C$ , 3.30 $COP_{H47}$ before 1/1/2029<br>2.67 $COP_{2C}$ , 3.96 $IVEC$ , 1.89 $COP_{H17}$ , 1.45 $COP_{H5}^c$ , 1.68 $IVHE$ , 1.58 $IVHE_C^c$ on or after 1/1/2029   |  |

a. Section 13 contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure.  
 b. *Single-phase* U.S. air-cooled air conditioners <19 kW are regulated as consumer products by the U.S. Code of Federal Regulations 10 CFR 430.  $SCOP_{2C}$  values for *single-phase* products are set by the U.S. Department of Energy.  
 c. For heating efficiency requirement, compliance with  $COP_{H17}$  and  $IVHE$  is required for ASHRAE Standard 169 Climate Zones 0A, 0B, 1A, 1B, 2A, 2B, 3A, 3B, 3C, 4A, 4B, and 4C, and compliance with  $COP_{H17}$ ,  $COP_{H5}$ , and  $IVHE_C$  is required for Climate Zones 5A, 5B, 5C, 6A, 6B, 7, and 8; for all, U.S. DOE requires compliance with  $IVHE$  for ≥19 kW to <223 kW products, which includes Climate Zones 1A, 1B, 2A, 2B, 3A, 3B, 3C, 4A, 4B, 4C, 5A, 5B, 5C, 6A, 6B, 7, and 8.  
 d. For definition of efficiency metrics see the reference standards. The metrics have the following units: Cooling Metrics W/W— $COP_C$ ,  $COP_{2C}$ ,  $SCOP_{2C}$ ,  $ICOP$ ,  $IVEC$ ; Heating Metrics W/W— $IVHE$ ,  $IVHE_C$ ,  $SCOP_{2H}$ ,  $COP_{H17}$ ,  $COP_{H5}$ . Note, the number in  $COP_{2H}$  is the I-P rating ambient.  
 e. All double-duct units with capacities ≥19 kW should be rated per AHRI 1340, which requires an additional 0.12 kPa external static pressure for the condenser, and double-duct units with capacities <19 kW should be rated per AHRI 210/240 with 0.0 kPa external static pressure for the condenser and shall comply with packaged air-conditioner requirements.  
 f. Dual fuel heat pumps with gas heat shall comply with the  $IVHE$ , but, instead of using electric auxiliary heat as defined in Equations 29, 31, 32, and 38 of AHRI 1340 for the  $IVHE$  and  $IVHE_C$ , calculations shall replace the calculated electric auxiliary heat required with the output gas heat (input divided by thermal efficiency) converted to kW.

**Table 6.8.1-2 Electrically Operated Air-Source Unitary Heat Pumps—Minimum Efficiency Requirements (SI)**

| Equipment Type  | Size Category       | Heating Section Type                                  | Subcategory                            | Minimum Efficiency <sup>d</sup>  | Test Procedure <sup>a</sup>                                    |
|---|---------------------|---|--|--|--|
| Double-duct air-source HP air conditioners <sup>f</sup>         | ≥70 kW and < 88 kW  | Electric resistance (or none)                         | All U.S. and outside U.S. applications | 2.78 COP <sub>C</sub> , 3.20 COP <sub>H47</sub> before 1/1/2029<br>2.34 COP <sub>2C</sub> , 3.75 IVEC, 1.88 COP <sub>2H17</sub> , 1.47 COP <sub>2H5</sub> , <sup>c</sup> 5.47 IVHE, 1.59 IVHE <sub>C</sub> <sup>c</sup> on or after 1/1/2029   | AHRI 340/360 before 1/1/2029<br>AHRI 1340 on or after 1/1/2029 |
|   |                     | All other including dual fuel heat pumps <sup>f</sup> |  | 2.73 COP <sub>C</sub> , 3.20 COP <sub>H47</sub> before 1/1/2029<br>2.29 COP <sub>2C</sub> , 3.75 IVEC, 1.88 COP <sub>2H17</sub> , 1.47 COP <sub>2H5</sub> , <sup>c</sup> 1.60 IVHE, 1.49 IVHE <sub>C</sub> <sup>c</sup> on or after 1/1/2029   |  |
| HP Air-Source Unitary Three-Phase Air-Cooled Air Conditioners   |                     |   |  |  |  |
| Split-system air-source HP air conditioners                     | <19 kW <sup>b</sup> | All   | All U.S. and outside U.S. applications | 4.19 SCOP <sub>2C</sub> , 2.20 SCOP <sub>2H</sub>  | AHRI 210/240-2024  |
| Single-package air-source HP air conditioners                   | <19 kW <sup>b</sup> | All   | All U.S. and outside U.S. applications | 3.93 SCOP <sub>2C</sub> , 1.96 SCOP <sub>2H</sub>  | AHRI 210/240-2024  |
| Split-systems and single-package air-source HP air conditioners | ≥19 kW and <40 kW   | Electric resistance (or none)                         | All U.S. and outside U.S. applications | 3.22 COP <sub>C</sub> , 4.13, ICOP <sub>C</sub> , 3.40 COP <sub>H47</sub> , 2.25 COP <sub>H17</sub> before 1/1/2029<br>3.05 COP <sub>2C</sub> , 3.93 IVEC, 2.20 COP <sub>2H17</sub> , 1.76 COP <sub>2H5</sub> , <sup>c</sup> 1.82 IVHE, 1.74 IVHE <sub>C</sub> <sup>c</sup> on or after 1/1/2029 | AHRI 340/360 before 1/1/2029<br>AHRI 1340 on or after 1/1/2029 |

a. Section 13 contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure.

b. Single-phase U.S. air-cooled air conditioners <19 kW are regulated as consumer products by the U.S. Code of Federal Regulations 10 CFR 430. SCOP<sub>2C</sub> values for single-phase products are set by the U.S. Department of Energy.

c. For heating efficiency requirement, compliance with COP<sub>2H17</sub> and IVHE is required for ASHRAE Standard 169 Climate Zones 0A, 0B, 1A, 1B, 2A, 2B, 3A, 3B, 3C, 4A, 4B, and 4C, and compliance with COP<sub>2H5</sub>, COP<sub>2H5</sub>, and IVHE<sub>C</sub> is required for Climate Zones 5A, 5B, 5C, 6A, 6B, 7, and 8; for all, U.S. DOE requires compliance with IVHE for ≥19 kW to <223 kW products, which includes Climate Zones 1A, 1B, 2A, 2B, 3A, 3B, 3C, 4A, 4B, 4C, 5A, 5B, 5C, 6A, 6B, 7, and 8.

d. For definition of efficiency metrics see the reference standards. The metrics have the following units: Cooling Metrics W/W—COP<sub>C</sub>, COP<sub>2C</sub>, SCOP<sub>2C</sub>, ICOP, IVEC; Heating Metrics W/W—IVHE, IVHE<sub>C</sub>, SCOP<sub>2H</sub>, COP<sub>2H17</sub>, COP<sub>2H5</sub>. Note, the number in COP<sub>2H</sub> is the I-P rating ambient.

e. All double-duct units with capacities ≥19 kW should be rated per AHRI 1340, which requires an additional 0.12 kPa external static pressure for the condenser, and double-duct units with capacities <19 kW should be rated per AHRI 210/240 with 0.0 kPa external static pressure for the condenser and shall comply with packaged air-conditioner requirements.

f. Dual fuel heat pumps with gas heat shall comply with the IVHE, but, instead of using electric auxiliary heat as defined in Equations 29, 31, 32, and 38 of AHRI 1340 for the IVHE and IVHE<sub>C</sub>, calculations shall replace the calculated electric auxiliary heat required with the output gas heat (input divided by thermal efficiency) converted to kW.

**Table 6.8.1-2 Electrically Operated Air-Source Unitary Heat Pumps—Minimum Efficiency Requirements (SI)**

| Equipment Type  | Size Category      | Heating Section Type                                  | Subcategory                            | Minimum Efficiency <sup>d</sup>  | Test Procedure <sup>a</sup>  |
|---|--------------------|---|--|--|--|
| Split-systems and single-package air-source HP air conditioners | ≥19 kW and <40 kW  | All other including dual fuel heat pumps <sup>f</sup> | All U.S. and outside U.S. applications | 3.17 $COP_C$ , 4.07 $ICOP_C$ ,<br>3.40 $COP_{H47}$ , 2.25 $COP_{H17}$<br>before 1/1/2029<br><br>2.99 $COP2_C$ , 3.93 $IVEC$ ,<br>2.20 $COP2_{H17}$ , 1.76 $COP2_{H5}$ , <sup>c</sup><br>1.82 $IVHE$ , 1.73 $IVHE_C$ <sup>c</sup><br>on or after 1/1/2029 | AHRI 340/360<br>before 1/1/2029<br><br>AHRI 1340<br>on or after 1/1/2029 |
|   | ≥40 kW and <70 kW  | Electric resistance (or none)                         |  | 3.11 $COP_C$ , 3.96 $ICOP_C$ ,<br>3.30 $COP_{H47}$ , 2.05 $COP_{H17}$<br>before 1/1/2029<br><br>2.90 $COP2_C$ , 3.84 $IVEC$ ,<br>1.99 $COP2_{H17}$ , 1.52 $COP2_{H5}$ , <sup>c</sup><br>1.76 $IVHE$ , 1.67 $IVHE_C$ <sup>c</sup><br>on or after 1/1/2029 |  |
|   |                    | All other including dual fuel heat pumps <sup>f</sup> |  | 2.93 $COP_C$ , 3.90 $ICOP_C$ ,<br>3.30 $COP_{H47}$ , 2.05 $COP_{H17}$<br>before 1/1/2029<br><br>2.84 $COP2_C$ , 3.84 $IVEC$ ,<br>1.99 $COP2_{H17}$ , 1.52 $COP2_{H5}$ , <sup>c</sup><br>1.76 $IVHE$ , 1.66 $IVHE_C$ <sup>c</sup><br>on or after 1/1/2029 |  |
|   | ≥70 kW and <223 kW | Electric resistance (or none)                         |  | 2.78 $COP_C$ , 3.66 $ICOP_C$ ,<br>3.20 $COP_{H47}$ , 2.05 $COP_{H17}$<br>before 1/1/2029<br><br>2.58 $COP2_C$ , 3.55 $IVEC$ ,<br>1.98 $COP2_{H17}$ , 1.55 $COP2_{H5}$ , <sup>c</sup><br>1.70 $IVHE$ , 1.67 $IVHE_C$ <sup>c</sup><br>on or after 1/1/2029 |  |

a. Section 13 contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure.  
b. Single-phase U.S. air-cooled air conditioners <19 kW are regulated as consumer products by the U.S. Code of Federal Regulations 10 CFR 430.  $SCOP2_C$  values for single-phase products are set by the U.S. Department of Energy.  
c. For heating efficiency requirement, compliance with  $COP2_{H17}$  and  $IVHE$  is required for ASHRAE Standard 169 Climate Zones 0A, 0B, 1A, 1B, 2A, 2B, 3A, 3B, 3C, 4A, 4B, and 4C, and compliance with  $COP2_{H17}$ ,  $COP2_{H5}$ , and  $IVHE_C$  is required for Climate Zones 5A, 5B, 5C, 6A, 6B, 7, and 8; for all, U.S. DOE requires compliance with  $IVHE$  for ≥19 kW to <223 kW products, which includes Climate Zones 1A, 1B, 2A, 2B, 3A, 3B, 3C, 4A, 4B, 4C, 5A, 5B, 5C, 6A, 6B, 7, and 8.  
d. For definition of efficiency metrics see the reference standards. The metrics have the following units: Cooling Metrics W/W— $COP_C$ ,  $COP2_C$ ,  $SCOP2_C$ ,  $ICOP$ ,  $IVEC$ ; Heating Metrics W/W— $IVHE$ ,  $IVHE_C$ ,  $SCOP2_H$ ,  $COP2_{H17}$ ,  $COP2_{H5}$ . Note, the number in  $COP2_H$  is the I-P rating ambient.  
e. All double-duct units with capacities ≥19 kW should be rated per AHRI 1340, which requires an additional 0.12 kPa external static pressure for the condenser, and double-duct units with capacities <19 kW should be rated per AHRI 210/240 with 0.0 kPa external static pressure for the condenser and shall comply with packaged air-conditioner requirements.  
f. Dual fuel heat pumps with gas heat shall comply with the  $IVHE$ , but, instead of using electric auxiliary heat as defined in Equations 29, 31, 32, and 38 of AHRI 1340 for the  $IVHE$  and  $IVHE_C$ , calculations shall replace the calculated electric auxiliary heat required with the output gas heat (input divided by thermal efficiency) converted to kW.

**Table 6.8.1-2 Electrically Operated Air-Source Unitary Heat Pumps—Minimum Efficiency Requirements (SI)**

| Equipment Type  | Size Category      | Heating Section Type                                  | Subcategory                            | Minimum Efficiency <sup>d</sup>   | Test Procedure <sup>a</sup>  |
|---|--------------------|---|--|---|--|
| Split-systems and single-package air-source HP air conditioners | ≥70 kW and <223 kW | All other including dual fuel heat pumps <sup>f</sup> | All U.S. and outside U.S. applications | 2.73 COP <sub>C</sub> , 3.60 ICOP <sub>C</sub> ,<br>3.20 COP <sub>H47</sub> , 2.05 COP <sub>H17</sub><br>before 1/1/2029<br><br>2.52 COP <sub>2C</sub> , 3.55 IVEC,<br>1.98 COP <sub>2H17</sub> , 1.55 COP <sub>2H5</sub> , <sup>c</sup><br>1.70 IVHE, 1.66 IVHE <sub>C</sub> <sup>c</sup><br>on or after 1/1/2029  | AHRI 340/360<br>before 1/1/2029<br><br>AHRI 1340<br>on or after 1/1/2029 |
|   | ≥223 kW            | Electric resistance (or none)                         |  | 2.78 COP <sub>C</sub> , 3.11 ICOP <sub>C</sub> ,<br>3.20 COP <sub>H47</sub> , 2.05 COP <sub>H17</sub><br>before 1/1/2029<br><br>2.58 COP <sub>2C</sub> , 3.43 IVEC,<br>1.98 COP <sub>2H17</sub> , 1.55 COP <sub>2H5</sub> , <sup>c</sup><br>1.70 IVHE, 1.62 IVHE <sub>C</sub> <sup>c</sup><br>on or after 1/1/2029  |  |
|   |                    | All other including dual fuel heat pumps <sup>f</sup> |  | 2.73 COP <sub>C</sub> , 3.05 ICOP <sub>C</sub> ,<br>3.20 COP <sub>2H47</sub> , 2.05 COP <sub>H17</sub><br>before 1/1/2029<br><br>2.52 COP <sub>2C</sub> , 3.43 IVEC,<br>1.98 COP <sub>2H17</sub> , 1.55 COP <sub>2H5</sub> , <sup>d</sup><br>1.70 IVHE, 1.61 IVHE <sub>C</sub> <sup>d</sup><br>on or after 1/1/2029 |  |
| HP Air-Source Air-Cooled Condensing Unit ≥135,000 Btu/h         |                    |   |  |   |  |
| HP condensing units, air-source                                 | ≥40 kW and <70 kW  | All   | All U.S. and outside U.S. applications | No requirements before 1/1/2029<br><br>2.90 COP <sub>2C</sub> , 3.84 IVEC,<br>1.99 COP <sub>2H17</sub> , 1.52 COP <sub>2H5</sub> , <sup>c</sup><br>1.76 IVHE, 1.67 IVHE <sub>C</sub> <sup>c</sup><br>on or after 1/1/2029   | AHRI 365<br>before 1/1/2029<br><br>AHRI 1365<br>on or after 1/1/2029     |

a. Section 13 contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure.  
 b. Single-phase U.S. air-cooled air conditioners <19 kW are regulated as consumer products by the U.S. Code of Federal Regulations 10 CFR 430. SCOP<sub>2C</sub> values for single-phase products are set by the U.S. Department of Energy.  
 c. For heating efficiency requirement, compliance with COP<sub>2H17</sub> and IVHE is required for ASHRAE Standard 169 Climate Zones 0A, 0B, 1A, 1B, 2A, 2B, 3A, 3B, 3C, 4A, 4B, and 4C, and compliance with COP<sub>2H17</sub>, COP<sub>2H5</sub>, and IVHE<sub>C</sub> is required for Climate Zones 5A, 5B, 5C, 6A, 6B, 7, and 8; for all, U.S. DOE requires compliance with IVHE for ≥19 kW to <223 kW products, which includes Climate Zones 1A, 1B, 2A, 2B, 3A, 3B, 3C, 4A, 4B, 4C, 5A, 5B, 5C, 6A, 6B, 7, and 8.  
 d. For definition of efficiency metrics see the reference standards. The metrics have the following units: Cooling Metrics W/W—COP<sub>C</sub>, COP<sub>2C</sub>, SCOP<sub>2C</sub>, ICOP, IVEC; Heating Metrics W/W—IVHE, IVHE<sub>C</sub>, SCOP<sub>2H</sub>, COP<sub>2H17</sub>, COP<sub>2H5</sub>. Note, the number in COP<sub>2H</sub> is the I-P rating ambient.  
 e. All double-duct units with capacities ≥19 kW should be rated per AHRI 1340, which requires an additional 0.12 kPa external static pressure for the condenser, and double-duct units with capacities <19 kW should be rated per AHRI 210/240 with 0.0 kPa external static pressure for the condenser and shall comply with packaged air-conditioner requirements.  
 f. Dual fuel heat pumps with gas heat shall comply with the IVHE, but, instead of using electric auxiliary heat as defined in Equations 29, 31, 32, and 38 of AHRI 1340 for the IVHE and IVHE<sub>C</sub>, calculations shall replace the calculated electric auxiliary heat required with the output gas heat (input divided by thermal efficiency) converted to kW.

**Table 6.8.1-2 Electrically Operated Air-Source Unitary Heat Pumps—Minimum Efficiency Requirements (SI)**

| Equipment Type                             | Size Category         | Heating Section Type | Subcategory                               | Minimum Efficiency <sup>d</sup>   | Test Procedure <sup>a</sup>  |
|--|-----------------------|----------------------|---|---|--|
| HP <i>condensing units</i> ,<br>air-source | ≥70 kW and<br><223 kW | All                  | All U.S. and<br>outside U.S. applications | No requirements before 1/1/2029<br>2.58 COP <sub>2C</sub> , 3.54 IVEC,<br>1.98 COP <sub>H17</sub> , 1.55 COP <sub>H5</sub> , <sup>c</sup><br>1.70 IVHE, 1.67 IVHE <sub>C</sub> <sup>c</sup><br>on or after 1/1/2029 | AHRI 365<br>before 1/1/2029<br><br>AHRI 1365<br>on or after 1/1/2029 |
|  | ≥223 kW               |                      |   | No requirements before 1/1/2029<br>2.58 COP <sub>2C</sub> , 3.43 IVEC,<br>1.98 COP <sub>H17</sub> , 1.55 COP <sub>H5</sub> <sup>d</sup><br>1.70 IVHE, 1.62 IVHE <sub>C</sub> <sup>c</sup><br>on or after 1/1/2029   |  |

- a. Section 13 contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure.
- b. *Single-phase* U.S. air-cooled air conditioners <19 kW are regulated as consumer products by the U.S. Code of Federal Regulations 10 CFR 430. SCOP<sub>2C</sub> values for *single-phase* products are set by the U.S. Department of Energy.
- c. For heating efficiency requirement, compliance with COP<sub>H17</sub> and IVHE is required for ASHRAE Standard 169 Climate Zones 0A, 0B, 1A, 1B, 2A, 2B, 3A, 3B, 3C, 4A, 4B, and 4C, and compliance with COP<sub>H17</sub>, COP<sub>H5</sub>, and IVHE<sub>C</sub> is required for Climate Zones 5A, 5B, 5C, 6A, 6B, 7, and 8; for all, U.S. DOE requires compliance with IVHE for ≥19 kW to <223 kW products, which includes Climate Zones 1A, 1B, 2A, 2B, 3A, 3B, 3C, 4A, 4B, 4C, 5A, 5B, 5C, 6A, 6B, 7, and 8.
- d. For definition of efficiency metrics see the reference standards. The metrics have the following units: Cooling Metrics W/W—COP<sub>C</sub>, COP<sub>2C</sub>, SCOP<sub>2C</sub>, ICOP, IVEC; Heating Metrics W/W—IVHE, IVHE<sub>C</sub>, SCOP<sub>H</sub>, COP<sub>H17</sub>, COP<sub>H5</sub>. Note, the number in COP<sub>H</sub> is the I-P rating ambient.
- e. All double-duct units with capacities ≥19 kW should be rated per AHRI 1340, which requires an additional 0.12 kPa external static pressure for the condenser, and double-duct units with capacities <19 kW should be rated per AHRI 210/240 with 0.0 kPa external static pressure for the condenser and shall comply with packaged air-conditioner requirements.
- f. Dual fuel heat pumps with gas heat shall comply with the IVHE, but, instead of using electric auxiliary heat as defined in Equations 29, 31, 32, and 38 of AHRI 1340 for the IVHE and IVHE<sub>C</sub>, calculations shall replace the calculated electric auxiliary heat required with the output gas heat (input divided by thermal efficiency) converted to kW.

## **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.

**ASHRAE · 180 Technology Parkway · Peachtree Corners, GA 30092 · [www.ashrae.org](http://www.ashrae.org)**

### **About ASHRAE**

Founded in 1894, ASHRAE is a global professional society committed to serve humanity by advancing the arts and sciences of heating, ventilation, air conditioning, refrigeration, and their allied fields.

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.

To stay current with this and other ASHRAE Standards and Guidelines, visit [www.ashrae.org/standards](http://www.ashrae.org/standards), and connect on LinkedIn, Facebook, Twitter, and YouTube.

### **Visit the ASHRAE Bookstore**

ASHRAE offers its Standards and Guidelines in print, as immediately downloadable PDFs, and via ASHRAE Digital Collections, which provides online access with automatic updates as well as historical versions of publications. Selected Standards and Guidelines are also offered in redline versions that indicate the changes made between the active Standard or Guideline and its previous edition. For more information, visit the Standards and Guidelines section of the ASHRAE Bookstore at [www.ashrae.org/bookstore](http://www.ashrae.org/bookstore).

### **IMPORTANT NOTICES ABOUT THIS STANDARD**

**To ensure that you have all of the approved addenda, errata, and interpretations for this Standard, visit [www.ashrae.org/standards](http://www.ashrae.org/standards) to download them free of charge.**

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