



ENERGY STAR® Program Requirements Product Specification for Air Source Heat Pump and Central Air Conditioner Equipment

Eligibility Criteria Draft 2 Version 5.0

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9 Following is the Draft 2 Version 5.0 product specification for ENERGY STAR qualified central air conditioner
10 and air source heat pump equipment. A product shall meet all of the identified criteria if it is to earn the
11 ENERGY STAR.

12 **1) Definitions:** Below are the definitions of the relevant terms in this document.

- 13 A. Air-Source Heat Pump (ASHP)²: An air-source unitary heat pump model is a product other than a
14 packaged terminal heat pump, which consists of one or more assemblies, powered by single phase
15 electric current, rated below 65,000 Btu per hour, utilizing an indoor conditioning coil, compressor, and
16 refrigerant-to-outdoor air heat exchanger to provide air heating, and may also provide air cooling,
17 dehumidifying, humidifying circulating, and air cleaning.
- 18 B. Central Air Conditioner²: A central air conditioner is a product, which is powered by single phase
19 electric current, air cooled, rated below 65,000 Btu per hour, not contained within the same cabinet as
20 a furnace, the rated capacity of which is above 225,000 Btu per hour, and is a heat pump or a cooling
21 unit only.
- 22 C. Single Package¹: A single package unit is an ASHP or central air conditioner that has all major
23 assemblies enclosed in a single cabinet.
- 24 D. Split System¹: A split system is an ASHP or central air conditioner that has one or more of the major
25 assemblies separated from the others.
- 26 E. Gas/Electric Package Unit: A single package unit with gas heating and electric air conditioning that is
27 often installed on a slab or roof.
- 28 F. Basic Model²: All units of a given type of covered product (or class thereof) manufactured by one
29 manufacturer and which have the same primary energy source and, which have essentially identical
30 electrical, physical, or functional (or hydraulic) characteristics that affect energy consumption, energy
31 efficiency, water consumption or water efficiency.
- 32 G. Heating Seasonal Performance Factor (HSPF)¹: HSPF is the total space heating required during the
33 space heating season, expressed in Btu, divided by the total electrical energy consumed by the heat
34 pump system during the same season, expressed in watt-hours.
- 35 H. Seasonal Energy Efficiency Ratio (SEER)¹: SEER is the total heat removed from the conditioned
36 space during the annual cooling season, expressed in Btu, divided by the total electrical energy
37 consumed by the air conditioner or heat pump during the same season, expressed in watt-hours.
- 38 I. Energy Efficiency Ratio (EER)¹: EER is the ratio of the average rate of space cooling delivered to the
39 average rate of electrical energy consumed by the by the air conditioner or heat pump. This ratio is
40 expressed in Btu per watt.h (Btu/W.h).

1 10 CFR part 430 Subpart B, Appendix M

2 10 CFR 430, Subpart A, § 430.2 Definitions

- 41 J. Independent Coil Manufacturer (ICM): A manufacturer that manufactures only the indoor unit (coil) in
42 a Central Air Conditioner or Air-Source Heat Pump Split System.
- 43 K. System Manufacturer (SM): A manufacturer that manufactures all the major assemblies in an Air-
44 Source Unitary Heat Pump and/or Unitary Air-Conditioner.

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46 **Note:** In consideration of including Split Systems that include Independent Coil Manufacturer (ICM) indoor
47 units in the ENERGY STAR CAC/ASHP program, EPA has added definitions for Independent Coil
48 Manufacturer and System Manufacturer. See below sections for more detail regarding the inclusion of ICM
49 units and their efficiency requirements.

50 Stakeholders are encouraged to provide comments on the above definitions and also to provide suggestions
51 on whether there are additional terms that should be defined.

52 2) Scope:

53 A. Included Products: Single package, split system, and gas/electric package units that meet the
54 definitions of an ASHP or central air conditioner as specified herein are eligible for ENERGY STAR
55 qualification, with the exception of products listed in Section 2.B. Units may be intended for
56 installation into a duct system, or may be ductless.

57 B. Excluded Products: Three phase central air conditioners and ASHPs, and products rated at 65,000
58 Btu/h or above are not eligible for ENERGY STAR.

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60 **Note:** EPA received a request to include combinations with ICM coils in the ENERGY STAR program. While
61 in the past EPA has declined to do so, our research has shown that the situation has changed, and ICMs are
62 now ripe for inclusion, due to several factors.

63 The most important factor is that industry practices in rating third party coil combinations have changed in the
64 last several years. In addition, EPA has learned more about the situations in which ICM coils are typically
65 used, which has allayed concerns about warranty implications for homeowners. Lastly, EPA has identified a
66 potential path forward in terms of the partnership responsibilities of companies under various scenarios of
67 relabeling and brand ownership. Due to these various changes, EPA now proposes to allow third party coil
68 combinations to earn the ENERGY STAR.

69 The inclusion of ICM combinations makes good ENERGY STAR options available to consumers whose
70 requirements are not met by system manufacturer (SM) combinations. This may be due to space constraints,
71 or because their climate requires a less traditional combination, such as in hot dry climates where contractors
72 recommend systems that maximize cooling while minimizing moisture removal. EPA understands that ICM
73 combinations are often warranted similarly to SM combinations, and warranties on outdoor units are still valid
74 when they are combined with ICM coils. It is clear that the ICM is responsible for certifying the rating of their
75 combinations to DOE, and as proposed, the ICM would also be the ENERGY STAR partner, with all the
76 associated privileges and responsibilities.

77 To add ICM combinations to the scope of the program, the Included Products section has been revised to
78 include these units. Accordingly, the Excluded Products section has been revised to remove the reference to
79 third party (or independent) coils.

80 Stakeholders are encouraged to comment on the inclusion of ICMs and provide data that supports their
81 comment.

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83 **3) Qualification Criteria:**

84 A. Energy Efficiency Requirements:

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Table 1: Energy-Efficiency Criteria for Qualified Residential ASHPs and Central Air Conditioners			
Product Type	SEER	EER	HSPF¹
CAC Split Systems	≥ 15.00	≥ 12.50	N/A
ASHP Split Systems	≥ 15.00	≥ 12.50	≥ 8.50
CAC Single Package Equipment ²	≥ 15.00	≥ 12.00	N/A
ASHP Single Package Equipment ²	≥ 15.00	≥ 12.00	≥ 8.20

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Notes:

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1. HSPF criteria is applicable to heat pump, only

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2. Including gas/electric package units.

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B. Multiple Assemblies: For split system ASHP and central air conditioner, ENERGY STAR qualification shall be determined by the rated performance of the particular combination of indoor and outdoor units, regardless of the fact that the components may be used in other combinations.

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C. Gas/Electric Package Units: To qualify for ENERGY STAR, gas/electric package units shall meet the cooling portion of the single package specification requirements in Table 1, above.

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D. ICM coil combinations: To qualify for ENERGY STAR, ICM coil combinations shall meet the Central Air Conditioner and Air-Source Heat Pump Split System specification requirements in Table 1, above.

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Note: EPA has received consistent feedback regarding regional versus national requirements, and regarding the performance criteria. Several stakeholders have commented that an ENERGY STAR regional specification would be onerous for the industry (manufacturers, distributors, contractors, etc.) given that there are already regional Federal standards and CEE Tier levels. Manufacturers design product families such that all members can meet a certain efficiency criteria, in order to have a marketing story that is simple enough to be effective. Thus, the existence of different efficiency criteria for different programs as well as different regions makes it more difficult for manufacturers to explain to consumers what efficiency means.

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EPA's previous reservation with regards to a national requirement was that the equipment specifications be mutually supportive with the new ENERGY STAR Verified HVAC Installation (ESVI) program. As the ESVI program has evolved, it has become clear that a national ENERGY STAR level can provide that support. Upon further research and detailed discussions with stakeholders, EPA proposes a national requirement for all product types.

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With regards to the performance criteria, the levels proposed in this Draft 2 harmonize with CEE Tier 2 for split systems. A 15 SEER CAC split system provides good consumer value over 14 SEER system in many situations. Further, efficiency program rebates remain important to CAC/ASHP, and harmonizing with CEE levels increases consumer access to such rebates.

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For single package units, stakeholders noted that the EER levels proposed under Draft 1 would be harder for higher capacity units to meet and have recommended aligning levels between the CAC and ASHP single package units to 15 SEER, 12 EER and 8.2 HSPF. Given the small market for package units, alignment of air conditioning and heat pumps to simplify manufacturing encourages program participation.

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119 **Note contd.:** Upon further research and discussion, EPA proposes to adopt 15 SEER, 12 EER, 8.2 HSPF
 120 levels for single package units. These aligned levels assure heat pump models are available to consumers.
 121 Stakeholders are encouraged to comment on the above proposed changes.

122 E. The HSPF and SEER ratings shall be identical to the levels reported on the Federal Trade
 123 Commission (FTC) Energy guide label and to those reported to DOE.

- 124 F. Significant Digits and Rounding:
 125 a. All calculations shall be carried out with actual measured or observed values. Only the final
 126 result of a calculation shall be rounded. Unless otherwise directed below, calculated results
 127 shall be rounded to the nearest significant digit as expressed in the corresponding specification
 128 limit.
 129 b. Unless otherwise specified, compliance with specification limit shall be evaluated using exact
 130 values without any benefit from rounding.
 131 c. As specified in 10 CFR, 430.23(m)(3), SEER, and HSPF shall be rounded off to the nearest
 132 0.05 Btu/W.h. Similarly, EER should also be rounded off to the nearest 0.05 Btu/W.h.
 133 d. As specified in 10 CFR part 430 Subpart B, Appendix M, capacity shall be expressed in
 134 accordance with in Table 2, below.

Table 2: Rounding Requirements for Capacity	
Capacity Ratings, Btu/h	Multiples, Btu/h
< 20,000	100
≥ 20,000 and < 38,000	200
≥ 38,000 and < 65,000	500

135 **4) Test Requirements:**

- 136 A. One of the following sampling plans shall be used for purposes of testing for ENERGY STAR
 137 certification:
 138 a. A single unit is selected, obtained, and tested. The measured performance of this unit and
 139 of each subsequent unit manufactured must be equal to or better than the ENERGY STAR
 140 specification requirements. Results of the tested unit may be used to certify additional
 141 individual model variations within a Basic Model as long as the definition for Basic Model
 142 provided in Section 1, above, is met; or
 143 b. Units are selected for testing and results calculated according to the sampling requirements
 144 defined in 10 CFR Part 429, Subpart B § 429.16. The certified rating must be equal to or
 145 better than the ENERGY STAR specification requirements. Results of the tested unit may
 146 be used to certify additional model variations within a Basic Model as long as the definition
 147 for provided above and in 10 CFR Part 430.2 is met. Further, all individual models within a
 148 Basic Model must have the same certified rating per DOE's regulations in Part 429 and this
 149 rating must be used for all manufacturer literature, the qualified product list, and certification
 150 of compliance to DOE energy conservation standards.

151 **Note:** The verification testing for ICM coil combinations will be slightly different from that for system
 152 manufacturer (SM) coil combinations. EPA envisions a process similar to the AHRI certification program for
 153 ICM coil combinations, for instance including testing the coils with an outdoor unit that has recently passed
 154 verification testing as part of a SM coil combination. The process will also accommodate cases where the
 155 ICM does not use the same certification body (CB) as the SM, with similar rigor to the AHRI process.

156 B. When testing ASHPs and central air conditioners, the following test method shall be used to
157 determine ENERGY STAR qualification:

Table 3: Test Method for ENERGY STAR Qualification	
ENERGY STAR Requirement	Test Method Reference
SEER, EER, HSPF	10 CFR part 430 Subpart B, Appendix M

158 **5) Effective Date:** This ENERGY STAR ASHP and Central Air-Conditioners Specification shall take effect on
159 **TBD.** To qualify for ENERGY STAR, a product model shall meet the ENERGY STAR specification in effect
160 on the date of manufacture. The date of manufacture is specific to each unit and is the date (e.g., month
161 and year) on which a unit is considered to be completely assembled.

162 **Note:** Based on the current timeline for revision, EPA expects a September 2015 effective date, with the
163 advantage that the specification does not change in the middle of a cooling or a heating season.

164 **6) Future Specification Revisions:** EPA reserves the right to change the specification should technological
165 and/or market changes affect its usefulness to consumers, industry, or the environment. In keeping with
166 current policy, revisions to the specification are arrived at through industry discussions. In the event of a
167 specification revision, please note that the ENERGY STAR qualification is not automatically granted for the
168 life of a product model.

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