



# ENERGY STAR® Program Requirements for Air Source Heat Pump (ASHP) and Central Air Conditioner Equipment

## DRAFT 2 Eligibility Criteria

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Below is the **DRAFT 2** specification (Version 4.0) for ENERGY STAR qualified central air conditioner and air source heat pump equipment. Equipment must meet all of the identified criteria if it is to be labeled or characterized as ENERGY STAR.

**Note:** *In January 2006, the Federal standard for central air conditioners (CAC) and ASHPs will increase to 13 SEER. As a result, the ENERGY STAR specification should be updated to capture energy savings beyond the standard in a way that is cost effective for consumers and maintains product performance. However, because of the new standard, the marginal benefit to consumers of selecting higher SEER equipment will be less than in the past. In contrast potential benefits from improving installation of HVAC systems are large, on the order of 10 to 20 percent savings on heating and cooling costs. Numerous field studies have shown that more than half of CAC/ASHP systems are installed with incorrect refrigerant charge and/or airflow.*

*On January 28, 2005, EPA distributed the Draft 1 ENERGY STAR specification for CAC and ASHPs to stakeholders with a request that comments on the document be received by March 25<sup>th</sup>. This deadline was subsequently extended to April 8<sup>th</sup>. Draft 1 contained proposed energy-efficiency criteria for CAC/ASHP equipment, as well as installation criteria for qualified systems. In addition, Draft 1 proposed a shift in process for ENERGY STAR in that only systems, once installed and verified for proper air flow and refrigerant charge, could be labeled as ENERGY STAR. Finally, the ENERGY STAR partnership was proposed to shift from manufacturers of equipment to those instituting programs to verify proper installation of systems.*

*Due to the need to revise the equipment specification before the new Federal Standard takes effect in January 2006 and the response from practically all stakeholders that EPA should continue to allow the ENERGY STAR mark on efficient equipment, EPA is moving forward with the equipment specification and continuing the ENERGY STAR Partnership with manufacturers. Therefore, this Draft 2 of the ENERGY STAR Program Requirements for ASHP and Central Air Conditioner Equipment contains specifications for equipment only. While EPA still considers proper installation vital to achieving the stated energy efficiency ratings of equipment, we have decided to develop a separate specification for proper installation. The estimated date for implementing this proper installation specification is January 1, 2007. Between now and 2007, EPA will work with stakeholders to identify proper testing and verification methods to qualify systems as "installed to ENERGY STAR guidelines."*

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1) **Definitions:** Below are brief descriptions of residential ASHPs and central air conditioners and other terms as relevant to ENERGY STAR.

- A. **Air-Source Heat Pump (ASHP):** An air-source unitary heat pump model consists of one or more factory-made assemblies which normally include an indoor conditioning coil(s), compressor(s), and outdoor coil(s), including means to provide a heating function. ASHPs shall provide the function of air heating with controlled temperature, and may include the functions of air-cooling, air-circulation, air-cleaning, dehumidifying or humidifying.
- B. **Central Air Conditioner:** A central air conditioner model consists of one or more factory-made assemblies which normally include an evaporator or cooling coil(s), compressor(s), and condenser(s). Central air conditioners provide the function of air-cooling, and may include the functions of air-circulation, air-cleaning, dehumidifying or humidifying.

- 27 C. Single Package: A single package unit is an ASHP or central air conditioner that combines  
28 both condenser and air handling capabilities in a single casing.  
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- 30 D. Split System: A split system is an ASHP or central air conditioner with separate indoor  
31 (evaporator) and outdoor (condenser) units. For split systems, the energy-efficiency ratings of  
32 a particular split system model are based on one of the following: 1) the condenser-evaporator  
33 combination that is the partner's most commonly sold combination for that condenser, or 2)  
34 the actual condenser-evaporator coil combination of the split system model.  
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- 36 E. Gas/Electric Package Unit: A single package unit with gas heating and electric air conditioning  
37 that is often installed on a slab or roof.  
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- 39 F. Heating Seasonal Performance Factor (HSPF): This is a measure of a heat pump's energy  
40 efficiency over one heating season. It represents the total heating output of a heat pump  
41 (including supplementary electric heat) during the normal heating season (in Btu) as  
42 compared to the total electricity consumed (in watt-hours) during the same period. HSPF is  
43 based on tests performed in accordance with ARI 210/240<sup>1</sup>.  
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- 45 G. Seasonal Energy Efficiency Ratio (SEER): This is a measure of equipment energy efficiency  
46 over the cooling season. It represents the total cooling of a central air conditioner or heat  
47 pump (in Btu) during the normal cooling season as compared to the total electric energy input  
48 (in watt-hours) consumed during the same period. SEER is based on tests performed in  
49 accordance with ARI 210/240.  
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- 51 H. Energy Efficiency Ratio (EER): This is a measure of the instantaneous energy efficiency of  
52 cooling equipment. EER is the steady-state rate of heat energy removal (e.g., cooling  
53 capacity) by the equipment in Btuh divided by the steady-state rate of energy input to the  
54 equipment in watts. This ratio is expressed in Btuh per watt (Btuh/watt). EER is based on tests  
55 performed in accordance with ARI 210/240.  
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- 57 I. Matched Assembly: A matched assembly is a model combination that is listed in the ARI  
58 Directory of Certified Equipment and in which both the condenser unit and evaporator coil are  
59 installed simultaneously. A matched assembly should also include the air handler, furnace, or  
60 other component that is used to determine the rating according to ARI 210/240.

**Note:** Several commentors requested clarification of what is meant by the term "Matched Assembly". In response, a definition for "Matched Assembly" has been added in Section 1. The definition clarifies that a matched assembly refers to a model combination that is listed in the ARI Directory. Commentors also noted that some listings in the ARI Directory require retrofit of the furnace and/or furnace fan in order to meet the rated efficiency level, therefore, the definition in the specification should encompass not only the condenser and evaporator coil, but also the air handler, furnace, expansion valve, and time delay when used to determine the ARI rating. The definition in Section 1 reflects these instances.

EPA has been approached by several manufacturers of ductless mini-split air conditioning equipment. Although this type of equipment represents a small percentage of the U.S. market for air conditioning equipment, it is categorized among central air conditioning systems according to ARI 210/240. Therefore, EPA sees no reason to exclude it from qualifying as ENERGY STAR as long as it meets the energy efficiency criteria outlined in Section 3 below. However, in order to ensure that ductless, mini-split equipment is not interpreted as excluded from this specification the following sentence was removed from the definitions for single package, split system, and gas/electric package unit: "Air is treated at a central location and carried to and from the rooms in a house by one or more fans and a system of ducts." Removal of this sentence does not change the definition except to allow for the inclusion of ductless, mini-split equipment.

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62 2) **Qualifying Products**: In order to qualify as ENERGY STAR, an ASHP or central air conditioner must

<sup>1</sup> Air-Conditioning and Refrigeration Institute. Standard 210/240 "2003 Standard for Unitary Air-Conditioning and Air-Source Heat Pump Equipment."

63 meet the definition in Section 1 and the specification requirements provided in Section 3, below.

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65 A. ASHPs: This specification shall cover residential ASHPs that are rated below 65,000 Btuh and  
66 powered by single-phase current. The ASHP may be a single packaged system, where there  
67 is only one assembly, or a split system where there are two. If such equipment is provided in  
68 more than one assembly, matched assemblies shall be used in meeting the specifications  
69 outlined in Section 3 below.

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71 B. Central Air Conditioners: This specification shall cover residential central air conditioners that  
72 are rated below 65,000 Btuh, and powered by single-phase current. The central air  
73 conditioner may be a single packaged system, where there is only one assembly, or a split  
74 system where there are two. If such equipment is provided in more than one assembly,  
75 matched assemblies shall be used in meeting the specifications outlined in Section 3 below.

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77 C. Gas/Electric Package Units: This specification shall cover gas/electric package units that are  
78 rate below 65,000 Btuh. To qualify for the ENERGY STAR label, they must meet the cooling  
79 portion of the single package specification outlined in Section 3 below.  
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***Note:** One commentor requested that the ENERGY STAR specification for residential ASHP and central air conditioners be extended to include 3-phase residential and commercial equipment rated below 65,000 Btuh. Another commentor requested that the specification be revised to more clearly articulate that it covers only single-phase equipment. EPA has not extended the specification to include 3-phase equipment as this equipment is already included within ENERGY STAR under the specification for Light Commercial HVAC. In addition, since the specification clearly states within Section 2, Parts A and B, that it only covers single-phase equipment, EPA did not deem it necessary to repeat similar language within the specification. Partners shall label only single-phase equipment under this specification.*

*One commentor recommended eliminating gas/electric packaged units from this specification unless EPA specifies a heating requirement for these units. This comment was also received from other stakeholders in the past. However, EPA is not currently able to specify a heating requirement for these units. Therefore, EPA is considering eliminating these units from the specification until such time as a heating requirement may be instituted, but would appreciate further feedback from stakeholders before doing so.*

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82 3) Energy-Efficiency Specifications for Qualifying Products: Only those systems listed in Section 2  
83 with a limited warranty that also meet the criteria below qualify as ENERGY STAR.  
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<b>Energy-Efficiency Criteria for Qualified Residential ASHPs and Central Air Conditioners</b>			
Product Type	SEER	EER	HSPF (for heat pumps only)
Split Systems	≥ 14	≥ 11.5	≥ 8.2
Single Package Equipment (including gas/electric package units)	≥ 14	≥ 11	≥ 8.0

**Note:** EPA received several comments on the Draft 1 document suggesting alternative energy-efficiency criteria, such as adjusting the EER level of split systems to 11.5, lowering the HSPF for split heat pumps to 8.2, and increasing the EER level of packaged units to 12. After careful consideration and assistance from ARI in evaluating the model combination availability at the various levels and tonnages, EPA has decided to adjust the split system levels to 14 SEER/ 11.5 EER/ 8.2 HSPF. This change will, in effect, double the percentage of model combinations available at the proposed ENERGY STAR levels (from 3.4% at 12 EER/8.5 HSPF to 7.4% at 11.5EER/8.2 HSPF). This is particularly important at higher tonnages (~5 tons) where the number of potentially qualifying model combinations will increase from 9 to 16. EPA has decided not to adjust the packaged unit levels as this change could not be justified based on model availability.

Several commentors urged EPA to determine energy efficiency criteria independent of levels set by other organizations such as the Consortium for Energy Efficiency (CEE). While EPA has done so, it cannot be stressed enough that a source of information on ENERGY STAR qualified model combinations is vital to the existence of the program. Currently, the only source of this information is the CEE Directory of ARI Verified Equipment. As such, it is critical that either CEE or the HVAC industry take the necessary steps to ensure that qualifying model combination information continues to be available after the new ENERGY STAR specification goes into effect.

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- 4) **Testing Requirements:** Qualification for the energy efficiency criteria contained in this specification will be based on testing performed in compliance with Federal Regulations. It is EPA's intention that Partners will utilize the CEE Directory of ARI Verified Equipment to determine which equipment qualifies for ENERGY STAR.

**Note:** EPA does not plan to independently develop a list of qualifying products. Instead, stakeholders will be encouraged to use the CEE Directory of ARI Verified Equipment, assuming it is updated in a way consistent with the new ENERGY STAR specification, or some alternative database provided through ARI, to determine which model combinations meet the energy-efficiency criteria for qualified residential ASHPs and central air conditioners. Any manufacturers that do not participate in the ARI certification program will be expected to submit product information directly to EPA for listing on the [www.energystar.gov](http://www.energystar.gov) web site.

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- 5) **Effective Date:** The date that central air conditioners and air source heat pump equipment may begin to qualify as ENERGY STAR under the Version 3.0 specification will be defined as the *effective date* of the agreement. The ENERGY STAR Specification for ASHP and central air conditioner equipment shall go into effect on **March 27, 2006**. Any previously executed agreement on the subject of ENERGY STAR qualified ASHP and central air conditioner equipment shall be terminated effective March 26, 2006.
- A. **Qualifying and Marketing Products under the Version 4.0 specification:** All equipment, including model combinations originally qualified under Version 3.0, with a **date of manufacture** after **March 27, 2006**, must meet Version 4.0 requirements in order to bear the ENERGY STAR mark on the product or in product literature. The date of manufacture is specific to each unit, and is the date on which a unit is considered to be completely assembled.
- B. **Elimination of Automatic Grandfathering:** Under Version 4.0, EPA has made a significant change with regard to equipment qualification and marking during specific transitions. **ENERGY STAR qualification under Version 3.0 is not automatically granted for the life of the products model combination.** To earn the ENERGY STAR mark, a model combination must meet the ENERGY STAR specification in effect on the date of manufacture.

**Note:** EPA has adjusted the proposed effective date of this specification revision to March 27, 2006. This is due to the amount of time that had been needed to finalize the revision and the need to give manufacturers ample time to institute the revision into their company practices. For specification revisions, EPA typically allows a nine-month lead time between when a specification is final and when it becomes effective. Although the effective date no longer exactly coincides with the date of the new Federal standard, it is shortly thereafter and will still allow the new specification to be in place for the 2006 cooling season.

EPA received comments from several stakeholders proposing a six-month transition period (to July 23, 2006) for qualifying products. This would allow the supply side a reasonable amount of time to sell remaining inventory that may be labeled as ENERGY STAR and acknowledge that some 13 SEER equipment with preexisting ENERGY STAR labels will still be available in the market in 2006. ENERGY STAR has instituted a programmatic elimination of grandfathering across all product categories as specifications are revised. EPA realizes that preexisting labeled equipment will be in the market and that manufacturers cannot be expected to remove labels from equipment that is already in the distribution channel, therefore, we allow the date of manufacture to be used as a cut off for equipment labeling. The language in Section 6, Effective Date, now clearly articulates that the date of manufacture is the date that is used to determine qualification with the ENERGY STAR specification. By using the date of manufacture, we eliminate the need for this proposed six-month transition period requested by commentors.

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- 6) **Future Specification Revisions:** EPA reserves the right to change the specification should technological and/or market changes affect its usefulness to consumers, industry, or the environment. In keeping with current policy, revisions to the specification are arrived at through stakeholder discussions. In the event of a specification revision, please note that ENERGY STAR qualification is not automatically granted for the life of a product model. To qualify with the energy efficiency criteria of ENERGY STAR, a product model must meet the ENERGY STAR specification in effect on the date of manufacture. The date of manufacture is specific to each unit and is the date on which a unit is considered to be completely assembled.