



ENERGY STAR® Program Requirements Product Specification for Room Air Conditioners

Eligibility Criteria Final Draft Version 3.0

1 **Note:** With this Final Draft Version 3.0 Specification for ENERGY STAR Room Air Conditioners (RACs),
2 EPA is finalizing the new requirements for RACs that include strengthened EER levels and new criteria
3 encouraging intelligent energy-saving product features in ENERGY STAR products.

4 The connected sections of Version 3.0 have been temporarily removed since work on connected for
5 RACs is ongoing. EPA plans to continue to work with stakeholders in the coming months on the
6 connected language and will integrate the connected criteria into the Version 3.0 specification once they
7 have been finalized.

8 As previously noted in the Refrigerator/Freezer specification development process, to be eligible to take
9 advantage of an allowance, a product must have the demand response (DR) functionality of its connected
10 features certified using the still-to-be developed ENERGY STAR test method. EPA notes that AHAM has
11 recently finished developing a new test procedure to verify RAC DR functionality and has shared this test
12 with DOE and EPA. DOE's efforts to develop the ENERGY STAR test method have been delayed due to
13 the lack of RACs currently available with connected functionality. At this point in time, it is unclear
14 whether an ENERGY STAR test method will be finalized by the time the specification takes effect. If a
15 test method is not available, manufacturers could opt to have RACs with connected functionality certified
16 as connected (based on inspection of the product and/or product documentation), but could not use the
17 allowance to meet the minimum EER levels.

18 EPA welcomes comments on this Final Draft proposal by May 31, 2012; please send comments via email
19 to appliances@energystar.gov.

20 Following is the **Final Draft Version 3.0** ENERGY STAR Product Specification for Room Air
21 Conditioners. A product shall meet all of the identified criteria to earn the ENERGY STAR.

22 1) **Definitions:** Below are the definitions of the relevant terms in this document. Unless otherwise
23 specified, these definitions are consistent with the definitions in the DOE test procedure at 10 CFR
24 430, Subpart B, Appendix F.

25 A. **Room Air Conditioner (RAC):** A consumer product, other than a "packaged terminal air
26 conditioner," which is powered by a single phase electric current and which is an encased
27 assembly designed as a unit for mounting in a window or through the wall for the purpose of
28 providing delivery of conditioned air to an enclosed space. It includes a prime source of
29 refrigeration and may include a means for ventilating and heating.

30 1. **Casement-only:** A RAC designed for mounting in a casement window with an encased
31 assembly with a width of 14.8 inches or less and a height of 11.2 inches or less.

32 2. **Casement-slider:** A RAC with an encased assembly designed for mounting in a sliding or
33 casement window with a width of 15.5 inches or less.

34 3. **Reverse Cycle:** A RAC that employs a means for reversing the function of the indoor and
35 outdoor coils such that the indoor coil becomes the refrigerating system condenser, allowing
36 for heating of the air in the conditioned space; similarly, the outdoor coil becomes the
37 evaporator, utilizing outdoor air as a source of heat.

- 38 4. Through the Wall (TTW): A RAC without louvered sides. These units may also be referred to
39 as “built-in” units.
- 40 5. Electromechanical: A RAC that measures room temperature with a thermostat that
41 undergoes a physical change (dimensional, phase change, etc.) relative to temperature, and
42 utilizes mechanical rotary, switch, or similar user controls for cooling output, fan speed,
43 desired temperature, or other features.
- 44 B. Basic Model: All units of a given type of product (or class thereof) manufactured by one
45 manufacturer, having the same primary energy source, and which have essentially identical
46 electrical, physical, and functional (or hydraulic) characteristics that affect energy consumption,
47 energy efficiency, water consumption, or water efficiency.
- 48 C. Energy Efficiency Ratio (EER): The ratio of cooling output (measured in BTU per hour) to
49 electrical energy input (measured in Watts).
- 50 D. Louvered Sides: Exterior side vents on a RAC enclosure to facilitate airflow over the outdoor coil.
- 51 E. Packaged Terminal Air Conditioner (PTAC): A wall sleeve and a separate unencased
52 combination of heating and cooling assemblies specified by the builder and intended for mounting
53 through the wall. It includes a prime source of refrigeration, separable outdoor louvers, forced
54 ventilation, and heating availability energy.
- 55 F. Portable Air Conditioner: A single package air conditioner typically mounted on wheels for the
56 purpose of moving the unit from place to place within a building or structure.

57 2) **Scope:**

- 58 A. Included Products: Products that meet the definition of a Room Air Conditioner as specified
59 herein are eligible for ENERGY STAR qualification, with the exception of those products listed in
60 Section 2.B.
- 61 B. Excluded Products: PTACs, portable air conditioners, and models with electric resistance heat as
62 the primary heat source are not eligible for ENERGY STAR qualification under this specification.
63 Products that are covered under other ENERGY STAR product specifications are not eligible for
64 qualification under this specification.

65 3) **Core Qualification Criteria:**

- 66 A. Energy Efficiency Ratio (EER): EER shall be greater than or equal to the Minimum EER (EER_{MIN})
67 as calculated per Equation 1.

68 **Equation 1. Calculation of Minimum EER**

$$EER_{MIN} = EER_{BASE} - EER_{Adder_Connected}$$

69 *where,*

70 EER_{BASE} is the base EER, per Table 1, 2 or 3

71 $EER_{Adder_Connected}$ is the EER connected allowance, per Table 4

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84 b. After the above period, when the compressor is off, the fan may be cycled on for up to
85 17% of the total cycle time to facilitate accurate control of room temperature. For
86 example, the fan may run for 1 minute then cycle off for at least 5 minutes or the fan may
87 run for 2 minutes then cycle off for at least 10 minutes. Manufacturers may use other fan
88 run durations, but fan run time shall not exceed 17% of total cycle time.

89 c. Through the Wall RACs, as defined in Section 1, may include an installer accessible
90 setting that disables Energy-Saver Mode functionality. Access to this setting shall require
91 the use of tool(s), and removal of a panel, or the like.
92

93 2. Products, excepting electromechanical RACs as defined in Section 1, shall ship with Energy
94 Saver Mode enabled as the default setting.

95 a. Products, excepting electromechanical RACs as defined in Section 1, shall default to
96 Energy Saver Mode each time the unit is turned on. However, products are not required
97 to default to Energy Saver Mode upon restoration of power after an outage.

98 D. Filter Reminder:

99 1. Products, excepting electromechanical RACs as defined in Section 1, shall have a filter
100 reminder that provides visual notification recommending the filter be checked, cleaned or
101 replaced, as applicable. The filter reminder may be based on operating hours, sensing
102 technology, or other means.

103 2. Through the Wall RACs, as defined in Section 1, may include an installer accessible setting
104 that disables Filter Reminder functionality. Access to this setting shall require the use of
105 tool(s), and removal of a panel, or the like.

106 **Note:** During the January 31st webinar stakeholders commented that operators of hospitality and other
107 commercial properties often prefer to configure their RACs for continuous fan operation. RACs where the
108 fan cycles on and off were noted to generate complaints from guests due to sleep interruption, which can
109 be costly for the property owner. The revised criteria allows for Energy Saver Mode to be disabled at the
110 time of installation in Through the Wall RACs, which are commonly used in hospitality and other
111 commercial locations. The additional criteria mandate that all RACs ship with the Energy Saver Mode
112 enabled.

113 EPA extended the same approach for the filter reminder in Through the Wall RACs. Stakeholders noted
114 that commercial units tend to be cleaned and maintained on a regular basis, which would render the filter
115 reminder superfluous. In addition, consumers in a setting, such as a hotel, may find the light bothersome
116 and/or believe that the unit is malfunctioning, which could be costly for the property owner. Therefore, the
117 revised criteria allows for the filter reminder to be disabled at the time of installation in Through the Wall
118 RACs.

119 In addition, stakeholder comments noted that in the event of a power failure or other event that required
120 an auto-recovery, consumers would expect the unit to go back to its setting when the failure occurred. For
121 this reason, EPA has clarified that for those instances where the unit must perform an auto-recovery it will
122 not be required to default to the Energy Saver Mode. EPA does not anticipate that these instances would
123 occur too often and therefore would not dramatically impact energy savings.

124 E. Significant Digits and Rounding:

125 1. All calculations shall be carried out with directly measured (unrounded) values. EER shall be
126 rounded to the nearest 0.1 Btu per watt-hour, as specified in 10 CFR 430.23(f).

127 2. Compliance with the specification limits shall be evaluated using values rounded to the
128 nearest 0.1 Btu per watt-hour.

129 3. Directly measured or calculated values that are submitted for reporting on the ENERGY
130 STAR website shall be rounded to the nearest significant digit as expressed in the
131 corresponding specification limit (0.1 Btu per watt-hour) and as specified in 10 CFR 430.23(f).

132 E. Model Numbers: Model numbers used for ENERGY STAR qualified product submissions shall be
133 consistent with Federal Trade Commission (FTC) and Department of Energy (DOE) submissions.

134 4) **Connected Product Criteria**: TBD

135 5) **Test Requirements**:

136 A. One of the following sampling plans shall be used to test energy performance for qualification to
137 ENERGY STAR:

138 1. A representative unit shall be selected for testing based on the definition for Basic Model
139 provided in Section 1. above; or

140 2. Units shall be selected for EER testing per the sampling requirements defined in 10 CFR
141 429.15.

142 B. When testing energy efficiency of room air conditioners, the following test method shall be used
143 to determine ENERGY STAR qualification:

144 **Table 5: Test Methods for ENERGY STAR Qualification**

ENERGY STAR Requirement	Test Method Reference
EER	10 CFR 430, Subpart B, Appendix F

145 C. Compliance with Energy Saver Mode and Filter Reminder criteria shall be through examination of
146 product and/or product documentation.
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149 6) **Effective Date**: The ENERGY STAR Room Air Conditioner specification shall take effect on October
150 1, 2013. To qualify for ENERGY STAR, a product model shall meet the ENERGY STAR specification
151 in effect on the model's date of manufacture. The date of manufacture is specific to each unit and is
152 the date (e.g., month and year) on which a unit is considered to be completely assembled.
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154 **Note**: In consideration of the production cycle for RACs, EPA is proposed a revised effective date of
155 October 1, 2013, for Version 3.0.

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