



ENERGY STAR® Program Requirements for Room Air Conditioners

Partner Commitments

Following are the terms of the ENERGY STAR Partnership Agreement as it pertains to the manufacture and labeling of ENERGY STAR certified products. The ENERGY STAR Partner must adhere to the following partner commitments:

Certifying Products

1. Comply with current ENERGY STAR Eligibility Criteria, which define performance requirements and test procedures for room air conditioners. A list of eligible products and their corresponding Eligibility Criteria can be found at www.energystar.gov/specifications.
2. **Prior to associating the ENERGY STAR name or mark with any product**, obtain written certification of ENERGY STAR certification from a Certification Body recognized by EPA for room air conditioners. As part of this certification process, products must be tested in a laboratory recognized by EPA to perform room air conditioner testing. A list of EPA-recognized laboratories and Certification Bodies can be found at www.energystar.gov/testingandverification.

Using the ENERGY STAR Name and Marks

3. Comply with current ENERGY STAR Identity Guidelines, which define how the ENERGY STAR name and marks may be used. Partner is responsible for adhering to these guidelines and ensuring that its authorized representatives, such as advertising agencies, dealers, and distributors, are also in compliance. The ENERGY STAR Identity Guidelines are available at www.energystar.gov/logouse.
4. Use the ENERGY STAR name and marks only in association with certified products. Partner may not refer to itself as an ENERGY STAR Partner unless at least one product is certified and offered for sale in the U.S. and/or ENERGY STAR partner countries.
5. Provide clear and consistent labeling of ENERGY STAR certified room air conditioners.
 - 5.1. The ENERGY STAR mark must be clearly displayed on the top/front of the product (by placement of the ENERGY STAR logo on the FTC's EnergyGuide label, on product labels, and/or as a permanent mark), in product literature (i.e., user manuals, spec sheets, etc.), and on the manufacturer's Internet site where information about ENERGY STAR certified models is displayed.
 - 5.2. It is also recommended that the mark appear on the product packaging.

Verifying Ongoing Product Certification

6. Participate in third-party verification testing through a Certification Body recognized by EPA for room air conditioners, providing full cooperation and timely responses. EPA/DOE may also, at its discretion, conduct tests on products that are referred to as ENERGY STAR certified. These products may be obtained on the open market, or voluntarily supplied by Partner at the government's request.

Providing Information to EPA

7. Provide unit shipment data or other market indicators to EPA annually to assist with creation of ENERGY STAR market penetration estimates, as follows:

- 7.1. Partner must submit the total number of ENERGY STAR certified room air conditioners shipped in the calendar year or an equivalent measurement as agreed to in advance by EPA and Partner. Partner shall exclude shipments to organizations that rebrand and resell the shipments (unaffiliated private labelers).
- 7.2. Partner must provide unit shipment data segmented by meaningful product characteristics (e.g., type, capacity, presence of additional functions) as prescribed by EPA.
- 7.3. Partner must submit unit shipment data for each calendar year to EPA or an EPA-authorized third party, preferably in electronic format, no later than March 1 of the following year.

Submitted unit shipment data will be used by EPA only for program evaluation purposes and will be closely controlled. If requested under the Freedom of Information Act (FOIA), EPA will argue that the data is exempt. Any information used will be masked by EPA so as to protect the confidentiality of the Partner.

8. Report to EPA any attempts by recognized laboratories or Certification Bodies (CBs) to influence testing or certification results or to engage in discriminatory practices.
9. Notify EPA of a change in the designated responsible party or contacts within 30 days using the My ENERGY STAR Account tool (MESA) available at www.energystar.gov/mesa.

Performance for Special Distinction

In order to receive additional recognition and/or support from EPA for its efforts within the Partnership, the ENERGY STAR Partner may consider the following voluntary measures, and should keep EPA informed on the progress of these efforts:

- Provide quarterly, written updates to EPA as to the efforts undertaken by Partner to increase availability of ENERGY STAR certified products, and to promote awareness of ENERGY STAR and its message.
- Consider energy efficiency improvements in company facilities and pursue benchmarking buildings through the ENERGY STAR Buildings program.
- Purchase ENERGY STAR certified products. Revise the company purchasing or procurement specifications to include ENERGY STAR. Provide procurement officials' contact information to EPA for periodic updates and coordination. Circulate general ENERGY STAR certified product information to employees for use when purchasing products for their homes.
- Feature the ENERGY STAR mark(s) on Partner website and other promotional materials. If information concerning ENERGY STAR is provided on the Partner website as specified by the ENERGY STAR Web Linking Policy (available in the Partner Resources section of the ENERGY STAR website), EPA may provide links where appropriate to the Partner website.
- Ensure the power management feature is enabled on all ENERGY STAR certified displays and computers in use in company facilities, particularly upon installation and after service is performed.
- Provide general information about the ENERGY STAR program to employees whose jobs are relevant to the development, marketing, sales, and service of current ENERGY STAR certified products.
- Provide a simple plan to EPA outlining specific measures Partner plans to undertake beyond the program requirements listed above. By doing so, EPA may be able to coordinate, and communicate Partner's activities, provide an EPA representative, or include news about the event in the ENERGY STAR newsletter, on the ENERGY STAR website, etc. The plan may be as simple as providing a list of planned activities or milestones of which Partner would like EPA to be aware. For example, activities may include: (1) increasing the availability of ENERGY STAR certified products by converting the entire product line within two years to meet ENERGY STAR guidelines; (2) demonstrating the economic and environmental benefits of energy efficiency through special in-store displays twice a year; (3) providing information to users (via the website and user's manual) about energy-saving features and operating characteristics of ENERGY STAR certified products; and (4)

building awareness of the ENERGY STAR Partnership and brand identity by collaborating with EPA on one print advertorial and one live press event.

- Join EPA's SmartWay Transport Partnership to improve the environmental performance of the company's shipping operations. The SmartWay Transport Partnership works with freight carriers, shippers, and other stakeholders in the goods movement industry to reduce fuel consumption, greenhouse gases, and air pollution. For more information on SmartWay, visit www.epa.gov/smartway.
- Join EPA's Green Power Partnership. EPA's Green Power Partnership encourages organizations to buy green power as a way to reduce the environmental impacts associated with traditional fossil fuel-based electricity use. The partnership includes a diverse set of organizations including Fortune 500 companies, small and medium businesses, government institutions as well as a growing number of colleges and universities. For more information on Green Power, visit www.epa.gov/greenpower



ENERGY STAR® Program Requirements Product Specification for Room Air Conditioners

Eligibility Criteria Version 4.0

Following is the **Version 4.0** ENERGY STAR Product Specification for Room Air Conditioners. A product shall meet all of the identified criteria to earn the ENERGY STAR.

- 1) Definitions:** Below are the definitions of the relevant terms in this document. Where noted below, definitions are identical to the definitions in the U.S Department of Energy (DOE) test procedure at 10 Code of Federal Regulations (CFR) 430, Subpart B, Appendix F or in 10 CFR 430.2. When in conflict, the definitions in the CFR take precedence.
- A. **Room Air Conditioner (RAC)**¹: A consumer product, other than a “packaged terminal air conditioner,” which is powered by a single phase electric current and which is an encased assembly designed as a unit for mounting in a window or through the wall for the purpose of providing delivery of conditioned air to an enclosed space. It includes a prime source of refrigeration and may include a means for ventilating and heating.
 - 1. **Casement-only**¹: A RAC designed for mounting in a casement window with an encased assembly with a width of 14.8 inches or less and a height of 11.2 inches or less.
 - 2. **Casement-slider**¹: A RAC with an encased assembly designed for mounting in a sliding or casement window with a width of 15.5 inches or less.
 - 3. **Reverse Cycle**²: A RAC that employs a means for reversing the function of the indoor and outdoor coils such that the indoor coil becomes the refrigerating system condenser, allowing for heating of the air in the conditioned space; similarly, the outdoor coil becomes the evaporator, utilizing outdoor air as a source of heat.
 - 4. **Through the Wall (TTW)**: A RAC without louvered sides. These units may also be referred to as “built-in” units.
 - 5. **Electromechanical**: A RAC that measures room temperature with a thermostat that undergoes a physical change (dimensional, phase change, etc.) relative to temperature, and utilizes mechanical rotary, switch, or similar user controls for cooling output, fan speed, desired temperature, or other features.
 - B. **Basic Model**¹: All units of a given type of covered product (or class thereof) manufactured by one manufacturer, having the same primary energy source, and which have essentially identical electrical, physical, and functional (or hydraulic) characteristics that affect energy consumption, energy efficiency, water consumption, or water efficiency.
 - C. **Combined Energy Efficiency Ratio (CEER)**: The ratio of measured cooling output (in BTU per hour) to the sum of the measured average annual electrical energy input (in watts) and measured annual standby/off-mode power consumption (in watts). CEER is expressed in BTUs per watt-hour.
 - D. **Ethylene Propylene Diene Monomer (EPDM)**: A closed-cell rubber that is used for outdoor gasketing and/or heating, ventilating, and air conditioning applications.
 - E. **Louvered Sides**: Exterior side vents on a RAC enclosure to facilitate airflow over the outdoor coil.
 - F. **Packaged Terminal Air Conditioner (PTAC)**¹: A wall sleeve and a separate unencased combination of heating and cooling assemblies specified by the builder and intended for mounting through the wall. It includes a prime source of refrigeration, separable outdoor louvers, forced ventilation, and heating availability energy.

¹ 10 CFR 430.2

² Derived from ASHRAE 58 – Method of Testing for Rating Room Air Conditioner and Package Terminal Air Conditioner Heating Capacity

- G. Portable Air Conditioner³: A single package air conditioner typically mounted on wheels for the purpose of moving the unit from place to place within a building or structure.

2) Scope:

- A. Included Products: Products that meet the definition of a room air conditioner as specified herein are eligible for ENERGY STAR certification, with the exception of those products listed in Section 2.B.
- B. Excluded Products: PTACs, portable air conditioners, and room air conditioner models with electric resistance heat as the primary heat source are not eligible for ENERGY STAR certification under this specification. Products that are covered under other ENERGY STAR product specifications, e.g., dehumidifiers, are not eligible for certification under this specification.

3) Certification Criteria:

- A. Combined Energy Efficiency Ratio (CEER): CEER shall be greater than or equal to the Minimum CEER ($CEER_{MIN}$) as calculated per Equation 1.

Equation 1. Calculation of Minimum CEER

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

where,

$CEER_{BASE}$ is the value provided in Table 1, 2 or 3 below, depending on product type

$CEER_{Adder_Connected}$ is the CEER connected allowance derived using the calculation provided in Table 4, below

Table 1: Units Without Reverse Cycle

Capacity (BTU/hour)	$CEER_{BASE}$ (units with louvered sides)	$CEER_{BASE}$ (units without louvered sides)
< 6,000	12.1	11.0
6,000 to 7,999		
8,000 to 10,999	12.0	10.6
11,000 to 13,999		10.5
14,000 to 19,999	11.8	10.2
20,000 to 27,999	10.3	10.3
≥ 28,000	9.9	

³ CSA C370-09 – Cooling Performance of Portable Air Conditioners
ENERGY STAR Program Requirements for Room Air Conditioners – Eligibility Criteria

Table 2: Units With Reverse Cycle

Capacity (BTU/hour)	CEER _{BASE} (units with louvered sides)	CEER _{BASE} (units without louvered sides)
< 14,000		10.2
≥ 14,000		9.6
< 20,000	10.8	
≥ 20,000	10.2	

Table 3: Casement Units

Casement Type	CEER _{BASE}
Casement-Only	10.5
Casement-Slider	11.4

Table 4: Connected Allowance

Product Type	CEER _{Adder_Connected} ²
All RAC types covered in Tables 1, 2 and 3 ¹	0.05 x CEER _{BASE}

¹ Product must be certified using the final ENERGY STAR Test Method for Room Air Conditioners to Validate Demand Response (TBD) to use the allowance.

² Calculated allowance shall be rounded down to the nearest tenth before being applied in Equation 1.

B. Energy Saver Mode:

1. Product shall have an “Energy Saver Mode,” which may be consumer override-able. In this mode, fan operation shall occur only in conjunction with compressor operation, with the following exceptions:
 - a. The fan may continue to run for a period not exceeding 5 minutes after the compressor is switched off.
 - b. After the above period, when the compressor is off, the fan may be cycled on for up to 17% of the total compressor off cycle time to facilitate accurate control of room temperature. For example, the fan may run for 1 minute then cycle off for at least 5 minutes or the fan may run for 2 minutes then cycle off for at least 10 minutes. Manufacturers may use other fan run durations, but fan run time shall not exceed 17% of total cycle time
 - c. Through the Wall RACs, as defined in Section 1 may include an installer accessible setting that disables Energy Saver Mode functionality. The setting may be accessible from the product’s controls or may use a physical switch, jumper or the like. Appropriate measures shall be taken to ensure that the setting is implemented as an installer setting not intended to be consumer accessible. For example, physical switches or jumpers shall require the use of tool(s), removal of a panel, or the like; settings accessible in the product’s controls shall require a unique sequence of button presses, shall be in a hidden menu, shall require an installer password, or the like.
2. Products, excepting electromechanical RACs as defined in Section 1, shall ship with Energy Saver Mode enabled as the default setting.

3. Products, excepting electromechanical RACs as defined in Section 1, shall default to Energy Saver Mode each time the unit is switched on. However, products are not required to default to Energy Saver Mode upon restoration of power after an electrical power outage that results in a loss of power to the unit.

C. Filter Reminder:

1. Products, excepting electromechanical RACs as defined in Section 1, shall have a filter reminder that provides visual notification recommending the filter be checked, cleaned or replaced, as applicable. The filter reminder may be based on operating hours, sensing technology, or other means.
2. TTW RACs, as defined in Section 1, may include an installer accessible setting that disables Filter Reminder functionality. The setting may be accessible from the product's controls or may use a physical switch, jumper or the like. Appropriate measures shall be taken to ensure that the setting is implemented as an installer setting not intended to be consumer accessible. For example, physical switches or jumpers shall require the use of tool(s), removal of a panel, or the like; settings accessible in the product's controls shall require a unique sequence of button presses, shall be in a hidden menu, shall require an installer password, or the like.

D. Installation Requirements:

1. *Installation Materials (window units only):* Room air conditioners intended for window installations shall be shipped with weather stripping and/or gasket materials appropriate for all intended applications, including the window size(s) the unit is typically used for, when installed according to provided instructions. The materials shall minimize air leaks (seal) between the room air conditioner and the window opening, including the area between the room air conditioner and the window sash, and the area between the room air conditioner and the window sill (if bottom-mounted) or the window head (if top-mounted). The materials shall also seal gaps between fixed and movable window sashes. Acceptable weather stripping or gasket material includes, but is not limited to, vinyl clad foam, EPDM cellular rubber, silicone rubber, or comparable alternatives that resist air and water infiltration as well as degradation due to ultraviolet (UV) radiation exposure. Room air conditioner side curtains must be tight fitting to minimize air leaks and contain insulation in the panel with a minimum insulation value of R1 as determined by the Federal Trade Commission's (FTC) Labeling and Advertising of Home Insulation regulations, 16 CFR part 460.
2. *Installation Instructions:* Products shall ship with detailed installation documentation that includes text and, where applicable, diagrams intended to facilitate installation that minimizes air leakage and thermal losses. Instructions shall include recommendations on the proper locations to install weather stripping or gaskets and, optionally, the use of temporary tape or removable caulk to seal the unit in place. If the product is a TTW unit, instructions shall also include a recommendation that the consumer install an appropriately sized cover, to include recommended specifications that facilitate satisfactory fit, when the RAC is not in use to provide additional insulation and air sealing.

E. Significant Digits and Rounding: All calculations shall be carried out as specified in Appendix F to Subpart B of Part 430 and 10 CFR Part 430.23(f).

F. Model Numbers: Model numbers used for ENERGY STAR certified product submissions shall be consistent with FTC and DOE submissions.

4) Connected Product Criteria:

The following optional connected criteria are applicable to Included Products, Section 2.A,

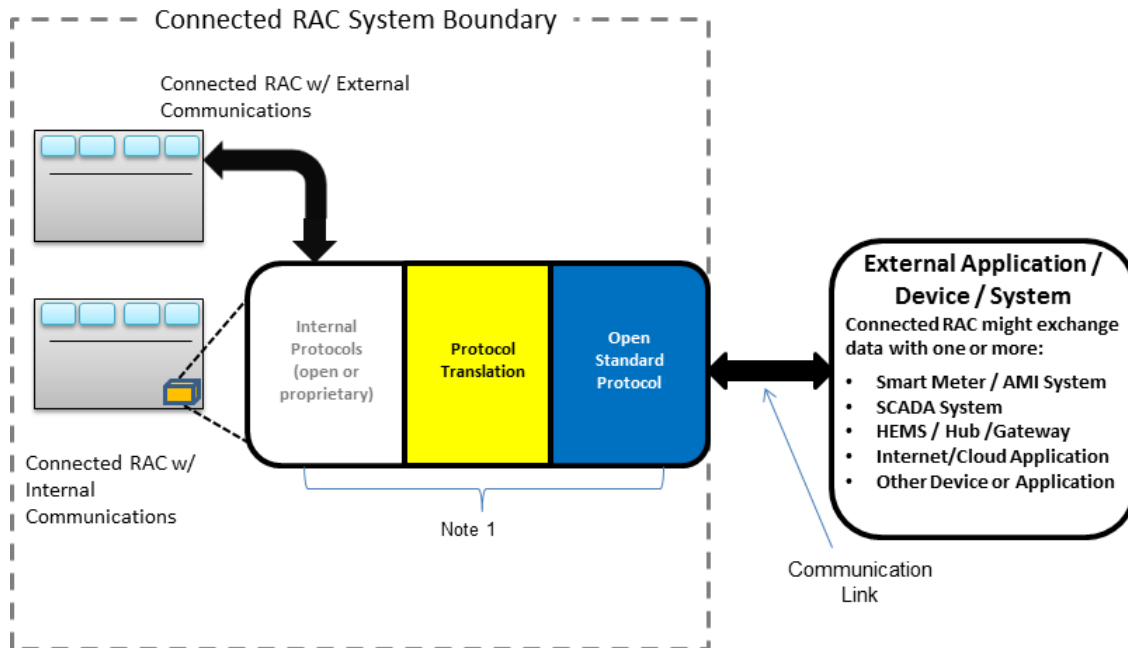
A. Connected Room Air Conditioner System

To be recognized as connected and to be eligible for the connected allowance, a Connected RAC System, as shown in Figure 1) shall include the appliance plus all elements (hardware, software) required to enable communication in response to consumer-authorized energy related commands (*not including third-party remote management which may be made available solely at the discretion of the manufacturer*). These elements may be resident inside or outside of the appliance. This capability shall be supported through one or more means, as identified in section 4.B.2.

The specific design and implementation of the Connected RAC System is at the manufacturer's discretion provided it is interoperable with other devices via open communications protocol and enables economical consumer-authorized third party access to the functionalities provided for in sections 4.D, 4.F and 4.G. The capabilities shall be supported through one or more means, as identified in section 4.B.2. A product that enables economical and direct, on-premises, open-standards based interconnection is the preferred option for meeting this requirement, but alternative approaches, where open-standards connectivity is enabled only outside of the consumer premises, are also acceptable.

The product must continue to comply with the applicable product safety standards – the addition of the functionality described below shall not override existing safety protections and functions.

Figure 1. Connected Room Air Conditioner System Boundary – Illustrative Example



Note 1: Communication device(s), link(s) and/or processing that enables open standards-based communication between the Connected Room Air Conditioner System and Energy Management Device/Application(s). These elements could be within the appliance, and/or an external communication module, a hub/gateway, or in the Internet/cloud.

B. Communications

1. Open Standards – Communication with entities outside the Connected RAC System that enables connected functionality (sections 4.D, 4.F and 4.G) must use, for all communication layers, standards:

- Included in the Smart Grid Interoperability Panel (SGIP) Catalog of Standards,⁴ and/or

⁴ http://collaborate.nist.gov/twiki-sggrid/bin/view/SmartGrid/PMO#Catalog_of_Standards_Processes

- Included in the NIST Smart Grid framework Tables 4.1 and 4.2, and/or
 - Adopted by the American National Standards Institute (ANSI) or another well-established international standards organization such as the International Organization for Standardization (ISO), International Electrotechnical Commission (IEC), International Telecommunication Union (ITU), Institute of Electrical and Electronics Engineers (IEEE) or Internet Engineering Task Force (IETF).
2. Communications Hardware Architecture – Communication with entities outside the Connected RAC System that enables connected functionality (sections 4.D through 4.G) shall be enabled by any of the following means, according to the manufacturer’s preference:
- a. Built-in communication technology
 - b. Manufacturer-specific external communication module(s) and/or device(s)
 - c. Open standards-based communication port on the appliance combined with open standards-based communications module
 - d. Open standards-based communication port(s) on the appliance in addition to a, b or c, above

If option b or c is used, the communication module/device(s) must be easy for a consumer to install and be shipped with the appliance, provided to the consumer at the time of sale, or provided to the consumer in a reasonable amount of time after the sale.

C. Open Access

To enable interconnection with the product, in addition to section 4B1 that requires open-standards, an interface specification, application programming interface (API) or similar documentation shall be made available to interested parties that at a minimum, allows transmission, reception and interpretation of the following information:

- Energy Consumption Reporting specified in section 4.D (must include accuracy, units and measurement interval);
- Operational Status, User Settings & Messages specified in section 4.F (if transmitted via a communication link);
- Demand Response specified in section 4.G.

D. Energy Consumption Reporting

In order to enable simple, actionable energy use feedback to consumers and consumer authorized energy use reporting to 3rd parties, the product shall be capable of transmitting energy consumption data via a communication link to energy management systems and other consumer authorized devices, services, or applications. This data shall be representative of the product’s interval energy consumption. It is recommended that data be reported in watt-hours for intervals of 15 minutes or less, however, representative data may also be reported in alternate units and intervals as specified in the product manufacturer’s interface specification or API detailed in section 4.C.

The product may also provide energy use feedback to the consumer on the product itself. On-product feedback, if provided, may be in units and format chosen by the manufacturer (e.g., \$/month).

E. Remote Management

The product shall be capable of receiving and responding to consumer authorized remote requests (*not including third-party remote management which may be made available solely at the discretion of the manufacturer*), via a communication link, similar to consumer controllable functions on the product. The product is not required to respond to remote requests that would compromise performance and/or product safety as determined by the product manufacturer.

F. Operational Status, User Settings & Messages

1. The product shall be capable of providing the following information to energy management systems and other consumer authorized devices, services or applications via a communication link:
 - Operational / Demand Response status (e.g., off/standby, energy saver mode, low cool, max cool, delay appliance load, temporary appliance load reduction).
2. The product shall be capable of providing the following information on the product and/or to energy management systems and other consumer authorized devices, services or applications via communication link:
 - At least two types of messages relevant to the energy consumption of the product. For example, messages for room air conditioners might address a performance issue, such as a clogged filter, or reporting energy consumption that is outside the product's normal range.

G. Demand Response

The product shall have the capability to receive, interpret and act upon consumer-authorized signals by automatically adjusting its operation depending on both the signal's contents and settings from consumers. At a minimum, the product shall be capable of providing the following for all cycle and setting combinations:

1. *Delay Appliance Load Capability*: The capability of the product to respond to a signal in accordance with consumer settings, except as permitted below; by increasing the set temperature by at least 4°F for at least 4 hours.
 - a. Maximum Set Temperature – The increased set temperature shall not exceed 85°F.
 - b. Consumer override – The consumer shall be able to override the product's Delay Appliance Load response without limitation.
 - c. The product shall be able to provide at least one Delay Appliance Load response in a rolling 24-hour period.
2. *Temporary Appliance Load Reduction Capability*: The capability of the product to respond to a signal in accordance with consumer settings, except as permitted below; by disabling compressor operation for at least 10 minutes.
 - a. Maximum Set Temperature – The product shall not respond if the set temperature is $\geq 85^{\circ}\text{F}$.
 - b. Consumer override – The consumer shall be able to override the product's Temporary Appliance Load Reduction response without limitation.
 - c. The product shall be able to provide at least three Temporary Appliance Load Reduction responses in a rolling 24-hour period. The product is not required to provide more than one Temporary Appliance Load Reduction response per 60-minute period.

H. Information to Consumers

If additional modules, devices, services and/or infrastructure are part of the configuration required to activate the product's communications capabilities, prominent labels or other forms of consumer notifications with instructions shall be displayed at the point of purchase and in the product literature. These shall provide specific information on what consumers must do to activate these capabilities (e.g. "*This product has Wi-Fi capability and requires Internet connectivity and a wireless router to enable interconnection with an Energy Management System, and/or with other external devices, systems or applications.*").

5) **Test Requirements:**

- A. One of the following sampling plans shall be used to test energy performance for certification to ENERGY STAR:
 1. A single unit is selected, obtained, and tested. The measured performance of this unit and of

each subsequent unit manufactured must be equal to or better than the ENERGY STAR specification requirements. Results of the tested unit may be used to certify additional individual model variations within a Basic Model as long as the definition for Basic Model provided in Section 1, above, is met; or

2. Units are selected for testing and results calculated according to the sampling requirements defined in 10 CFR Part 429, Subpart B § 429.16. The certified rating must be equal to or better than the ENERGY STAR specification requirements. Results of the tested unit may be used to certify additional model variations within a Basic Model as long as the definition provided above and in 10 CFR Part 430.2 is met.

- B. When testing room air conditioners, the following test method shall be used to determine ENERGY STAR certification:

Table 5: Test Methods for ENERGY STAR Certification

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

- C. Compliance with Energy Saver Mode, Filter Reminder, and Installation criteria shall be through examination of product and/or product documentation.
- D. Compliance with connected functionality requirements, as specified in Section 4, shall be demonstrated through examination of product and/or product documentation. In addition, upon publication of a final test method, demand response functionality shall be tested using the ENERGY STAR Test Method for Room Air Conditioners to Validate Demand Response. After the publication of the final Test Method, it must be used to certify demand response functionality in order for a product to be listed as having connected functionality on the Qualified Product List, and to be eligible for any connected allowance.

6) Effective Date: The ENERGY STAR Room Air Conditioner specification shall take effect on **October 26, 2015**. Any product model with a date of manufacture on or after this date shall meet this specification to earn the ENERGY STAR. The date of manufacture is specific to each unit and is the date on which a unit is considered completely assembled.

7) Future Specification Revisions: EPA reserves the right to change the criteria should federal requirements, 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 industry discussions. In the event of a specification revision, please note that ENERGY STAR certification is not automatically granted for the life of a product model.