



# ENERGY STAR® Program Requirements Product Specification for Dehumidifiers

## Eligibility Criteria DRAFT 2: Version 3.0

Following is the **DRAFT 2 Version 3.0** product specification for ENERGY STAR qualified dehumidifiers. A product shall meet all of the identified criteria if it is to earn the ENERGY STAR.

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

- A. **Dehumidifier:** A self-contained, electrically operated, and mechanically encased assembly consisting of: (a) a refrigerated surface (evaporator) that condenses moisture from the atmosphere; (b) a refrigerating system, including an electric motor; (c) an air-circulating fan; and (d) means for collecting and/or disposing of the condensate<sup>1</sup>.
  - a. **Stand Alone:** Portable unit designed to provide dehumidification within the confined living space where it is placed and plugged into an electrical outlet.
  - b. **Whole House:** Unit designed to be incorporated into the home's HVAC system, or installed with its own duct system, providing dehumidification for all conditioned spaces within the building enclosure.
- B. **Capacity**<sup>2</sup>: A measure of the ability of a dehumidifier to remove moisture from its surrounding atmosphere, measured in pints collected per 24 hours of continuous operation. Capacity shall be measured according to the test standard referenced in Section 4, below.
- C. **Energy Factor (EF)**<sup>2</sup>: A measure of energy efficiency of a dehumidifier calculated by dividing the water removed from the air by the energy consumed, measured in liters per kilowatt hour (L/kWh). EF shall be calculated according to the test standard referenced in Section 4, below.
- D. **Basic Mode Group**<sup>1</sup>: All units of a given type 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.

**Note:** For purposes of harmonizing with the U.S. Department of Energy (DOE) minimum standards, EPA has revised the definitions for Capacity, Energy Factor and Basic Model Group based on the definitions provided in the DOE test procedure (10 CFR Part 430). The existing Dehumidifier definition is similar to that provided in the DOE test procedure and hence does not need further revision.

**2) Scope:**

- A. **Included Products:** Products that meet the definition of a dehumidifier as specified herein are eligible for ENERGY STAR qualification, with the exception of products listed in Section 2.B. Stand alone and whole house units with capacities measuring less than or equal to 185 U.S. pints (87.5 liters) are eligible for ENERGY STAR.
- B. **Excluded Products:** Dehumidifiers with daily water-removal capacities greater than 185 U.S.

<sup>1</sup> 10 CFR Subpart A of Part 430

<sup>2</sup> 10 CFR Appendix X to Subpart B of Part 430

pints (87.5 liters) are not eligible for ENERGY STAR.

3) **Qualification Criteria:**

- A. Energy Efficiency Requirements: To qualify for ENERGY STAR, dehumidifiers shall meet the EF requirements provided in Table 1, below.

**Table 1: Performance Criteria for ENERGY STAR Qualified Dehumidifiers**

<b>Product Capacity (Pints/Day)</b>	<b>Energy Factor Under Test Conditions (L/kWh)</b>
< 75	> 1.90
75 ≤ 185	≥ 2.80

**Note:** Provision of an adjustable humidistat control allows higher capacity units (i.e. 50-75 pts/day) to be used where less water removal is needed. EPA has conducted tests on some of these units to better understand part load efficiency performance. This testing confirms that their efficiency when measured under the ANSI/AHAM DH-1 test conditions is maintained at part-load capacities. EPA therefore continues to believe that larger capacity units will meet the needs of smaller spaces while offering consumers more efficient and cost effective solutions. As a result, a single Energy Factor level continues to be proposed for all units rated less than 75 pints/day.

EPA is aware of concerns that few smaller capacity units meet the proposed Energy Factor and therefore, smaller units are being disadvantaged. EPA welcomes entrants into the market among smaller units that can meet these high efficiency requirements, but reiterates that higher capacity units with humidistat control offer consumers a cost effective option. EPA considered whether the physical size of higher capacity units might be an issue for consumers, but found little correlation between physical size and moisture removal capacity, even when efficiency is taken into account.

EPA also received questions about the cost effectiveness of units meeting the proposed 2.8 Energy Factor for high capacity units. EPA's assessment of the cost effectiveness is based on our initial research, which found that there are units meeting this level that are cost-competitive with less efficient units.

Stakeholders are encouraged to provide data and other documentation that supports or challenges the single EF level approach.

B. Other Requirements:

Qualifying units shall be equipped with an adjustable humidistat control or shall require a remote humidistat control to operate.

**Note:** EPA has updated the humidistat requirement to allow for remote humidistat controls. Dehumidifiers with built-in humidistat controls, or designed to work with humidistat controls located in living spaces, are eligible to qualify for ENERGY STAR.

Prior to releasing the Draft 1 specification, EPA received a comment that suggested some dehumidifiers have continuous fan operation to monitor humidity levels in the surrounding space. In response, EPA proposed an approach in the Draft 1 that sought to reduce the amount of energy consumed while in this "idle mode". However, since releasing the Draft 1 EPA has been unable to confirm that any dehumidifiers sold by ENERGY STAR partners have continuous fan operation. Therefore, EPA has decided to remove the requirement proposed regarding fan runtime frequency and fan power.

C. Significant Digits and Rounding:

- a. All calculations shall be carried out with directly measured (unrounded) values.
- b. Unless otherwise specified, compliance with specification limits shall be evaluated using directly measured or calculated values without any benefit from rounding.
- c. Directly measured or calculated values that are submitted for reporting on the ENERGY STAR website shall be rounded to the nearest significant digit as expressed in the corresponding specification limit.

4) **Test Requirements:**

- A. Units shall be selected for testing per the sampling requirements defined in 10 CFR 429.36, Subpart B.
- B. When testing dehumidifiers, the following test methods shall be used to determine ENERGY STAR qualification:

<b>ENERGY STAR Requirement</b>	<b>Test Method Reference</b>
Capacity and Energy Factor	10 CFR Appendix X to Subpart B of Part 430

**Note:** For purposes of harmonizing with the applicable DOE test procedures, EPA is proposing to reference 10 CFR Appendix X to Subpart B of Part 430 for purposes of measuring and calculating Capacity and Energy Factor. EPA believes that this change would not have any effect on the testing of the dehumidifiers as the DOE test procedure refers to the 2001 ENERGY STAR test procedure, which in turn refers to the ANSI/AHAM DH-1 test procedure.

EPA has also updated the sampling requirements to be more specific that the requirements are defined under the section 429.36 of 10 CFR Subpart B.

- 5) **Effective Date:** This ENERGY STAR Dehumidifier Specification shall take effect on **October 1, 2012**. To qualify for ENERGY STAR, a product model shall 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.

**Note:** Coupled with the fact that DOE has a new standard going into effect in October 2012, EPA is proposing an effective date of October 1, 2012 for this revision, to align with the upcoming change in the minimum efficiency standards for dehumidifiers. However, in the past stakeholders have found it confusing when ENERGY STAR and DOE effective dates aligned. Stakeholders are encouraged to provide feedback if there are any concerns with moving the effective date to October 1, 2012.

- 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 industry discussions. In the event of a specification revision, please note that the ENERGY STAR qualification is not automatically granted for the life of a product model.