



ENERGY STAR[®] Qualified Residential Dehumidifiers
Final Draft Product Specification
September 20, 2000



Below is the final *draft* specification for ENERGY STAR qualified dehumidifiers. A product must meet all of the identified criteria if it is to be labeled as ENERGY STAR by its manufacturer.

- 1) **Definitions:** Below is a brief description of dehumidifiers and common energy consumption characteristics relevant to ENERGY STAR.
 - A. **Dehumidifier:** A dehumidifier is a self-contained, electrically operated, and mechanically refrigerated encased assembly consisting of (a) a refrigerated surface 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.¹
 - B. **Energy Factor:** The energy efficiency of dehumidifiers will be measured in liters of water removed per kilowatt-hour (kWh) of energy consumed at standard test conditions. This metric is defined as the energy factor. Energy factor will be calculated according to the test procedure listed in Section 4.
 - C. **Capacity:** Capacity refers to water removal capacity at standard test conditions, measured in liters. Capacity will be calculated according to the test procedure listed in Section 4.

EPA Comments: EPA's interest in developing energy-efficiency guidelines for dehumidifiers is driven by the following: 1) significant per unit energy consumption – up to 1,000 kWh/year; 2) variation in energy efficiency among product models; and 3) the potential for more energy-efficient design based on engineering analysis and test data.

After reviewing the Canadian Standard, EPA does not feel it is necessary to “reinvent” the development process by designing a new program framework. As such, the definitions, program scope (i.e., qualifying products), and test procedure are consistent with CAN/CSA C749-94. The primary difference between ENERGY STAR as proposed, and the Canadian Standard is the energy-efficiency criteria/specification level.

One of the tenets of the ENERGY STAR philosophy is to maintain customer satisfaction by increasing energy efficiency without sacrificing performance. Accordingly, the energy-efficiency criteria for dehumidifiers will focus on energy factor (EF), which is a direct measurement of the unit's function and efficiency, and does not place limits on a unit's capacity.

- 2) **Qualifying Products:** For the purposes of ENERGY STAR, dehumidifiers include the following:

¹ Source: *Performance of Dehumidifiers, National Standard of Canada CAN/CSA-C749-94*. Ontario, Canada 1994.

- A. Standard Capacity Dehumidifiers: Dehumidifiers with daily water-removal capacities up to 35 Liters (74.0 US pints).²
 - B. High Capacity Dehumidifiers: Dehumidifiers with daily water-removal capacities up to 57 Liters (120.5 US pints).
- 3) Energy-Efficiency Specifications for Qualifying Products: Only those products listed in Section 2 that meet the criteria outlined in Table 1 or Table 2 below may qualify as ENERGY STAR.

Table 1	
Draft Criteria for ENERGY STAR Qualified Standard Capacity Dehumidifiers	
Product Capacity (L/day)	Energy Factor Under Test Conditions (L/kWh)³
L/day < 10	? 1.20
10 ? L/day < 25	? 1.30
25 ? L/day ? 35	? 1.50

EPA Comments: Based on a technical review of existing products and discussions with manufacturers, EPA feels that the specification listed above for standard capacity dehumidifiers is challenging, reasonable, and technology-neutral. In keeping with EPA’s ENERGY STAR philosophy, the proposed specification recognizes approximately the top 25% of energy performers currently on the market (see footnote 3). As such, EPA has identified for each capacity bin, a sub-set of the current market that meets the proposed specification. In response to industry comments on the Draft 1 Product Specification, EPA has increased the upper limit of the third capacity bin for standard capacity dehumidifiers to 35 L/day. EPA has also decided to continue measuring the product capacity in terms of liters.

After reviewing product test data and identifying the most efficient models, EPA developed three capacity bins for standard capacity dehumidifiers based on distinct differences in energy factor. The decision to set the specification based on capacity was influenced by the following: 1) EPA’s 75th percentile analysis (to recognize approximately the top 25% of product models) showed variations in energy factor for the four capacity bins identified above; and 2) engineering analysis suggests that higher capacity products are able to cost-effectively achieve greater energy factors. Based on this result, EPA does not believe that it is reasonable to directly compare high capacity units to low capacity units.

Given that product efficiencies vary within size categories, and the corresponding retail prices are similar across the varying efficiencies, EPA believes that several low-cost design options exist that when implemented will allow all interested manufacturers to meet the proposed specification.

² Source: *Performance of Dehumidifiers, National Standard of Canada CAN/CSA-C749-94*. Ontario, Canada 1994.

³ Within the < 10 L/day capacity, the 75th percentile for our test data falls at 1.10 L/kWh. Due to the distribution of test data within this capacity (70% of units tested have an energy factor of 1.10 L/kWh), EPA set the specification at 1.2 L/kWh, which recognizes the top 10% of the market. This specification is consistent with EPA’s philosophy of recognizing the top energy performers in the marketplace; alternatively, choosing a specification of 1.10 L/kWh would have allowed almost every product to qualify for the label.

Table 2	
Draft Criteria for ENERGY STAR Qualified High Capacity Dehumidifiers	
Product Capacity (L/day)	Energy Factor Under Test Conditions (L/kWh)
$36 \leq L/\text{day} \leq 57$? 2.25

EPA Comments: EPA proposes incorporating high capacity dehumidifiers into the specification because of the high energy factor these products are able to achieve. EPA recognizes that currently high capacity dehumidifiers comprise a small portion of the total market; however, these products are prevalent in some parts of the country and incorporate innovative energy-efficient designs that merit recognition.

Based on a technical review of existing products and discussions with manufacturers, EPA feels that the specification listed above for high capacity dehumidifiers is challenging, reasonable, and technology-neutral.

- 4) **Test Criteria:** Tests shall be conducted in accordance with Clauses 4, 5, and 7 of ANSI/AHAM Standard DH-1, except that a watt-hour meter shall be used to measure dehumidifier energy consumption during the capacity rating test. The watt-hour meter shall be accurate within 0.5 percent of the indicated value and have a scale with graduations of 1 watt-hour or less.

EPA Comments: EPA proposes to use the test method as specified in the Canadian Standard, Performance of Dehumidifiers, National Standard of Canada CAN/CSA-C749-94, Section 6.2.2 page 4.

- 5) **Other Information:** The *final* version of the ENERGY STAR dehumidifier specification will include additional information describing the goals and key components of ENERGY STAR as well as any other partner commitments (see EPA Comments in box below). In addition to product specifications, other issues will be addressed, such as the following:

A. **Buyer Information:** In keeping with the spirit of the ENERGY STAR program, the Partner will be expected to ensure that consumers have a quick and easy method of determining which of its products qualify for ENERGY STAR. To achieve this goal, EPA will outline how the Partner might utilize the ENERGY STAR logo on all qualified product models, their packaging, and product-related materials such as brochures, manuals, advertisements, and web sites. Further, to educate consumers about energy efficiency and its benefits, the Partner will provide one or more of the following: a description of the ENERGY STAR program, a discussion of the energy-saving characteristics of the product, a description of the environmental benefits that result from the energy saved by the product, and/or a description of the potential energy-bill savings of the product. The Partner may determine the best manner to disseminate this information to customers.

B. **Effective Date:** The date that manufacturers may begin to qualify products as ENERGY STAR will be defined as the *effective date* of the specification. This date is subject to negotiation with industry. EPA welcomes input from industry on the proposed effective date of November 1, 2000. A

manufacturer has one year after signing the Partnership Agreement to ensure that the ENERGY STAR label appears directly on at least one ENERGY STAR qualified dehumidifier model.

C. Future Specification Revisions: EPA reserves the right to revise the specification should technological and/or market changes affect its usefulness to consumers, industry, or the environment. Revisions to the specification are generally made following discussions with industry.

Approximately two years after the specification launch, EPA will thoroughly assess the impact of the original specification in order to evaluate the level at which its partners have performed. A Tier 2 set of specifications may be issued to recognize those manufacturers who have gone beyond the original energy-efficiency limits. Similar to Tier 1, the new criteria would be selected such that the top 25 percent of the market in terms of energy efficiency qualifies initially for the label. Models produced under the Tier 1 guidelines would be allowed to carry the ENERGY STAR label until they are phased out of the market, assuming the manufacturer continues its participation in the program and the product model continues to meet the specifications under which it was originally qualified (i.e., new specifications would not apply retroactively to previously qualified products). Once the Tier 2 specifications took effect, models shipped on or after that date would be required to meet the new specifications in order to use the ENERGY STAR label.

EPA Comments: After reviewing comments on the Draft 1 Product Specification, EPA has moved up the specification's proposed effective date to November 1, 2000.

To focus EPA/industry discussions on the definitions and specification, the most crucial elements, EPA has provided this brief draft specification as opposed to a complete agreement. However, the final specification will contain many of the standard sections of an ENERGY STAR Partnership Agreement.

As always, EPA welcomes comments or alternative proposals from industry that address these issues. EPA deems industry feedback crucial to the successful development of new ENERGY STAR product areas.