



ENERGY STAR® Program Requirements for Exit Signs

Draft 2 - Eligibility Criteria – Version 3.0

Below is the **Draft 2** product specification (Version 3.0) for ENERGY STAR qualified exit signs. A product must meet all of the identified criteria to earn the ENERGY STAR.

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

A. **Exit Sign:** A sign that is permanently fixed in place and used to identify an exit. For the purposes of ENERGY STAR, an exit sign must have an illuminated, legally required legend. The sign is designed to remain illuminated via an emergency power source upon failure of the normal power supply as specified in 7.10.4 of the NFPA 101 Life Safety Code.

Note: It was EPA's original intent with the Draft 1 specification to broaden the definition of an exit sign to include signs with varying light sources. However, given the importance of assuring the safety of these products, and the need to fully understand a model's total energy consumption, EPA proposed two conditions which effectively precluded any photoluminescent or self-luminous signs from qualifying under Draft 1. These conditions have been removed from this draft and the rationale is as follows.

EPA feels strongly that any exit sign that qualifies for the ENERGY STAR must be effective and reliable in addition to energy efficient. Based on additional research and input from industry, EPA has concluded that these goals can best be accomplished by relying on the expertise of organizations such as NFPA and UL.

EPA has conducted additional research on the ability of ambient light to sufficiently charge photoluminescent exit signs, and is satisfied that it is not common practice to install an additional charging light source in order to result in 5 foot-candles on the face of the sign. For this reason, EPA has removed the requirement that photoluminescent exit signs must be evaluated for ENERGY STAR qualification with their integral, charging light source.

From this definition, EPA has also removed the restriction that signs may not have transparent or mirrored backgrounds.

EPA welcomes additional manufacturer input on these changes, and understands that further discussions may be necessary.

B. **Exit:** A path of egress from a building or structure.

C. **Legally Required Legend:** The words "EXIT", "TO EXIT", "STAIR", "TO STAIR", "STAIRS", "TO STAIRS", "FIRE ESCAPE", "TO FIRE ESCAPE", "FIRE EXIT", and "TO FIRE EXIT". This definition will also encompass other combinations of letters and symbols if and when these signs may be listed in accordance with UL 924.

D. **Exit Sign Model:** For the purposes of ENERGY STAR, an exit sign model is an exit sign in the configuration that is actually packaged and sold to end users under a unique model number or name. For exit sign models with an individual rechargeable battery, the battery charger shall be included as part of the exit sign model and shall be tested and qualified as a single product.

E. **Input Power Demand:** The amount of active power required to continuously illuminate an exit sign model, measured in watts (W). For exit sign models with rechargeable batteries, input power demand

shall be measured with batteries at full charge.

F. Power Factor: A measurement that determines how effectively power drawn by the equipment is converted into actual usable power by an electric component. Power Factor is the ratio between active (useful) power, measured in watts, and apparent power, measured in volt-amperes.

G. Lagging Power Factor: With an inductive load, the current lags the applied voltage in a clockwise direction represented on a vector diagram, and is said to be a lagging power factor.

H. Leading Power Factor: With a capacitive load, the current leads the applied voltage in a clockwise direction represented on a vector diagram, and is said to be a leading power factor.

I. NFPA: The National Fire Protection Association (United States) develops the Life Safety Code for buildings that provides guidance for building design, construction, operation, and maintenance to protect occupants from fire, smoke, and fumes or similar emergencies. Many states and localities adopt this Life Safety Code into their own Building Code standards.

J. NRTL: Nationally Recognized Testing Laboratory Program, which is a part of OSHA's Directorate of Technical Support.

K. OSHA: Occupational Safety & Health Administration.

L. UL: Underwriters Laboratories is an OSHA NRTL that develops UL 924, the Standard for Safety for Emergency Lighting and Power Equipment.

- 2) **Qualifying Products**: In order to qualify as ENERGY STAR, an exit sign must meet the definition in Section 1A and the specifications in Table 1 below. In addition, ENERGY STAR requires that each model be listed in accordance with UL 924, and installed in accordance with applicable building codes and standards, such as NFPA 101. Further information about listing to UL 924 may be found under Section 3.A. in Test Procedure. This agreement does not apply to exit sign retrofit kits.

Note: Listing in accordance with UL 924 must be completed by an organization recognized by the Occupational Safety & Health Administration (OSHA) as a Nationally Recognized Testing Laboratory (NRTL). A list of OSHA NRTL's may be found at: <http://www.osha.gov/dts/otpc/nrtl/index.html>.

A. Specifications for Qualifying Products:

Luminance Depreciation: For electrically-powered exit signs, partner must include a statement in product materials that acknowledges luminance depreciation of the light source over time, and explains that code requirements for average luminance may not be maintained without lamp replacement at targeted intervals during the lifetime of the exit sign. The following statement shall be included, "The light source in this sign will depreciate, which can lead to a light output level that is below current building code requirements. The light source (lamps) should be replaced at regular intervals, and when they are no longer functioning, to assure safety and visibility in the event of an emergency." This statement must appear in the user manual or installation instructions.

Note: The comments EPA received from industry indicate that a standard statement of luminance depreciation is preferred by manufacturers. This draft does not include the provision that modified luminance depreciation statements may be acceptable if approved in advance by EPA. One manufacturer suggested that partners should not be required to include this statement "in the user manual or installation instructions", and that permitting inclusion "in product materials" allowed a necessary level of flexibility. EPA does not feel that requiring the luminance depreciation statement "in the user manual or installation instructions" is overly-restrictive, and has retained that requirement in this draft. EPA welcomes further comment from industry regarding the appropriateness of this requirement.

**Table 1: Product Specifications
For ENERGY STAR Qualified Exit Signs (Version 3.0)**

Energy-Efficiency Characteristics	Performance Specification
Input power demand	3 watts or less per sign
Power factor (for electrically-powered, internally-illuminated signs only)	Any leading power factor is satisfactory. A lagging power factor not less than 0.7 is satisfactory.
Reliability Characteristics	Specification
Manufacturer warranty for defects in materials and manufacturing	Replacement of defective parts for 5 years from date of purchase
Product Listing	Listed in accordance with UL 924

Note: EPA received several comments from industry indicating that an input power demand of 3 watts or less per sign was too low to allow proper design for long life. It was suggested that 5 watts per sign is a more appropriate level. In this draft, EPA has retained the 3-watt criterion. Currently, 31% of reported ENERGY STAR qualified exit signs would meet the proposed 3-watt specification. EPA feels this is indicative of available energy-efficient technology, and encourages manufacturers to employ strategies to lower the energy consumption of their products. Since manufacturers have alerted EPA to a correlation between lowered energy consumption and product reliability, EPA is open to further discussion on this issue, and encourages manufacturers to submit additional data that warrants consideration.

This draft specification contains revised language to address power factor. Many of the comments received from industry indicated that the language in the Draft 1 specification was unclear. EPA believes that this revised language will clarify the intent of this criterion, and that this clarification will address most of the comments received. Other manufacturers suggested that the proposed power factor criterion was too lenient, and that even exit signs with a leading power factor should need to meet a specific limit in order to earn the ENERGY STAR. As it is EPA's intent to lessen the effect of exit signs with low power factor ratings on the overall system power factor in buildings, EPA welcomes industry comment on a .2 limit for leading power factors.

EPA has deleted the criteria for analytical measurement of luminance in the above table. As stated in the first note in this specification, EPA will defer to national codes and standards on this matter, and will not mandate specific luminance levels for ENERGY STAR qualified exit signs.

In this draft specification, EPA has retained the requirement that qualified exit signs have a five-year manufacturer warranty. Discussions with industry indicate that a five-year warranty is more than sufficient to ensure a reliable, high-quality exit sign, and EPA has received no comments in opposition to this requirement.

- 3) **Test Procedure:** Manufacturers are required to perform tests to determine if an exit sign product model meets the product specifications in Section 2, Table 1. Section A below provides further explanation about the requirement that signs be listed in accordance with UL 924. To determine if the product model meets the energy-efficiency performance specifications in Section 2, Table 1, all performance measurements and calculations must be completed as described Sections B and C. Section B explains the general test conditions for ENERGY STAR qualified exit signs, and Section C outlines the specific procedures for measurement and calculation of the product specifications in Section 2, Table 1. Section D explains partners' requirements for submitting qualified product data to ENERGY STAR.

A: **Listing in Accordance with UL 924:** Must be completed by an organization recognized by the Occupational Safety & Health Administration (OSHA) as a Nationally Recognized Testing Laboratory (NRTL). A list of OSHA NRTL's may be found at: <http://www.osha.gov/dts/otpca/nrtl/index.html>.

Note: ENERGY STAR includes this requirement because listing in accordance with UL 924 indicates that a variety of safety and performance characteristics not otherwise addressed in this specification have indeed been assessed for the product model. On a Qualified Product Information (QPI) form, partners will be asked to certify that the reported exit sign model is listed in accordance with UL 924.

B. Test Conditions for Energy Efficiency Performance Specifications in Section 2, Table 1:

All voltages shall be provided within $\pm 0.5\%$ by a constant voltage power supply.

Prior to input power measurements, the exit sign model shall be operated at the rated input voltage for a period of 100 hours. In addition, the exit sign model with an internal battery shall be operated from the battery for one-and-one-half¹ hours, the minimum period of emergency operation specified in NFPA's "Life Safety Code", and then recharged for the period specified by the sign manufacturer.

All of the light sources in the exit sign model must produce light throughout the first 100 hours of operation, before any measurements are taken, in order to meet the requirements of this specification.

C. Measurement and Calculation of Product Specifications in Section 2, Table 1:

1. Input power demand measurement

The input power demand of the exit sign model in its entirety shall be measured with an appropriate True RMS Watt Meter at the rated input voltage which represents normal operation. For an exit sign model that includes a battery, the battery circuit shall be connected and the battery fully charged before any measurements are made.

2. Power factor measurement

At the time of testing for input power demand, the magnitude and waveform of the voltage and current and measurement between them shall also be measured, calculated, and reported. Testing results shall include:

- Active power measured in watts
- Apparent power based on the formula (rms volt-amperes)
- Power factor based on the formula:

$$\text{Power factor} = \frac{\text{Active power (watts)}}{\text{Total apparent power (rms volt-amperes)}}$$

- Indication of whether the power factor is leading or lagging

D: Submittal of Qualified Product Data to ENERGY STAR: Partners are required to self-certify those product models that meet the ENERGY STAR guidelines and report information to ENERGY STAR on a Qualified Product Information form.

***Note:** Once the Version 3.0 specification has been finalized, EPA will create an updated QPI form that manufacturers will use to report qualified product data. EPA recognizes that testing each product model and/or configuration can be expensive and time-consuming. In cases where the light output performance and energy demand of a model or model series are identical, EPA is open to suggestions from industry on a protocol for testing and reporting selected models in a worst case scenario.*

- 4) **Effective Date:** The date that manufacturers may begin to qualify products as ENERGY STAR under the Version 3.0 specification will be defined as the *effective date* of the agreement. The ENERGY STAR Exit Sign (Version 3.0) specification shall go into effect on **TBD**. Any previously executed agreement on the subject of ENERGY STAR labeled exit signs shall be terminated effective **TBD**.

¹ As in current NFPA 101, *Life Safety Code*, 7.9.2.1.

Note: EPA recognizes that manufacturers will need some lead time to: (1) identify power factors of currently qualified units to determine which will meet the new specification; (2) make changes to existing units; and (3) produce new product literature, installation documents, and/or packaging. Based on preliminary information from industry, it has been recommended to EPA that the effective date be six months to one year from the time of publication of the Version 3.0 specification to allow sufficient lead time to re-qualify existing products or qualify new products. EPA is open to discussing this effective date further; as such, manufacturers are encouraged to submit comments and/or suggestions on this issue.

- A. Qualifying and Labeling Products under the Version 3.0 Specification: All products, including models originally qualified under Version 2.0, with a **date of manufacture** after **TBD**, must meet Version 3.0 requirements in order to bear the ENERGY STAR label 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.

Note: On a date to be determined in the future, EPA will begin to edit the Web list of ENERGY STAR qualified exit signs. Product models that were originally qualified under the Version 2.0 specification will be removed from the list. If a product model meets the Version 3.0 specification, the partner will need to submit its testing results to EPA on a new QPI form in order for the product to remain on the list of qualified exit sign models. The models for which EPA does not receive updated QPI forms will be removed from the list.

- B. Elimination of Automatic Grandfathering: Under Version 3.0, ENERGY STAR has made a significant change with regard to product qualification and labeling during specification transitions. **ENERGY STAR qualification under Version 2.0 is not automatically granted for the life of the product model.** To earn the ENERGY STAR label, a product model must meet the ENERGY STAR specification in effect on the date of manufacture.

Note: ENERGY STAR has made this important programmatic change for two reasons:

- 1. To deliver on expectations about ENERGY STAR by ensuring that the products perform at levels promised by the program.*
- 2. To ensure that ENERGY STAR's ability to differentiate more efficient products is not undermined by high percentages of labeled products qualifying at less stringent performance levels.*

- 5) Future Specification Revisions: ENERGY STAR 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.