



ENERGY STAR® Criteria for Solid-State Lighting Products

ENERGY STAR® is a voluntary labeling program designed to help consumers identify energy-efficient, cost-effective products on the market. To earn the label, a manufacturer's product must meet strict efficiency and performance criteria established by the U.S. Department of Energy (DOE). The ENERGY STAR program for solid-state lighting (SSL) luminaires went into effect in September 2008 with the goal of ensuring that only high-quality, efficient SSL products bear the label. The first ENERGY STAR-labeled SSL products arrived on the market in November 2008.

The ENERGY STAR label is a highly valued and widely recognized mark of energy efficiency. As part of its national strategy to accelerate market introduction of high-efficiency SSL products, DOE developed ENERGY STAR criteria, which employs a transitional, two-category approach:

- **Category A** addresses near-term applications, where SSL technology can already be applied to provide good lighting performance and energy efficiency.
- **Category B** establishes a future efficacy target for all applications, which will take effect approximately three years after the initial effective date of the ENERGY STAR SSL criteria.

Category A covers indoor and outdoor residential and non-residential lighting applications of many types, including undercabinet lights, portable desk/task, recessed downlights, ceiling- and surface-mounted lights, and several types of outdoor luminaires. These applications were chosen on the basis of their suitability for solid-state lighting, given the current state of SSL technology.

Because light-emitting diode (LED) technology continues to advance quickly, DOE adds new applications to Category A regularly. Early in 2009, DOE expanded Category A to include ceiling-mounted luminaires, cove lighting, wall washers, and several other residential and commercial applications. Outdoor area and roadway lighting, parking garage lighting, and other outdoor applications will be added to Category A during 2009. In addition, DOE has initiated a public stakeholder review and comment process for new criteria covering integrated LED replacement lamps.



Category B will cover innovative SSL systems applications of all types. This category encompasses a much wider range of future applications that will emerge as the technology matures further and serves as a target for lighting manufacturers as they develop products over the next several years.

Once Category B goes into effect, Category A will be dropped. This transitional approach recognizes the rapid pace of SSL technology development, yet allows early participation of a limited range of products for lighting applications in Category A that take advantage of SSL's unique attributes.

For more information on DOE's ENERGY STAR program for solid-state lighting, or to view the complete criteria, see www.energystar.gov/sslpartners.

Key Stakeholders in Criteria Development

DOE worked closely with key industry stakeholders in developing the new ENERGY STAR criteria and the testing procedures upon which the criteria are based, including the Next Generation Lighting Industry Alliance (NGLIA), Illuminating Engineering Society of North America (IES), and American National Standards Institute (ANSI). DOE also received extensive advice and useful comments from individual lighting companies, electric utilities, energy efficiency organizations, and others.

General Requirements

The principal energy efficiency metric used in the criteria is luminaire efficacy (net light output from the fixture divided by the input power). In April 2008, IES published LM-79, "Approved Method for Electrical and Photometric Measurement of SSL Products," which specifies a standard test method for measuring the photometric properties of SSL luminaires, allowing calculation of luminaire efficacy. In September 2008, IES published LM-80, "Approved Method for Measuring Lumen Maintenance of LED Light Sources." Both LM-79 and LM-80 are integral to the ENERGY STAR criteria for SSL. LM-79 is the basis for CALiPER testing and is used to evaluate products for GATEWAY demonstrations.

To streamline the product qualification process, DOE has developed a Manufacturer's Guide for Qualifying Solid-State Lighting Luminaires and an online product submittal tool that allows manufacturers to upload the necessary information and test data required for qualifying their products. To learn more about these tools and other resources for manufacturers, visit www.energystar.gov/sslpartners.

Finding Qualified Products

The ENERGY STAR criteria for SSL focus on lighting applications and products that have advanced to a point where performance is equal to or better than traditional lighting technologies, based on light output, luminaire efficacy, and cost. The ENERGY STAR Web site offers additional tools and resources to assist consumers in finding and selecting qualified products, including a Buyer's Guide for Selecting LED Products, a Qualified Products List, and Frequently Asked Questions. To learn more, see www.energystar.gov/led.

For more information on ENERGY STAR, see www.ssl.energy.gov/energy_star.html.

EERE Information Center
1-877-EERE-INF (1-877-337-3463)
www.eere.energy.gov

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