
NEW BALLAST ENERGY CONSERVATION RULES

Department of Energy mandates testing to new metric

Fluorescent lamp ballast manufacturers have been required to comply with the US Department of Energy (DOE) energy conservation standards since 1990. The standards encourage energy savings and carbon emission reduction by setting minimum ballast efficiencies. In November 2011, the DOE issued new rules regulating the efficiency of ballasts, which will come into effect on November 14, 2014. The new rules consist of energy efficiency standards, test procedures, and other requirements such as test laboratory accreditation. Lumentra is well positioned to assist ballast manufacturers in obtaining product certifications under the new regulations.

The current standard requires several types of ballasts for T12 lamps to have minimum efficacy factor (BEF) and power factor (PF). Along with ballast factor and system efficacy, BEF has been the traditional metric for energy standards in North America. The new rule, however, introduces a different efficiency metric, Ballast Luminous Efficiency (BLE) for minimum energy efficiency requirements, and goes beyond T12 to also regulate T8 and T5 electronic ballast efficiencies.

Ballasts that do not comply with the new standards by November 2014 will be prohibited from domestic manufacture and importation. As a result, ballast manufacturers are urged to ensure their compliance with the new standards on both product performance and test lab accreditation.

New Coverage and Requirements

According to the new standards, each ballast designed for use in connection with fluorescent lamps as defined in 10 CFR 430.2 at nominal input voltages of 120 or 277 volts, with input current

frequency of 60 Hertz, shall have a power factor of 0.9 or greater (or a power factor of 0.5 or greater if it is designed and labeled for use only in residential applications). The BLE requirements vary depending on ballast use-case (Instant Start or Rapid Start type), type (U Shaped and Bi-pin), and lamp length (2, 4, or 8 foot).

If the ballast has dimming capabilities, the BLE requirements are different. Please refer to the [new rule documentation](#) for full details.

New Efficiency Metric

BLE is equal to lamp arc power divided by input power and then multiplied by an adjustment factor based on high- or low-frequency lamp operation. This adjustment factor accounts for the decreased lighting efficacy of low-frequency lamp operation.

$$BLE = \frac{\text{Total Test Ballast Lamp Arc Power}}{\text{Ballast Input Power}} \times \beta$$

DOE proposed the BLE metric because it reduces measurement variation and testing burden compared to the existing test procedures. The new metric eliminates photometric measurements and implements electrical measurements of a lamp-and-ballast system. The use of a lamp-and-ballast system allows the ballast to operate at its natural operating point and will more accurately assess ballast performance compared to when a resistor is used as the ballast test load. Meanwhile, the use of electrical measurements exclusively reduces the impact of lamp manufacturing variation on the efficiency descriptor. BLE provides for wide comparability among all types of ballasts and can

distinguish between the efficacies of high- and low-frequency lamp operation.

Laboratory Accreditation Requirements

One change in the new rules that is often overlooked is the testing accreditation requirement. Previously, an accredited test laboratory was not required for ballast testing; in-house testing and self-reporting was accepted. The new rules now require that testing for BLE shall only be conducted by test laboratories accredited by the National Voluntary Laboratory Accreditation Program (NVLAP) or by an accrediting organization recognized by NVLAP. The accreditation scope should include *ANSI C82.2:2002 Ballast for Fluorescent Lamps - Methods of Measurement*. A manufacturer's or importer's own laboratory, if accredited, may conduct the applicable testing. Laboratories accredited by Underwriters

Laboratories or the Standards Council of Canada may also conduct BLE Testing. The accreditation requirements guarantee testing integrity and quality.

Manufacturers who need to comply with the new rules can either obtain proper accreditation for their first-party laboratories or partner with third party laboratories. Establishing and maintaining a first-party accredited laboratory consumes a tremendous amount of resources, necessitating expertise in testing and quality management. Often, participation in accreditation programs with the requirement of periodic audits may not provide any return on investment. On the other hand, working with a third-party accredited laboratory provides efficiency and confidence. NVLAP is a stringent accreditation program in the lighting industry and is well recognized internationally.

References

- TITLE 10 ENERGY - Part 430 Energy Conservation Program For Consumer Products [10 CFR 430]
- http://www1.eere.energy.gov/buildings/appliance_standards/product.aspx/productid/62
- ANSI C82.2:2002 Ballast for Fluorescent Lamps - Methods of Measurement

About us

Lumentra is a cleantech company that develops new solutions for improving colour quality of solid-state lighting products. It also provides accredited optical, electrical, thermal and environmental measurement services, optical design services, consultancy and standards compliance assistance for the lighting industry. Lumentra's staff are actively involved in international standard committees to develop standard test methods for semiconductor and organic LEDs.

Lumentra Inc. is ISO 17025 accredited by NVLAP ([Lab Code 500084-o](#)) under the Energy Efficient Lighting Products Program with its accreditation scope covering fluorescent lamp ballast testing. Lumentra will support manufactures to ensure the compliance with the new DOE energy standard enacted in November 2014. Lumentra is also a Designlights Consortium, Energy Star and Lighting Facts approved testing laboratory.

services@lumentra.com

<http://lumentra.com>

[@lumentra](#)

Ph: (647)479 8820, (647)479 7820

60 St. George St., Suite 331, Toronto, ON. M5S 1A7. CANADA