Resources for Today’s Lighting Appliances

Understanding California’s Title 20 Requirements
Welcome!

- Major changes in California’s lighting appliance regulations
- Resources for manufacturers
- Resources for retailers & consumers
- Q & A
MAJOR CHANGES

UPDATE TO LAMP REGULATIONS AND CATEGORIES
General service LED lamps are now regulated as a separate category from other light sources in the general service lamp category. New requirements include specific performance metrics and corresponding test methods to quantify product performance in an industry-recognized manner.

Small diameter directional lamps with a diameter of 2.25 inches or less that are equipped with ANSI compliant base-types or the E26 base type are now regulated. New requirements apply to both low- and line-voltage lamps.

Portable luminaires that are equipped with a socket requiring a general service lamp must be packaged with a compact fluorescent lamp or LED lamp that adheres to the updated lamp requirements.

CALIFORNIA APPLIANCE EFFICIENCY DATABASE
The appliance database filing structure that manufacturers use to submit products for listing with the California Energy Commission will include new product categories and performance metrics starting January 1, 2018.

PRODUCT LABELING
Manufacturers must test and certify their products with the updated regulations before including claims of dimmability, incandescent lamp equivalency, wattage equivalence, decorative lamp lumen output, or compliance with the Voluntary California Quality LED Lamp Specification in their lamp marking, marketing material, and package labeling.
GSL Performance Requirements

• General Service Lamp performance requirements (all technologies):
  – At least 1,000 hour rated life
  – At least 45 lumens/watt

• Specific GSL LED requirements:
  – Rated life of 10,000 hours or more
  – Minimum efficacy of 68 lumens/watt
  – Color quality requirements to at least meet:
    • 4-Step ANSI C78.377-2015
    • Average CRI of 82 AND R1-R8 of 72
  – Compliance score of at least 282 where:
    • 282 = Efficacy + (2.3 x CRI)
  – Omni-directional distribution adheres to ENERGY STAR® Lamps v2.0
  – Power factor of 0.7 or greater
Small-Diameter Directional Lamp performance requirements (all technologies):

- Rated life of 25,000 hours or more
- Efficacy of at least 80 lumens/watt

OR

- Compliance score of at least 165 with a minimum efficacy of 70 lumens/watt where:

\[ \text{Compliance Score} = \text{Efficacy} + \text{CRI} \]

Ex. \[ 165 = 70 + 95 \]
Portable Luminaire Requirements

Portable luminaires that are equipped with an E12, E17, or E26 screw-based socket must be pre-packaged and sold together with:

- One compact fluorescent lamp

  OR

- One LED lamp that adheres to the updated lamp requirements
Appliance Efficiency Database

- Manufacturers
  - Manufacturers are responsible for certifying that their products comply with the standards.

- Retailers
  - Retailers are responsible for ensuring that products offered for sale in California appear in the Appliance Efficiency Database.

https://cacertappliances.energy.ca.gov/Pages/ApplianceSearch.aspx
## Appliance Efficiency Database

<table>
<thead>
<tr>
<th>PERFORMANCE METRIC</th>
<th>INDUSTRY TEST METHOD</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Input Power</strong>: The total amount of electric power required, measured in watts, to operate the lamp, as measured at the base of the lamp.</td>
<td></td>
</tr>
<tr>
<td><strong>Lumen Output</strong>: The total luminous flux of the lamp at full output, measured in lumens.</td>
<td></td>
</tr>
<tr>
<td><strong>Efficacy</strong>: Indicates how much light is produced by a lamp or lighting system per unit of electrical power it consumes, measured in lumens per watt (lm/W).</td>
<td></td>
</tr>
<tr>
<td><strong>Correlated Color Temperature (CCT)</strong>: The absolute temperature of a blackbody whose chromaticity most nearly resembles that of the light source. Light sources with a low CCT (2700–3000K) emit light with a warmer appearance. Those with a higher CCT (4000–6500K), emit light with a cooler color appearance.</td>
<td>IES LM-79*</td>
</tr>
<tr>
<td><strong>Duv</strong>: The closest distance from the chromaticity coordinate of the light source to the Planckian locus on the International Commission on Illumination (CIE) ((u', 2/3 v')) coordinates with &quot;+&quot; sign for above and &quot;+&quot; sign for below the Planckian locus.</td>
<td></td>
</tr>
<tr>
<td><strong>Color Rendering Index (CRI)</strong>: The current industry standard for measuring how accurately a light source renders the colors of objects it illuminates. The average CRI value is an average of the standard color pallets known as R1 – R8. The maximum CRI value is 100.</td>
<td></td>
</tr>
<tr>
<td><strong>Power Factor (PF)</strong>: The input power in watts divided by the product of RMS input voltage and RMS input current of a ballast or driver.</td>
<td></td>
</tr>
<tr>
<td><strong>Lumen Maintenance</strong>: The luminous flux or lumen output at a given time in the lamp's life expressed as a percentage of the rated luminous flux or rated lumen output.</td>
<td>IES LM-84 and TM-28*</td>
</tr>
<tr>
<td><strong>Standby Power</strong>: The power drawn while the lamp is in OFF mode.</td>
<td>IEC 62301/80 Fed. Reg 39667</td>
</tr>
</tbody>
</table>
## Appliance Efficiency Database

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<tr>
<th>Metric</th>
<th>Description</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Flicker</strong></td>
<td>A relative measure of the cyclic variation in output of a light source (percent modulation).</td>
<td>Title 24, Part 6 JA-10</td>
</tr>
<tr>
<td><strong>Rated Life</strong></td>
<td>The length of time at which 50 percent of a large sample of lamps reaches the end of their individual lives.</td>
<td></td>
</tr>
<tr>
<td><strong>Survival Rate</strong></td>
<td>The percent of tested units that shall be operational at the completion of the 6,000-hour life test.</td>
<td>Title 24, Part 6 JA-8</td>
</tr>
<tr>
<td><strong>Minimum Dimming Performance</strong></td>
<td>The minimum light output to which a light source is capable of dimming.</td>
<td></td>
</tr>
<tr>
<td><strong>Audible Noise</strong></td>
<td>Noise emitted by lamps above 24 decibels when heard from one meter away from the lamp.</td>
<td>ENERGY STAR® Lamps V1.0 Test Methods</td>
</tr>
</tbody>
</table>

Additional optional GSL metrics: R9, warranty length, start time, 6,000-hour lumen maintenance, 6,000-hour survival rate, NEMA SSL 7A compatibility, and notation of the lamp's T24 JA-8 marking.
Manufacturers must **test and certify** their products before including claims of:

- Dimmability,
- Incandescent lamp equivalency,
- Wattage equivalence,
- Decorative lamp lumen output, or
- Compliance with the *Voluntary California Quality LED Lamp Specification*.

This applies to the following:

- Lamp marking,
- Marketing material, and
- Package labeling.
Resources for Manufacturers

The California Statewide Codes & Standards Program

Here to help you meet California’s Title 20 appliance and equipment certification requirements.

We offer FREE
- Trainings
- Resources

All designed to improve compliance with the state’s appliance and building energy codes and aimed at locking in long-term energy savings.

WHAT’S NEW IN THE TITLE 20 LIGHTING APPLIANCE EFFICIENCY REGULATION

Changes to California’s lighting appliance requirements

The California Energy Commission adopted new standards updating lighting appliance. Updates will roll out in two steps with Trial 1 off. Notably, this update adds standards for smallerMini directional and indirect lighting product quality for both general and track LED lamps andrer lighting appliance efficiency standards previously included in the require revisions to the California Appliance Efficiency Database pertaining regulations for lamp labeling, marketing material, and testing.

MAJOR CHANGES

UPDATES TO LAMP REGULATIONS AND CALIBRATION
- General service LED lamps are now regulated in the general service lamp category. New requirements and test methods to quantify product performance.
- Small diameter directional lamps with a single ANSI compliant beam-type or the EDEF apply to both line and line-voltage lamps.
- Portable luminaires that are equipped with variable speed motors must be packaged with a compact fluorescent updated lamp requirements.

CALIFORNIA APPLIANCE EFFICIENCY DATA
- The appliance database filing structure that report the California Energy Commission will include:
  - starting January 1, 2018.
  - product labeling

Manufacturers must test and certify their products to demonstrate compliance with the Voluntary Standard (Voluntary Standards), lamp testing, marketing material, and product labeling.

CALIFORNIA ENERGY COMMISSION

January 2017

CCE - 400 - 2017 - 002

CALIFORNIA LIGHTING TECHNOLOGY CENTER - UNIVERSITY OF SOUTHERN CALIFORNIA

This guide is not intended to be used in place of California’s Appliance Efficiency Standards. Please refer to the latest version and the implementing specific to General Purpose LED Lamps and/or other relevant guidelines for detailed information.
https://govt.westlaw.com/calregs/Browse/Home/California/CaliforniaCodeofRegulations?guid=I8F8F3BC0D44E11DEA95CA4428EC25FA0&originContext=document&transitionType=Default&contextData=(sc.Default)
What’s New in Title 20 Lighting Appliance Efficiency Regulations?

The California Energy Commission adopted new standards updating the 2015 Appliance Efficiency Regulations (Title 20) for lighting appliances. Updates will roll out in two phases: Phase 1 effective January 1, 2019, and Phase 2 effective July 1, 2019. Notably, this update adds standards for small-diameter directional lamps. The updated regulations incorporate elements of lighting product quality for both general-service LED lamps and small-diameter directional lamps in addition to the traditional lighting appliance efficiency standards previously included in the regulations. The addition of these new standards will require revisions to the California Appliance Efficiency Database product certification process, as well as updates to product labeling requirements for lamp marking, marketing material, and product packaging.

MAJOR CHANGES

UPDATES TO LAMP REGULATIONS AND CATEGORIES

General service LED lamps are now regulated as a separate category from other light sources in the general-service lamp category. New requirements include specific performance metrics and corresponding test methods to quantify product performance in an industry-recognized manner.

Small diameter directional lamps with a diameter of 2.75 inches or less that are equipped with ANSI compliant base-types or the E26 base type are now regulated. New requirements apply to both line and line-voltage lamps.

Portable luminaires that are equipped with a socket requiring a general-service lamp must be packaged with a compact fluorescent lamp or LED lamp that adheres to the updated lamp requirements.

CALIFORNIA APPLIANCE EFFICIENCY DATABASE

The appliance database will have new structures that manufacturers use to submit products for listing with the California Energy Commission. The new product categories and performance metrics starting January 1, 2019.

PRODUCT LABELING

Manufacturers must test and certify their products with the updated regulations before including claims of dimmibility, incandescent lamp equivalency, wattage equivalence, decorative lamp lenses, fixture, or compliance with the Voluntary California Quality LED Lamp Specification in their lamp marking, marketing material, and package labeling.

cltc.ucdavis.edu/publication/title-20-lighting-appliance-efficiency
energycodeace.com/download/8557/file_path/fieldList/Title%2020%20Certification%20Information%20Handout%20for%20Manufacturers%20and%20Distributors
I'M IN THE LIGHTING AISLE, NOW WHAT?

A CONSUMER’S GUIDE TO BUYING THE RIGHT LIGHT
How to Choose the Right Light – Videos

https://cltc.ucdavis.edu/publication/how-choose-right-light

Frequently Asked Questions:
State-Regulated Lamps

If clarification is needed on any of the information contained in the FAQ document, please contact the Appliance Efficiency Program via email at: applianceeff@energy.ca.gov with the following title in the subject line: State-Regulated Lamps FAQ.

Must an LED lamp be dimmable in order to claim wattage equivalencies with incandescent lamps?

What test procedures should be used for LED lamps that are downlight retrofit kits?
Resources for Today’s Lighting Appliances

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Questions?