

SMUD's 2009 LED Lighting Program

Requirements for Refrigerated and Frozen Food Case Lighting Systems (Vertical Cases)

Updated February 20, 2009

The intent of SMUD's LED Lighting Program is to encourage the installation of reliable and efficient LED lighting systems that save energy and provide quality lighting for our customers.

Product Requirements

Minimum Luminaire Efficacy	System Type		Luminaire Efficacy (lpw)			
	LED (non-dimming)		30 lpw			
	LED with dimming and motion sensors		25 lpw			
Correlated Color Temperature (CCT)	5700 K maximum					
Luminaire	<ul style="list-style-type: none"> Must be a permanently installed luminaire: LED lamps that install into the fluorescent lamp sockets are not eligible for SMUD's program. Minimum 4-year manufacturer warranty (from date of purchase) for luminaire including LEDs, lenses, mounting hardware, etc. LEDs must maintain no less than 70% of initial lumen output at 50,000 hours of operation. 					
CRI	Minimum 70					
Maximum Power Consumption	5' Case Door			6' Case Door		
	End Light	Center Light	Maximum Per Door	End Light	Center Light	Maximum Per Door
	19 W	38 W	38 W	23 W	46 W	46 W
Dimming Systems: Maximum Power Consumption During "Unoccupied" Mode	System Type		Maximum Power			
	5ft. case (fixture)		8.0 Watts per door			
	6ft. case (fixture)		9.6 Watts per door			
Power Supply (a.k.a. Driver)	<p>Tested at 25°C (± 1°C), the power supply must meet the following requirements.</p> <ul style="list-style-type: none"> Efficiency of 85% or greater at 120 volts. Power factor of 0.9 or greater. Total harmonic distortion of 20% or less. Driver shall have minimum operating temperature of -20°C or below. Shall meet UL 1310 for Class 2. Shall comply with FCC Class A requirements. Minimum 5-year manufacturer warranty (from date of purchase). 					
Motion Sensors and Dimming Systems	<ul style="list-style-type: none"> Motion sensors must be specifically designed for refrigerated or frozen food case applications. Maximum power consumption during low (unoccupied) mode must not exceed 8.0 Watts per door for 5ft. fixtures and 9.6 Watts per door for 6ft. fixtures. Maximum time delay for switching to the unoccupied or low mode shall be 5 minutes. Sensors must be permanently mounted. Minimum 5-year manufacturer warranty (from date of purchase). 					
Warranty	<ul style="list-style-type: none"> A manufacturer warranty covering repair or replacement of defective parts for all LED lighting systems must be provided in writing to customers. Manufacturer's warranty must include luminaires, mounting hardware, power supplies, light sources (i.e. LEDs), sensors, dimming modules and all other aspects of the LED lighting system. Contractor warranty shall include all labor, parts and shipping for one year from the date of installation. 					
Cut Sheet and Installation Instructions	Product cut sheets, manufacturer's warranty, and installation instructions must be provided to all customers.					

Specific Test Requirements

Maximum Power Consumption Testing

- Constant Voltage Product shall be tested in a typical full load condition. Manufacturer shall provide documentation that indicates the number of light bars and total wattage for the following two conditions:
 - Typically installed full load condition.
 - Typically installed minimum load condition.
- Constant current products need to be tested at typical full and minimum load conditions to ensure constant current is maintained with differing loads.
- **Dimming systems must be tested with all applicable components in the circuit (i.e. power supply, driver, dimming modules, sensors, luminaire, etc). Systems must be tested at both the typical full output and in the “unoccupied” mode (typically 20% of full output / 80% dimming) conditions to ensure compliance with maximum power requirements.**

General Test Requirements for All Luminaires

- The ambient temperature of the photometric and power consumption tests shall be 25°C plus or minus 1°C.
- The test procedure for determining luminaire performance shall follow the procedures specified in **IESNA LM-79-08** Approved Method for the Electrical and Photometric Measurements of Solid-State Lighting Products.
- All testing shall be done by an independent testing lab approved for testing of LED lighting products for Energy Star certification. A list of approved labs is available on the U.S. Department of Energy’s Commercially Available LED Product Evaluation and Reporting (CALiPER) program website http://www1.eere.energy.gov/buildings/ssl/test_labs.html
- The luminaire shall be tested at rated electrical conditions.
- Power consumption shall include total system power, including luminaire, driver, dimming modules and sensors, as it will be sold and installed in the end-use application.
- Luminaire manufacturers shall adhere to device manufacturer guidelines, certification programs, and test procedures for thermal management.
- Manufacturer must confirm that the LED chip tested by the laboratory is indeed the LED chip that will be employed in the final production of items. If a different or “enhanced” chip is intended to be used in production, then manufacturer must demonstrate that the production chip will be equivalent or better (in color, output, and efficacy with the intended operating environment, current, and temperature).
- Manufacturer must provide an estimated LED source lifetime (L70) in hours) at the drive current and temperature used in the tests.

Product Family Testing

SMUD recognizes the time and cost associated with testing. Therefore manufacturers may perform a single test for a group of similar products as described below.

- Luminaires qualified under a single application must be intended to produce the same quantity and quality of light.

- LED Modules(s) array(s) and Power Supply combinations intended to produce different CCT, CRI, total flux and other quantitative and qualitative differences in light may **not** be included in a single product application.
- Individual tests shall be performed for product varying by CCT, CRI, or total flux. In essence, luminaires with CCT of 3500K and 5000K are considered separate products and each will be independently qualified.
- Manufacturers shall list their product color temperature(s) CCT and range as described in Energy Star Program Guidelines for Solid State Lighting v1.0
http://energystar.gov/index.cfm?c=new_specs.ssl_luminaires
- For linear products, length may vary if:
 - 1) LED type and number of LEDs per foot are identical.
 - 2) Luminaire lpw (lumens per watt) is identical, based on item 1 above.

SMUD's LED Program qualifying specifications are subject to change based on industry developments.

SMUD does not endorse or provide warranties for any products that may qualify for SMUD's LED Lighting Program.

SMUD will review all submitted test reports to determine:

- 1) Whether or not the product meets the technical specifications of the program, and
- 2) Whether or not the product meets the intent of the program to provide high quality lighting and energy savings.

Products that meet the program technical requirements but do not meet the intent of the program in customer applications may be rejected at the discretion of the program administrator.

Manufacturers who wish to qualify a product for SMUD's LED Lighting Program must submit the following documentation:

- 1) A dated cover letter including contact information and a list of the product(s) being submitted for qualification.
- 2) Product cut sheets.
- 3) A completed "Product Information Sheet" (Sample Attached)
- 4) Independent laboratory test results (as described earlier in this document) including power consumption, power factor, total harmonic distortion, total lumen output and photometric test results.
- 5) Product warranty information
- 6) Installation instructions.

These documents should be sent to:

SMUD ATTN: Dave Bisbee MS A204
6301 S Street, Sacramento CA 95817-1899
E-mail: dbisbee@smud.org

Note: All projects must be pre-approved by SMUD: even when using products that have qualified for the LED Lighting program.

SMUD's 2009 LED Lighting Program: Product Information Sheet

1. Product information:

- Name of manufacturer: _____
- Name of product: _____
- Catalog or part #: _____
- Intended application(s): _____
- Warranty: _____
- Power supply (a.k.a. Driver): _____
- Dimming module (if applicable): _____
- Sensors (if applicable): _____
- Operating voltage: _____

2. Summary of test report data: All product characteristics listed in this section must be based upon independent laboratory test results. Please list the laboratory test number next to each characteristic.

- | | Test # |
|---|--------|
| • System wattage: _____ | _____ |
| • Luminaire Efficacy (lumens per Watt): _____ | _____ |
| • Color Temperature (CCT): _____ | _____ |
| • Color Rendering Index (CRI): _____ | _____ |
| • Measured Power Factor (PF): _____ | _____ |
| • Total Harmonic Distortion (THD) %: _____ | _____ |
| • Power supply efficiency (%): _____ | _____ |

3. LED source characteristics:

- Estimated LED source L70 lifetime at the drive current and temperature used in the above tests: _____ (hours)

By submitting this form to SMUD, the Manufacturer confirms that the LED chip used in these laboratory tests is indeed the LED chip that will be employed in the final production of items. If a different or "enhanced" chip is intended to be used in production, then Manufacturer must demonstrate that the production chip will be equivalent or better (in color, output, and efficacy with the intended operating environment, current, and temperature).

Submit completed forms, test results and product information to: dbisbee@smud.org

Questions? Please call Dave Bisbee at (916) 732-6409