

# Just the Facts, Ma'am: Getting the Most out of LED Lighting Facts and Other LED Product Data



The Grainger Show

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# Outline

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- What lists can help with LED purchases?
- What are the differences?
- How to use each list
  - LED Lighting Facts
  - ENERGY STAR
  - Design Lights Consortium (DLC) Qualified Products List (QLP)

# Comparing the Lists

	ENERGY STAR	DLC	LED Lighting Facts
<b>Technologies</b>	CLF & LED	Only LED	Only LED
<b>Focus Area</b>	Residential	Commercial	Both
<b>Product Types</b>	Lamps & Res. Luminaires	Luminaires	Both
<b>Minimum Requirements</b>	Yes	Yes	No
<b>Voluntary</b>	Yes	Yes	Yes
<b>Family Groupings</b>	Yes	Yes	Yes
<b>Primary Function</b>	Certification program	Qualification program	Performance Verification
<b>Funding</b>	EPA	Utilities/Application fees/Grants	DOE
<b>Verification</b>	Yes	Yes	Yes

# What is LED Lighting Facts?

- Recognized as an *industry* tool for reporting accurate performance about products.
- Defacto resource to:
  - introduce transparency to the solid-state lighting (SSL) supply chain
  - help assure buyers that product performance claims were not exaggerated.

The screenshot shows the LED Lighting Facts website. At the top, there is a navigation bar with links for 'About', 'Products', 'EE Programs', 'Partners', 'Approved Labs', and 'Library'. A 'Registered User Login' button is in the top right. The main content area features a large graphic titled 'Success with solid-state lighting' which includes a sample LED Lighting Facts label. The label displays the following information: Light Output (Lumens) 840, Watts 9, Lumens per Watt (Efficacy) 93, Color Accuracy (Color Rendering Index (CRI)) 87, and Light Color (Correlated Color Temperature (CCT)) 2900 (Warm White). Below the label, there is a color spectrum showing Warm White (2700K), Bright White (3000K), Daylight (4500K), and 6500K. A banner below the label reads 'NOT A PARTNER? TAKE THE PLEDGE TODAY!'. The 'Products' section is visible, stating 'LED lighting products that have received an LED Lighting Facts label, including verified performance information.' A search bar with the text 'Manufacturer, Model Number, etc.' and a 'Search Products' button is present. A large blue graphic on the right shows '16835 TOTAL PRODUCTS' and an 'ADVANCED SEARCH' button.

# Understanding the Label

**Light Output/Lumens**  
Measures light output. The higher the number, the more light is emitted.  
Reported as "Total Integrated Flux (Lumens)" on LM-79 test report.

**Watts**  
Measures energy required to light the product. The lower the wattage, the less energy used.  
Reported as "Input Power (Watts)" on LM-79 report.

**Lumens per Watt/Efficacy**  
Measures efficiency. The higher the number, the more efficient the product.  
Reported as "Efficacy" on LM-79 test report.

**IESNA LM-79-2008**  
Industry standardized test procedure that measures performance qualities of LED luminaires and integral lamps. It allows for a true comparison of luminaires regardless of the light source.

**Registration Number  
Model Number  
Type**

**Brand**

**Color Rendering Index (CRI)**  
Measures color accuracy.  
Color rendition is the effect of the lamp's light spectrum on the color appearance of objects.

**Correlated Color Temperature (CCT)**  
Measures light color.  
"Cool" colors have higher Kelvin temperatures (3600–5500 K); "warm" colors have lower color temperatures (2700–3500 K). Color temperatures higher than 6500 are outside of the defined region for white light, but may be appropriate for outdoor applications.

**lighting facts**<sup>CM</sup>  
A Program of the U.S. DOE

Brand X

Light Output (Lumens)	840
Watts	9
Lumens per Watt (Efficacy)	93
Color Accuracy Color Rendering Index (CRI)	87
Light Color Correlated Color Temperature (CCT)	2900 (Warm White)

Warm White      Bright White      Daylight

2700K      3000K      4500K      6500K

All results are according to IESNA LM-79-2008: *Approved Method for the Electrical and Photometric Testing of Solid-State Lighting*. The U.S. Department of Energy (DOE) verifies product test data and results.

Visit [www.lightingfacts.com](http://www.lightingfacts.com) for the *Label Reference Guide*.

Registration Number: ABC435TH4792023  
Model Number: 18756CHT56428954RGHT1234H3  
Type: 18756CHT56428954RGHT1234H3

# Program Stats

- 23,600 listed products
  - New products added at increasing rate of 1,800-2,000
  - Only 2-3 week turn around time
  - Product breakdown:
    - Approximately 75% are luminaires, 25% lamps
- Over 200 products have been or being processed for Verification Testing
  - Search results from the Product and Archive Lists!
- 993 manufacturers with at least 1 product listed, some have more than 500 products listed
- 1,000 accredited testing labs provide performance testing

**Product Type:**  Luminaire  Lamp  Retrofit Kit

Product Categories	Use Location	Mounting Base	Subcategory	Product Size
Please select a Product Type to narrow by Product Category.	Please select a Product Type to narrow by Use Location.	Please select a Product Type to narrow by Mounting Base.	Please select a Product Type and Product Category to narrow by Subcategory.	Please select a Product Type and Product Category to narrow by Product Size.

Lumen Output	Input Wattage	Lumens Per Watt	Color Accuracy (CRI)	Light Color (CCT)
<input type="range" value="3 to 119759"/>	<input type="range" value="0.5 to 1298.4"/>	<input type="range" value="0.97 to 173"/>	<input type="range" value="23 to 100"/>	<input type="range" value="103 to 10225"/>

**Additional Product Metrics (CLICK TO COLLAPSE)**

Power Factor	<input type="range" value="0.218 to 9"/>	Zonal lumen density (0-60°)	<input type="range" value="0 to 100"/>
Input Voltage	<input type="range" value="0.0045 to 480.2"/>	Zonal lumen density (60-90°)	<input type="range" value="0 to 100"/>
DUV	<input 63.748"="" to="" type="range" value="-0.0195"/>	Zonal lumen density (90-120°)	<input type="range" value="0 to 50.9"/>
RO	<input 98.4"="" to="" type="range" value="-395"/>	Zonal lumen density (120-180°)	<input type="range" value="0 to 100"/>
Total Harmonic Distortion	<input type="range" value="0 to 164"/>	Spacing Criteria (0-180)	<input type="range" value="0 to 3.94"/>
Beam Angle	<input type="range" value="6 to 327.4"/>	Spacing Criteria (90-270)	<input type="range" value="0 to 12"/>
Center Beam Candlepower	<input type="range" value="33.8 to 844394"/>		

Only include products that have been Verification Tested  Only include products that are:

- ENERGY STAR Certified
- DLC Qualified
- Winners of the Next Generation Luminaires competition
- Participants in the GATEWAY Demonstration Program

Only include products that have a warranty

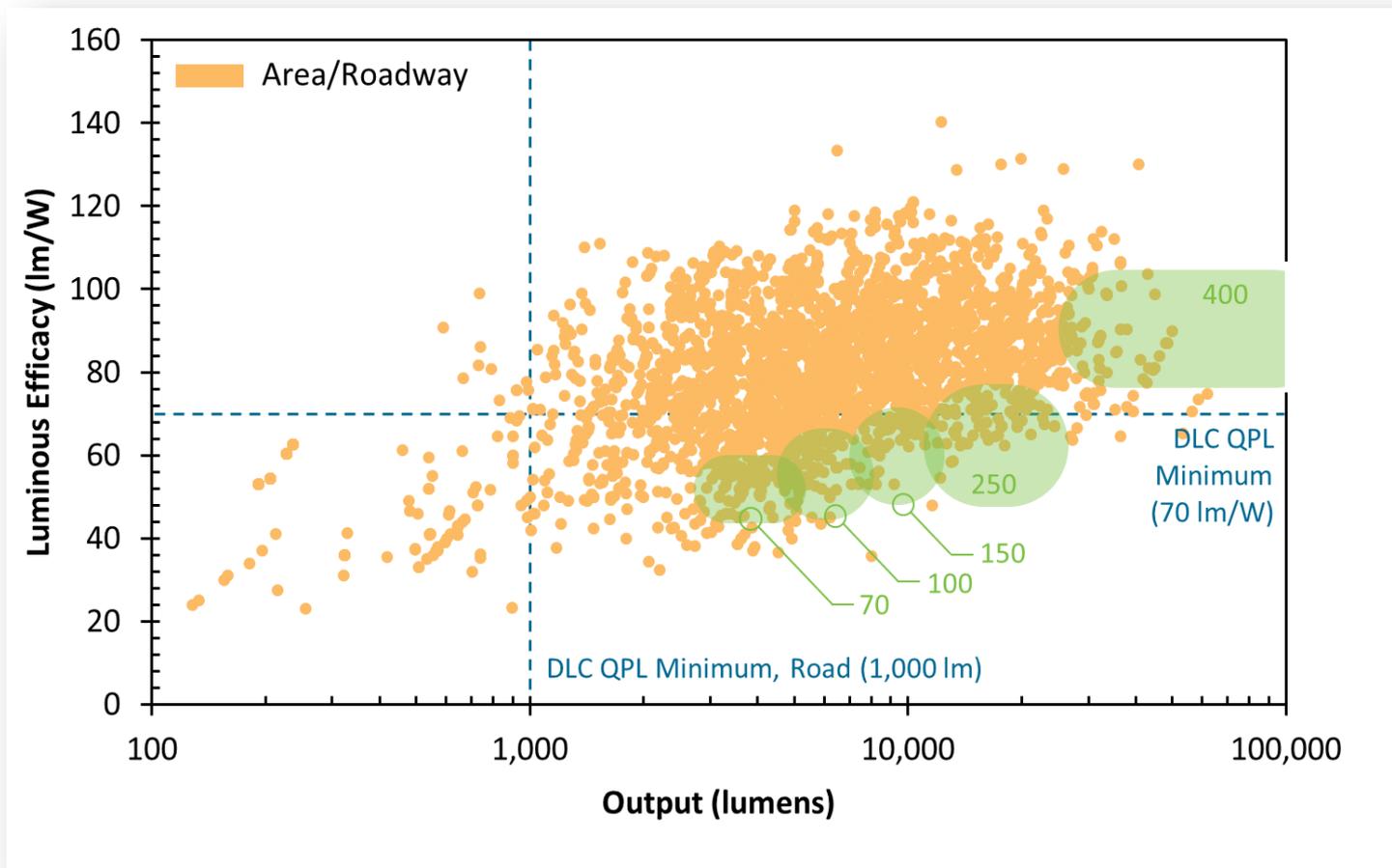
Only include products that have exact values

Only include products with dimming information

Only include products that have listed lumen maintenance

# Performance Still Varies Widely!!

CALiPER  
Snapshots  
look at full range  
of products  
indicative of  
current market



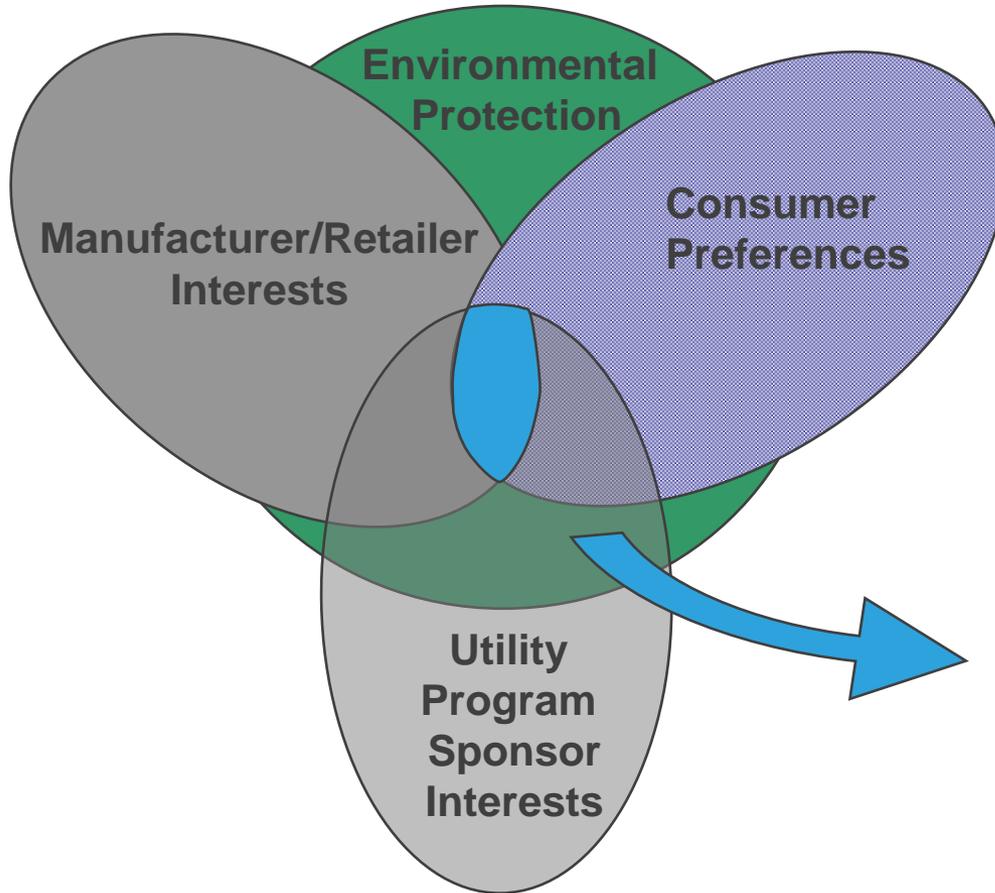
Outdoor Area (Road) Luminaires Current Efficacy & Output

# What is ENERGY STAR?



- Created by the U.S. Environmental Protection Agency in 1992 to reduce greenhouse gas emissions
- ENERGY STAR is a voluntary product certification and labeling program
- Products that have earned the ENERGY STAR label meet **strict energy efficiency & performance guidelines** set by the US EPA with **open and broad stakeholder engagement**
  - The first specification for SSL created in 2007 for Luminaires
  - 2009 first specification for SSL replacement lamps

# Builds Upon Intersection of Interests



- Cost-effective
- No sacrifice in performance
- Gov't backed

## Consumer is Key

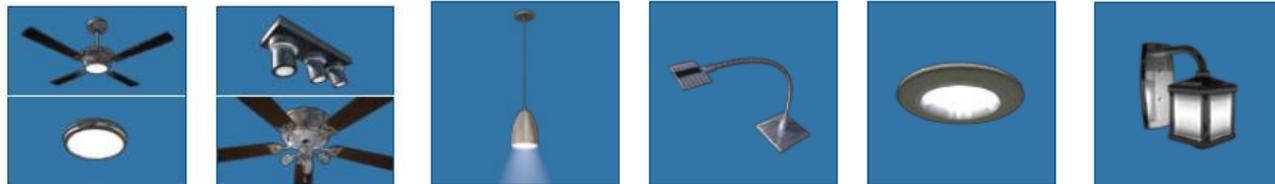
# ENERGY STAR Lighting Specifications

## Residentially focused scope: Not all inclusive

Energy saving replacements for the most common residential light bulbs and fixtures.



Eligible to Earn the ENERGY STAR	NOT Eligible to Earn the ENERGY STAR
General purpose CFL and LED lamps	Linear fluorescent lamps and their solid state retrofits
Accent lights (line-voltage and directional track lights)	High bay fixtures and recessed troffers
Down lights: recessed, pendant, surface-mounted, solid state retrofit kits	Outdoor street and area lighting: wall packs, garage, canopy lighting and wall packs
Wall sconces, chandeliers, bath vanities, ceiling and close-to-ceiling mount, floor and table lamps	Signage of any type, including EXIT signs and channel letter backlighting systems
Under cabinet or shelf-mounted task lighting	Linear fluorescent pendants
Ceiling and ventilation fans with lighting	Party or entertainment lighting
Portable desk task lights	Adapters or converters



# ENERGY STAR Lamp Specification

- Important but lesser known requirements
  - Long term elevated temperature testing to ensure bulbs perform as expected in higher temperature scenarios, e.g. recessed can, enclosed fixtures
  - If it looks like a general purpose A lamp it has to act like one – omnidirectional light distribution requirements and strict guidelines for equivalency claims

Visit [www.energystar.gov/lamps](http://www.energystar.gov/lamps)  
for more information!



# ENERGY STAR Resources

- Stakeholder resources:
  - [www.energystar.gov/Lightingresources](http://www.energystar.gov/Lightingresources)
- Consumer Info:
  - [www.energystar.gov/lighting](http://www.energystar.gov/lighting)
- Certification FAQs:
  - [www.energystar.gov/lightingfaqs](http://www.energystar.gov/lightingfaqs)
- Rebate Summary:
  - [www.energystar.gov/DIME](http://www.energystar.gov/DIME)
- Contact: [Lighting@energystar.gov](mailto:Lighting@energystar.gov)



## Lighting Made Easy

### Just Look for the ENERGY STAR®

- ★ Independently certified to meet strict energy-efficiency and performance criteria
- ★ Same brightness (lumens), 70-90% less energy (watts)
- ★ Help protect the environment and prevent climate change

**LEARN MORE AT** [energystar.gov](http://energystar.gov)



## LIGHTING MADE EASY

### Just Look for the ENERGY STAR®

Only bulbs that have earned the ENERGY STAR label have been independently certified and undergone extensive testing to assure that they will save energy and perform as promised.



- ★ Use 75% less energy than incandescent bulbs
- ★ Save you \$40 to \$135 in energy bills
- ★ Provide the same brightness (lumens) with less energy (watts)
- ★ Last 10 to 25 times longer than incandescent bulbs
- ★ Help protect the environment and prevent climate change

**ENERGY STAR certified CFL and LED bulbs** are available in a variety of shapes and sizes for any application—including recessed cans, track lighting, table lamps, and more. You can even find certified bulbs that are dimmable. **Use this chart as a guide to finding the right ENERGY STAR certified bulb for your light fixture and remember to always check the packaging for proper use.**

	BULB TYPES					
TABLE OR FLOOR LAMPS						
PENDANT FIXTURES						
CEILING FIXTURES						
CEILING FANS						
WALL SCONCES						
RECESSED CANS						
ACCENT LIGHTING						

### BRIGHTNESS

For brightness, look for lumens, not watts. Lumens indicate light output. Watts indicate energy consumed. ENERGY STAR certified bulbs provide the same brightness (lumens) with less energy (watts). **Use this chart to determine how many lumens you need to match the brightness of your old incandescent bulbs.**

Old Incandescent Bulbs (Watts)	ENERGY STAR Bulb Brightness (Minimum Lumens)
40	450
60	800
75	1,100
100	1,600
150	2,600

### COLOR/APPEARANCE

ENERGY STAR certified bulbs are available in a wide range of colors. Light color, or appearance, matches a temperature on the Kelvin scale (K). Lower K means warmer, yellowish light, while higher K means cooler, bluer light.

2700K	3000K	3500K	4100K	5000K	6500K
WARM			COOL		
Warm White, Soft White		Cool White, Natural White		Natural or Daylight (think blue sky at noon)	
Standard color of incandescent bulbs.		Good for kitchens and work spaces.		Good for reading.	

Visit [energystar.gov/lighting](http://energystar.gov/lighting) for more information.

# What is the DesignLights Consortium?

- Created by the Northeast Energy Efficiency Partnerships (NEEP) in 1998 to promote quality lighting and design in commercial spaces
- 1998: knowhow series
- 2006: HPT8 Project
- 2008: QPL



# What is the DLC QPL?

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- A **qualification program** for commercial LED fixtures
- Launched with support from NEEP region utilities to cover application categories not served by ENERGY STAR

LOG IN

About the DLC ▼ DLC QPL ▼ SSL Resources ▼

DESIGNLIGHTS  
CONSORTIUM

ne  
ep

## The DesignLights Consortium®

Brings stakeholders together to define and promote leading edge high quality, high efficiency commercial sector lighting solutions.

Welcome to the new webpage for the Designlights Consortium®! As we transition to this new website, we are confident you will find it a powerful and valuable tool. To make the transition as easy as possible, however, if you are simply looking for the Qualified Products List, you can download in its old format:

[Click here to download the QPL - Updated 10/14/2013 \(xls\)](#)  
[Cliquez ici pour télécharger la LPO - Mise à jour 10/14/2013 \(xls\)](#)

Search the DLC Qualified Products List >

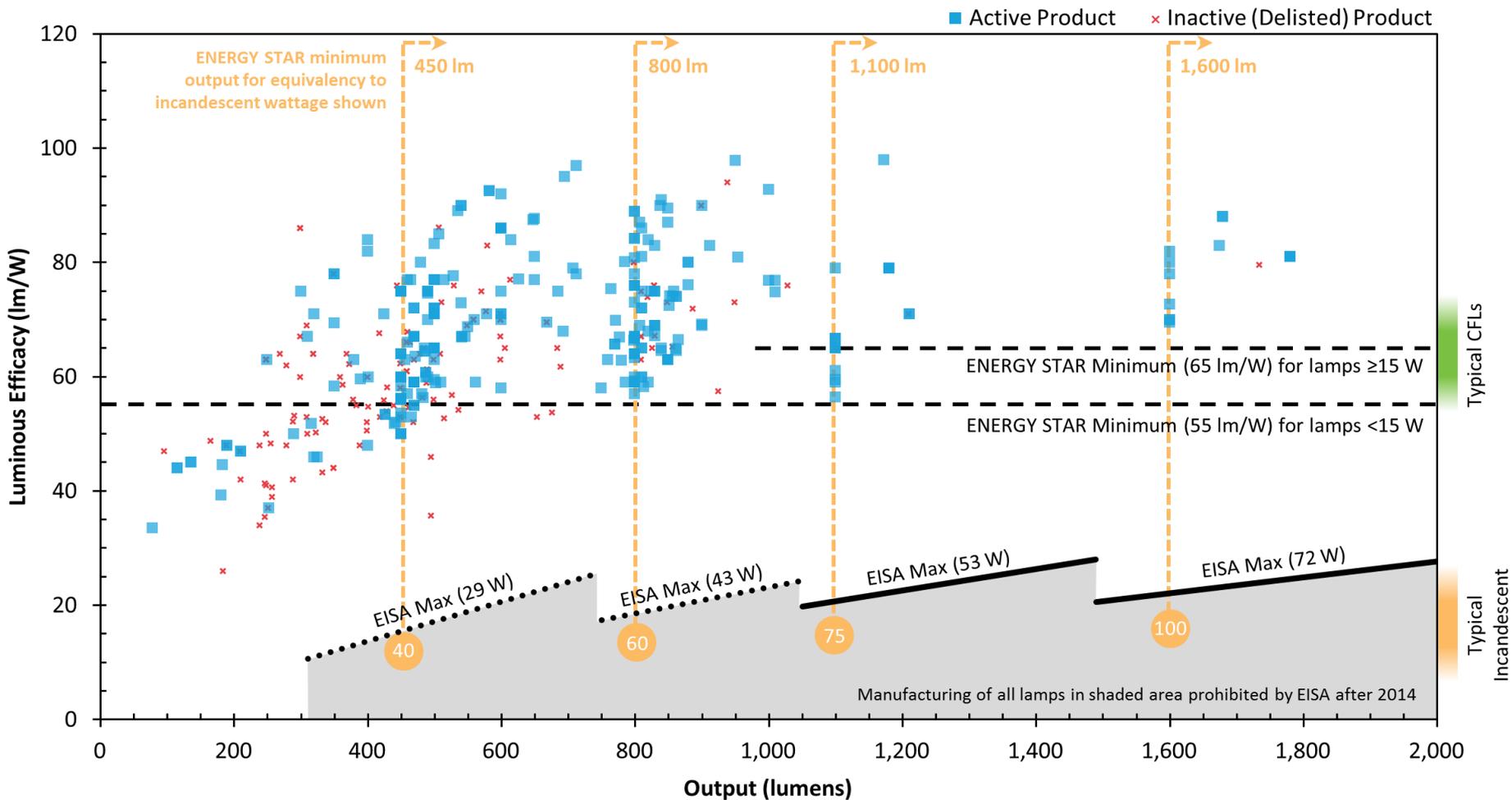
View/Download the Category Specifications >

Information about Submitting Products >

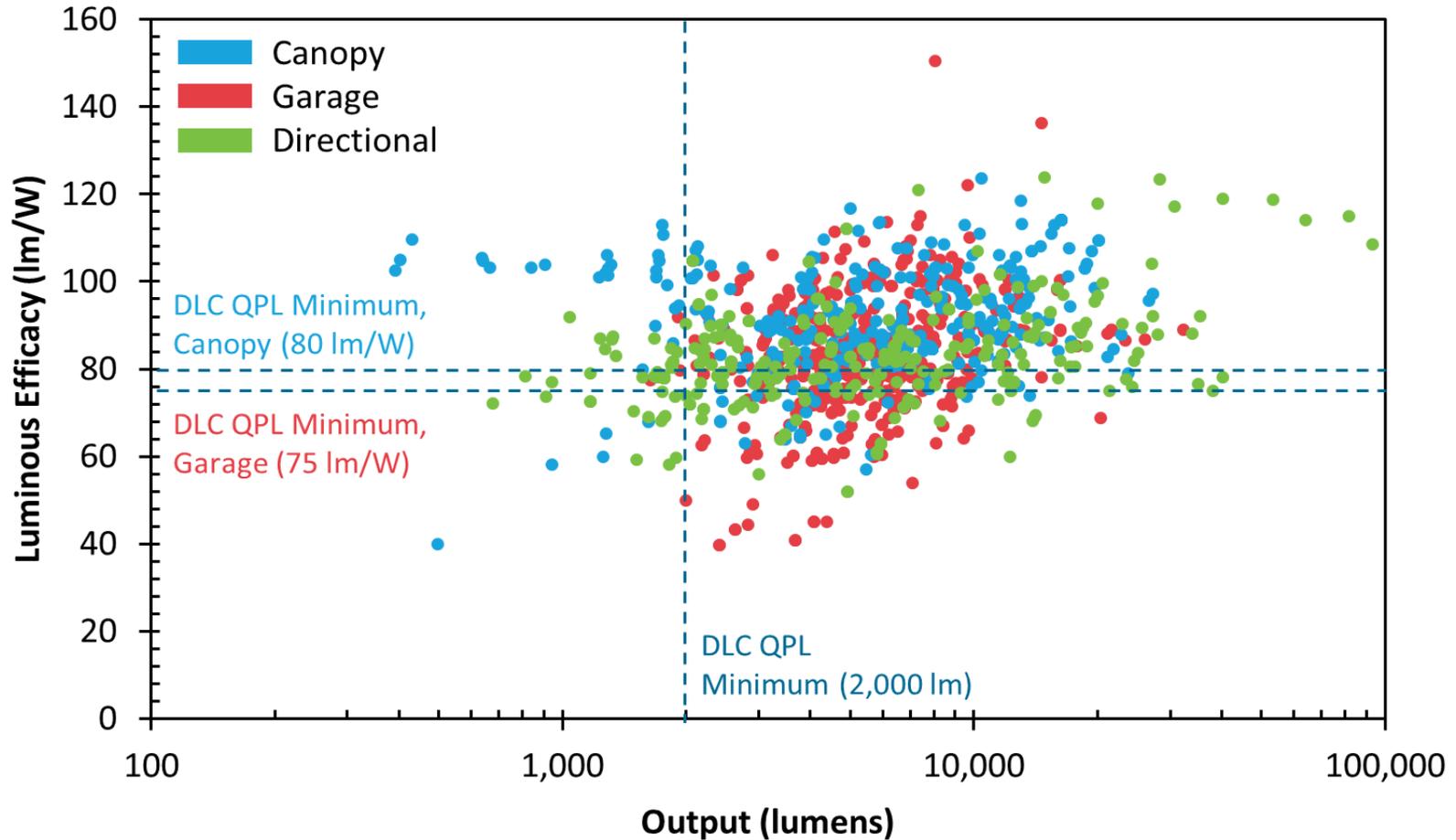
DLC News

Important news, events, and other information about the DLC.

# LED Lamp Market Compared to New Standards



# Tracking QPL Requirements



# Collaboration – Standardized Testing Methods

LED **lighting facts**<sup>®</sup>  
A Program of the U.S. DOE

Brand X

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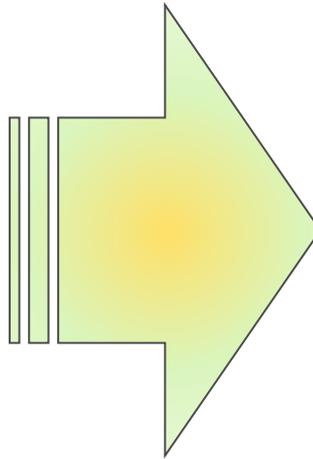
2700K 3000K 4500K 6500K

LED Lumen Maintenance Projection at 25,000 Hours at 25°C Ambient*	95.11%
Warranty**	Yes

All results, except LED Lumen Maintenance, are according to IESNA LM-79-2008:  
*Approved Method for the Electrical and Photometric Testing of Solid-State Lighting.*  
The U.S. Department of Energy (DOE) verifies product test data and results.

\* Based on TM-21 projections for the light source.  
\*\* See [www.lightingfacts.com/products](http://www.lightingfacts.com/products) for details.

Registration Number: ABC435TH4792023  
Model Number: 18756CHT56428954RGHT1234H3  
Type: 18756CHT56428954RGHT1234H3



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# Thank You

Ruth Taylor  
PNNL

[www.ssl.energy.gov](http://www.ssl.energy.gov)