

100 years of **innovation**  
and we're just getting started

**BOSTON GREEN TOURISM**  
CREATING A GREENER WELCOME FOR GREATER BOSTON'S VISITORS



# *Advances in Lighting for Hotels*

Tom Varela  
GE Lighting  
Oct. 28<sup>th</sup>, 2010



# Agenda



Regulatory Update  
Basic Upgrades  
L.E.D.'s

## Resources

DOE Website – Just Google [doe\\_space\\_ssl](#)  
GE Website ( [gelighting.com](#) & [led.com](#) )

# Regulatory Update

2005 Energy Policy Act

2007 Energy Bill

( Energy Independence and Security Act of 2007 )

2009 DOE Rulemaking

2009 Stimulus Bill

**2010 Update**

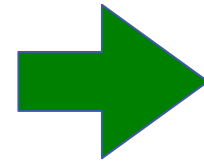


imagination at work

# Incandescent A-line Regulations

## Incandescent Lamps

100W	➔	72W	1/1/2012
75W	➔	53W	1/1/2013
60W	➔	43W	1/1/2014
40W	➔	29W	1/1/2014



- Requirements for reduced wattage with similar lumen output and 1000 hours minimum life
- Decorative and Specialty Lamps generally exempted
- CA and NV can put in place one year earlier due to existing state laws. 2008 CA law requires 5% wattage reduction to 95, 71, 57 and 38 watts.

# 2009 DOE Rulemaking

Sets new Federal Efficiency Levels on:

- 4', 8', 8' HO and U-6 Fluorescent Lamps
  - Includes T12, T8 and T5 lamps
- Halogen PAR38, PAR30 & PAR20 Lamps

Provides Several Exemptions

Standards to be effective 3 years after publication in Federal Register.

- July 2012



# 2012 Standard – Linear Fluorescent Lamps

## Effect of Standard on 4' and U-Bend

### 4' T12 and U-Bend T12 Lamps:

All standard 4' T12 lamps and U-bend T12 lamps are eliminated by the regulation.

### 4' T8 Lamps and U-Bend T8 Lamps:

All 32W SP "700" series T8 lamps eliminated.

32 Watt SPX "800 series", 32W High Lumen, 30W, 28W and 25W T8 lamps remain.

### ~4' T5 lamps:

All T5 lamps remain.



# 2012 Standard – Linear Fluorescent Lamps

## Effect of Standard on 8' and 8' HO

### **8' T12 and T8 Slimline Lamps:**

All 75W 8' T12 lamps eliminated.

All SP "700 series" 60W 8' T12 lamps eliminated -

60W SPX/WM T12 passes.

Almost all 8' T8 lamps pass.

### **8' T12 HO Lamps and 8' T8 HO Lamps:**

All 110W 8' T12 & 95W SP HO lamps eliminated.

- Cold Temperature exemption remains.

All 8' T8 HO lamps pass.

GE Consumer & Industrial

# 2009 DOE Rulemaking

## Halogen PAR



# 2012 Standard – Halogen PAR Lamps

## Effect of Standard

### **PAR38 and PAR30**

All standard Halogen PAR lamps eliminated.

Halogen-IR lamps near standard limits.

Halogen-IR+ pass.

### **PAR20:**

All standard Halogen PAR 20 lamps eliminated.

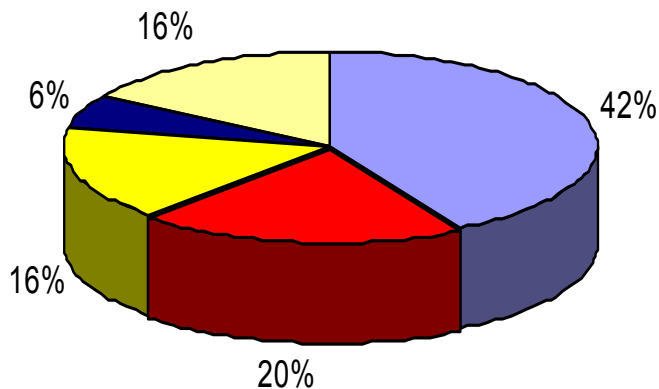
Redesign required.

Simple lighting strategies that will...

Lower your energy consumption  
&  
Reduce your maintenance costs

# High energy bills?

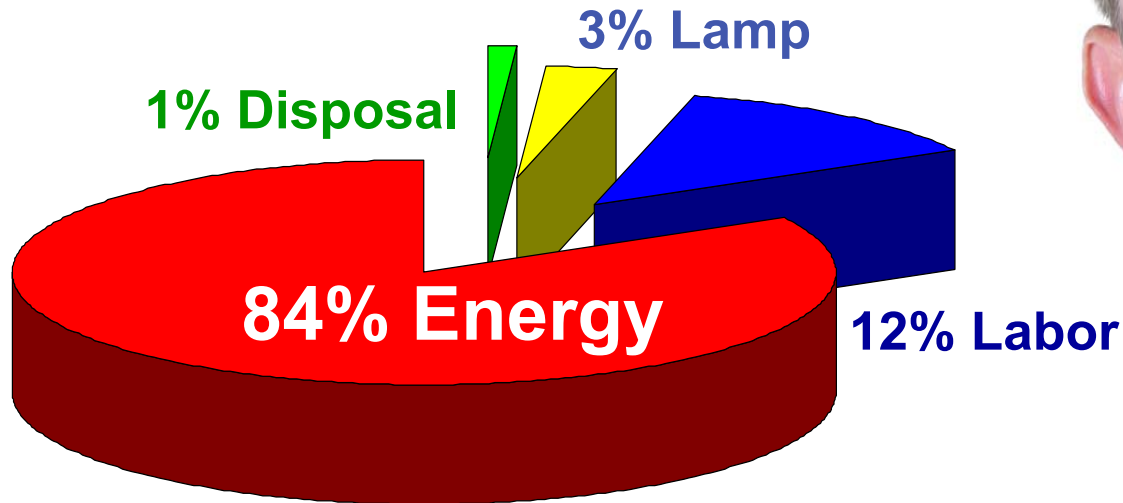
- On average, the lodging industry spend \$1.41 / square foot on energy annually.
- U.S. hotels spend an average of \$820 annually per available room for electricity.
- A U.S. hotel utilizes 42% of its energy on Lighting (20%) & HVAC (22%).
- A typical guest room will utilize 80% of its energy on room lighting and air conditioning.
- Hotel utility costs average 3.9% of total revenue.
- Lighting is a significant factor that can positively impact the net income of a hotel.



# High energy bills?

## The “Cost of Light”

- When buying light bulbs for your hotel, are you focused on the right “Piece of the Pie?”
- The average 200-guest room hotel can reduce its lighting electricity expenses by as much as 45% with better lighting specifications.
- Long Life Lamps lamps will reduce your maintenance and procurements costs as well.



# High energy bills?

*“GE’s Brilliant Idea”*



STOP using Incandescent Bulbs

Start using Compact Fluorescents  
and LED's

# Easy as screwing in a light bulb!



Save 108 watts



Save 50 watts



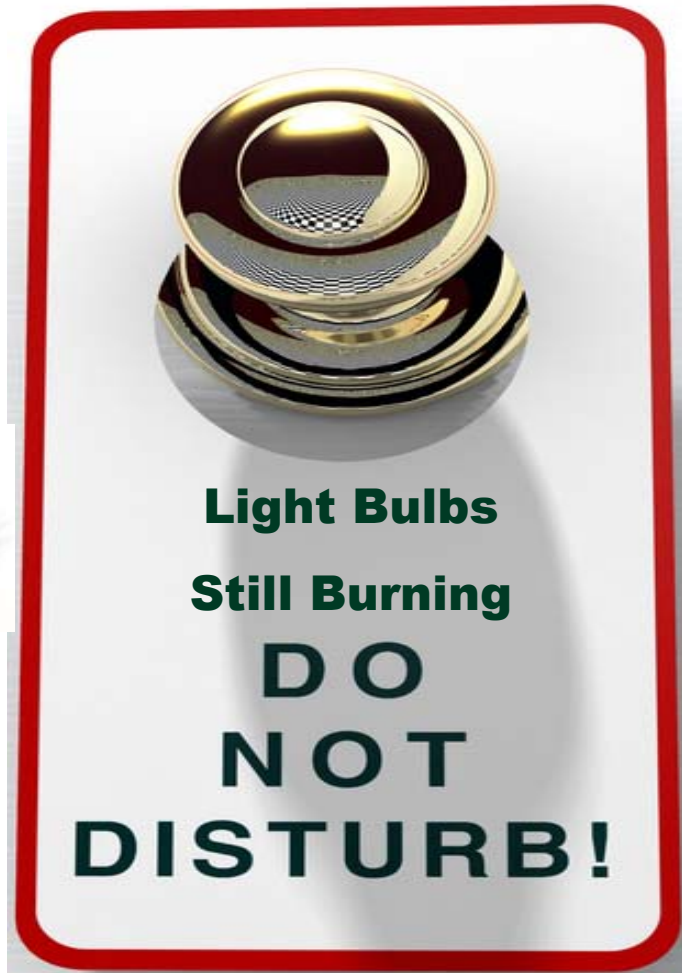
Save 45 watts



Save 31 watts



# Here's to a Long Life!



# Summary

1. Train and educate your staff on the “Cost of Light”
2. In common areas and guest rooms...  
wherever possible, switch to CFLs and/or LED’s
3. Public spaces, Common Areas & Back of the House...  
Make sure that all Linear Fluorescent (2ft. & 4ft. Tubes)  
are the most energy efficient available.

## Features:

Reduce energy consumption by up to 75%



Increase lamp life 10-15 times



## Benefits:

Lower energy bills  
Improved bottom line

Reduce maintenance time  
Reduce waste  
Increased guest satisfaction



GE Consumer & Industrial  
Lighting

# LED PAR20 – 7 Watt



imagination at work

Information provided is subject to change without notice. Please verify all details with GE. All values are design or typical values when measured under laboratory conditions, and GE makes no warranty or guarantee, express or implied, that such performance will be obtained under end-use conditions.

# LED PAR20



## Features & Benefits

- Long 30,000 hour life rating\*
- Very Low 7 watt Energy consumption ... save up to \$46 over the life of the lamp vs. a 30 watt incandescent R20.
- Environmentally conscious with lead free glass, low energy consumption and long life which drives fewer lamp changes and disposal
- Superior optics vs. an incandescent R20 means more light on target to improve visual display.

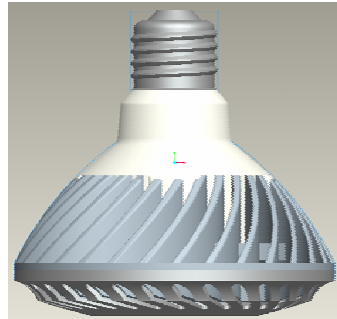
## Product Offerings

<u>Product Code</u>	<u>Description</u>
73717	LED7PAR20/SP10
73718	LED7PAR20/NFL20
73716	LED7PAR20/NFL/CD

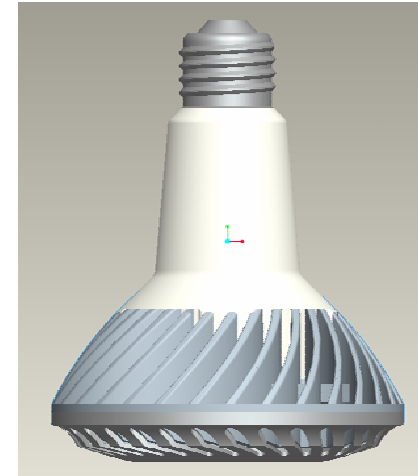


# LED - PAR30 lamps

- More Light
- More LEDs
- Manage Cost



Short neck – PAR30



Long neck – PAR30

Lumens	320	320
Life (hrs)	$\geq 30,000$	$\geq 30,000$
Color	3000° K	3000° K
CRI	$>80$	$>80$
Watts	10-W	10-W
Sug. Retail Price	\$35 - 40	\$35 - 40

*Popular Narrow Flood beam pattern*

# LED - Medium Base PAR16



Track Lighting



*Target shape:  
Same as Popular  
GE Halogen PAR16*

LED PAR 16

Lumens	120
Life (hrs)	$\geq 20,000$
Color	3000° K
CRI	$>80$
Watts	4-W
Sug. Retail Price	\$20-25

*For Medium base compact accent fixtures*

# Decorative lamps for 2009 - 2<sup>nd</sup> Half

G25



- Clear
- Frosted
- Color Changing



Vanity Strips

Small Globes (16.5)



- Med base
- Cand Base
- Clear/White



Decorative

Candle



- Med base
- Cand Base
- Clear/Colors
- Reg. & Bent tip



Decorative

*Variety of wattages, shapes and bases*

# More Decorative lamps for 2009 – 2<sup>nd</sup> Half

Night Light



- Clear
- White
- Blue



Night Light

A15



- Clear/White
- Appliance ,  
Party Bulb
- Ceiling Fan



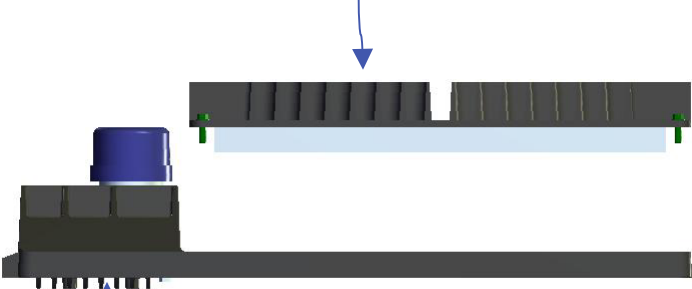
Ceiling Fan

S14 & others

*A complete range of LED Decorative products*

# Site Light Concept – 400W Equivalent

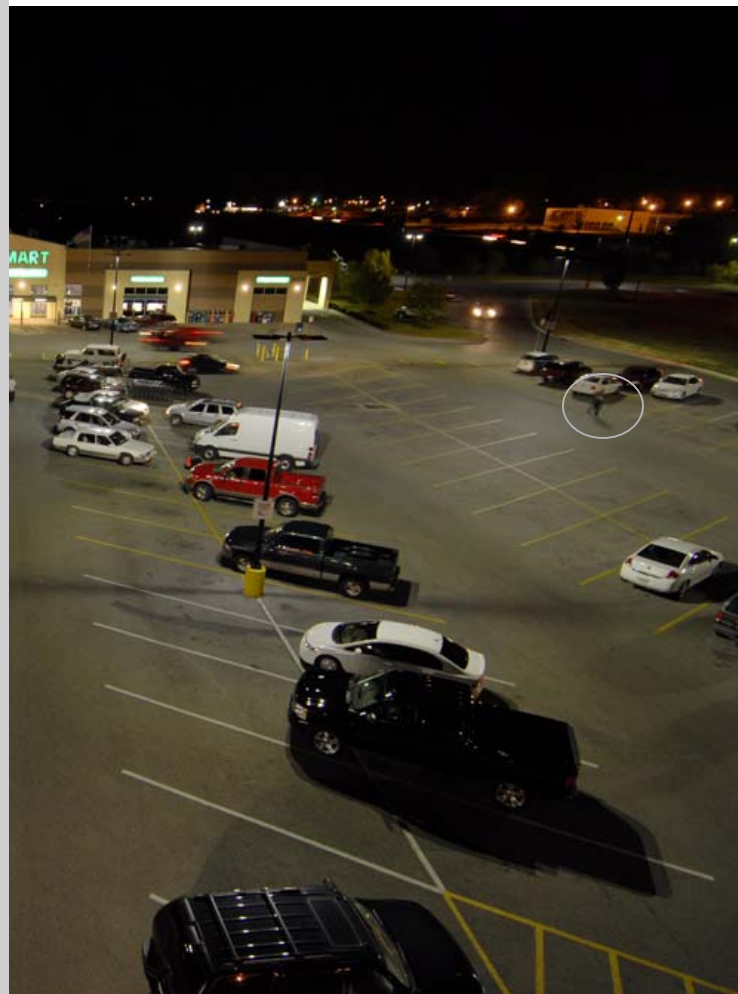
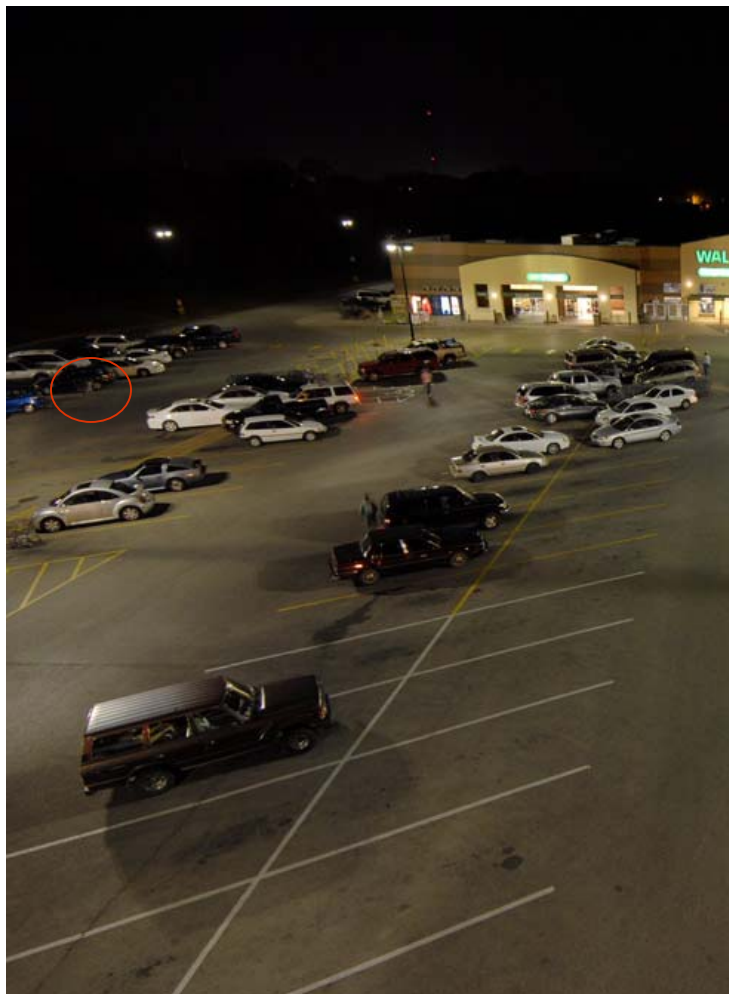
Lumination to provide:  
Sealed Optical / Thermal Module & Drivers



GELS to provide:  
Fixture Frame, Mounting Arm, PE,  
Terminal Blocks, and wiring



# Uniformity and Vertical Illumination Improves Security



400w MH



205w LED



# DOE Website Just Google – doe space ssl

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## Solid-State Lighting

About the Program | R&D Projects | Market-Based Programs | Using LEDs | Information Resources | Financial Opportunities

**DOE Solid-State Lighting Portfolio**  
The U.S. Department of Energy and its partners are working to accelerate advances in solid-state lighting — a pivotal emerging technology that promises to fundamentally alter lighting in the future.

No other lighting technology offers as much potential to save energy and enhance the quality of our building environments, contributing to our nation's energy and climate change solutions.

Read more about the energy-saving potential ([PDF 72 KB](#)). [Download Adobe Reader](#).

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L Prize Partners stand ready to support the winning products.  
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**For more information, e-mail:**  
[James Brodrick](#)  
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# Independent Product Testing

## To protect you, the consumer

Commercially  
Available  
LED  
i  
Product  
Evaluation  
and  
Reporting  
(CALiPER) program



The screenshot shows the U.S. Department of Energy website for Solid-State Lighting. The page is titled "Market-Based Programs" and features a sidebar with a navigation menu. The "CALiPER Program" link is circled in red, with a red arrow pointing to it from the text on the left. The main content area includes a section titled "About the CALiPER Program" which describes the program's purpose and lists test results. Below this, there is a section for "CALiPER Program Planning" and a list of available documents in PDF format.

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

Solid-State Lighting

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- CALiPER Program**
- About the Program
- FAQs
- Summary Reports
- Detailed Reports
- Benchmark Reports
- Testing Laboratories

**Standard Development**

**Technical Information Network**

**GATEWAY Demonstrations**

**Municipal Consortium**

**Design Competitions**

**About the CALiPER Program**

The DOE CALiPER program supports testing of a wide array of SSL products available for general illumination, using industry-approved test procedures.

CALiPER test results:

- Guide DOE planning for SSL R&D and market introduction activities, including ENERGY STAR<sup>®</sup> program planning
- Support DOE GATEWAY demonstrations and technology procurement activities
- Provide objective product performance information to the public in the early years, helping buyers and specifiers have confidence that new SSL products will perform as claimed
- Guide the development, refinement, and adoption of credible, standardized test procedures and measurements for SSL products

**CALiPER Program Planning**

Analysis of CALiPER test results and feedback from lighting manufacturers, efficiency programs, and utilities guide DOE planning for the CALiPER program. DOE hosts periodic CALiPER roundtables to solicit input on test results and procedures and additional testing needs for SSL.

The following documents are available as Adobe Acrobat PDFs. [Download Adobe Reader.](#)

- 2010 CALiPER Roundtable Report ([PDF 500 KB](#))
- 2009 CALiPER Roundtable Report ([PDF 398 KB](#))
- 2007 CALiPER Roundtable Report ([PDF 215 KB](#))

DOE has also established a guidance committee — including representatives from energy efficiency programs, utilities, the lighting design community, and key trade groups — to guide CALiPER program improvements and serve as a direct communications channel with stakeholders.

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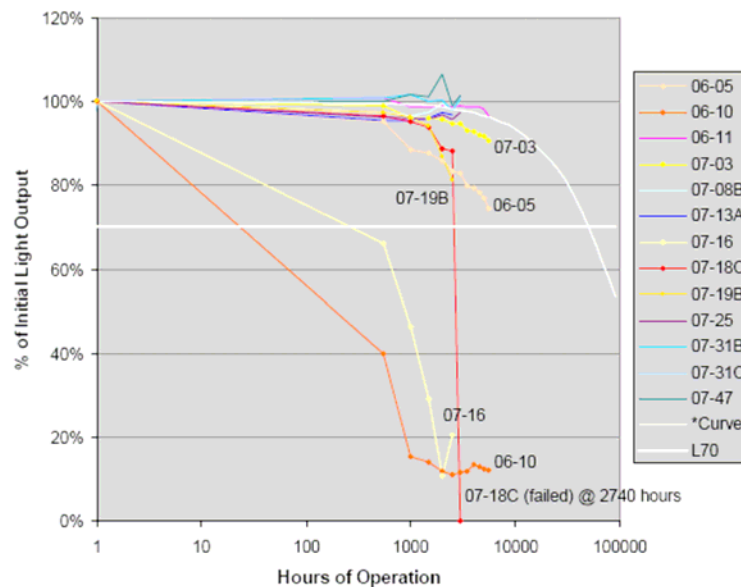
Content Last Updated: 04/21/2010

# U.S. Department of Energy SSL Caliper Testing Program

## Conformance to Initial Claims

Test Round	Date	Number Tested	Number Meet	Percent Meet
1	Mar-07	8	1	13%
2	Aug-07	13	2	15%
3	Oct-07	24	11	46%
4	Jan-08	15	2	13%
5	May-08	17	4	24%
6	Aug-08	24	2	8%
7	Jan-09	9	3	33%
Total		110	25	23%

## Conformance to Life Claims



**23% of Commercially Available Products Meet Claims**

Round 11, Oct. 2010

A 40 page report on:

Roadway  
Post-Top  
Linear Fluorescent  
Screw-in & plug-in  
replacement lamps

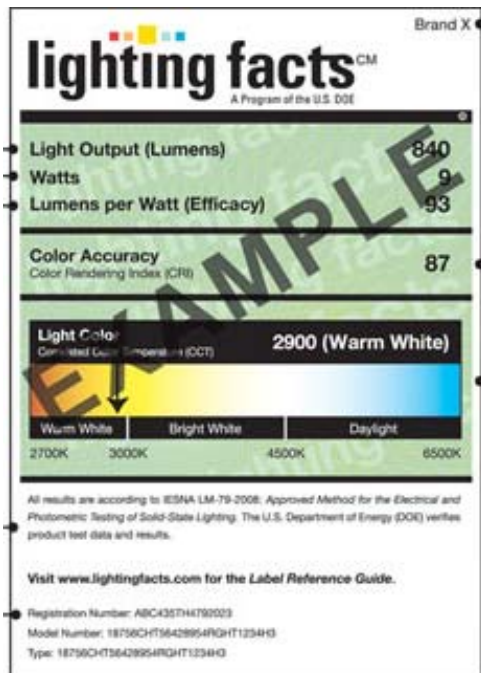
# CALiPER

## SUMMARY REPORT

October 2010

DOE Solid-State Lighting CALiPER Program

## Summary of Results: Round 11 of Product Testing



“Average overall efficacy of products tested in this round shows steadily increasing performance. While many products continue to carry misleading equivalency claims and inaccurate manufacturer published performance metrics, a number of products now carry accurate performance claims—in particular those that carry the Lighting Facts label”.

“The majority of claims of light output and efficacy for SSL linear lamps were accurate, particularly for products carrying the Lighting Facts label. Equivalency statements, however, were misleading, implying or claiming comparable light output to T8 fluorescent lamps”.

“Even with manufacturer data in hand, there is often uncertainty as to whether that data corresponds to a particular version of a product. Nevertheless, manufacturer numerical claims regarding product performance metrics are becoming more accurate, in particular when the manufacturer provides an LM-79 test report or publishes the data on a Lighting Facts label (based on LM-79 testing). Carrying a Lighting Facts label is not a guarantee that a product will perform as labeled, but it does appear to improve the chances that a product will meet or exceed claims or come close to meeting those claims”.

# Anatomy of the Label

**Brand X** → **Brand**

**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**

**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.

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)
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: 18756CHT56428954RIGHT1234HD  
Type: 18756CHT56428954RIGHT1234HD

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- New & Exclusive web site
- One stop for customer education and information
- Environmental sustainability combined site
  - > Lighting and electrical products

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**U.S. Green Building Council (USGBC) / LEED® Certification**  
This non-profit organization, comprises more than 7,200 organizations from every segment of the industry. They also developed the Leadership in Energy & Environmental Design (LEED®) Program.

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