



Overview

Energy Star Program for Solid State light source

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Global Market for LED light

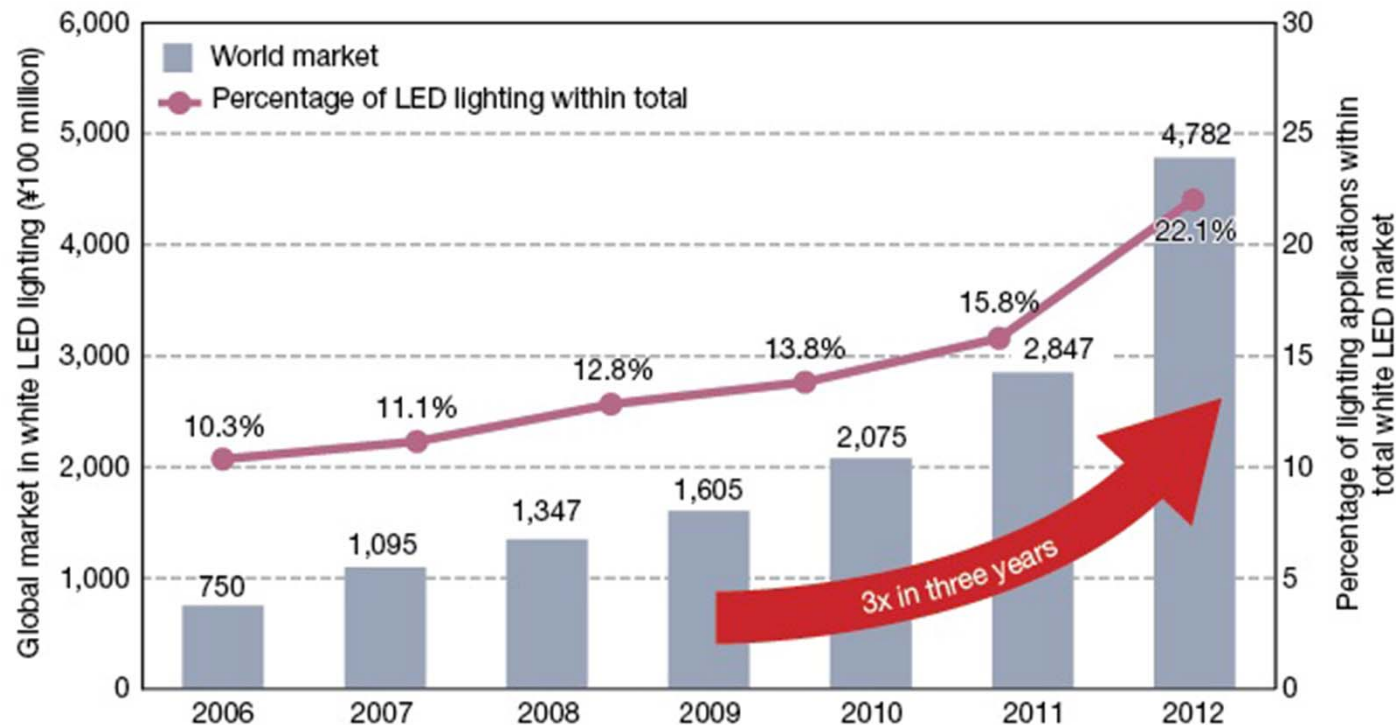
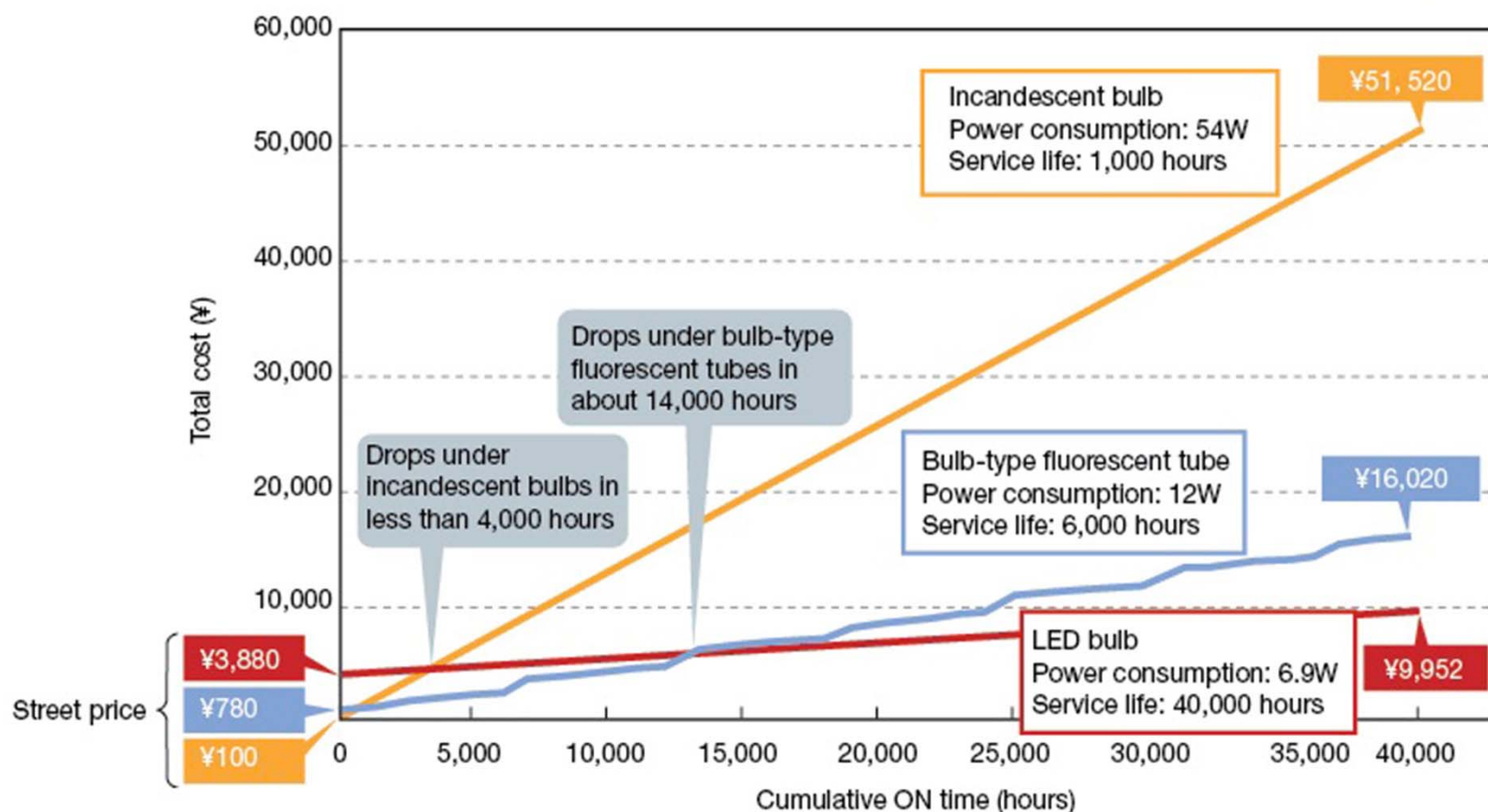


Fig 3 LED Lighting to Account for Over 20% of Global Market A survey by Nomura Research Institute shows the world market for white LED lighting will almost triple in 2009. Lighting will account for over 20% of the total white LED market in 2012, assuming an increasingly important position in the market. Diagram by *Nikkei Electronics* based on material courtesy *Nikkei Market Access*.

<http://techon.nikkeibp.co.jp/article/HONSHI/20091126/178024/?P=4>





Key Element for SSL

Performance

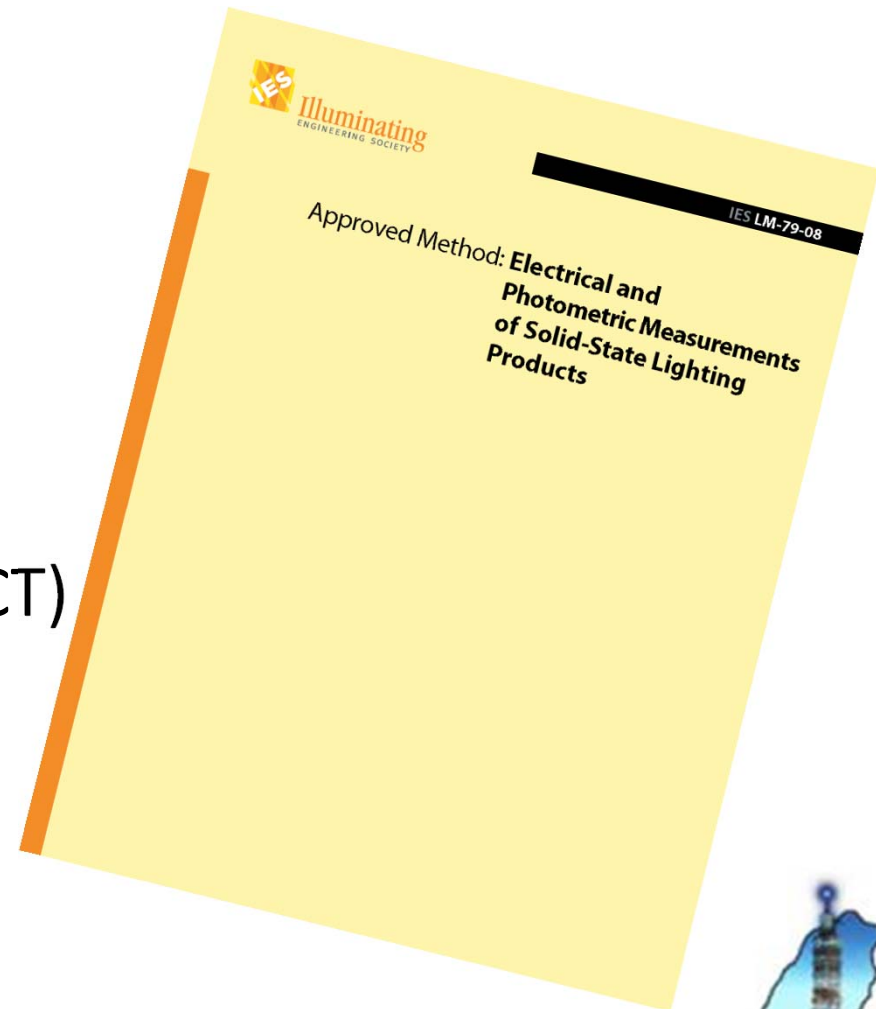
Cost

Life Time



Photometry Performance for SSL

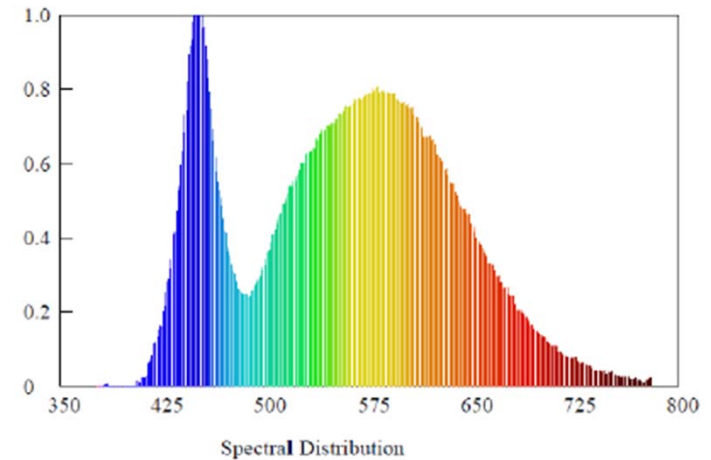
- Luminous Efficacy,
- Lumen Output,
- Zonal Lumen Density
- Correlated Color Temp. (CCT)
- CRI
- Chromaticity



Photometry Parameter

- Integral Sphere Test System***

Spectroradiometric Parameters



Chromaticity Coordinates: $x=0.3628$ $y=0.3583$ $u'=0.2207$ $v'=0.4905$

Correlated Color Temperature: 4400 K

Luminous Flux: 142.961 lm

Chromaticity Difference: -0.0033Duv

Color Ratio: $K_r=36.4\%$ $K_g=54.7\%$ $K_b=8.9\%$

Bandwidth: 28.4nm

Rendering Index: $R_a=81.0$

R1=80 R2=87 R3=90 R4=79 R5=79 R6=79 R7=86 R8=67

R9=13 R10=66 R11=75 R12=56 R13=82 R14=94 R15=77

Dominant Wavelength: 579.0 nm(E)

Purity: 0.1640

Peak Wavelength: 452.1 nm

Color Tolerance: 0.0 SDCM

Radiant Flux: 0.423 W



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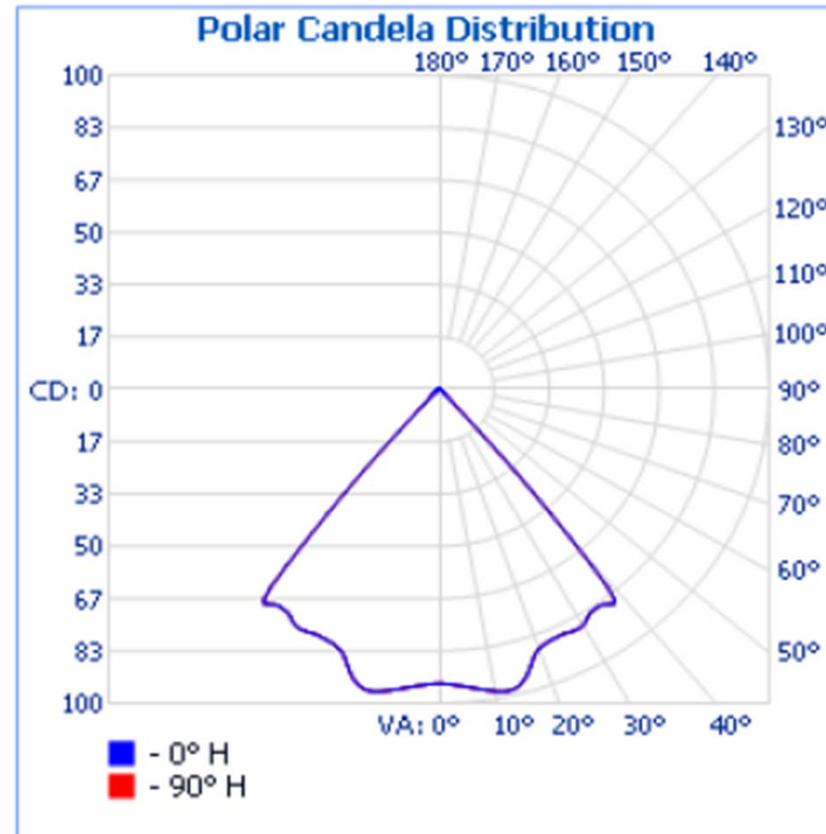
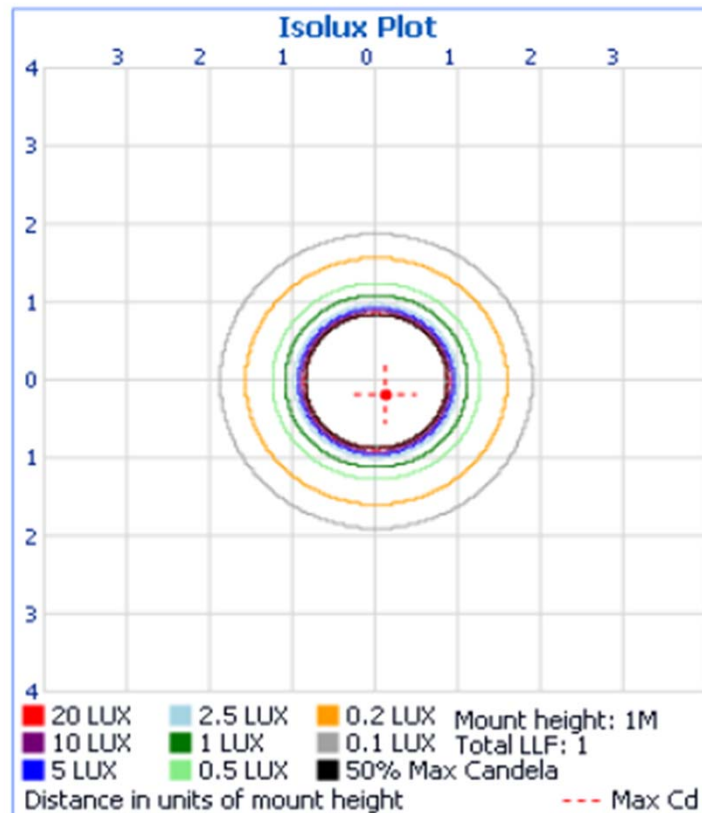
Photometry Parameter

- *Integral Sphere Test System*



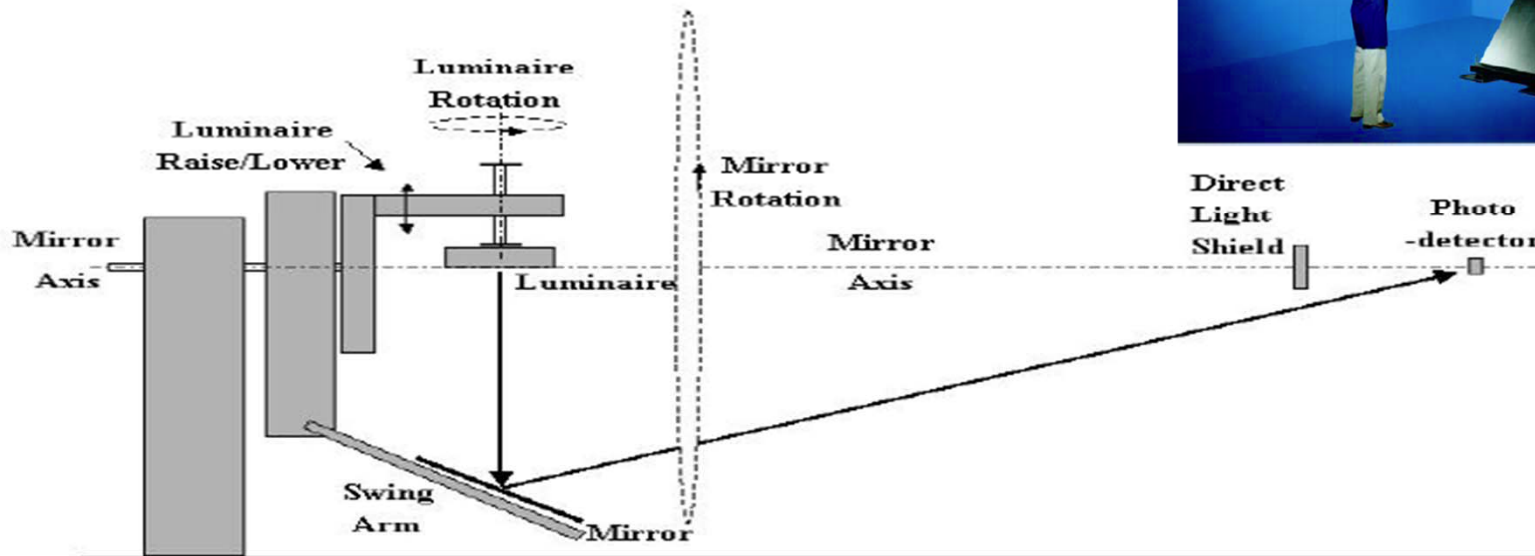
Photometry Parameter

- ***Goniophotometer System***



Photometry Parameter

- *Goniophotometer System*



Lift time performance for SSL

- Lumen Maintenance
- Color Maintenance

LM-79

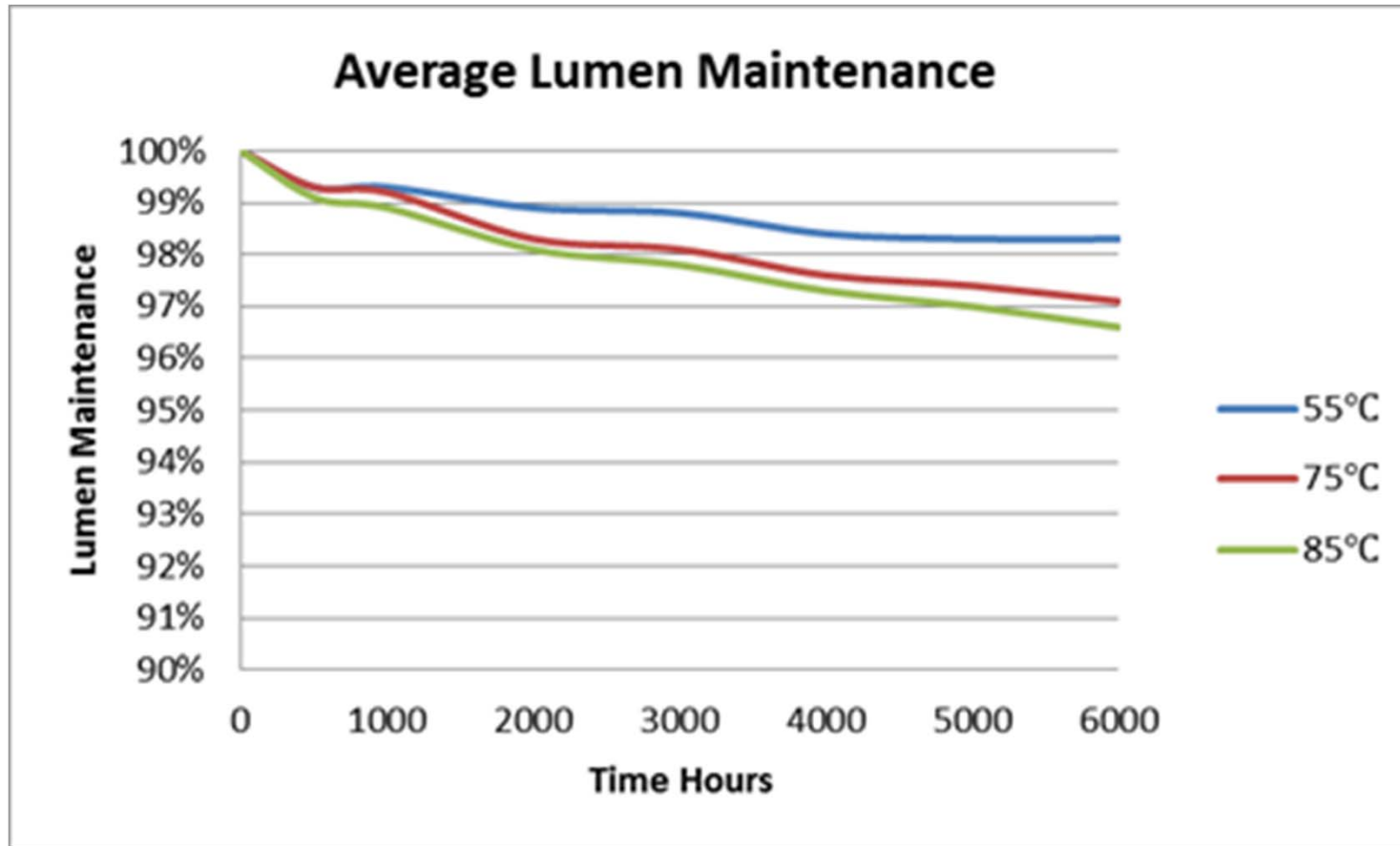
Details Testing Procedures
for the Photometric and
Electrical Performance of
LED Luminaire.

LM-80

Details Testing Procedures
for the Lumen
Maintenance Testing of
Individual LEDs.



Lift time performance for SSL



Regulation (NRcan, Canada)

ENERGY STAR qualified products which will be labeled and promoted in Canada are:

- major appliances
- residential heating, cooling and ventilation equipment
- office equipment
- consumer electronics
- windows and doors
- lighting
- commercial equipment

A full listing of the current ENERGY STAR qualified products in Canada can be found on the NRCan web site.



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Regulation (ENERGY STAR, US)

- **Effective Date: April 1, 2012**



ENERGY STAR[®] Program Requirements
Product Specification for Luminaires (Light Fixtures)

Eligibility Criteria
Version 1.1

- **Effective Date: August 31, 2010**



ENERGY STAR[®] Program Requirements for Integral LED Lamps

Eligibility Criteria - Version 1.4



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Regulation (DoE, US)

News update (3, May)

Energy Conservation Program: Test Procedures for Light-Emitting Diode Lamps (Proposal)

Public Meeting Slides Topics

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

- 1 Rulemaking Process and Scope
- 2 Test Procedure for Input Power, Lumen Output, and CCT
- 3 Test Procedure for Rated Lifetime

Milestone	Date
Notice of Proposed Rulemaking (NOPR) Publication	<i>April 9, 2012</i>
NOPR Public Meeting	<i>May 3, 2012</i>
Comment Period Ends	<i>June 25, 2012</i>
Final Rule Publication (projected)	<i>November 2012</i>

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Reference

- IES LM-79 “Electrical and Photometric Measurements of Solid-State Lighting Products”
- IES LM-80 “Measuring Lumen Maintenance of LED Light Sources”
- <http://techon.nikkeibp.co.jp/article/HONSHI/20091126/178024/?P=4>
- <http://www.energystar.gov/>
- <http://oee.nrcan.gc.ca/regulations/16802#products>
- http://www1.eere.energy.gov/buildings/appliance_standards/residential/test_procedures_for_light_emitting_diode_lamps.html

