

ENERGY STAR[®] Lamps V1.0 Specification Draft 3 Webinar

January 11, 2013

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U.S. EPA ENERGY STAR Program



Learn more at energystar.gov

Webinar Agenda

Topics

- Spec Activities, Comment Period, Objectives
- Scope and Lamp Classification
- Federal lighting regulations
- Product Qualification
- Photometric Performance Requirements
- Lumen Maintenance & Rated Life Requirements
- Electrical Performance Requirements
- Labeling and Packaging Requirements
- Test Methods
- Q&A Session

Activities to Date – Lamps V1.0

- **March 22, 2011:** Framework Document released
- **October 21, 2011:** Draft 1 Released
- **October 24, 2011:** Lab/Accreditation Body/Certification Body Round Table
- **November 30, 2011:** Draft 1 Webinar
- **July 6, 2012:** Lamps Draft 2 Released
- **August 8, 2012:** Draft 2 Webinar
- **October 21, 2012:** Dimming Discussion
- **December 21, 2012:** Release of Draft 3
- **January 11, 2013:** Draft 3 Webinar

Thank you for your comments!



Advanced Compliance

Intertek

Nexxus Light

Solutions

Isine

NYSERDA

Batteries Plus

ITL

Orb Optronix

Bell-Southcn LED

Joinluck

Osram Sylvania

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Khosla Ventures

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Lighting Science Group

Spectra Optronics

CEE

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CREE

Littelfuse

TCP

CSA

Loeb Electric

TOSPO

EEL

Lucidity Lights, Inc.

TUV SUD

Efficiency Vermont

NEEP

UL

Feit Electric

NEMA

GE



Comments

- Stakeholders are encouraged to ask clarifying questions during the webinar
- Please send comments to: lamps@energystar.gov

Comment Deadline

January 18, 2013

- Comments will be posted at www.energystar.gov/lamps unless noted “DO NOT POST”

Webinar Objectives

1. Overview of changes made in Draft 3
2. Opportunity to ask clarifying questions on proposed requirements
 - Please contact us at lamps@energystar.gov for in depth discussion items on the draft
 - Specification is posted at www.energystar.gov/lamps
3. Discuss next steps

Specification Scope and Lamp Classification

1. Scope and Lamp Classification:

Reorganized by purpose and to add clarity to which shapes and types of lamps are eligible

- Removed semi-directional lamps and non-standard SSL
 - Stakeholders from the manufacturing and efficiency communities concerns
 - Evaluation of existing products
 - Packaging requirements are insufficient
 - Damage to ENERGY STAR brand
- Clarified equivalency claims eligibility for wattage and lamp shape
- Moved Globes to decorative section
- Removed Fluorescent Circuline and D lamp types



1. Scope and Lamp Classification: Organization

Lamp Purpose and Performance Description	Standard Lamp Form Factor (Solid-State and CFL) ¹	Non-Standard Lamp Form Factor (CFL only) ²
<p>Omni-directional – Lamps intended for general purpose that meet applicable omnidirectional performance requirements in this specification.</p>	<p>ANSI standard lamp shapes - A, BT, P, PS, S and T.</p>	<p>Lamps intended to replace ANSI standard general purpose lamps and do not meet Lamp Shape and Dimensional Requirements (p. 30).</p> <p>The following self-ballasted compact fluorescent lamps are included:</p> <ul style="list-style-type: none"> • Bare spiral • Bare mini-spiral • Bare twin tube • Bare triple tube • Bare quadruple tube • Covered lamps
<p>Decorative - Lamps of common decorative shapes meeting applicable decorative performance requirements in this specification.</p>	<p>ANSI standard lamp shapes - B, BA, C, CA, DC, F, G</p>	<p>Lamps intended to replace ANSI standard decorative shapes but do not meet Lamp Shape Dimensional Requirements (p. 30).</p>
<p>Directional - Lamps meeting applicable directional performance requirements in this specification.</p>	<p>ANSI standard lamp shapes - R, BR, ER, MR and PAR.</p>	<p>Lamps intended to replace ANSI standard reflector lamps but do not meet Lamp Shape Dimensional Requirements (p. 30).</p>

¹ Standard form factor lamps must meet the lamp shape dimensional requirements in the specification and may claim wattage and ANSI lamp type equivalency. All solid-state lamps must conform to a standard lamp form factor.

² Non-standard form factor lamps may claim wattage equivalency but may not claim ANSI lamp type equivalency.

1.2 Excluded products

- **Revised:** Lamps, **other than MR types** that operate only on an external (i.e. not integral to the lamp) ballast, driver or transformer, e.g. pin-based fluorescent lamps (linear and compact).
- Solid-state lamps intended to replace linear fluorescent or high-intensity discharge lamps.
- Lamps powered by an internal power source, e.g. solar-powered cell.
- **Revised:** Lamps incorporating power-consuming features **in the on or off state** which do not provide illumination (e.g. audio functions, air fresheners).
- Lamp technologies lacking applicable industry standardized methods of measurement.
- Lamps with bases not detailed in ANSI standards.
- ZHAGA compliant LED light engines.
- **New:** Solid-state lighting lamps with non-standard form factors.

Not comprehensive of all excluded products, just some examples for guidance.

NEW: 3.1 Considerations for future revisions

- Topics that EPA is considering for future point revisions but will not be in V1.0
 - Lamps that consume power when off, e.g. Wi-Fi lamps
 - Directional lamp beam quality
 - Enhanced requirements for dimmable lamps
 - Improvements in color consistency and quality
 - Products with ZHAGA bases
 - Pending relevant standards (IES LM-84 and TM-28)

4. Definitions: Updated and New

- **Updated:**
 - **CRI, CCT, input power, light-emitting diode (LED), lumen maintenance, and rated wattage** now align with the definitions in the U. S. Department of Energy Code of Federal Regulations CFR Title 10.
 - **Run-up time** revised to align better with the ENERGY STAR Run-Up Test Method
 - **Compact fluorescent lamp** - updated to clarify lamps include integral electronic ballasts and ANSI base types.
 - **Decorative Lamp** - updated to align with changes made in this draft.
- **New definitions:**
 - **dimnable lamp, flicker, multi-power lamps and omnidirectional lamps**

Definitions can be found on page 4 of Draft 3

Commercial Tier

- **Removed**
 - Its implementation could create potential complications in the marketplace with existing “commercial” lighting products, as well as potentially confuse consumers.
 - The new features of the ENERGY STAR advanced certified product list will allow users to screen and search for specific performance attributes such as lifetime, CRI and Power Factor, to better meet individual programmatic needs.

ENERGY STAR & Federal laws covering lighting products



ENERGY STAR & Federal Regulations

- Some of the products in the scope of ENERGY STAR Lamps V1.0 are also covered by federal law
 - Federal laws are not a part of voluntary ENERGY STAR requirements
 - Federal laws impacting lamps are not under the jurisdiction of EPA
 - Testing for lamps covered by federal efficiency standards has been adjusted so testing for federal standards can be leveraged for ENERGY STAR certification
 - Testing above and beyond federal standards will be necessary to meet ENERGY STAR requirements.



More on Federal Efficiency Standards

- Testing for federal efficiency standards must be conducted by a NVLAP accredited laboratory – NOT all EPA-recognized laboratories have been accredited by NVLAP.
- All values for ENERGY STAR products that are covered by DOE standards should be the same as calculated by 10 CFR 429.35 in accordance with [Directive #2011-05, June 14, 2011, Measured versus Reported Values for ENERGY STAR Certification.](#)
- All tests shall be conducted with the lamp connected to a supply circuit of rated frequency. For lamps with multiple operating voltages, the lamp shall be operated at 120 volts throughout testing. If the lamp is not rated for 120 volts, it shall be operated at the highest rated voltage.

Examples of testing differences for products covered by federal standards: Luminous Efficacy

- The sample set for the Luminous Efficacy testing requirement for lamps covered by the CFR shall include 5 lamps tested base-up in accordance with the CFR. In order to meet the luminous efficacy requirement for ENERGY STAR certification, 5 additional samples tested base-down must be tested.

	Sample Size	Reference	Sample Orientation*
CFL Covered under 10 CFR 430			
CFR Requirement	5 Minimum	10 CFR 430	Base Up
Additional for ENERGY STAR	5	LM-66-11	Base Down
Total units for ENERGY STAR	10	10 CFR 430 LM-66-11	5 Base Up 5 Base Down
CFL Not Covered under 10 CFR 430			
Total units for ENERGY STAR	10	LM-66-11	5 Base Up 5 Base Down
* Unless position restricted			



Examples of testing differences for products covered by federal standards: Lumen Maintenance

- The sample set for the Lumen Maintenance testing requirement for lamps covered by the CFR shall include 5 lamps tested base-up in accordance with the CFR. For ENERGY STAR certification, the 5 samples in the base-up orientation for DOE may be leveraged but manufacturers must test an additional 5 samples base-down in accordance with the IES LM-65, as dictated by lamp wattage and type in this specification.

Non-ETLT Lamp	Sample Size	Reference	Sample Orientation*
CFL Covered under 10 CFR 430			
CFR Requirement	5 Minimum	10 CFR 430	5 Base Up
Additional for ENERGY STAR	5	LM-65-10	5 Base Down
Total for lamp with ENERGY STAR	10	10 CFR 430 and LM-65-10	5 Base Up 5 Base Down
CFL Not Covered under 10 CFR 430			
Total for lamp with ENERGY STAR	10	LM-65-10	5 Base Up 5 Base Down
*Unless position restricted			



Examples of testing differences for products covered by federal standards: Lumen Maintenance

- The sample set for the Lumen Maintenance testing requirement for lamps covered by the CFR shall include 5 lamps tested base-up in accordance with the CFR. For ENERGY STAR certification, the 5 samples in the base-up orientation for DOE may be leveraged but manufacturers must test an additional 5 samples base-down in accordance with the Elevated Temperature Life Test, as dictated by lamp wattage and type in this specification.

ETLT Lamp	Sample Size	Reference	Sample Orientation*
CFL Covered under 10 CFR 430			
CFR Requirement	5 Minimum	10 CFR 430	5 Base Up
Additional for ENERGY STAR	5	ETLT	5 Base Down
Total for lamp with ENERGY STAR	10	10 CFR 430 and ETLT	5 Base Up 5 Base Down
CFL Not Covered under 10 CFR 430			
Total for lamp with ENERGY STAR	10	ETLT	5 Base Up 5 Base Down
*Unless position restricted			

Examples of testing differences for products covered by federal standards: Rated Life

- The sample set for the Rated Life testing requirement for lamps covered by the CFR shall include 5 lamps tested base-up and 5 lamps tested base-down in accordance with the CFR. In order to meet the rated life requirement for ENERGY STAR certification, 5 of the 10 samples tested for DOE may be leveraged but manufacturers must test an additional 5 samples in the base-down position in accordance with IES LM-66, as dictated by lamp wattage and type.

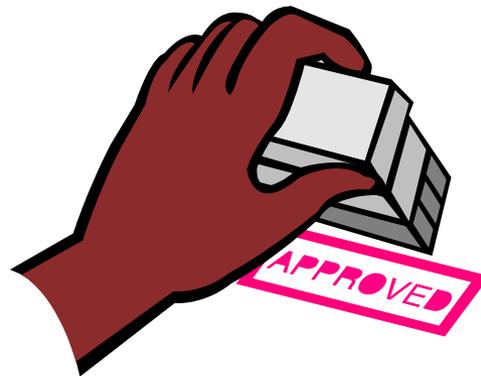
Non-ETLT Lamp	Sample Size	Reference	Sample Orientation*
CFL Covered under 10 CFR 430			
CFR Requirement	10	10 CFR 430	5 Base Up 5 Base Down
Additional for ENERGY STAR	0	N/A	N/A
Total for lamp with ENERGY STAR	10	10 CFR 430	5 Base Up 5 Base Down
CFL Not Covered under 10 CFR 430			
Total for lamp with ENERGY STAR	10	LM-65-10	5 Base Up 5 Base Down
*Unless position restricted			

Examples of testing differences for products covered by federal standards: Rated Life

- The sample set for the Rated Life testing requirement for lamps covered by the CFR shall include 5 lamps tested base-up and 5 lamps tested base-down in accordance with the CFR. In order to meet the rated life requirement for ENERGY STAR certification, 5 of the 10 samples tested for DOE may be leveraged but manufacturers must test an additional 5 samples in the base-down position in accordance with Elevated Temperature Life Test, as dictated by lamp wattage and type.

ETLT Lamp	Sample Size	Reference	Sample Orientation*
CFL Covered under 10 CFR 430			
CFR Requirement	10	10 CFR 430	5 Base Up 5 Base Down
Additional for ENERGY STAR	5	ETLT	Base Down
Total for lamp with ENERGY STAR	15	10 CFR 430 ETLT	5 Base Up 10 Base Down
CFL Not Covered under 10 CFR 430			
Total for lamp with ENERGY STAR	10	ETLT	5 Base Up 5 Base Down
*Unless position restricted			

Product Certification





7. Product Certification:

7.1 Allowable Product Variations

- Variations Include:
 - Clarified: Paint color of heat sink (SSL only)
 - Beam angle
 - Lamp base type
 - Envelope shape
 - Envelope finish
 - New: CCT for life testing of CFLs



7. Product Certification:

7.1 Table 2 Allowable Variation

Table 2: Allowable Variations

Lamp Attribute	Allowable Variation	Additional Test Data Required For Each Variant
Heat Sink Paint Color (solid-state only)	Lamp body color/pigment. (Not the type of paint or plastic).	None
Beam Angle (solid-state only)	The dimensions of lamp secondary optics (e.g. lens thickness, refractor patterns). Variation in secondary optical material not allowed.	Center Beam Intensity, Color Angular Uniformity
Lamp Base (ANSI base adapter)	Lamp base type (e.g. ANSI E26, GU24, etc.)	None
Correlated Color Temperature (CFL only)	Correlated color temperature so long as representative lamp model has completed 100% of rated life testing.	Lumen Maintenance testing to 40% of rated life
Envelope Shape (decorative shapes only)	Lamp envelope shape, so long as the envelope material and thickness are unchanged. The surface area and volume of the tested representative model's envelope shall be less than or equal to that of the variant.	None
Envelope Finish (decorative shapes only)	Lamp envelope finish, so long as the envelope material and thickness are unchanged. The surface area and volume of the tested representative model's envelope shall be less than or equal to that of the variant.	Luminous Efficacy Light Output Correlated Color Temperature Color Rendering

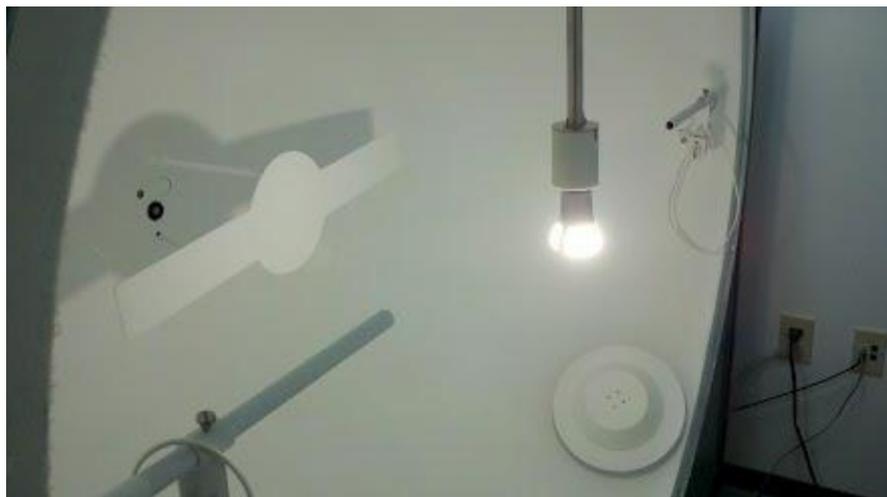
7. Product Certification:

7.1 Conditions for Allowable Product Variations

- In situ temperature of critical components cannot vary more than 2.5°C
 - **Adjusted:** May use 1 - 5 samples and average temperature results
 - **TMPLED** of any variant sample may not exceed the maximum case temperature tested in corresponding IES LM-80 report.



Photometric Performance Requirements



9. Photometric Performance Requirements:

9.1 Luminous Efficacy

- Adjusted wattage bins
 - Breaks now at 15, 20, 25 W no longer at 10W
- Raised efficacy for high wattage reflectors
 - 20W or greater 50 lm/w
- Average of unit values and ≥ 8 units individually required to pass

13 Watt Omnidirectional Lamp (minimum 55 lm/W)											
Orientation	VBU	VBU	VBU	VBU	VBU	VBD	VBD	VBD	VBD	VBD	AVERAGE
Sample	1	2	3	4	5	6	7	8	9	10	
Lamp A	55.5	56.2	57.8	56.3	55.2	55.1	54.3	56.7	54.4	56.8	55.83
Lamp B	55.3	55.6	56.3	54.1	56.8	54.2	55.6	55.9	54.3	55.8	55.39



9. Photometric Performance Requirements:

9.2 Light Output

- Removed wattage levels required by EISA to prevent confusion regarding wattage equivalency claims
- Average of unit values and ≥ 8 units individually required to pass
- Globes moved to decorative

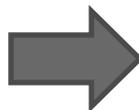


9. Photometric Performance Requirements:

9.2 Light Output

- Adjusted table for reflector lamps covered by DOE's ruling

Rated Wattage of the Referenced Incandescent Lamp (watts)	Light Output for R20 (Lumens)	Light Output for Lamps Larger Than R20 (Lumens)
45	630	750
50	720	850
65	1,010	1,190
75	1,210	1,420
90	1,520	1,790
100	1,740	2,050
120	2,190	2,580
150	2,910	3,430



Rated Wattage of the Referenced Incandescent Lamp (watts)	Light Output for R20 (Lumens)	Light Output for Lamps Larger Than R20 (Lumens)
45	-	750
50	720	850
65	1,010	1,190
75	1,210	1,420
90	1,520	1,790
100	1,740	2,050
120	2,190	2,580
150	2,910	3,430



9. Photometric Performance Requirements:

9.3 Elevated Temperature Light Output Ratio Test

- Only applies to directional lamps
- The initial light output ambient measurement temperature has been explicitly defined as $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$.
- Clarified to be the same elevated temperature environment (Option A, B, or C) that the model is tested for lumen maintenance and life testing.



9. Photometric Performance Requirements: Luminous Intensity Distribution Requirements:

- Removed distribution requirements for ANSI PAR and Low Voltage MR Lamps
 - Under consideration for future revisions
- New requirement for decorative lamps (CFLs exempt)
 - No less than 5% of lumens in the 135°-180° zone



Color

9.9 Color Angular Uniformity (CAU)

- Due to ongoing issues with equipment sensitivity in measuring color angular uniformity Draft 3 includes the following changes:
 - CAU should be measured across the beam angle versus the field angle as mentioned in earlier drafts.
 - The permitted variation has been changed back to 0.006 specified in the ENERGY STAR Integral LED Lamps specification.
 - Scanned on two vertical angles
 - Scanning resolution 1° for beam angles $<10^\circ$ and 2° for beam angles $\geq 10^\circ$

Lumen Maintenance and Rated Life Requirements

10. Lumen Maintenance Requirements: CFLs

- Added 1000-hour lumen maintenance requirement from CFL V4.3
 - Common failure in verification testing
 - Consistent with DOE CFR
 - Removed 6,000 measurement
- Passing requirements updated
 - All lamp samples shall be surviving at 1000-hours.
 - The average lumen maintenance of the ≥ 9 surviving units shall meet the min requirement for the designated life claim.
 - No more than 3 units may have lumen maintenance $< 75\%$ at 40% of rated life.

13 Watt Omnidirectional Lamp Lumen Maintenance at 40% of Rated Life											
Orientation	VBU	VBU	VBU	VBU	VBU	VBD	VBD	VBD	VBD	VBD	AVERAGE
Sample	1	2	3	4	5	6	7	8	9	10	
Lamp A	73.3	74.5	82.5	82.1	74.5	82.9	83.4	81.9	83.1	82.1	80.03
Lamp B	83.9	84.5	83.5	74.6	83.9	74.7	82.7	82.8	74.9	74.8	80.03





10. Lumen Maintenance Requirements:

- 25°C Ambient Lumen Maintenance & Life Testing
 - All Decorative lamps
 - Omnidirectional lamps < 10 watts

10. Lumen Maintenance Requirements:

- Elevated Temperature Testing
 - All Directional lamps
 - Omnidirectional lamps ≥ 10 watts
 - Adjusted for lamps tested for federal standards
 - 5 samples at 25°C, 5 at the elevated temperature
 - Tiered temperature by wattage and product type
 - All directional lamps ≤ 20 watts, and all omnidirectional lamps ≥ 10 watts Option A , Option B or C with an operating temperature of 45°C
 - All directional lamps > 20 watts use the Option A or Option B with an operating temperature of 55°C
 - All temps have a tolerance of $\pm 5^\circ\text{C}$

Rated Life Requirements



10.2 Rated Life Requirements: Life

- Draft 3
 - 10,000 hour min. – CFLs
 - 15,000 hour min. – decorative LEDs
 - 25,000 hour min. – non-decorative LED lamps
- Changes:
 - Removed 35,000 hour for commercial grade lamps

10.2 Rated Life Requirements: Life

Early pathways for 30,000 and 35,000 hour lamps removed with the commercial tier 6,000 hours second milestone for CFLs removed

Example Operating Hour Milestones for Rated Lifetime Lumen Maintenance Qualification			
Lifetime Rating	1 st (Early Interim) Qualification Milestone ¹	2nd (Interim) Qualification Milestone ²	Full Lifetime Qualification
CFL - 10,000 Hrs	4,000 Hrs (40% of Life)	-	10,000 Hrs (100% of Life) ³
CFL - 12,000 Hrs	4,800 Hrs (40% of Life)	-	12,000 Hrs (100% of Life) ³
CFL - 15,000 Hrs	6,000 Hrs (40% of Life)	-	15,000 Hrs (100% of Life) ³
LED - 15,000 Hrs	3,000 Hrs	6,000 Hrs	
LED - 20,000 Hrs	3,000 Hrs	6,000 Hrs	
LED - 25,000 Hrs	3,000 Hrs	6,000 Hrs	
LED - 30,000 Hrs	-	6,000 Hrs	7,500 Hrs
LED - 35,000 Hrs	-	6,000 Hrs	8,750 Hrs
LED - 40,000 Hrs	-	6,000 Hrs	10,000 Hrs
LED - 45,000 Hrs	-	6,000 Hrs	11,250 Hrs
LED - 50,000 Hrs	-	6,000 Hrs	12,500 Hrs

Note 1: 100% of lamps must be operational

Note 2: 90% of lamps must be operational

Note 3: 50% of lamps must be operational

Rated Life Requirements:

10.3 Rapid Cycle Stress Test

- Maintained earlier draft proposals
 - Cycling once per hour of rated life, 5 min on 5 min off with a 15,000 cycle cap
 - **New:** Exemption for instant start CFLs, only to be cycled once per every two hours of rated life
 - **Updated:** Samples size reduced from 10 to 6 (all base up) to align with testing for required for federal regulations



Electrical Performance Requirements



11. Electrical Performance Requirements:

11.2 Power Factor

- Removed commercial tier and associated power factor levels

Technology	Draft 3
Compact Fluorescent	≥ 0.5 for Lamps >5W
Solid State	≥ 0.7 for Lamps >5W

11. Electrical Performance Requirement:

11.5 Run-Up Time – CFLs only

- Covered CFLs
 - 80% full brightness in 120 seconds
- All Other CFLs
 - 80% stabilized light output in ≤ 60 seconds
- **What changed?** Removed mid points for bare lamps, changed from 100% brightness to 80% (historical run up brightness point) changed covered product run up time from 90 sec to 120.



Dimming

Performance requirements and
test methods

12. Dimming Performance

- EPA worked with stakeholders to develop dimming requirements
 - Test methods still under development
- **Definition** “*A lamp that is capable of producing varying levels of light, for the purposes of this specification, the lamp must be capable of reducing light output to at least 20% when paired with a control or dimmer*”
- **Maximum light output**
 - Not to exceed rated light output by more than 10%
 - Not fall below max light output by more than 20%
- **Minimum light output**
 - No more than 20% of initial light output
 - Lower dimming percentage claims are allowed, and encouraged but need to pass all applicable tests



12. Dimming Requirements:

12.3 Flicker

- For the purposes of the ENERGY STAR specification, “flicker” is defined as

“Luminous flux modulation made perceptible by the motion of objects or by the motion of the observer’s eye when the observer’s eye is still.”

- Round robin testing in progress
 - Measuring flicker at 2-3 points, max, 20%, and lower min if applicable, on ten dimmers.

12.3. Flicker:

Lamp Type	ENERGY STAR Requirements	Methods of Measurement and/or Reference Documents	Supplemental Testing Guidance
All Lamps Marketed As Dimmable	Lamp shall have a flicker index ≤ 0.15 at 100 Hz, increasing linearly to 0.50 at 800 Hz. Applies at full and dimmed measurement conditions.	Measurement: ENERGY STAR Flicker Test Method in development	<p>Sample Size: TBD</p> <p>Passing Test: TBD</p> <p>Determine the dominant frequency in the light output waveform, by looking at a scope trace from a photodiode or from the LED driving current. Measure the flicker index over one period of that waveform.</p>

12. Dimming Requirements:

12.4 Audible Noise

12.4. Audible Noise:

Lamp Type	ENERGY STAR Requirements	Methods of Measurement and/or Reference Documents	Supplemental Testing Guidance
All Lamps	Lamp shall not emit noise above 24dBA.	Measurement: <i>ENERGY STAR Noise Test Method in development</i> <i>ANSI standard S12.55-2006/ISO3745:2003</i>	Sample Size: <i>TBD</i> Passing Test: <i>TBD</i> <i>Measurements shall be taken in an anechoic chamber. The microphone shall be placed at a distance of 1 foot or 1 meter (TBD) from the lamp. The dimmer shall be outside the anechoic chamber. The sound level of the lamp shall be measured at the maximum light level, 20% of maximum light output, and the lowest setting, if less than 20% of maximum light output (indicated by the manufacturer). The initial sound pressure level of the empty chamber shall be measured. Measurements shall be taken at six different positions around the lamp, spaced 90° apart. The loudest measurement of the set shall be reported as the sound level. The sound level of the lamp shall be calculated from the measurement taken, with the baseline level corrected for and in accordance with ISO 7574-4:1985, B.2.1. All other aspects of the measurements to be taken in accordance with ANSI standard S12.55-2006/ISO3745:2003 (anechoic chamber specifications, calibration, etc.)</i>

Dimming work in progress

- Round robin testing to inform the test methods, sampling and passing criteria.
 - 10 dimmers selected based on the guidance on page 25
 - A variety of lamp types (both CFL and LED) from more than 3 lamp manufacturers
 - 1 lamp on a circuit, and 4 lamps on a circuit
 - 2-3 light output levels, max, 20% of max, and a lower declared level if applicable
 - More info available at www.energystar.gov/lamps

Lamp Labeling and Packaging Requirements



15. Lamp Labeling and Packaging Requirements:

15.1 Product Labeling

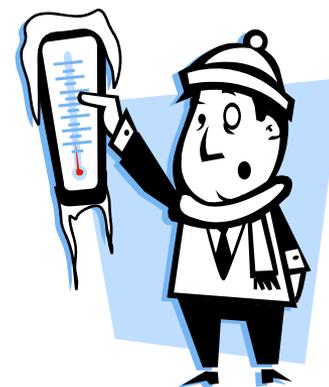
- All Lamps:
 - Manufacturer or Brand Name
 - Model Number as will appear on QPL
 - Nominal CCT
- For lamps not covered by FTC
 - Rated Wattage
 - Rated Lumen Output
 - **New:** Nominal Beam Angle (instead of lumens for PAR and MR lamps)
- **New:** Placing a “W” or “K” after the appropriate number in the model or retail number can satisfy lamp labeling for wattage or CCT.



15. Lamp Packaging Requirements:

15.1 All Lamps

- Replaced Minimum Operating Temperature requirement with the Minimum Starting Temperature requirement
 - Must appear on packaging
 - Must be reported to Certification Body
 - To be included in future product search criteria





15. Lamp Packaging Requirements:

15.1 Dimmable Lamps

- Dimming
 - Must indicate product may not be compatible with all dimmers
 - Reference a website which provides dimmer compatibility
 - If claiming compatibility with a limited set of controls, all compatible controls must be listed on packaging (and controls listed must pass testing with the lamp)



15. Lamp Packaging Requirements:

15.1 Low Voltage MR Lamps

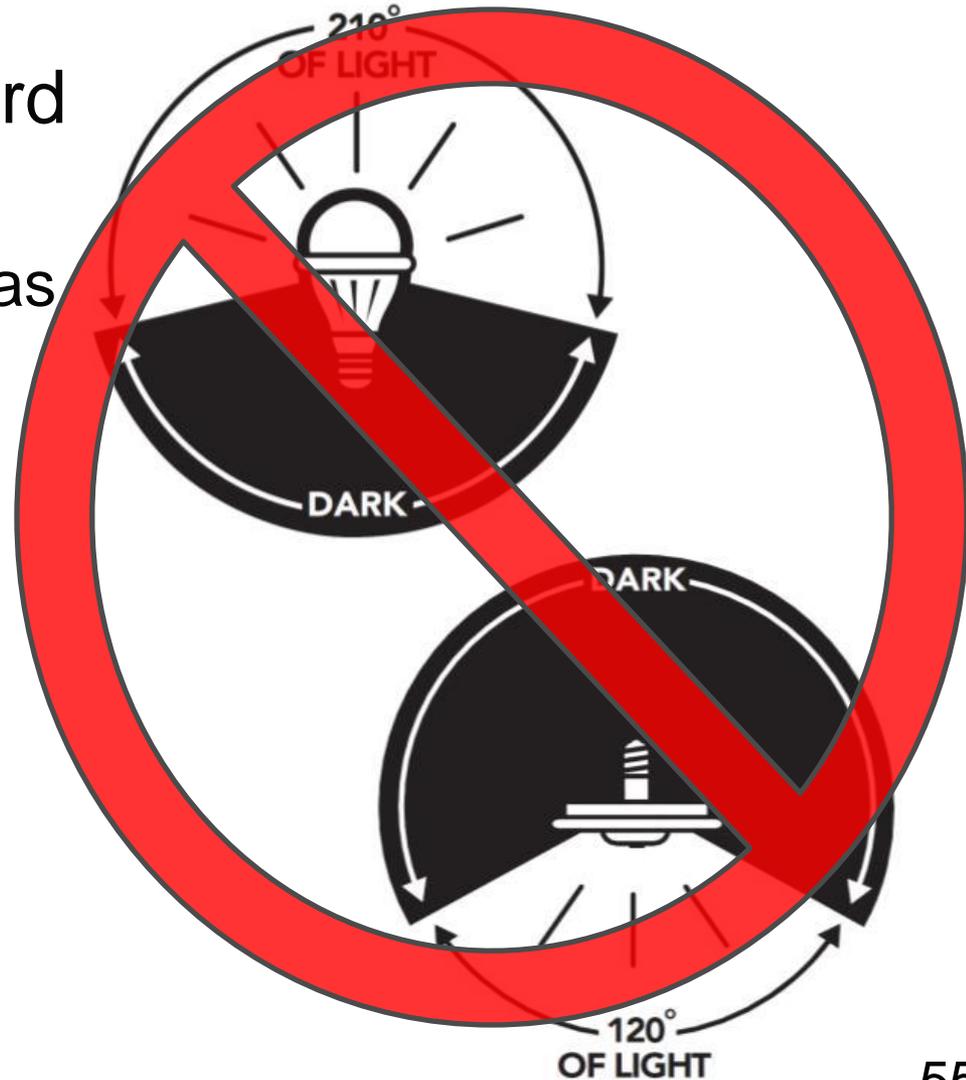
- Low-voltage MR Lamps intended for use on low-voltage circuits
 - Must state compatibility with low-voltage transformers
 - Must use caution label stating limited compatibility with low voltage transformers
 - Include web address for low-voltage transformer compatibility

15. Lamp Packaging Requirements:

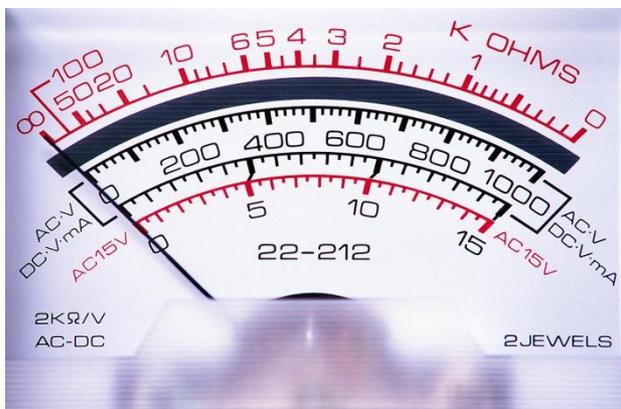
15.2 Non-Standard Lamps



- Removed Non-Standard Icon Requirement
 - Only CFLs can qualify as “non-standard” shape and light distribution is not a concern.



ENERGY STAR Test Methods – Formerly Annexes A through E



ENERGY STAR Test Methods

- Formerly Annexes
- Reformatted
- Applicability now appears in specification
- **Updated** Run-Up and Start Time Tests
 - Added references for seasoning
 - Added flexibility for testing equipment
- Will be posted to www.energystar.gov/lamps soon and attached to the next draft

ENERGY STAR Test Method: Elevated Temperature Life Test

Elevated Temperature Life Test (ETLT)

- Three (3) methods of testing from CFL and Integral LED Lamps specifications
 - Option A: Recessed Can
 - Option B: Elevated Temperature Apparatus
 - Option C: Elevated Temperature Room
- Option A self regulates heat, Option B can be operated at 45 or 55°C depending on product type and wattage and Option C can be operated at 45°C
- Applicability moved to specification

Elevated Temperature Life Test (ETLT)

- Operating Cycle of 180 minutes on / 20 minutes off (for CFLs; **New: cycling is optional for SSL**)
- Options restricted to A and B (at 55C) for Directional lamps >20W

Elevated Temperature Life Test - Option A

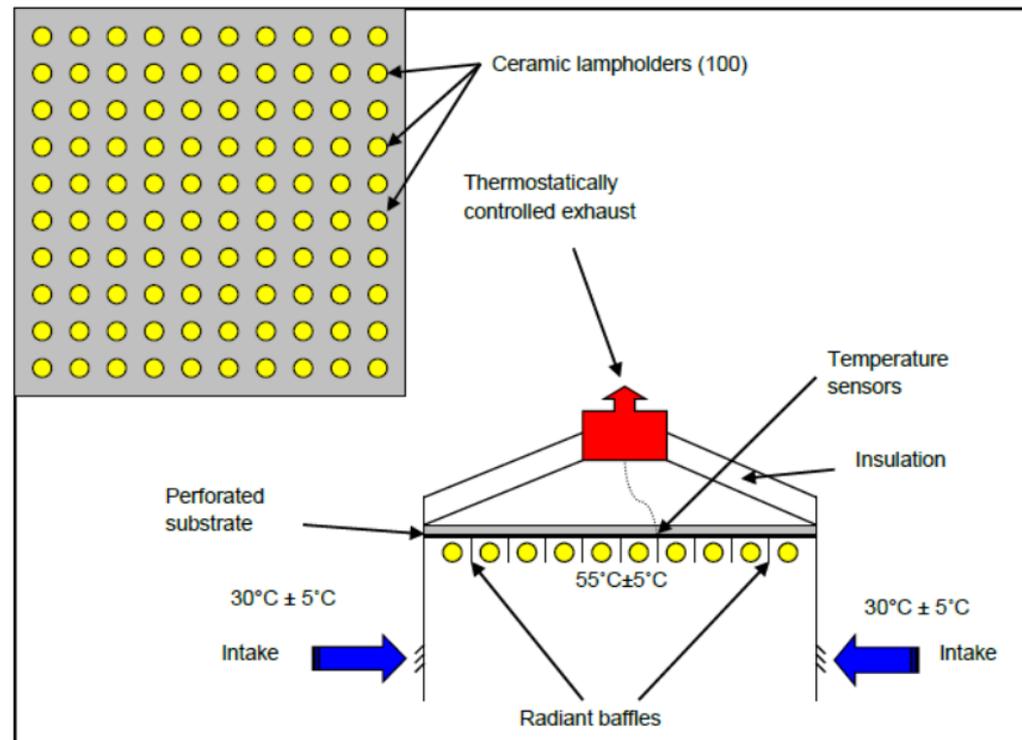
- Recessed Can Luminaire Option
- Carried over from CFL specification
 - Ambient temperature rewritten from $25^{\circ}\text{C} + 10^{\circ}\text{C}$ to $30^{\circ}\text{C} \pm 5^{\circ}\text{C}$
- Applicable to:
 - Directional lamps and Omnidirectional lamps $\geq 10\text{W}$
 - Vertical Base-Up Orientation only



Elevated Temperature Life Test - Option B



- Elevated Temperature Apparatus
- Carried over from CFL specifications
- Applicable to:
 - Vertical Base-Up Orientation only



Elevated Temperature Life Test - Option C



- Elevated Temperature Room Option
 - Carried over from Integral LED Lamp specification
- Applicable to:
 - All Lamps (except all decorative and omnidirectional <10W)
 - Base up and base down orientation
- **Updated:** Temperature per the specification (45°C)
- **Updated:** Spacing requirements
 - Minimum 6” center to center
 - Minimum 2” lamp to lamp
- **Refined:** TMP locations per LM-66 and LM-79
 - No more than 1 meter from lamp



Figure 1: Hot Room that may not meet ETLT Requirements

ENERGY STAR Test Method: Ambient Temperature Life Test

Ambient Temperature Life Test (ATLT)

- For LED lamps until an appropriate industry standard is available (LM84)
 - similar to LM-65 for CFLs
- Identical to the 2 controlled temperature options of Elevated Temperature Life Tests
 - Option A: Controlled Temperature Apparatus
 - Option B: Controlled Temperature Room
 - Both life tests are performed at 25°C
- **Updated:** Spacing requirements
 - Minimum 6" center to center
 - Minimum 2" lamp to lamp
- Operating cycle 180 minutes on / 20 minutes off (for CFLs; **cycling is optional for SSL**)

Coming Soon to www.energystar.gov/lamps

- New Test Methods for:
 - Dimming
 - Flicker
 - Noise
- Updated Test Methods for:
 - Elevated Temperature Life Test
 - Ambient Temperature Life Test
 - Elevated Temperature Light Output Ratio
 - Start Time
 - Run-Up Time
- Agency response to comments on Draft 2



Next Steps

- Send comments by January 18 to: lamps@energystar.gov
- Comments will be posted at www.energystar.gov/lamps unless noted “DO NOT POST”
- Look for next draft in February depending on comments received
 - A draft 4 would be followed by a four week comment period
 - A draft final is followed by a 2 week comment period



Q & A Session

Press *6 to unmute your line

Send general questions:

lamps@energystar.gov

For more information visit

www.energystar.gov/lamps

www.energystar.gov/3rdpartycert



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