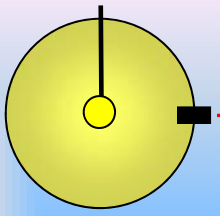

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COMMISSION INTERNATIONALE DE L'ECLAIRAGE
INTERNATIONAL COMMISSION ON ILLUMINATION
INTERNATIONALE BELEUCHTUNGSKOMMISSION

EPA Rules for Energy Star Certification for lighting products

by
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Abstract

Paper #5
EPA Energy Star Certification for Lighting Products

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Over the last year or so the US Environmental Protection Agency (EPA) has revised the Energy Star requirements for lighting products. A major change from previous DOE Energy Star rules is the requirement that Certifying Bodies (CBs) be the major interfaced between the manufacturer and EPA. In addition the Accrediting Body (AB) which previously was limited to the National Voluntary Laboratory Accrediting Program (NVLAP) has now been opened up by EPA to allow other ABs to accredited laboratories for making measurements on lighting products.

I will present lighting Energy Star requirements for EPA, manufacturers, laboratories, ABs and CBs from the perspective of a NVLAP assessor of lighting laboratories. The current requirements cover most lighting products, fluorescent, HID, halogen and particularly SSL products, including luminaires. I believe this to be of interest to the CIE NCs as some CIE documents are listed as part of the requirements for test methods that the laboratories must know and the AB must assess.

Outline of Presentation

- Previous rules under Department of Energy (DOE)
  - 1st or 3rd party Laboratory accreditation through NVLAP
- New Energy Star rules under Environmental Protection Agency (EPA)
  - EPA Requirements
  - Manufacturer's Requirements
  - Accreditation Body Requirements
  - Certification Body Requirements
  - Laboratory Requirements
- Rules apply to all lamp types

Energy Star Product Categories

- EPA recognizes laboratories only for photometric testing of
  - Fluorescent
  - HID
  - SSL
  - Halogen
- Electrical Safety and EMI requirements are met by OSHA and FCC regulations, respectively

Responsibilities: EPA

http://www.energystar.gov/ia/partners/downloads/mou/ES_Process_Flow_Diagram_and_Explanation.pdf

- Process and approve applications for EPA recognition of Accreditation Bodies (ABs), Laboratories, and Certification Bodies (CBs): ABs, labs, and CBs will seek EPA recognition by submitting an application that EPA will then review and ultimately approve or reject.
- Sign ENERGY STAR manufacturer Partnership Agreement (PA): As partners sign onto the ENERGY STAR program via a PA, EPA will countersign as it has historically done.
- Make product specifications available: EPA will continue to write new specifications or revise current ones, making them available to all interested parties, but especially those interested in the product qualification process.
- Make label and labeling guidelines available: EPA will continue to authorize use of the label, make the label and labeling requirements available to partners and other eligible parties, and ensure that partners commit to abide by them when qualifying products.

Responsibilities: EPA (cont.)

- Maintain online qualified product (QP) lists: EPA will continue to maintain QP lists to inform all interested parties of which products are ENERGY STAR qualified. Products will be added to these lists upon confirmation of certification by an EPA-recognized CB.
- Withdraw recognition of Certification Bodies or Laboratories as necessary: As ABs audit EPA-recognized labs or CBs, or as CBs audit their enrolled Witnessed or Supervised Manufacturers' Testing Labs (W/SMTLs), EPA will withdraw its recognition of these bodies upon their loss of accreditation/enrollment.
- Disqualify products as necessary: EPA will continue to disqualify products based on conclusive evidence that they do not meet ENERGY STAR requirements.

Responsibilities: Manufacturing Partner

- Sign ENERGY STAR manufacturer Partnership Agreement: Organizations will continue to join the ENERGY STAR program by signing a PA.
- Have products tested: Partners will have their products tested at an EPA-recognized laboratory in order for them to be eligible for qualification.
- Label product according to labeling guidelines: Partners will continue to have to abide by EPA's labeling guidelines.
- Cooperate with product verification procedures and outcomes: Partners will be required to abide by the new verification procedures and outcomes, cooperating with CB efforts to select, source, and test products, and de-labeling any products with negative verification results.

Responsibilities: Certification Bodies

- Submit application for EPA recognition: To participate in the ENERGY STAR program, and thereby certify products pursuant to qualification, the CB will need to apply for and gain EPA recognition.
- Apply for accreditation as per ENERGY STAR requirements: Before applying for EPA recognition, the CB will need to gain accreditation to ISO/IEC Guide 65.
- Verify signed ENERGY STAR manufacturer Partnership Agreement: Before determining whether a product it is certifying meets ENERGY STAR requirements, the CB will need to verify the party seeking qualification is an ENERGY STAR partner.
- Assess laboratory qualifications: Before accepting test results from a given lab, the CB will need to verify that the lab is qualified to conduct the relevant tests. Note, the CB could also operate its own lab.

Responsibilities: Certification Bodies (cont.)

- Certify performance: Before EPA may consider a product qualified, a CB will have to certify its performance by reviewing the lab report, witnessing testing if the lab is a WMTL, and verifying the data source is an EPA-recognized lab.
- Report certified products and data to EPA: Once the CB has certified a product's performance, it will report this to EPA so EPA may review and qualify the product.
- Cooperate with ongoing accreditation: To maintain EPA recognition, the CB will have to cooperate with the ongoing accreditation requirements of the AB that accredited it.
- Administer verification and challenge testing, and share testing results: The CB will select and obtain qualified products to verify ongoing performance through verification and challenge testing to ensure products continue to meet ENERGY STAR requirements after initial qualification.

EPA-recognized Certifying Bodies

http://www.energystar.gov/index.cfm?fuseaction=recognized_bodies_list.show_RCB_search_results

CB Name	Recognized Product
Advance Compliance Solutions, Inc.	CFLs, Decorative Light Strings, Integral LED Lamps, Luminaires, Residential Light Fixtures, Solid-State Lighting
Bay Area Compliance Laboratories Corp.	CFLs, Decorative Light Strings, Integral LED Lamps, Luminaires, Residential Light Fixtures, Solid-State Lighting
CSA International	CFLs, Decorative Light Strings, Integral LED Lamps, Luminaires, Residential Light Fixtures, Solid-State Lighting
Curtis Strauss, LLC – a Bureau Veritas Co.	CFLs, Decorative Light Strings, Integral LED Lamps, Luminaires, Residential Light Fixtures, Solid-State Lighting

EPA-recognized Certifying Bodies cont.

CB Name	Recognized Product
Intertek Testing Services, NA, Inc.	CFLs, Decorative Light Strings, Integral LED Lamps, Luminaires, Residential Light Fixtures, Solid-State Lighting
Keystone Certifications, Inc.	CFLs, Decorative Light Strings, Integral LED Lamps, Luminaires, Residential Light Fixtures, Solid-State Lighting
TUV SUD America, Inc.	CFLs, Decorative Light Strings, Integral LED Lamps, Luminaires, Residential Light Fixtures, Solid-State Lighting
Underwriters Laboratories, Inc.	CFLs, Decorative Light Strings, Integral LED Lamps, Luminaires, Residential Light Fixtures, Solid-State Lighting

Responsibilities: Laboratories

- Submit application for EPA recognition: To participate in the ENERGY STAR program, and thereby test products pursuant to qualification, the lab will apply for EPA recognition. Alternatively, if it is a first-party lab, it may participate in a CB's W/SMTL program.
- Apply for accreditation as per ENERGY STAR requirements: Before applying for EPA recognition, the lab will need to gain accreditation to ISO/IEC 17025 and the test methods required by the relevant ENERGY STAR product specification.

Or

- Participate in a Certification Body's W/SMTL program: Many CBs operate programs whereby they build confidence in a given lab over time. EPA will permit CBs to accept data from such labs for the purpose of qualification.

Responsibilities: Laboratories (cont.)

- Test products: The lab will have to test products seeking qualification.
- Cooperate with ongoing audits (accreditation/assessment): To maintain EPA recognition, the lab will have to cooperate with the ongoing accreditation requirements of the AB that accredited it, or the assessments of the CB that enrolled it in its W/SMTL program.
- Test products selected for verification or challenge testing: As the CB schedules products for verification and challenge testing, tests will need to be conducted at EPA-recognized labs. In-house labs may only be used if the test is witnessed by the CB and in the case that the product was pulled off the manufacturing line for testing.

Responsibilities: Accreditation Bodies

- Submit application for EPA recognition: To accredit labs for their participation in the ENERGY STAR program, the AB will need to apply for and gain EPA recognition.
- Accredit Certification Bodies and/or laboratories as per the ENERGY STAR requirements: For CBs or labs to participate in the ENERGY STAR program, they will need to be accredited. Labs will need to be accredited by an EPA-recognized AB that meets the conditions and criteria for recognition of ABs for the ENERGY STAR program (see section immediately above for an alternative approach, enrollment as a W/SMTL, that a lab may take). CBs will need to be accredited by a signatory to the International Accreditation Forum Multilateral Recognition Agreement.
- Audit Certification Bodies or laboratories for ongoing accreditation, and report results: The AB will provide ongoing accreditation of CBs and labs.

EPA-recognized Accreditation Bodies

http://www.energystar.gov/index.cfm?c=partners.epa_recognized_accreditation_bodies

- A2LA
- ANSI-ASQ National Accreditation Board (ACLASS)
- Brazil General Coordination for Accreditation (CGCRE)
- China National Accreditation Service for Conformity Assessment (CNAS)
- Dutch Accreditation Council (RvA)
- Entidad Nacional de Acreditación (ENAC)
- French Accreditation Committee (COFRAC)
- German Accreditation Service (DAkkS)
- Guatemalan Accreditation Body (OGA)
- Hong Kong Accreditation Service

EPA-recognized Accreditation Bodies (cont.)

- International Accreditation Japan (IAJapan)
- International Accreditation Service, Inc (IAS)
- Japan Accreditation Board (JAB)
- Korea Laboratory Accreditation Scheme (KOLAS)
- Laboratory Accreditation Bureau (L-A-B)
- National Accreditation Board for Testing and Calibration Laboratories (NABL)
- **National Voluntary Laboratory Accreditation Program (NVLAP)**
- Norwegian Accreditation (Norsk Akkreditering)
- Perry Johnson Laboratory Accreditation, Inc. (PJLA)

EPA-recognized Accreditation Bodies (cont.)

- Singapore Accreditation Council (SAC)
- Sistema Italiano di Accreditamento (ACCREDIA)
- Sri Lanka Accreditation Board for Conformity Assessment (SLAB)
- Standards Council of Canada (SCC)
- Swedish Board for Accreditation and Conformity Assessment (SWEDAC)
- Taiwan Accreditation Foundation (TAF)
- United Kingdom Accreditation Service (UKAS)
- Voluntary EMC Laboratory Accreditation Center Inc. (VLAC)

EPA Application: Laboratory

http://www.energystar.gov/ia/partners/downloads/mou/Application_Accredited_Laboratory.pdf

- **General Requirements:**
  - an EPA-recognized, accredited laboratory must maintain accreditation to ISO/IEC 17025, by an EPA-recognized Accreditation Body.
    a. Name of EPA-recognized Accreditation Body:
    b. Laboratory accreditation effective date:
    c. Laboratory accreditation expiration date:
    d. Include a digital copy of the laboratory's accreditation certificate and scope of accreditation

EPA Product Categories

- Following are a few pages of a separate document that EPA published on its web page with the declared purpose:
  - to clarify for laboratories, ABs, CBs and manufacturers the test methods to which accredited manufacturers a laboratory must be accredited to gain EPA recognition for testing one or more lighting product specifications.

Laboratory Recognition for Luminaires and Certified Subcomponents

- **Luminaires Specification**
  - Fluorescent
  - High Intensity Discharge
  - Solid State Lighting
  - Halogen
- **Lighting Sub Components (CSD)**
  - LEDs (Package, Module or Array)
  - Fluorescent Ballasts
  - Fluorescent Lamps
  - HID Ballasts
  - HID Lamps

Luminaire Specification

- Luminaires: Fluorescent
  - Directional
  - Non-Directional (self-ballasted lamps and lamp-ballast platforms)
- Similarly for HID, SSL and Halogen

Fluorescent Test Procedures

Requirement	Luminaire or CSD	Test Procedure		
CFL run-up time	CSD	ANSI	C78.5-2003	Specifications for Performance of Self-ballasted CFL
PF, Operating Frequency	CSD	ANSI	C82.2-2002	Method of Measurement of Fluorescent Lamp Ballasts
Color Rendering	CSD	CIE	Pub. 13.3	Method of Measuring and Specifying CRI of Light Sources
CCT	CSD	CIE	Pub 15	Colorimetery
Efficacy, Output, Lumen Maintenance, CCT, CRI	CSD	IESNA	LM-9:2009 LM-66:2011	Electric and Photometric Measurements of Fluorescent (CFL) Lamps
Light Source Life, Lumen Maintenance	CSD	IESNA	LM-40:2001 LM-65:2001	Life Testing of Fluorescent (CFL)Lamps

Fluorescent Test Procedures (cont.)

Requirement	Luminaire or CSD	Test Procedure		
Efficacy, Output, Zonal Lumen Distribution	Luminaire specific	IESNA	LM-10:1996 (LM-10: 2011)	Photometric Testing of Outdoor Fluorescent Luminaires
Efficacy, Output, Zonal Lumen Distribution	Luminaire specific	IESNA	LM-41:1996 LM-41:2011	Photometric Testing of Indoor Fluorescent Luminaires

SSL Test Procedures

Requirement	Luminaire or CSD	Test Procedure		
Efficacy, output, zonal lumen distribution, Color angular uniformity, Luminaire photometry	Luminaire specific	IESNA	LM:79:2008 (sect 10)	Electrical and Photometric Measurements of Solid-State Lighting Products (Goniophotometer)
Color angular uniformity	Luminaire specific	IESNA	LM-58:1994	Guide to Spectroradiometric Measurements
Color Rendering	Both	CIE	Pub. 13.3:1995	Method of Measuring and Specifying CRI of Light Sources
CCT	Both	CIE	Pub 15:2004	Colorimetery
Efficacy, Output, Lumen Maintenance, CCT, CRI, Color Maintenance	Both	IESNA	LM-79:2008	Electrical and Photometric Measurements of Solid-State Lighting Products

SSL Test Procedures (cont.)

Requirement	Luminaire or CSD	Test Procedure		
Light Source Life, Lumen Maintenance, Color maintenance	Both	IESNA	LM:80:2008	Measuring Lumen Maintenance of LED Light Sources
Light Source Life, Lumen Maintenance	Both	IESNA	TM-21:2011	Projecting Long Term Lumen Maintenance of LED Packages (in draft 12/2010)
Efficacy, output, Lumen Maintenance, CCT, CRI, Color maintenance, Light source life	Both	IESNA	TM-82:2011 (not yet approved)	Characterization of LED light engines and Integrated LED Lamps for electrical and Photometric properties as a function of temperature
Power Factor	Both	ANSI	C82-77:2002	Harmonic Emission

SSL Test Procedures (cont.)

Requirement	Luminaire or CSD	Test Procedure		
Light Source Life, Lumen Maintenance, Color maintenance	Both	IESNA	LM:80:2008	Measuring Lumen Maintenance of LED Light Sources
Light Source Life, Lumen Maintenance	Both	IESNA	TM-21:2011	Projecting Long Term Lumen Maintenance of LED Packages (in draft 12/2010)
Efficacy, output, Lumen Maintenance, CCT, CRI, Color maintenance, Light source life	Both	IESNA	TM-82:2011 (not yet approved)	Characterization of LED light engines and Integrated LED Lamps for electrical and Photometric properties as a function of temperature
Power Factor	Both	ANSI	C82-77:2002	Harmonic Emission

Expiring Specifications

- SSL Luminaires
- Residential Light Fixtures (RLF)
  - GU24 based lamps (will be replaced by Lamps Specification in 2011/2012
- Fluorescent Ballasts
  - labs recognized for Luminaires: Fluorescent can carry out subcomponent tests
- Fluorescent Lamps
  - labs recognized for Luminaires: Fluorescent can carry out subcomponent tests

Still not sure how EPA recognition of ABs, CBs or Laboratories work?

- The requirements that each organization must meet in order to gain recognition are available at

  www.energystar.gov/testingandverification

- From the above page the other information shown earlier can be accessed